The Transpennine Route Upgrade Programme

Department for Transport and Network Rail

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Contents

Key facts

£1bn

spent on the Transpennine Route Upgrade Programme (the Programme) between 2011-12 and 2021-22 (cash prices)

£9bn to £11.5bn

Department for Transport's (the Department) range estimate of the full cost of the Transpennine Route Upgrade Programme (cash prices as at May 2021)

2036 to 2041

estimated delivery date for the full programme (as at May 2021)

2011	year the Department first developed a plan to upgrade the Transpennine route
4 out of 12	core projects in the Programme are at an early stage of development
£190 million	Network Rail's estimated spend on design and development of options not taken forward
5 key outcomes	as of November 2021, the Department's planned outcomes for the Programme are:

- **better punctuality:** infrastructure to support a 50% reduction in average minutes late for passenger services (compared with service performance before the COVID-19 pandemic);

- **enhanced passenger capacity:** one additional fast or semi-fast passenger service and one additional stopping passenger service per hour between Manchester and Leeds;

- **faster journeys:** a 63- to 66-minute planned journey time between Manchester and York on the end-state route, down from 74 minutes on pre-COVID-19 services (saving up to 11 minutes);

- **improved environment:** up to 87,000 tonnes a year possible reduction in carbon emissions from electrification and a shift from other modes of transport to rail; and

- **facilitation of Northern Powerhouse Rail:** works to facilitate the future Northern Powerhouse Rail Programme

15%	Network Rail's cost-efficiency target against the Programme's total infrastructure costs

Summary

About the Transpennine Route Upgrade

1   The Transpennine route is a 76-mile-long rail link in the north of England, which connects Manchester in the west and York in the east via Huddersfield and Leeds. It provides the most direct rail link between Manchester and Leeds, as well as connecting smaller towns and commuter areas. In 2011, the Department for Transport (the Department) announced its intention to upgrade the route. Network Rail, which manages the rail infrastructure in Great Britain, is responsible for delivering the upgrade.

2   In November 2021, the Department published its Integrated Rail Plan for the North and Midlands. This set out government's plans for delivering and sequencing major rail investment in the North and Midlands. One element of this plan is Northern Powerhouse Rail, through which government intends to significantly improve connectivity between the North's major economic centres. The Department announced that the Transpennine Route Upgrade Programme (the Programme) will now be delivered as phase one of Northern Powerhouse Rail. The Programme plans for full electrification of the route, additional track in some sections, new digital signalling, station upgrades, and works to increase the route's capability to carry freight.

3   The Department's outcomes for the Programme, as set out in its May 2021 Programme Business Case and confirmed in line with its Integrated Rail Plan, are to provide:

- **better punctuality:** infrastructure to support a 50% reduction in average minutes late for passenger services (compared with service performance before the COVID-19 pandemic);

- **enhanced passenger capacity:** one additional fast or semi-fast passenger service and one additional stopping passenger service between Manchester and Leeds;

- **faster journeys:** a 63- to 66-minute planned journey time between Manchester and York on the end-state route, down from 74 minutes on pre-COVID-19 services (saving up to 11 minutes);

- **improved environment:** up to 87,000 tonnes a year possible reduction in carbon emissions from electrification and a shift from other modes of transport to rail; and

- **facilitation of Northern Powerhouse Rail:** works to facilitate the future Northern Powerhouse Rail programme. The Department considers that the programme will support economic growth and 'levelling up' in the region, as well as decarbonisation of transport through the electrification of the route.

Scope of this report

4 The Department and Network Rail have been considering upgrades to the Transpennine route for more than 10 years but, until the Integrated Rail Plan in November 2021, the Programme did not have a fully agreed scope and remained in design and development. As the Programme moves into a period of construction that extends into the 2030s, we have considered whether the Department and Network Rail are in a position to deliver the upgrade successfully. Ahead of the next business case update in December 2022, this report examines whether the Department and Network Rail:

- have a clear case for investment and a Programme scope that addresses the identified needs of the route (Part One);

- are ensuring that the Programme is appropriately set up at this stage to deliver successfully (Part Two); and

- are effectively managing the current challenges to the Programme to achieve value for money (Part Three).

5 This report does not examine the government's strategic approach to major rail upgrade programmes as set out in the Integrated Rail Plan for the North and Midlands. Where we do consider other rail programmes, such as Northern Powerhouse Rail, it is in relation to the delivery of the Programme. We set out our audit approach and our evidence base in Appendix One.

Key findings

Investment case and Programme scope

6   The Department has developed a clear case for investment on the Transpennine route. The route connects important areas of the economy in the north of England. However, the infrastructure on the route does not support the current demands for passenger and freight journeys. In the decade prior to the COVID-19 pandemic, the number of annual passenger journeys provided by TransPennine Express and Northern Rail, the two main passenger train operators running services on the Transpennine route, increased by 29%, from 106 million in 2009-10 to 137 million in 2019-20. This resulted in overcrowding of trains and platforms at peak times, and the Department reported that only 38% of trains on the route were on time in 2019. In 2017, the Department concluded that, without improvements, the infrastructure would continue to cause day-to-day problems for passengers and present a barrier to economic growth in the region (paragraphs 1.3, 1.4 and 1.6).

7   The Department has taken too long to decide how to upgrade the route. In 2011, the Department set out plans for electrification of the Transpennine route, which it intended to complete by 2019, to reduce rail industry operating costs and carbon footprint by moving from diesel to electric trains. Work began in early 2015 but was paused so that the scope of the upgrades could be revised to address issues with track capacity. Since 2017, the fundamental need for improved journey times, passenger capacity and decarbonisation has not changed but the Department has repeatedly altered the scope of the Programme to meet differing ministerial priorities and budget constraints. The Department failed to settle on a scope, switching between preferences for options which deliver to varying extents: electrification, digital signalling, additional track, station improvements, and changes to support the transport of different types of freight (paragraphs 1.5 to 1.7 and Figure 2).

8   The Department has now provided greater certainty over the Programme, including agreeing a scope with the potential to address the route's infrastructure issues. In its Integrated Rail Plan in November 2021, the Department set out its commitment to the Programme on both scope and funding as a core element of delivering its plan for rail in the North and the Midlands. The scope includes additional track which will increase capacity for train services and is expected to improve journey reliability. In addition, the Integrated Rail Plan set out that the Programme will be delivered as phase one of Northern Powerhouse Rail. The government's commitment to the Programme's long-term vision and scope reduces the risk of further scope change going forward. The Programme now includes additional construction work to enable Northern Powerhouse Rail and avoid multiple periods of disruption on the same sections of the route. As at May 2021, the Department estimated the total forecast cost of the Programme will be between £9 billion and £11.5 billion in cash terms and that it will be completed between 2036 and 2041 (paragraphs 1.8 to 1.10 and Figure 2).

9   Between 2011-12 and 2021-22, Network Rail spent £1 billion on the Programme, of which an estimated £190 million has been spent on work no longer needed as a result of changes in the scope. The majority of the total spend was incurred from 2020-21 onwards as Network Rail started construction work that would have been necessary under any scope. The changes in Programme scope and outcomes have, however, meant that some design plans and project options were developed but not used. Network Rail estimates that it spent £190 million on such work (paragraphs 1.12 and 1.14).

How the Programme is now set up to deliver

10   The Programme will be challenging for the Department and Network Rail to deliver, given its increased scale and complexity, with projects at varying stages of maturity. The Programme is Network Rail's largest rail upgrade scheme. Network Rail has split the Programme into 12 core projects, alongside additional enabling works, which are at different stages of development, design and construction. The four projects to facilitate Northern Powerhouse Rail are at a much less advanced stage than other parts of the Programme. The Department will not approve the full business case until 2024, with interim approval in December 2022 to seek funding for the next stage of each project. At these decision points, the Department will need to be comfortable that it can approve the Programme as a whole to proceed against the remaining uncertainty in design and costs from projects that are still immature (paragraphs 2.2 to 2.4).

11   The Department and Network Rail are putting in place governance structures that should enable them to manage the Programme more effectively, but this will be tested by upcoming decisions that require trade-offs. Reviews by the Department and the Infrastructure and Projects Authority (IPA) in early 2021 raised concerns about the adequacy of governance arrangements following the Programme's increased size. In response, the Department and Network Rail adopted new arrangements, including a new operating model, that should enable the Programme to be managed separately as a major programme rather than as a typical rail upgrade. They should also support more effective decision-making by involving the key stakeholders who are essential to the Programme's success, including contractors, and train and freight operators. However, these new arrangements are still being put in place and will require a high-level of collaboration to be effective. For example, the Programme will need to make trade-off decisions between competing factors of cost, efficiency and disruption in its scheduling of track construction works, and stakeholders will have different requirements (paragraphs 2.5 to 2.9).

