

Campaign for Borders Rail

Selected extracts from

The case for completing the Borders Railway

a report prepared for the Campaign by

Arcadis Consulting (UK) Ltd



October 2023

CBR commentary

It will soon be eight years since the Borders Railway reopened from Edinburgh to Tweedbank. The railway has been very successful and has demonstrated that reconnecting rural towns to the national rail network can bring new life and opportunities to communities and can reduce our unsustainable dependence on road transport. Great though the Borders Railway is, we at the Campaign for Borders Rail have always wanted to make it even better by extending it further south to Hawick and ultimately Carlisle. Frustrated by a lack of Governmental progress, we raised funds to commission a high-level study of the issues involved in extending the railway from international consultants Arcadis.

We have now received the Arcadis report and it makes exciting and interesting reading. However, it is a very long document. To make it as accessible as possible, we have extracted key sections to form a 25 page summary, which covers:-

- The purpose of the report.
- The existing Borders Railway.
- What should the extended railway achieve?
- What route might it take?
- How many services should there be?
- What are the key challenges?
- What needs to happen next?

The report by Arcadis does not give detailed answers to these questions, but highlights the potential and maps out what needs to be done to develop a detailed, soundly-based proposal.

It is important to note that the work by Arcadis was never intended to be a full feasibility study. The good work they have done has, of necessity, been at a high level. This means that important and potentially complex issues, although touched on, are not explored in detail. Two examples of this are the potential for developing sustainable tourism and the potential for transporting round timber from Borders forests by rail, rather than by road. Similarly, the Arcadis report describes issues to be considered when deciding the exact routing and alignment of the extended railway but does not make a firm recommendation. These, and many other issues will be thoroughly addressed in the more detailed work, for which we have been pressing.

Happily, things have not stood still while Arcadis have been at work, and it looks as if the next exciting stage of development work is finally about to begin. The Scottish and UK Governments previously allocated £10M to the Borderlands Growth Deal for a detailed feasibility study on extending the railway. We have been assured by national and local politicians that this detailed feasibility work will commence “very soon”, with Scottish Borders Council leading the project on behalf of the five local authorities who together constitute the Borderlands partnership. Encouragingly, a stakeholder working group, of which we are members, commenced work in August. So, the Arcadis report could not be more timely!

1 What is the purpose of this report?

Following its success in pressing for the opening of the Borders Railway between Edinburgh and Tweedbank, the Campaign for Borders Rail (the Campaign) has directed its attention to the continuation of the line southwards through Hawick to Carlisle.

Whilst the Campaign is well-versed in making the local and regional case for the railway, it has engaged with Arcadis to support its building of a wider national strategic case for the continuation of the Borders Railway.

Whilst the two leading published documents defining Scotland and the UK's strategic infrastructure have alluded to the potential benefits of the completed Borders Railway, the Campaign has been disappointed at the overall lack of attention or progress paid to advancing the project.

The second stage of the Holyrood "Strategic Transport Projects Review" (STPR2) recognised the potential of providing the Borders region with an inclusive, accessible, low-carbon and fit for purpose public transport solution, however did not allocate any further assessment of these benefits, or consider the wider strategic benefits to Scotland. Similarly, the Westminster initiated "Union Connectivity Review" only made passing reference to the project.

To support the Campaign to build a robust local, regional and national strategic case for continuation of Borders Railway, Arcadis were appointed in early 2022 to undertake a study of the potential routes, risks and opportunities associated with completing Borders Railway from Tweedbank to Carlisle.

Within the limits of their own resources, the Campaign wanted to understand more about the opportunities the line could create beyond those at a local level, to understand what infrastructure would be required to unlock those opportunities, and what the technical challenges might be to creating that infrastructure.

Essentially the Campaign sought support in shaping a clear and compelling narrative to support making the case for investment, whilst at the same time creating a solid foundation for developing and progressing the Campaign's vision for Borders Railway continuation.