12   Network Rail entered into its main commercial arrangements with contractors before the scope was settled but they remain appropriate for this stage of the Programme. Main delivery of the Programme is contracted through two 'alliance' frameworks, which bring together Network Rail and contractors to work together on design and construction, and to share the risks and benefits. Network Rail set up one alliance in 2015 and the other in 2017, but since then the scope and scale of the Programme has changed. An IPA review in early 2021 found the arrangements appropriate overall for the stage the Programme is now at and the key risks it identified at the time regarding the need for a fixed scope and stable funding have since been addressed. However, Network Rail has needed to separately contract out the new digital signalling element, as this was outside the agreed alliance frameworks. Such work with new contractors adds to the integration challenges on the Programme (paragraphs 2.15, 2.16, 2.18 and 2.19).

13   Network Rail is planning Programme activity in such a way as to provide staged improvements for passengers – this will require effective joint-working. Network Rail and its delivery partners are aiming to ensure that each stage of the work provides improvements to passengers as it is completed. This requires Network Rail and train operators to bring together changes to infrastructure, operations, rolling stock and timetabling that might otherwise be made without considering the interdependencies. This aims to avoid problems seen in other infrastructure programmes which have not been managed in a joined-up way. Network Rail expects to achieve the first stage of improvements for some journeys by December 2024 (paragraphs 2.11 to 2.14).

14   Network Rail is applying lessons learned from other major programmes in its management and delivery of the Programme. During the development of the Programme, Network Rail has drawn on lessons and good practice identified by the Department, the National Audit Office, other major infrastructure projects and experience on the Programme to date to identify 19 themes. The themes include areas we have highlighted on other programmes, such as a focus on promoting openness and transparency to avoid optimism bias. We have seen positive steps taken to incorporate lessons into the Programme and it will be important for this work to continue identifying learning that it can apply throughout the duration of the Programme (paragraphs 2.20 to 2.22).

Challenges for the Programme

Challenges specific to the Programme

15 The negotiations between Network Rail and operators to agree track access for carrying out construction work on the route will be difficult, and if not agreed on time, risk delaying the Programme. The Transpennine Route is an operational railway, and Network Rail must gain repeated access to the track for works, which will disrupt both train operators and the passengers and businesses who rely on the route. Network Rail has established a forum to agree track access arrangements with train and freight operators and manage the disruption, but agreeing access will be a key risk to the timetable throughout the Programme's delivery phase. The Programme will also need buy-in from local leaders, businesses and landowners to ensure timely consent for land access and development. Network Rail has had some early success with its initial application. Failure to obtain timely access and consent could lead to substantial delays in programme delivery and increased costs (paragraphs 3.3 and 3.4).

16 Passengers' awareness of the planned upgrades to the Transpennine route is low, which is a concern because of the disruption it may cause to their journeys. Until early 2022, Network Rail's stakeholder engagement was limited to a few specific places on the route ahead of early construction work. Research by Transport Focus in summer 2019 and Network Rail in spring 2022 found low awareness of the Programme from passengers and concerns about the disruption they would face. The long-term risk is that passengers may switch to other modes of transport to avoid the disruption during the works and not return to using the Transpennine route, reducing the benefits of the Programme. Network Rail is developing its communications approach with train operating companies and plans a large marketing campaign for autumn 2022. It is also implementing diversionary routes to minimise use of rail replacement bus services, which have historically been unpopular with rail users (paragraphs 3.4 to 3.6).

17 The Department has yet to commit funding for rolling stock that is critical for delivering the full benefits. Running electric trains that are capable of using new signalling infrastructure is essential to achieving the full benefits of the upgrade. However, the existing system of rolling stock procurement means that funding and approvals are being sought separately from the rest of the Programme. The Department has yet to commit funding for rolling stock as it will need to consider this as part of its wider budgeting decisions for rail services. Until the funding is committed there is no certainty that rolling stock will be funded to the level needed to achieve the benefits of the Programme. The Department and Network Rail are currently developing a strategy for rolling stock on the Programme (paragraphs 3.15 and 3.16).

Challenges common across major programmes

18   It is not clear how the Department and Network Rail will manage the cost of inflation. Material and energy costs are rising sharply, as is demand from other infrastructure projects for the same skills needed to deliver the Programme, which may also increase cost. The Department and Network Rail have not yet agreed how and if they are able to manage additional inflationary pressures within existing budgets but they are working with HM Treasury to monitor and manage these pressures. It is also not clear if actions by Network Rail and supply chain contractors will be able to fully address the labour shortage. Network Rail is aiming to achieve at least 15% cost-efficiency savings (estimated at £1.5 billion) against the Programme's total infrastructure cost, a target set prior to inflationary pressures emerging, and has identified an estimated £1 billion to date of possible cost-efficiencies with contractors. Network Rail may have to deal with increased costs because of inflation by delaying work on the Programme, or by delaying or de-scoping other rail programmes (paragraphs 3.7 to 3.10).

19   The Department and Network Rail are at an early stage in planning for delivery of benefits, but we would expect them to have established how they will measure success. Our past work on major programmes shows the importance of developing and maintaining a focus on benefits throughout a programme and of building this into decision-making. We found that the Department and Network Rail:

●   expect the Programme to achieve a range of benefits but do not yet have a full set of measures and baselines to assess whether they are on track to achieve these as the Programme completes. For example, they have a baseline for faster journey times but not, for example, carbon emissions (paragraphs 3.11 and 3.12);

●   have yet to agree with other stakeholders, including other government departments, local government and train companies, who is accountable for delivering and measuring the benefits (paragraphs 3.11 and 3.13);

●   have not assessed whether the design parameters set for the Programme in 2019 remain sufficient to ensure long-term resilience in light of climate change and increased frequency and severity of weather events in the region (paragraph 3.14); and

●   have not yet determined how the Programme, as phase one of the Northern Powerhouse Rail programme, will be managed within this larger programme as it develops so that benefits and connections between them are fully aligned (paragraphs 3.17 and 3.18).

Conclusion

20 The Transpennine Route Upgrade Programme has had a difficult start, with the Department taking more than a decade to agree a scope. As a result, passengers will have to deal with delays and overcrowding on a route that is at full capacity for longer. The Programme, which is Network Rail's largest rail upgrade, is now in a good position to proceed with greater certainty following the Department's Integrated Rail Plan. There is now an agreed scope that should make a real difference to the users of the route and deliver wider benefits to the region if delivered successfully.

21 The Department and Network Rail are putting in place appropriate structures, such as revised governance and operating model, suitable for a major programme about to go into substantive delivery. However, these arrangements have yet to be tested and many of the changes are still a work in progress. There is still work to be done by the Department and Network Rail to manage key areas of risk and challenge, as well as planning to achieve the intended benefits, if they are to ensure the Programme is in a good position to secure long-term value for taxpayers' money.

Recommendations

a   **The Department and Network Rail should review their business case approvals strategy and how this will manage the uncertainty in design and cost from projects still at an early stage.** The strategy should include setting out what the focus of future update approvals will be to reduce the risk of scope changes being introduced back into the Programme.

b   **The Department and Network Rail should include in their next business case update in December 2022:**

● their rolling stock strategy for the Programme, including the level of funding required to achieve planned benefits, the expected funding commitment from the Department and the implications of any funding gap;

● an update on the effectiveness of its new governance arrangements and operating model and establish future review points for its governance and commercial arrangements;

● the likely extent of the financial risk posed by inflationary pressures and confirm how this will be funded and managed between the Department, Network Rail and HM Treasury;

● how they will incorporate the lessons learned they have identified from other major programmes into their management of the Programme; and

● how the Programme will be integrated with the wider Northern Powerhouse Rail programme.

c   **The Department and Network Rail should complete their development of metrics for evaluating the benefits from the Programme,** such as for reduced carbon emissions or interconnectivity across the region.

d   **The Department and Network Rail should agree with other government departments, local government and train operating companies who should have ownership in delivering and measuring the wider benefits of the Programme.** This should include agreeing with local authorities on how to improve passengers' end-to-end journeys and increase usage of the upgraded route.

e   **As part of developing its marketing campaign for passengers, Network Rail should set out how it will assess its success at informing passengers and addressing their concerns**. This should include metrics to monitor passengers' awareness of the Programme and how it will disrupt their journeys. It should also consider continued monitoring of how the disruption may affect future passenger uptake.

Part One

Progress on the Transpennine Route Upgrade Programme since 2011

1.1   The Department for Transport (the Department) sets the strategic direction for the rail industry in England and Wales and funds Network Rail as the body responsible for maintaining and enhancing the rail network. This part of the report examines the progress the Department and Network Rail have made on the Transpennine Route Upgrade Programme (the Programme). We assess:

- the Department's case for the Programme;

- how the scope of the Programme has changed; and

- what the Department has spent on the Programme since 2011-12.

The Transpennine route

1.2   The Transpennine route is a 76-mile-long rail link in the north of England, which connects Manchester in the west and York in the east, via Huddersfield and Leeds (**Figure 1**). The route serves 23 stations and features 285 bridges and viaducts and six miles of tunnels. TransPennine Express and Northern Rail are the two main passenger train operators running services on the Transpennine route.

1.3   The Transpennine route is an important transport link in the north of England. It provides the most direct rail link between Manchester and Leeds, as well as connecting smaller towns and commuter areas. However, the infrastructure on the route does not support the needs of the railway today. The Department has identified the Transpennine route as of strategic importance for freight, with its ability to move goods between ports and the north of England. However, a lack of capacity on the route, as well as inadequate infrastructure, means that the current route is unable to support growth in freight transport and passenger demand on the route has increased.

Figure 1

The Transpennine rail route in the north of England

The route connects Manchester in the west with York in the east
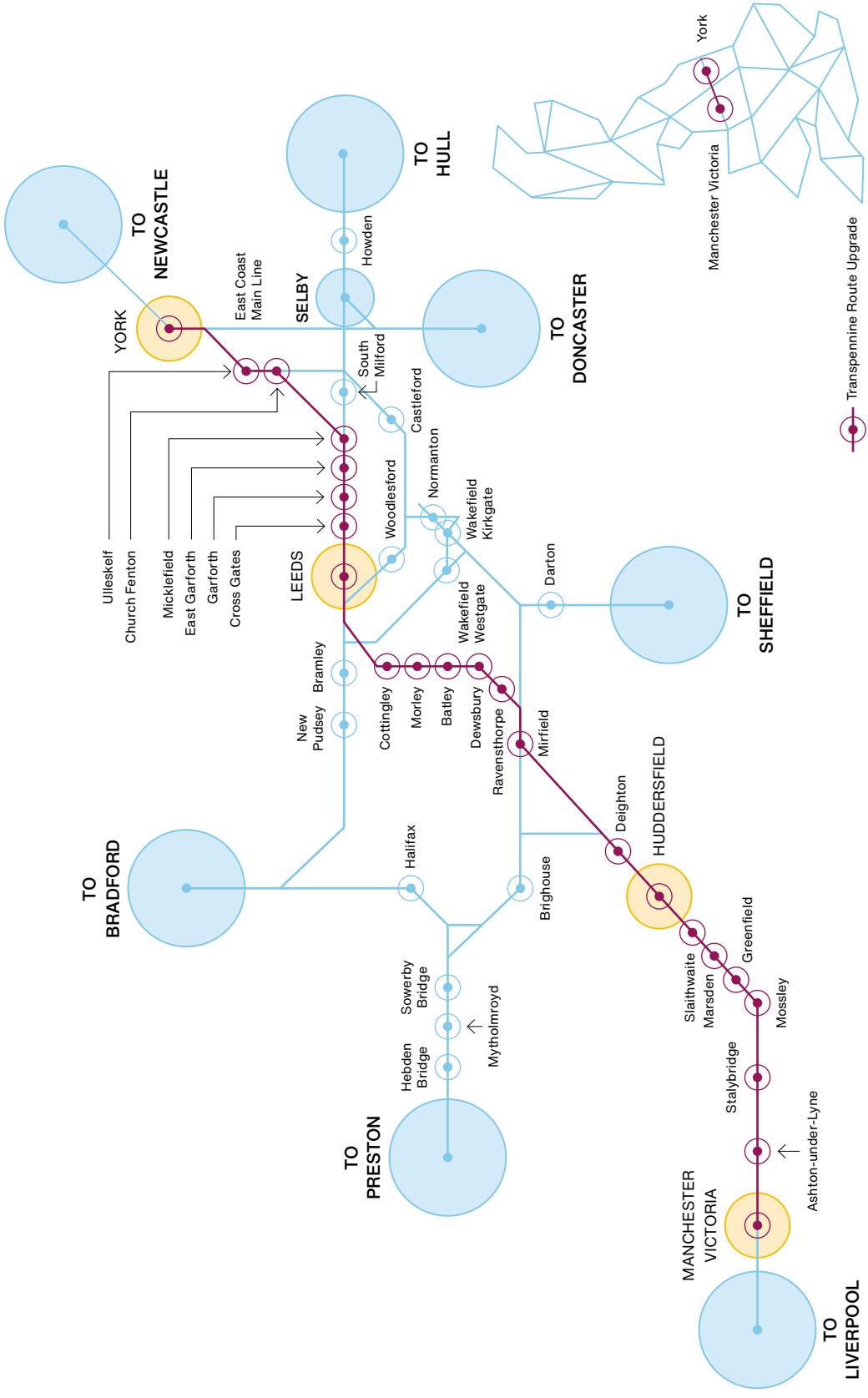
Note

1 The approximate locations of the Transpennine route and stations on the route are shown in purple and yellow. Branch lines and connecting routes are shown in blue.

Source: National Audit Office use of Network Rail information. Available at: www.networkrail.co.uk/running-the-railway/railway-upgrade-plan/key-projects/transpennine-route-upgrade/

1.4 In the decade prior to the COVID-19 pandemic, the number of annual passenger journeys provided by TransPennine Express and Northern Rail increased by 29% from 106 million in 2009-10 to 137 million in 2019-20. Capacity for passenger services on the route has been reached, and journeys are increasingly unreliable and crowded. Between 2010-11 and 2019-20, the average lateness experienced by passengers on trains run by the two main operators on the route doubled,[1] and the proportion of trains that were cancelled or significantly delayed also increased.[2] According to the Department, up to the autumn of 2019, only 38% of trains on the route were on time, and there was overcrowding of trains and platforms at peak times. Despite uncertainty around future passenger demand for rail, the Department estimates that passenger growth will continue. However, the Department told us it has yet to complete modelling work to ascertain likely regional future passenger demand.

The Department's decision to upgrade the route, and progress in the past decade

1.5 In 2011, the Department set out plans for the electrification of the Transpennine route. These aimed to reduce rail industry operating costs and its carbon footprint by moving from diesel to electric trains. The Department forecast that this upgrade would cost £289 million (in 2011 prices) and be completed by 2019.

1.6 The Department progressed these plans, and work began in early 2015 before pausing pending a review of Network Rail's investment programme. The work was restarted in late 2015 with a revised scope that aimed to increase track and train capacity and reduce journey times. In 2017, the Department concluded that, without improvements, the infrastructure would continue to cause day-to-day problems for passengers and present a barrier to economic growth in the region.

1.7 Since 2017 the fundamental outcomes for the Programme have remained unchanged: improving journey times for passengers, increasing track capacity and decarbonising the railway. Despite this, changing ministerial priorities and budget constraints led the Department to make repeated changes to the scope of the Programme in this time (**Figure 2** on pages 18 and 19). In 2018, the Department scoped the Programme to be delivered within a £2.9 billion budget and to be completed between 2019 and 2024. The Department subsequently revised the Programme several times with no clear agreement on the end state until 2021. This led the Infrastructure and Projects Authority (IPA) to rate the delivery confidence[3] of the Programme as Amber-Red in June 2019[4] and Amber in January and May 2021.[5]

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1   Northern Rail: two minutes to four minutes; TransPennine Express: three minutes to eight minutes.
2   Northern Rail: 2.3% to 5.5%; TransPennine Express: 5.1% to 12.0%.
3   The IPA uses a five-tier delivery confidence assessment rating of a project's likelihood of achieving its aims and objectives and doing so on time and on budget (Red, Amber-Red, Amber, Amber-Green, Green). Definitions of these ratings are set out in Annex 1 of the IPA annual report on major projects at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1002310/IPA_AR2021_final_14Jul.pdf.
4   The IPA uses an Amber-Red rating where successful delivery of the project is in doubt, with major risks or issues apparent in a number of key areas. Urgent action is needed to address these problems and/or assess whether resolution is feasible.
5   The IPA uses an Amber rating where successful delivery appears feasible but significant issues already exist, requiring management attention. These appear resolvable at this stage and, if addressed promptly, should not present a cost/schedule overrun.

1.8 In November 2021, the Department committed to a revised scope for the Programme, which it intends will facilitate the future Northern Powerhouse Rail (NPR) programme. The Department made this commitment as part of its Integrated Rail Plan for the North and Midlands, which sets out government's plans for delivering and sequencing major rail investment in the North and Midlands. The revised scope includes full electrification of the route; digital signalling; additional track in some sections that will increase capacity and journey reliability, and platform adjustments and enhancements along the route. The certainty of this long-term vision presents an opportunity for cost-efficient supply chain engagement and resource procurement. The Department's repeated changes to the Programme's scope in the past decade hampered progress and led to inefficient spend. The government's commitment to the Programme's long-term vision and scope now set out reduces the risk of further scope change.

1.9 The agreed scope of the Programme includes work that is not necessary for the route itself but will enable NPR. The NPR network includes a new western line that will join the Transpennine route at Marsden. To support NPR, additional work is now required from the Programme. This work includes additional sections of three or four tracks, works at Huddersfield station, a new passing section for freight trains and digital signalling across the full Transpennine route. The Department expects that this approach will avoid multiple periods of disruption on the same parts of the route. The Department set out in the Integrated Rail Plan for the North and Midlands that the Programme will be delivered as phase one of NPR. The Department has not yet agreed the scope of the NPR programme but, through it, government intends to significantly improve connectivity between the North's major economic centres.

1.10 The Department expects it will complete the revised Programme between 2036 and 2041, at a total cost of between £9 billion and £11.5 billion, based on its May 2021 forecasts. The costs will primarily be for infrastructure works but it also includes other elements such as rolling stock. The core elements of the Programme – those not needed to support NPR – are forecast to cost between £6.2 billion and £6.5 billion and to be completed between 2030 and 2033.