This report captures the work undertaken by Arcadis to answer these questions:

- What is the vision for Borders Railway continuation?
- What should the railway achieve?
- What route might the line take?
- Where might stations be located?
- How many services should there be?
- What are the key challenges?
- What should the Campaign do next?

The high-level brief provided to Arcadis is outlined in in Section 1.4 below.

The Campaign's chair, Marion Short, commented "Our initial response to both reports was one of disappointment, given the minimal reference to the proposals for Tweedbank to Carlisle. Any lack of political and government agency support will not deflect the Campaign in its top priority of seeing completion of a new cross-border link".

1.3 The existing Borders Railway

Since its opening in September 2015, Borders Railway has greatly enhanced transport links between Edinburgh, Midlothian and the Scottish Borders. It has unlocked significant housing, commercial and leisure development opportunities across the region and, through the provision of high-frequency services, has stimulated growth.

Travellers can get from Edinburgh to Tweedbank in nominally 55-minutes for most services with two trains per hour (tph) running in each direction.

Phase 1 of Borders Railway has undoubtedly been a great success with many of the original business case metrics being exceeded in both years 1 and 2. The business case for Phase 1 set out four key investment objectives:

1. Promote accessibility to and from the Scottish Borders and Midlothian to Edinburgh and the Central Belt
2. Foster social inclusion by improving services for those without access to a car.
3. Prevent decline in the Borders population by securing ready access to Edinburgh's labour market.
4. Create modal shift from the car to public transport.

At the end of 2017, Transport Scotland undertook a survey of patronage using on-train, telephone and ticket sales data to draw out a range of findings including:

- In terms of tourists, 71% said that the re-opening of the line had been a factor in choosing to make their trip and 25% stated that they would not have made the trip had the line not been in place¹.
- The re-opening of Borders Railway has resulted in significant modal shift from the car to public transport with 61% of respondents stating that they previously made their journey by another mode. Of these, 64% reported that they previously drove all their way to their destination resulting in approximately 35,800 saved single car trips¹.
- Borders Railway has influenced people's residential and workplace choices with nearly 17% stating that they had moved house since the re-opening of the line of which 58% stated that the re-opening of Borders Railway was a factor in their decision¹.
- There is evidence that Borders Railway has had an impact on people's choice of workplace with 52% of those who had moved employment stating that the re-opening of the line had been a factor in their decision¹.

The survey found that while commuting was the most common journey purpose, there were significant numbers of visitors and tourists making use of the improved access and using rail where previously they would not have travelled. There was also strong agreement amongst respondents that the railway had enabled them to access opportunities without using the car or only using the car for a portion of the journey.

¹ Transport Scotland Borders Railway Year 2 Evaluation Survey of users and non-users, 2018

The high commuting figures reinforced the evidence that the railway has opened up new work-related travel opportunities with further evidence confirming that passengers has switched mode to rail because of reduced journey times and costs.

Hence, there is clear supporting evidence that rail infrastructure investment not only opens-up new accessible and inclusive travel opportunities, but it also reduces car dependency, widens employment prospects and develops greater social cohesion. The following infographic by Transport Scotland highlights the successes of Phase 1.