Figure 2

Changes to the scope of the Transpennine Route Upgrade Programme, 2017 to 2021

Since 2017, the Department for Transport has made several changes to the scope of the Transpennine Route Upgrade Programme (the Programme)

Date scope considered	2017	2018	2020	2021	Scope agreed late 2021
Scope					
Upgrades across the full route	✓	Improvements focused between Huddersfield and Leeds	✓	✓	✓
Full route electrification between Manchester and York and enhanced signalling			✓	✓	✓
Additional digital signalling, freight gauge clearance and station upgrades				✓	✓
Facilitation of Northern Powerhouse Rail (NPR)					✓
Reason for scope change	Increasing scope beyond electrification to include other track improvements	Previous scheme was at an early stage of development. This scope was developed further and to meet a £2.9 billion budget.	Budget cap no longer applied. Full electrification between Manchester and York and enhanced conventional signalling	Digital signalling added as well as freight gauge clearance and station upgrades	Additional digital signalling and more sections of three or four tracks added to the core scope to enable later NPR works
Intended outcomes					
Faster journeys	✓	✓	✓	✓	✓
Enhanced passenger capacity	✓	✓	✓	✓	✓

Figure 2 *continued*

Changes to the scope of the Transpennine Route Upgrade Programme, 2017 to 2021

Date scope considered	2017	2018	2020	2021	Scope agreed late 2021
Intended outcomes					
Better punctuality	✔	✔	✔	✔	✔
Regional economic benefits	✔		✔	✔	✔
Improved environment			✔	✔	✔
Facilitation of NPR					✔
Forecast full programme cost	£1.5 billion	£2.9 billion	£6.0 billion to £6.2 billion	£6.2 billion to £6.5 billion	£9.0 billion to £11.5 billion
Benefit-cost ratio	1.40	1.07	1.44	1.44	1.08
Delivery timeframe	By 2022	Between 2019 and 2024	Between 2026 and 2028	Between 2030 and 2033	Between 2036 and 2041

Notes

1 This table includes the single programme options which were selected by the Department for Transport (the Department) and put forward for investment.

2 In 2019, a new Secretary of State commenced a more favourable approach to enhancement spend, and the Department began working on new options following the lifting of the £2.9 billion cap on the cost of the Transpennine Route Upgrade Programme.

3 The benefit-cost ratios for all schemes include wider economic benefits.

4 The benefit-cost ratio of 1.08 includes the costs of delivering the additional works to facilitate Northern Powerhouse Rail but does not include the benefits associated with this work. The Department told us it intends to update this benefit-cost ratio to include these benefits in its next business case, planned for December 2022.

5 All forecast costs are in cash terms at the point the option was considered.

Source: National Audit Office analysis of Department for Transport and Network Rail information

1.11 The Department wants the Programme to support economic growth and 'levelling up' in the region, as well as decarbonisation of transport through the electrification of the route. The Department's outcomes for the Programme, as set out in its May 2021 Programme Business Case and confirmed in line with its November 2021 Integrated Rail Plan, are to provide:

- **better punctuality:** the upgrades aim to provide infrastructure to support a 50% reduction in average minutes late for passenger services (compared with service performance before the COVID-19 pandemic);

- **enhanced capacity on the route for passenger services:** there will be one additional fast or semi-fast service and one additional stopping service per hour between Manchester and Leeds;

- **faster journeys:** a 63- to 66-minute planned journey time between Manchester and York on the end-state route, down from 74 minutes on pre-COVID-19 services (saving up to 11 minutes);

- **improved environment:** up to 87,000 tonnes a year possible reduction in carbon emissions from electrification and a shift from other modes of transport to rail; and

- **facilitation works to enable Northern Powerhouse Rail:** four projects in addition to the core programme to facilitate the future NPR programme.

The Department's spending on the Programme

1.12 Network Rail spent £1,042 million on the Programme between 2011-12 and 2021-22 (**Figure 3**). Most of this has been incurred since 2020-21, as Network Rail began 'no regrets' construction work that would be necessary irrespective of what final programme scope decisions were made. This included starting work on electrification south of York and the upgrade of track and signalling near Manchester. Network Rail told us that it carried out only minor enabling work for construction between September 2015 and 2020.

1.13 To the end of 2022-23, HM Treasury has provided funding approval for £2,958 million for the Programme. Until October 2021, it provided funding in partial settlements to sustain development activities while the Department agreed the Programme's scope. In 2021-22 and 2022-23, £959 million was approved in each year for the Programme to continue the development, design and delivery of projects in the Programme now that the final scope is agreed. The Department plans to request future funding settlements at planned approvals stages in December 2022 and in 2024.

Figure 3

Annual spend on the Transpennine Route Upgrade Programme (the Programme), 2011-12 to 2021-22

Spending to March 2022 on the Programme is £1,042 million, the majority of which was spent from 2020-21 onwards

Annual spend (£m)
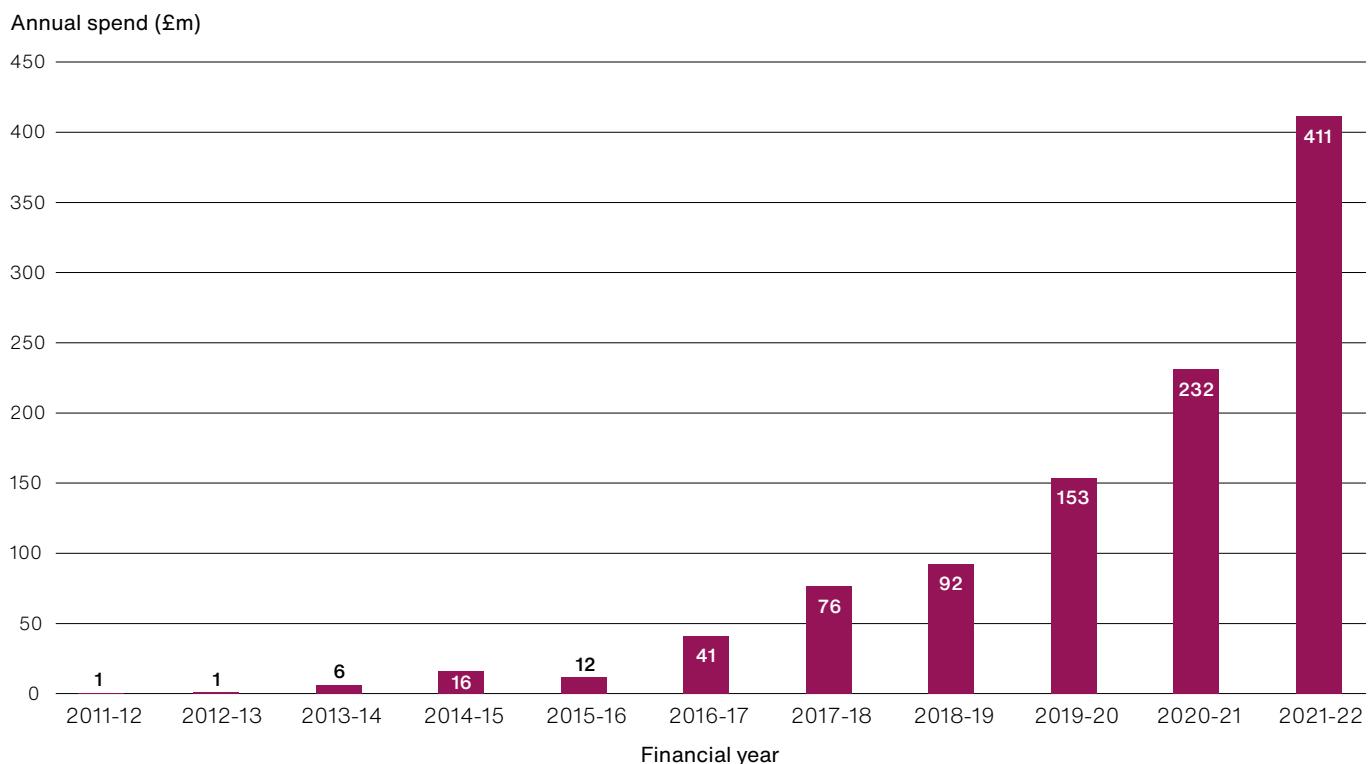
Note

1   Figures are in cash terms and do not sum due to rounding.

Source: National Audit Office analysis of Network Rail data

1.14 Network Rail estimated that of the £399 million spend up to 2019-20, almost half of this – £190 million – was spent on options that were not taken forward. While some element of obsolete spend is to be expected during the early development stages of a programme, this is higher than we would expect and is a result of the continually changing scope of the Programme. Of this £190 million, Network Rail estimated that:

- £50 million was expenditure on the design and project management of upgrades that are no longer relevant; and

- £140 million was expenditure on developing Programme options between 2016-17 and 2019-20 that became obsolete following changes in scope.[6]

6   Breakdown rounded to sum to £190 million.

Part Two

How the Programme is set up to deliver

2.1 This part of the report examines whether the Department for Transport (the Department) and Network Rail are ensuring that, at this stage, the Transpennine Route Update Programme (the Programme) is appropriately set up to successfully deliver before it moves into significant construction works. We assess:

- the management challenge presented by the Programme's scope;

- whether the Programme's governance, operating model and commercial arrangements are appropriate at this stage; and

- whether the Department and Network Rail are incorporating lessons from other programmes in their management approach.