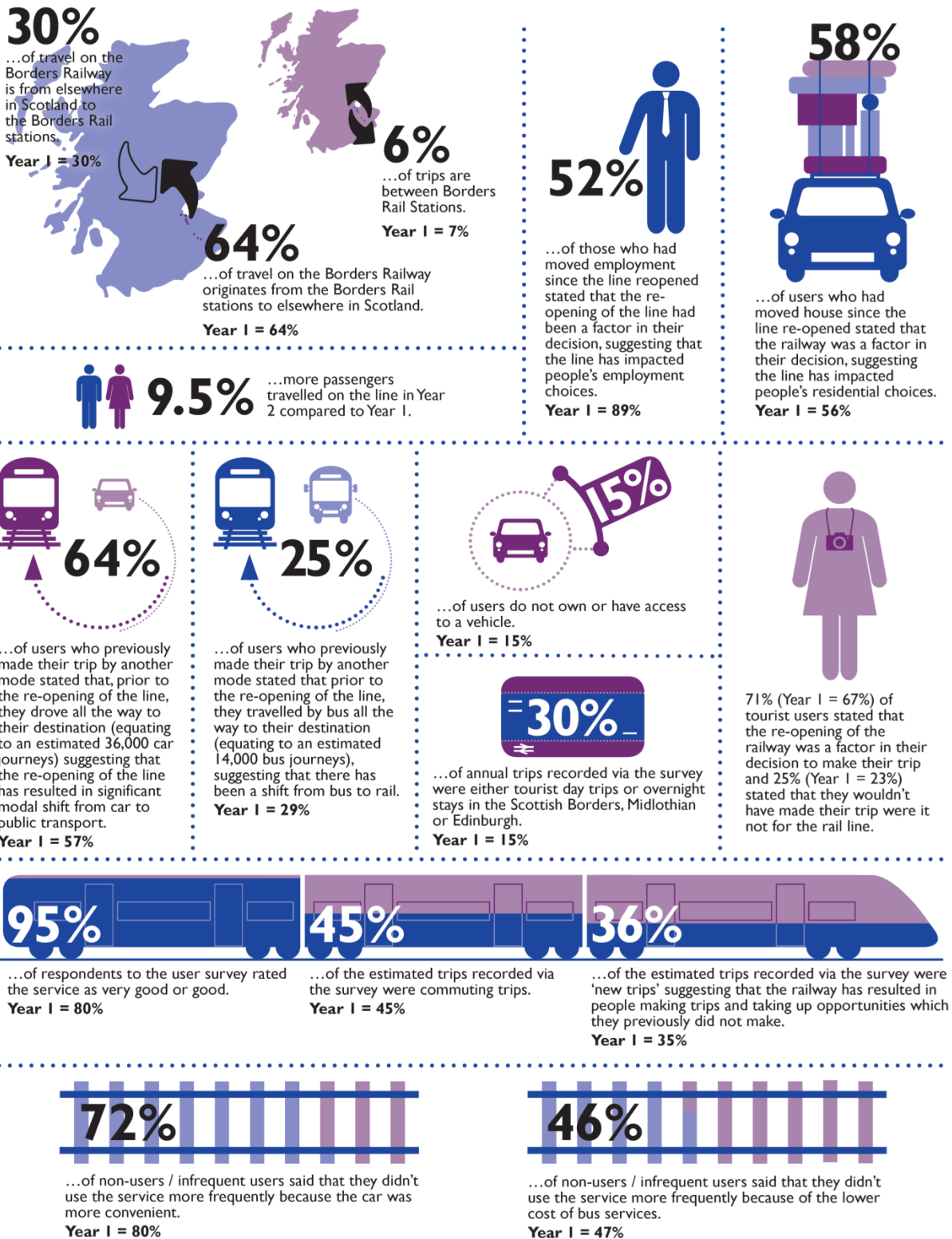


Figure 3: Transport Scotland Borders Railways Review 2018 Infographic

Transport Scotland's 'Business Case for Borders Railway' estimated 647,136 journeys would be made in the first 12 months of operation. This was taken from the median of two approaches to demand forecasting:

- ‘Trip generation’ approach using generic trip rates (the number of trips per thousand head of population within a defined area).
- ‘Stated preference’ survey by interviewing residents along the route about their potential use of the railway.

Ernst & Young, the Business Case author, commented the trip generation methodology had ‘a tendency to underestimate demand’ whilst there was some concern that the ‘stated preference’ method could have overstated demand, thus a mid-point between the two was chosen as the ‘central’ estimate.

During the first year of operation close to 1 million trips were recorded, increasing to 1.5m by 2018.