The challenges from the Programme's scope

2.2 The Programme is Network Rail's largest rail upgrade scheme. It is formed of 12 core projects alongside additional enabling works. Each project covers the work needed on a particular section of the route or a specific route-wide element in the case of digital signalling. The projects are at different stages of progress, ranging from option development to construction (**Figure 4**). All four of the projects still in the development stage are to facilitate Northern Powerhouse Rail (NPR).

2.3 The complexity of the Programme is increased by having projects at different stages of progress. There is, for example, the risk of issues emerging during the design of one project that will require re-work in projects already under construction. A mix of maturity is not unusual for large programmes – such as High Speed 2 – but the wide range of maturities is not typical for a Network Rail upgrade. Network Rail would normally plan projects to move together from one stage to the next, reducing the integration risk.

Figure 4

The Transpennine Route Upgrade Programme's core projects and their stage of progression, as at June 2022

Individual projects within the Transpennine Route Upgrade Programme (the Programme) are at different stages of progression

Notes

1   As well as the 12 core projects set out in this figure, the Programme is also carrying out enabling work on diversionary routes, programme management, depots and stabling, stations, and freight capacity. These additional activities are also at different stages of progression.

2   NPR is the Northern Powerhouse Rail programme.

Source: National Audit Office analysis of Network Rail programme data

2.4 The Department also expects that some projects will not be ready for construction by the time of the final business case approval in early 2024. To manage the Programme as a whole, the Department has been seeking business case approvals for the Programme with some projects at an earlier stage than would normally be expected. For example, there will be a time gap between final approval of the Programme and its budget and some projects commencing construction because of the way the works are being scheduled. One project is not due to begin construction until 2031. The Department and Network Rail also expect that they will need to finalise the scope of some projects after final business case approval in early 2024. As a result, there will be greater uncertainty in the costs and schedules of these projects. At this final decision point, and at the earlier interim approval in December 2022, the Department will need to be comfortable that it can approve the Programme as a whole to proceed against the remaining level of uncertainty and risk.

Governance and operating model

2.5 Until October 2020, Network Rail managed the Programme as a standard rail upgrade through its Northern Programmes portfolio. The Programme's increased size and complexity, however, led to Network Rail decoupling the Programme from this portfolio. It is now being delivered as a stand-alone programme, although it is still part of Network Rail's overall portfolio of programmes for accountability and the Department's wider governance of rail enhancements for decision-making and approvals. This includes the Rail Network Enhancements Portfolio Board, a joint Department and Network Rail committee that oversees rail enhancements across the network (**Figure 5**).

2.6 The Department and Network Rail made changes to the Programme's governance and operating model following issues raised by the Department and by the Infrastructure and Projects Authority (IPA) in early 2021 on existing arrangements. These included:

- a lack of engagement between key delivery stakeholders, making collaboration challenging and reducing the visibility of overlapping activities;

- insufficient information-sharing and visibility over decision-making and emerging issues; and

- Network Rail governance being seen as a blocker to progress, with multi-layered arrangements for approvals.

Figure 5

Governance and accountability of the Transpennine Route Upgrade Programme (the Programme) within the Department for Transport (the Department) and Network Rail

Since October 2020, the Programme has been managed as a stand-alone upgrade within Network Rail's programme portfolio but remains within the Department's wider governance for rail
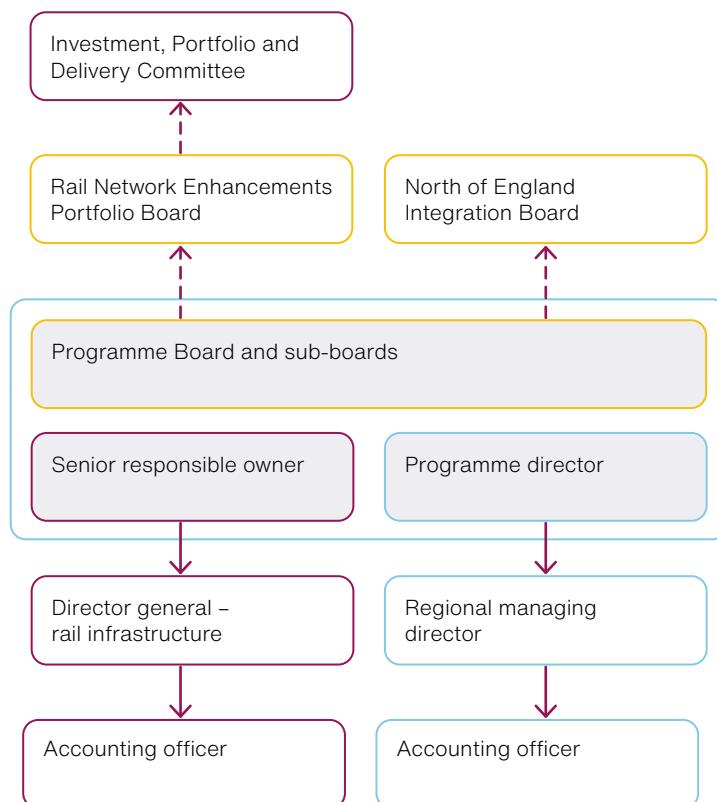
○ Department for Transport

○ Network Rail

○ Joint Department and Network Rail governance boards

○ Transpennine Route Upgrade Programme

→ Accountability

→ Decision making and approvals

Notes

1   The Transpennine Route Upgrade Programme Board attendees include: an independent chair, two non-executive directors, the Department (including the senior responsible owner of the Programme), Network Rail (including the programme director and regional managing director), managing directors of the two contractor alliances, and managing directors of train and freight operating companies.

2   The Programme is managed within Network Rail's programme portfolio, as indicated by the central blue box.

Source: National Audit Office analysis of Department for Transport and Network Rail information

2.7 The Department and Network Rail set out plans for a revised governance structure and a new operating model to address the issues the reviews raised. The Department and Network Rail placed a particular focus on arrangements that would improve collaboration and decision-making. These included:

● bringing all key stakeholders together – the Department, Network Rail, main contractors, and train operators (passengers and freight) – through an 'enterprise' operating model to implement the shared vision for the Programme. This included the creation of a joint programme management office to share information. The IPA recommended this model as being appropriate for the Programme; and

● streamlining governance arrangements by, for example, revising the Programme Board to have greater authority and delegation to make programme-level decisions, coupled with a reduction in Departmental and Network Rail governance.

2.8 It is too early to assess how effective the new arrangements will be, but they establish elements that we would expect to see in the management of a major programme. The revised Programme Board has been provided with more authority and responsibility for delivering the Programme and the senior responsible owner now has clearer oversight of the delivery bodies. However, appointments of the independent chair of the Board, a former chief executive officer of Crossrail,[7] and the two non-executive directors were not made until June 2022. The Department and Network Rail have also established clearer roles and responsibilities, although terms of references for lower-level boards were also not confirmed until early 2022.

2.9 There will be decisions that need to be made on the Programme later in 2022 that will test the effectiveness of the new collaborative arrangements. A key example is how the Department, Network Rail and others will make challenging trade-off decisions when scheduling the works. The competing constraints will include minimising passenger and freight disruption; managing availability of skilled workers, machinery and material; obtaining timely consents for accessing and building on land not owned by Network Rail; enabling cost-efficiency in the planning; and providing early improvements for passengers. Stakeholders will have different requirements for each factor that will need to be considered as part of the trade-off decisions.

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7 Mark Wild was Chief Executive Officer of the Crossrail Programme between November 2018 and May 2022.

2.10 Network Rail has also had to improve the Programme's underlying management controls to reflect its size and complexity. The Department and Network Rail identified the need to improve programme controls in April 2020, but a year later Network Rail's Internal Audit reported that there were a number of controls that had not yet been sufficiently developed for the stage the Programme was at. These included weaknesses in the cost performance system and the change management processes, which limited effective management of cost changes, and also in risk management, with overdue risk-mitigation actions and not everyone using the same system, which hindered comparison and consolidation. Network Rail reported that it had responded to these issues by October 2021 and reflected the improvements in its latest programme agreement with the Department.

Approach to providing improvements for passengers

2.11 The Department and Network Rail are planning Programme activity with the aim that passengers can see a difference to their journey as stages of work are completed. This requires them to focus on what they are intending to achieve and ensure that all the elements are in place at the same time, not just construction work. For example, faster journey times would also require changes to timetables. To coordinate this, Network Rail plans to deliver the Programme through seven 'key outputs'. For each key output, a set of improvements and the activities required to achieve them are agreed by train operators, the delivery alliances and other delivery partners. This approach should also help focus delivery partners on working together to achieve the outputs required.