Galashiels station was predicted to have a central patronage prediction of 23,431. ORR data for 2019-2020 show the station experienced 360,416 entries and exits, 15 times the Business Case predictions. Tweedbank station was predicted to have a central patronage prediction of 21,621. ORR data for 2019-2020 show the station experienced 443,766 entries and exits, 21 times the Business Case predictions.²

Clearly, Phase 1 has exceeded the expectations of those who campaigned for the investment and those who specified the outline performance and engineering solutions. Indeed, the popularity and rapid adoption of the railway has, in part, been its downfall. Expectations were set high on the day of opening and have escalated since, with many quickly developing reliance on the service frequency and journey times.

However late running services and cancellations have exceeded acceptable levels adding to the overcrowding problems associated with inadequate car numbers on peak-time services. Service levels are significantly impacted by eastern track layout on the approach to Edinburgh Waverley as well as the extensive use of single-track sections which naturally limits Borders Railway’s ability to adapt to the increased demand.

There is also clear evidence that bus services were significantly impacted by the opening of Borders Railway which resulted in the operator terminating key arterial services, especially along the A7. This adverse impact accounted for circa 20-25% of the additional rail journeys, rather than maintaining bus use and declining further car use.

This anecdotal evidence provides a brief insight into one of the key flaws in public transport investment in the UK where public transport (PT) alternatives pitch against each other for patronage. Logically, these systems should work as an integrated network, each part of which should target specific users and play to its own particular strengths. (i.e., bus for distribution and first/last mile and rail for direct rapid services between key nodes). The integration of bus and rail services at Galashiels is an exemplar of physical connectivity, however more work is required to achieve timetable integration.

The extension from Tweedbank to Carlisle therefore needs to learn some key lessons:

- Incorporate adequate passive provision for growth.
- Delivered in a logical and affordable sequence of phases.
- Be part of an integrated public transport network with systems adapted to strengthen the overall public transport solution.

Despite the shortcomings of Phase 1, demand has risen year-on-year since opening (accepting the fall in demand experienced since Mar 2020 due to the COVID-19 pandemic). This demonstrates the huge impact railway investment has and will continue to have on the Borders economy and future prosperity.

Increased visitor numbers, renewed business confidence and societal expectation for better and more efficient homes are being driven by the railway investment. Nothing demonstrates this better than the emerging Tweedbank Expansion framework and associated Supplementary Planning Guidance (SPG).

Immediately adjacent to Tweedbank station, the 34 ha Lowood Estate offers the opportunity to create an exemplar high-quality sustainable development of 300-400 homes and a 'care' village set in a respectful retained habitat and enhanced environmental infrastructure. Whilst the Scottish Borders Council's "Tweedbank - Vision for Growth and Sustainability. A Community for the Future SPG and Design Guide" of June 2021 does not specifically highlight the sustainable value of well-connected public transport adjacent to the site, clearly the proximity to the station has been a factor in providing the occupier confidence for such an advanced concept.

² Office of Rail and Road (ORR) Passenger Entries and Exits data Table 1410 (<https://dataportal.orr.gov.uk/statistics/usage/estimates-of-station-usage/>)

1.5 Answering the question

What is the purpose of this report?

This report provides the Campaign with a high-level technical commentary and begins to build a strong case for investment. The report also provides guidance for the potential future activities of the Campaign in securing stakeholder engagement and commitment to move to the next stage of development.

This report does not seek to establish the options from which a single preferred option could or might be selected, but rather provide a range of ideas and thoughts and begins to identify the challenges, risks and opportunities that need significant further work and development.

This report seeks to build upon the successes of Phase 1 of Borders Railway, learning lessons and formulating a strong blueprint for the continuation of the railway between Tweedbank and Carlisle.

3 What should the railway achieve?

A new, relevant, meaningful and accessible railway needs to achieve much more than just providing a network system. The railway should open-up opportunities, support growth, be a catalyst for regeneration, unlock development and be inclusive, sustainable, resilient, reliable and adaptable.

It should support local people to lead healthier, safer, more prosperous and resilient lives with choices based on opportunity, affordability, accessibility, effectiveness and efficiency. The railway should improve the quality of life for everyone.

The reach and impact of the railway, and the fundamental basis of assessing the values it will provide, should therefore be as broad as possible and developed in collaboration with the communities, stakeholders, investors and transport agencies involved.

Whilst previous studies have generated a wide and complex range of potential objectives, the following simplified list seeks to provide a more memorable strategic set of objectives, set within a framework of benefits and ambitions, that will help the multiple agencies, sponsors and stakeholders galvanise around a shared and ambitious vision.

3.1 Strategic objectives

To boost the economic success of the region and provide a foundation for strong sustainable, green and inclusive growth.

3.1.1 Stronger

To boost the economic success of the region and provide a foundation for strong sustainable, green and inclusive growth.

A strong economy is one that improves the prosperity of everyone. It fosters greater and broader 'inclusion' so every part of the community feels the impact of long-term sustainable growth. Growth built on creating a greener society, removes fuel poverty and provides people with credible and reliable low-cost public transport instead of relying on private car ownership.

For businesses, a stronger economy is one that supports investment by providing a stable long-term vision for increasing sales and business activity and developing the workforce. A strong economy will lower unemployment and replace low-value low-skill jobs with higher-paid, better skilled employment opportunities.

Skills that are defined and developed locally and target retaining the younger population and invigorate a buoyant local circular economy and making the region an attractive and realistic proposition for individuals, couples and families to relocate within and to the region.

A stronger economy will also support investment into alternative energy technologies and renewables, which in turn will reduce pollutants and improve air quality. A stronger economy will provide local people with greater choice to travel where and when they want to, which in turn reinforces the strong business case for investing in the railway.

A strong economy is one that is diverse and well-balanced, supporting every part of society and every business, workplace and industry by promoting local jobs for local people and investing in education and skills development focused on local needs and opportunities.

3.1.2 Fairer

To provide efficient, effective and accessible public transport connectivity to broaden opportunities, foster greater social cohesion and positively encourage modal shift to sustainable transport.

A fairer society is one in which access to transport is not blocked by ability, cost, reliability or route limitations. A fairer transport solution is one which is easy to access, affordable, easy to navigate and punctual taking people where they want to go, when they want to go there.

Choice is a key driver in allowing people to live their lives their way, whether its travelling for work, business, or leisure. With choice comes competition – the railway must compete for its patronage; it must be attractive, relaxing, inspiring, elegant and robust. It must connect with other transport solutions to provide holistic end-to- end journeys and be integrated in service patterns and timetables.

Integrated public transport draws upon the value of connected services to provide seamless travel, using common platforms for adaptable and flexible ticketing with real time, easy to use and reliable travel information.

A fairer transport solution must also include critical nodes that provide easy, efficient and effective access to the transport system. Stations must be accessible, inclusive and provide for a broad range of needs, wants and abilities. Stations must become venues and destinations in their own right, with functions not just for the traveller, but for the wider community. Facilities and services that bring the community together, engender social cohesion and demystify public transport.

The primary object of attractive, clean and punctual public transport is to allow people to make positive choices regards their travel preference, reducing reliance on private cars and opening-up new and different opportunities about where to live, work, learn, rest and play. It should provide easier access to more and better healthcare, education and community services, fostering more resilient self-supporting communities.

3.1.3 Faster

To provide valuable additional capacity for passengers and freight to ease congestion, improve resilience and enhance national connectivity.

A faster credible public transport alternative will not only help the localities, region and nations achieve their carbon reduction targets, but will also provide valuable additional capacity for north-south Borders connectivity especially WCML and East Coast Main Line (ECML).

A faster railway translates into drawing communities, places and businesses closer together, shortening journey times and making travel more effective and efficient. Faster and more reliable journeys give people choices and encourages their adoption of public transport for more of their journey needs.

A faster, more reliable network will diversify the Borders crossings and provide more and better diversionary routes in the event of unplanned emergency action and to aide planned maintenance, renewals and enhancements.