2.12 We have previously found a lack of joint working on major infrastructure programmes to be a barrier to delivering user benefits on time. For example, on the Thameslink programme, we reported in November 2017 that initially the Department and Network Rail did not make adequate arrangements to manage the introduction of new services, such as signalling or passenger management at stations.[8] The Committee of Public Accounts subsequently reported that full completion of the Thameslink Programme and delivery of benefits for some passengers was delayed by a year.[9]

2.13 The first key output has been formally agreed and is focused on establishing diversionary routes (**Figure 6** overleaf). The second key output is awaiting approval from the Programme Board in August 2022. Network Rail plans that this will electrify the track between Manchester and Stalybridge, enabling passenger journey improvements on services joining the route from Wigan. Delivery of this key output is planned for December 2024.

8 Comptroller and Auditor General, *Update on the Thameslink programme*, Session 2017–2019, HC 413, National Audit Office, November 2017.
9 HC Committee of Public Accounts, *Update on the Thameslink Programme*, Twentieth Report of Session 2017–2019, HC 466, February 2018.

Figure 6

The first two key outputs for the Transpennine Route Upgrade Programme
(the Programme)

Network Rail plans to deliver the Programme through key outputs that will release incremental benefits for users of the route

Key output	Description	Benefits released	Delivery date
1	Deliver the diversionary routes that train replacement services will run on	● Increased number of trains via diversionary routes during the main Programme construction phase ● Keeping customers on the trains as much as possible ● Reduced risk of infrastructure failure ● Provision of station enhancements for passengers ● A legacy of performance benefits and off-route capacity	May 2023
2 (subject to Programme Board approval)	Electrification between Manchester and Stalybridge and introduction of electric trains on the branch route from Wigan	● More seats per train ● Improved reliability ● Improved on-train experience ● Station enhancements ● Environmental benefits	December 2024

Note

1   There are a total of seven key outputs in the Transpennine Route Upgrade Programme. As at May 2022, only one of these had been formally agreed. Final approval for Key Output 2 by the Programme Board is expected in August 2022.

Source: National Audit Office analysis of Network Rail information

2.14 Some of the improvements from completion of the second key output are dependent upon transferring electric trains from the West Midlands to Northern Rail. Later key outputs may be dependent on further rolling stock, but the Department is yet to confirm its funding for this as it continues to develop its rolling stock strategy. Network Rail has also not yet formalised and approved the other key outputs. In defining these key outputs, Network Rail will need to make difficult trade-offs between, for example, deciding whether to prioritise reduced passenger disruption or more efficient construction through longer route closures.

Commercial arrangements

2.15 The Programme is primarily being designed and delivered through two alliances. Each alliance is formed of Network Rail and a number of contractors. Network Rail is also responsible for managing these alliance contracts. The alliances are delivering works to the east and west of Leeds, respectively:

● Transpennine Route Upgrade East (TRUe Alliance) – formed in 2015, it is responsible for the delivery of works between Leeds (excluding Leeds station) and York. It comprises Volker Rail, Murphy, Siemens and Network Rail.

● Transpennine Route Upgrade West (Transpire Alliance) – formed in 2017, it is responsible for the delivery of works between Leeds (excluding Leeds station) and Manchester (east of Victoria station). It comprises ARUP, Amey Rail, Amey OWR, BAM Nuttall and Network Rail.

2.16 Network Rail selected an alliancing approach for its main contractors, as it considered that for the size of the Programme, it would be necessary to work more collaboratively and share more of the risks and benefits. For example, the alliance frameworks establish agreed terms and conditions, such as open-book accounting, alliance governance and incentivisation arrangements, within which contracts for the works for individual projects are awarded. Network Rail considered other options such as separately procuring each element and taking on the sole responsibility for integration but saw that as higher risk.

2.17 We have previously reported that an alliance approach has been adopted on other programmes to improve how government and industry work together. For example, our 2017 report *Delivering Carrier Strike* identified that alliance arrangements in place to build the aircraft carriers facilitated joint working and gave the Ministry of Defence (the Ministry) a formal role in decision-making with industry partners.[10] We also reported in 2018 that the Ministry was implementing this on its Defence Nuclear Enterprise programme to help improve information-gathering, cost control and contractor performance.[11]

2.18 Network Rail established the alliances before the Programme scope was fully agreed. It considered that bringing in contractors at this early stage to help it with development would help reduce the risk once delivery began. However, in January 2021, a review by the IPA found that the continued change in options meant that the alliances ended up working on option development for much longer and, given alliance overheads, this was an inefficient use of the alliances ahead of main construction works.

10   Comptroller and Auditor General, *Delivering Carrier Strike*, Session 2016-17, HC 1057-I, National Audit Office, March 2017.

11   Comptroller and Auditor General, *The Defence Nuclear Enterprise: a landscape review*, Session 2017–2019, HC 1003, National Audit Office, May 2018.

2.19 The Department and Network Rail have since reviewed the alliance arrangements following the changes in Programme scope and scale. The IPA's review, commissioned by the Department, also set out that, overall, the alliancing model was appropriate at this stage of the Programme as main works begin, but that it should be revisited at later stages when activity reduces. The key risks the IPA identified at the time related to the need for a fixed scope and stable funding so that the Programme could fully commence in line with how the alliances were set up to deliver. These risks have since been addressed, as we set out in Part One. Some work will also have to be contracted outside the alliances, adding further integration complexity. For example, Network Rail is separately contracting out the route-wide installation of digital signalling, as the alliance agreements were based on digital-ready conventional signalling.

Learning lessons from other programmes

2.20 Both we and the Committee of Public Accounts have repeatedly reported on problems encountered in major programmes and recommended that government learn lessons to avoid repeating these. In November 2020, for example, we published *Lessons learned from Major Programmes*, which set out the most common issues we find and their root causes – to identify learning points for government to improve its performance.[12] In February 2019, the Committee raised concerns that the Department had not learned lessons from previous rail programmes as it embarked on the next programme, which was the Transpennine Route Upgrade.[13]

2.21 Network Rail has put in place a system to identify and incorporate relevant lessons learned into its management of the Programme. It has identified 19 themes, drawing on lessons and good practice identified by the Department, the National Audit Office, experience on the Programme to date and other major infrastructure projects, including Crossrail, Thameslink, Thames Tideway Tunnel and Sellafield. These themes include behaviours and culture, risk management and collaborative planning. To embed them into working practices, Network Rail told us that these themes have dedicated owners to liaise with the rest of the Programme to ensure lessons continue to be identified and applied. For example, the first three key outputs in the Programme have been designed and phased to release relatively modest benefits for passengers and enable delivery partners to focus on a cautious transition into service, based on learning from Thameslink.

12 Comptroller and Auditor General, *Lessons learned from Major Programmes*, Session 2019–2021, HC 960, National Audit Office, November 2020.

13 Committee of Public Accounts, *Rail management and timetabling*, Eighty-first Report of Session 2017–2019, HC 1793, February 2019.

2.22 Our review of Network Rail's work suggests that the lessons it has identified align with some of the common issues we have seen in our previous work on rail infrastructure and other major programmes. For example, Network Rail has established arrangements to facilitate collaborative planning and delivery, as we set out in paragraph 2.7. Network Rail told us that it is encouraging a culture of openness and transparency on the Programme. In 2019, a joint review by the Department and IPA identified a lack of transparency as a key limitation of transport programmes, contributing to optimism bias and a willingness to ignore potential issues.[14] The Programme has set up a charter, which promotes shared behaviours for delivery partners, alongside an emphasis on transparency and collaboration in the Programme's governance and alliance structures. At this stage of the Programme, it is too early for us to assess whether the changes that Network Rail has made will avoid the problems of the past.

14 Department for Transport and Infrastructure and Projects Authority, *Lessons from transport for the sponsorship of major projects*, April 2019.

Part Three

Challenges for the Programme

3.1 This part of the report examines how well the Department for Transport (the Department) and Network Rail are managing at this stage key challenges to the Transpennine Route Upgrade Programme (the Programme) that we have identified would impact on value for money if not managed effectively. These include challenges both specific to the Programme and those that are common across major programmes.

3.2 Our assessment found that the Department and Network Rail recognise these challenges and are managing some well (**Figure 7**). However, in other areas they will need to do further work to manage them effectively, some of which will require more immediate action, or even to identify and agree mitigations. We cover each of these challenges in more detail in this part.

Managing stakeholder engagement

3.3 To deliver the planned upgrades, Network Rail must gain repeated access to the track, which will disrupt passenger and freight trains and affect the passengers and businesses who rely on their services. Negotiations between Network Rail and train service operators to agree access will be required throughout the delivery phase of the Programme. To manage the process of agreeing track access, Network Rail has set up a cross-industry Strategic Access Task Force, chaired by TransPennine Express. This forum brings together the Department and Network Rail with train and freight operators and construction delivery partners to make decisions on access to the route for the Programme and to manage disruption. This forum takes into consideration the financial and operational needs of train companies, such as interim access to depots, when agreeing operational railway closures for construction work. Ensuring access arrangements balance the needs of those upgrading the route with those wanting to use the railway will be complex and the possibility of disagreement will be an ongoing risk throughout the Programme's delivery phase. If access is not agreed in a timely way, it could lead to substantial delays in programme delivery and increased costs.