A faster railway will provide more and better intercity opportunities, connecting more town and cities and broadening the traveller's destination and route choices. A faster railway will also enhance the performance of WCML by sharing services north of Carlisle via Hawick and Lockerbie to reach Edinburgh.

A faster railway will release valuable capacity for the movement of HS2 services between Manchester, Glasgow and Edinburgh, enabling the delivery of the values HS2 has promised and

increasing the speed of connections with core cities and international departures and arrivals via ports and airports.

A faster railway will also improve the passage of freight by increasing the paths available and potentially diverting traffic off WCML, returning the region's roads to local traffic and first and last mile journeys.

3.2 Success factors

In order to measure how successfully any solution satisfies the Strategic Objective, a set of 'success factors' should be developed that provide tangible benchmarks and key performance indicators for success.

The table below provides an initial framework that should be developed in collaboration with the communities, stakeholders, investors and transport agencies involved.

Stronger	To boost the economic success of the region and provide a foundation for strong sustainable, green and inclusive growth.	Improved prosperity
		Greater / broader inclusion
		Business growth
		Lower unemployment
		Access to better skills
		Access to better homes
		Improved environment
		Improved air quality
		Greater financial stability
		Attraction of (magnetic) investment
Fairer	To provide efficient, effective and accessible public transport to broaden opportunities, foster greater social cohesion and positively encourage modal shift to sustainable transport.	Greater accessibility
		More affordable travel
		Improved social sustainability
		Better local & regional connectivity
		Reduced reliance on road use
		More integrated public transport services
		Greater interchange between public transport modes
		Access to better jobs
		Better access to community services
		Higher skills for business
Higher retention of skills		
Alternative local delivery solutions		
Faster	To provide valuable additional capacity for passengers and freight to ease congestion, improve resilience and enhance local, regional, national and international connectivity.	Improved national connectivity
		Intercity opportunities
		More / better diversionary routes
		Enhanced performance of WCML
		Improved freight paths
		Better links with aviation
		Better links with ports (marine & inland)
		Opportunity to optimise regional network
		Mitigation of road congestion

3.6 Answering the question

What should the railway achieve?

In a modern complex world, infrastructure investment has to achieve much, much more than historically it has been challenged with delivering. A new railway must have a fundamental and widespread impact on lives, well beyond those of rail passengers.

The new railway should be a catalyst for sustainable, clean and green growth and inclusive prosperity. It should move people away from car reliance by providing a credible, affordable, efficient and effective alternative.

The new railway will need to address the punctuality and capacity issues of Phase 1 (Waverley to Tweedbank) and help deliver a more resilient and integrated public transport network.

Ultimately, the new railway should help facilitate long-term, stable and progressive change to make the economy stronger, transport opportunities fairer and to connect people and freight faster and more efficiently.

4 What route might the line take?

4.1 Aim of the alignment evaluation

This study aims to consider the strategic case for a new railway connecting through the Scottish Borders, providing an additional link between Scotland and England.

In doing so, this study seeks to rebalance the idea that Border Railway continuation would simply reopen the former Waverley Route (including the southern end of the Edinburgh and Hawick Railway and the Border Union Railway) with wider consideration of the other potential alternative corridors that may exist.

This study further seeks to highlight the potential values created at a national, regional and local level that all possible alignment options must target to develop a compelling investment case, rather than drawing an early assumption that the former alignment as the de facto route that the railway will take.

This is compounded by the fact that the reinstatement of a former railway usually involves significant civil engineering work similar in scale to the construction of a new railway. Whilst there can be advantages of following a former route in the locations of land boundaries and the presence of former structures (such as bridges and earthworks), these can be offset by the need to reconstruct or strengthen structures or the cost of purchasing properties that have encroached on the route. Older alignments also often have a reduced speed profile as trains had to avoid steeper gradients in the past to an extent that isn't such a critical requirement for modern trains.

Whilst some favour a route that closely follows the former alignment, this study has looked broadly at two corridors and begins to evaluate the feasibility of these options in relation to engineering feasibility, station location options, service potential and geographical context.