Figure 7

National Audit Office assessment of the Department for Transport and Network Rail's response to challenges facing the Transpennine Route Upgrade Programme, May 2022

The Department for Transport (the Department) and Network Rail must manage a range of challenges that would impact on value for money if not managed effectively

Challenge	National Audit Office assessment[1]	Paragraph
Stakeholder engagement		
Access rights	Amber	3.3
Regional advocacy	Green	3.4
Passengers	Amber	3.5 and 3.6
Financial and skills		
Inflationary pressures	Red	3.7 and 3.8
Skilled labour	Amber	3.9
Cost-efficiency	Amber	3.10
Achieving intended benefits		
Benefits management	Amber	3.11 and 3.12
Achieving wider benefits	Amber	3.11 and 3.13
Climate resilience	Amber	3.14
Delivering rolling stock	Red	3.15 and 3.16
Connections with other rail projects		
Relationships with other major rail programmes	Amber	3.17 and 3.18

Note

1 We identified key challenges to the Transpennine Route Upgrade Programme (the Programme) that would impact on value for money if not managed effectively. These include both risks specific to the Programme and issues that are common across major programmes. We define our ratings as:

- Green: The Department and Network Rail understand the challenge and are managing it well at this stage in the Programme, although risks remain.

- Amber: The Department and Network Rail understand the challenge, but further work will be required to manage it effectively.

- Red: The Department and Network Rail understand these challenges, but have not yet identified how they will mitigate for them.

Source: National Audit Office analysis of information from the Department for Transport and Network Rail

3.4 Network Rail also needs to secure buy-in for the Programme from local leaders, businesses and landowners in advance of the development consents required for construction in localities across the route. Not doing so may lead to more objections to Transport and Works Act applications. Until early 2022, Network Rail's stakeholder engagement was limited to a few specific places on the route ahead of early construction work, such as around Huddersfield station. Network Rail has identified key local stakeholders and increased its communications with regional stakeholders in March 2022. We expect Network Rail to use upcoming briefings to build understanding and address any concerns that stakeholders may have. Network Rail will be working to obtain development consents across the route into the next decade and so there is some way to go with securing regional advocacy. However, Network Rail has plans in place and can draw learning from its successful application around Huddersfield station.

3.5 Construction work will have an impact on passengers using the route. In response to customer feedback, Network Rail plans to use diversionary routes to minimise the need for unpopular rail replacement bus services, but these journeys will be longer and require changes to service timetables. In summer 2019, Transport Focus undertook qualitative research with 100 passengers who use the route and found that awareness of the Programme was low, especially around the upcoming projects that will affect passenger journeys.[15] It also found that when the upgrade was explained to them, respondents had concerns about the disruption they would face but were supportive of the works. Network Rail reported more recently that only 23% of passengers were aware of the Programme in March 2022. In addition to disruption caused by construction, Network Rail and operators must ensure the timetable changes in December 2022 are well managed. In May 2018 and December 2019, new timetables led to widespread service disruption and a reduction in passenger trust and satisfaction with services.

3.6 Network Rail launched its marketing campaign for the Transpennine Route Upgrade in April 2022. Working with train operating companies, it also plans to re-brand the Programme for launch in autumn 2022, coinciding with a large marketing campaign. It is important that this re-brand is clear and consistent with the information made available in the April 2022 campaign so as not to confuse passengers. Network Rail needs to continue its engagement with rail users to educate passengers about how disruption will be managed and to minimise the risk of passengers moving to other modes of transport and not returning.

15   Transport Focus, *Transpennine Route Upgrade research*, July 2020. Note that the fieldwork was undertaken
     in summer 2019.

Financial and skill pressures

3.7 The Programme is beginning to experience inflationary pressures. As an indicator of the rise in costs, the Office for National Statistics reported that the price of materials and fuels for manufacturing grew by 19.1% between March 2021 and March 2022. In comparison, prices fell by 1.8% between March 2019 and March 2020, when Network Rail was developing its cost base assumptions.[16] Network Rail expects its supply chain contractors to absorb some of the inflation costs, but the inflation risk will also need to be shared with government.

3.8 The Department and Network Rail have not yet agreed how and if they are able to manage additional inflationary pressures within existing budgets, but they are working with HM Treasury to monitor and manage these pressures. It will be important for all parties to identify the extent to which inflationary pressure is likely to be a short-term or longer-term financial challenge for the Programme. There is no additional funding available from HM Treasury should the Programme exceed its budget. Network Rail told us that if costs increase beyond the assumptions in its plans, it may result in changes to the schedule or scope of the Programme or changes to some of its other rail programmes.

3.9 Network Rail expects that it will face increased demand for skilled labour, which may increase costs. There is competing demand for skills from other rail and road programmes in the region (for example High Speed 2 and potential road upgrades to the Pennines stretch of the M62), as well as other large infrastructure projects. Analysis carried out by Network Rail and the National Skills Academy for Rail forecasts a shortfall in labour and skills until the next decade, with shortages in engineering, commercial and project management. A peak deficit is expected in 2026 when the Programme will be fully under way. We have seen evidence that insufficient design capabilities to meet the scale of the Programme's design needs is a key risk for the Programme in the short-term and has already led to delays in design work on some projects. Network Rail is doing further work to compare what it requires with market capacity and, together with its supply chain contractors, they are planning local recruitment drives and training programmes. Network Rail has also begun engaging with High Speed 2 Ltd to try to avoid peaks in workloads at similar times. However, it is not clear if these actions will be able to fully address the labour shortages.

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16 Office for National Statistics, *Growth rates of output and input producer price inflation*, January 1996 to May 2022 edition, 22 June 2022. Available at: www.ons.gov.uk/economy/inflationandpriceindices/datasets/growthratesofoutputandinputproducerpriceinflation

3.10 Network Rail is aiming to achieve cost efficiencies of 15% (estimated at £1.5 billion) against the Programme's total infrastructure cost, a target set prior to inflationary pressures emerging. Network Rail has set up a process with contractors to identify savings and, based on its work to date, estimates it can find efficiencies of around £1 billion. Our work often sees programmes fail to achieve their planned cost efficiencies. As we set out in our 2020 report, *Lessons learned from Major Programmes*, developing a detailed plan which identifies the steps needed to achieve target savings, tracking performance against this plan throughout the Programme and ensuring that responsibility for delivering savings is clearly articulated can help mitigate this risk.[17] While Network Rail has further work to identify the full 15% of efficiencies, it will need to work with its contractors to identify further savings on top of this to accommodate other financial pressures. Network Rail told us that it does not see its 15% target as a cap and will seek further savings.

Achieving the intended benefits

3.11 The Department expects the Programme to achieve a range of benefits, including wider benefits to the environment and local economy. These wider benefits include improved connectivity, supporting access to employment centres, training for local people in construction skills, procuring through local businesses, improved air quality and reduced noise pollution. However, the Department has not agreed where ownership lies for ensuring that these wider benefits are delivered between itself, other central government departments, local authorities and other bodies. The Department has also not yet decided how it will measure success and check progress against all the benefits. For example, it has a baseline for faster journey times but not for measuring reductions in carbon emissions.

3.12 In October 2021, the Department reviewed the Programme's benefits management approach. This resulted in a 'Red' rating for the Programme as key activities had not been completed, for example, the development of a benefits management and evaluation plan. The Department and Network Rail have since worked to address these issues and in June 2022 the rating was Amber. Our work and the Department's own lessons-learned exercises have pointed to the need to develop and maintain a focus on benefits and to build this into decision making.

3.13 Network Rail will need to work with wider stakeholders to help deliver the benefits of the Programme. For example, local government support will help maximise the benefits of the upgraded route by considering people's end-to-end journeys, such as aligning bus and train timetables and providing safe walking and cycling routes from stations. This will involve working with multiple local authorities and planning place-based solutions along the route.

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17 Comptroller and Auditor General, *Lessons learned from Major Programmes*, Session 2019–2021, HC 960, National Audit Office, November 2020.

3.14 The benefits of the Programme are predicated on the network being resilient. The Office of Rail and Road has identified an increased frequency and severity of extreme weather since 2019-20 across the regions the route passes through.[18] The Programme has a Weather Resilience and Climate Change Adaptation Plan in place, but this dates from 2019 and is based on climate projections made in 2018. Network Rail has not assessed whether the design requirements set out in its adaptation plan remain sufficient to ensure resilience to extreme weather events. Resilience to climate change is not included in the Department's Programme risk register.

3.15 A critical requirement to achieve the full benefits from the upgrade is the procurement and use of electric trains that are capable of using new signalling infrastructure. The Department and Network Rail are developing a strategy for the next business case approval in December 2022 to set out what additional rolling stock would be required and by when. The existing system of rolling stock procurement through train operating companies, however, means that funding and approvals are being sought separately from the rest of the Programme. In the 2021 Spending Round, HM Treasury provided funding for the infrastructure costs of the Programme to 2024-25 but confirmed that rolling stock would need to come from the Department's separate passenger services budget.