4.3.1 High level route description

Broadly, the route between the end of the current Borders Railway at Tweedbank and any of the various connections to the rail network around Carlisle can be split into three sections.

The first (*Section 1* in Figure 6) runs from Tweedbank to Hawick, along which there is essentially a single corridor that the former Edinburgh and Hawick Railway followed, utilising both the Tweed and Teviot valleys and the rolling but reasonably easy terrain between them.

The next section (*Section 2* in Figure 6) is between Hawick and Longtown, for which we focus on two alternative corridors crossing the Cheviot Hills. The corridors generally seek to follow terrain and alignments that will limit or mitigate the need for large-scale civil engineering works. The two corridors considered are:

- **Option 1:** Broadly following a re-engineered version of the former Border Union Railway linking the valleys of Slitrig Water and Liddel Water via Newcastleton.
- **Option 2:** Broadly following the A7 via Teviothead and linking the Teviot and Esk valleys via Langholm.

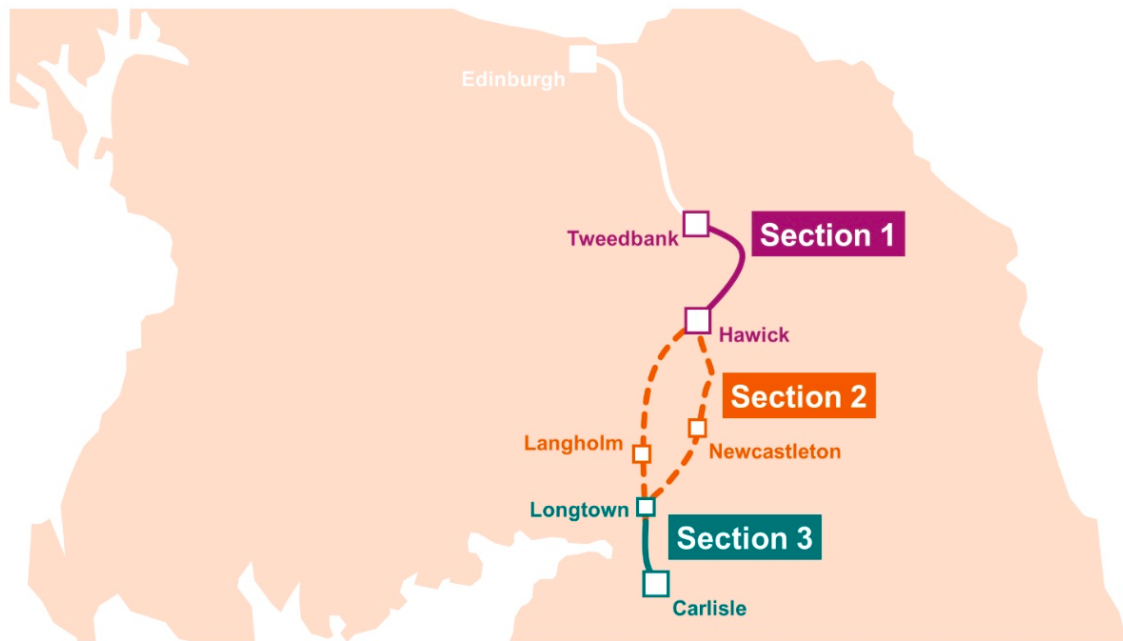


Figure 6: Borders Railway continuation alignment evaluation sections

There may be other potential crossing points which should be explored within any commissioned feasibility studies, however for expediency this study focuses on the above two pathways to frame examples of the various technical and topographical challenges.

The third and final section (*Section 3* in Figure 6) links Longtown with Carlisle. There are many options for connections to the existing rail network at Carlisle, including re-use of the former branch line towards Gretna, as well as more direct connections following the route of the former Border Union Railway.

4.9 Answering the question

What route might the line take?