3.16 The Department has not yet confirmed funding for rolling stock from its train operating budget, as it will need to consider this as part of wider budgeting decisions for rail services. Until the funding is committed there is no certainty that rolling stock will be funded to the level needed to achieve the benefits of the Programme.

Managing connections with other rail projects

3.17 There are several other rail programmes under way or planned in the region. The Programme is dependent on some of these to operate as intended, while others will, in combination with the Programme, contribute to improving rail connections in the region. Interfaces such as these are resolved through the Department's North of England Integration Board. For example:

- the capacity on the Transpennine route may be affected by the East Coast Mainline upgrade. Taken together, the service changes set out in the Programme, and in the East Coast Mainline upgrades exceed the capacity of the track north of York into which both connect. This will need to be resolved by Network Rail, the Department, and regional stakeholders; and

- the performance of the Programme may be affected by performance at Leeds station. The Programme assumes no decline in performance at Leeds, where there are capacity issues. Solving the issues at Leeds station are outside the scope of the Programme but, if resolved, could improve performance on the route.

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18 Office of Rail and Road, *Annual Assessment of Network Rail*, April 2020 to March 2021, July 2021. Available at: www.orr.gov.uk/sites/default/files/2021-07/annual-assessment-of-network-rail-2020-21.pdf.

3.18 As the Programme is phase one of Northern Powerhouse Rail (NPR), the Department and Network Rail will also need to integrate the Programme with NPR so that benefits and connections between them are fully aligned. With the latter at an early stage of development, the programmes are being managed separately with no formal structures yet determined to manage and integrate the two.

Appendix One

Our audit approach and evidence base

Our audit approach

1   This report examines whether the Department for Transport's (the Department's) Transpennine Route Upgrade Programme (the Programme) is set up to deliver value for money.

2   It is too early to assess whether the Programme has or will deliver value for money. At the time of our review, a number of management processes were still being revised, including the Programme's governance arrangements, operating model and the commercial arrangements for delivery. These processes will take time to become fully effective. Consequently, we have focused our report on progress to date in delivering the Programme and whether the changes made to the Programme's set-up are sufficient to address the challenges of delivery and support value for money.

3   We divided our review into:

● an examination of the Programme's progress between 2011 and 2022;

● an examination of changes to the Programme's set-up in 2021 and 2022; and

● a forward look to the challenges ahead for the Programme and how the Department and Network Rail are managing them.

4   We recognise that the scope of the Programme has changed substantially and repeatedly since 2011. We set out these changes in Part One to provide historical context to our evaluative judgements.

5   The Programme exists within a wider context of rail upgrade activities in the north of England, including most prominently government's Northern Powerhouse Rail (NPR) programme. The Programme is being delivered as the first phase of NPR and will deliver facilitation work to enable future upgrades. We have not examined the NPR programme in this report.

Developing our audit questions

6   In developing our audit questions, we drew on our November 2020 report, *Lessons learned from Major Programmes,* and our April 2021 guidance, *Framework for reviewing programmes.*[19,20] This audit framework includes 18 questions – covering programme purpose, value, set-up and delivery – that we may ask as part of our work. We considered those aspects of the framework most relevant to the Programme when developing our detailed audit questions. We also drew on government guidance, including HM Treasury's Green Book and the Infrastructure and Projects Authority's Cost Estimating Guidance.[21,22]

Our evidence base

7   We reached our independent conclusions on whether the Department's Programme is set up to deliver value for money after analysing evidence collected between December 2021 and June 2022.

Interviews

8   To understand and evaluate progress with the Programme between 2011 and 2022; to understand how the Programme is now set up to deliver; and to examine the challenges facing the Programme we held 14 joint meetings with the Department and Network Rail on key topic areas. We had one additional meeting with the Department early in fieldwork.

9   Officials were selected to participate because of their job roles and relevance to the audit. We interviewed senior members of the Department's programme team, including the programme senior responsible owner and programme director, and senior members of Network Rail's programme team, including the programme directors and programme finance director. We also interviewed members of specific Programme teams in Network Rail – including the Programme's finance team, lessons-learned team and communications team. Interview topics included: history of the programme, programme delivery and finance, programme delivery, sponsorship and governance, finance, and commercial and contracting arrangements, risk management, lessons learned and stakeholder engagement.

10   We also interviewed officials from other relevant parts of government including HM Treasury, the Infrastructure and Projects Authority and the National Infrastructure Commission.

19   Comptroller and Auditor General, *Lessons learned from Major Programmes*, Session 2019–2021, HC 960, National Audit Office, November 2020.

20   National Audit Office, *Framework to review programmes (Update April 2021)*, April 2021.

21   HM Treasury, *The Green Book, Central Government Guidance on Appraisal and Evaluation*, 2022.

22   Infrastructure and Projects Authority, *Cost Estimating Guidance, A best practice approach for infrastructure projects and programmes*, March 2021.

11   There are a wide range of stakeholders involved in the delivery of the Programme. To get their views on the Department and Network Rail's management of the Programme and how they were communicating and engaging with stakeholders we interviewed individuals from Network Rail's contracted delivery partners, TransPennine Express and Northern Rail, Rail Freight Group, Transport Focus and Transport for the North. While our questions were tailored to reflect each stakeholder's role, our questions aligned with our overall audit questions.

12   All our fieldwork interviews were held virtually over Microsoft Teams.

Document review

13   We reviewed departmental documents to develop our understanding of progress with the Programme between 2011 and 2022; to understand how the Programme is now set up to deliver; and to examine the challenges facing the Programme.

To understand and evaluate progress with the Programme between 2011 and 2022 we:

● reviewed the programme business cases from 2017, 2019 and 2021 and programme submissions to the Department's Investment Portfolio and Delivery Committee and HM Treasury's Major Projects Review Group between 2019 and 2021;

● reviewed the economic and strategic case for the Programme and its alignment with wider government and Departmental priorities;

● reviewed board minutes, management information and other documentation that the Department and Network Rail use to support their understanding of the Programme;

● reviewed financial data on Programme funding and spend between 2010-11 and 2020-21;

● reviewed industry-standard data on train operator performance, including delayed/cancelled trains, service lateness and reasons for service disruption; and

● reviewed the Programme's position within wider rail upgrade activities in the north of England, as set out in the Integrated Rail Plan for the North and Midlands, published in November 2021.

To understand how the Programme is now set up to deliver we:

● reviewed the Programme's approval process against the expectations set out in HM Treasury's Green Book;

● reviewed the Programme's delivery approach;

● reviewed the Programme's governance model, operating model, and commercial and contractual arrangements including recent changes to these. We used our *Framework to review programmes* to develop our evaluative questions;

● reviewed the Programme's benefits case and the underlying analytical assessments that underpin the cost and benefits of the Programme; and

● reviewed Programme reports from the Infrastructure and Projects Authority and Network Rail Internal Audit.

To examine the challenges facing the Programme we:

● reviewed the Department's Programme risk assessment, Network Rail's Programme risk register and a number of Network Rail's project-level risk assessments;

● reviewed other Network Rail and rail industry documentation to identify relevant risks including on labour and resource capacity, interfaces and interdependencies with other projects and major programmes, climate resilience and stakeholder management;

● reviewed the Department's approach to measuring and quantifying benefits delivered by the Programme;

● reviewed Programme cost estimates and cost efficiency targets; and

● reviewed our previous reports on major programmes to identify risks to value for money that were relevant to the Programme.

Data analysis

14 In Part One of our report to support our understanding of progress with the Programme between 2011 and 2022, we set out Programme spend. Our analysis is based on annual financial data provided to us by Network Rail, covering the period 2011-12 to 2021-22 inclusive. Data were provided to us in cash prices. We audit Network Rail expenditure as part of auditing its annual report and accounts.

15 To provide contextual information on the route, in Part One of our report we set out passenger numbers and the performance of passenger services delivered by TransPennine Express and Northern Rail. Our analysis is based on datasets published by the Office of Rail and Road. Specifically, we drew on data from:

- Archived national rail trends publications, available at: https://webarchive. nationalarchives.gov.uk/ukgwa/20101111041708/http:/www.rail-reg.gov.uk/ server/show/nav.1542

- Table 1223 – Passenger journeys by operators, available at: https://dataportal. orr.gov.uk/statistics/usage/passenger-rail-usage/table-1223-passenger- journeys-by-operator/

- Table 3194 – Cancelled and Significantly Late by operator and sector (periodic), available at: https://dataportal.orr.gov.uk/statistics/performance/passenger- rail-performance/table-3194-cancelled-and-significantly-late-by-operator-and- sector-periodic/

- Table 3144 – Average passenger lateness by operator and sector (periodic), available at: https://dataportal.orr.gov.uk/statistics/performance/passenger- rail-performance/table-3144-average-passenger-lateness-by-operator-and- sector-periodic/

Site visit

16 To develop our understanding of the current performance on the route and the engineering challenges that must be overcome to enable delivery of the planned upgrades, on 2 March 2022 we undertook a site visit to the Transpennine route. This included travelling on the route with Network Rail representatives and visiting the Programme's office in York.