The best route will be the one that provides optimum performance and balances maximising benefits and values delivered for the most economic costs. 'Best' should be a response to the delta between costs and values, not the cheapest nor easiest.

Speed undoubtedly plays a vital part in route performance and line speed obviously needs to be kept appropriately high. But speed needs to be balanced with cost and function – little point in getting somewhere quickly, if it's not where you want to go.

Stations limit line speed but provide access and connectivity and therefore play a crucial role in developing a reasoned argument over which route performs the best. Stations provide the opportunity for an integrated network, leveraging the power of bus & coach and enabling healthier lives through encouraging active travel.

Option 1 potentially disturbs large amounts of heritage that has been established along the Waverley Walk with newly developed ecology and sensitive biodiversity. Option 2 follows the A7 which already experiences noise and light pollutants and arguably is therefore less sensitive.

Route performance must also maximise economic impact and the potential to accelerate growth so the route that best connects people, places, regeneration and development opportunities should be an active consideration in analysing the options.

The potential for local traffic generation may also influence route selection, for example timber transport from commercial forestry, and the tourism and outdoor leisure markets. As a high level study, these and other important aspects are not fully explored in this report but merit detailed further work.

Looking through the lens of social sustainability and connectivity; Option 1 serves an immediate population of circa 21,956 with 82,700 within a 10km radius of the railway. Option 2 serves an immediate population of circa 23,348 with 85,200 within a 10km radius of the railway. Hence Option 2 serves notionally 7% greater overall population than Option 1.

Delivering the railway, the construction sequence and strategy, will also have a significant impact on costs, programme and quality of life. Option 1 weaves through remote terrain meaning construction traffic and build sequence will be governed by temporary access and maximising the line of route opportunities. Option 2, following the A7, integrally has better construction traffic access, but the frequency with which the line of route crosses and interacts with the A7 and the scale of construction activities, may seriously impact the performance of this arterial and strategically important road.

Hence, 'which route is best' encompasses much more than just the railway's engineering and technical challenges.

5.12 Answering the question

Where might stations be located?

Station locations and the preferred line of route need to work 'hand in hand'. The locations need to inform and contribute to shaping the railway solution whilst the challenges, costs and constraints of the railway's path will unavoidably influence where stations might be located.

Within each town and village, there are a range of alternative locations that each have the potential for a slightly different identity, function and purpose which should be shaped by the likely demand, community preference and the strategic opportunities the location presents.

Along the route, there are a range of very different station catalysts from business, industry and logistics to housing and community services. As an end-to-end route the combination is potent and will undoubtedly permit any strategic case to leverage a broad range of values and benefits.

Individually, some locations may not present value for money, hence retaining a programme-level aggregation of costs and benefits for as long as possible will help make the case for investment. Disaggregation should be reserved for targeting funding opportunities as and when they appear on the horizon.

6.5 Answering the question

How many services should there be?

The obvious answer is 'as many as can be supported with patronage' yet this potentially risks the longer-term vision of transformation change and impact. Measuring service levels through anticipated demand, as can be seen on Border Railway Phase 1, leans towards scrutinising calculations, rather than setting and aiming for a strategic vision.

Infrastructure investments that have the capacity and capability to grow and adapt over time harness greater long-term value and invariably exhibit better use of public money.

Hence, in keeping with the primary vision, the service frequency, capacity and calling pattern should be scalable within the context of the infrastructure, yet with the ability to sequentially build the service capability as the vision is delivered over time.

Of the options considered, Option 2 provides around a 5 – 6-minute better journey time than Option 1. This results in an all-stations (electrified) journey time of around 1 hour 50 minutes between Carlisle and Edinburgh and around 1 hour 20 minutes for a non-stop train. An electric intermodal freight service would be around 5 – 10 minute slower than a passenger train.

The most basic train service would be an extension of the existing Edinburgh – Tweedbank service to Carlisle, which would not require any additional infrastructure above Borders Railway. Running any passenger or freight services on top of this would trigger an intervention between Edinburgh and Tweedbank (such as further double-tracking).

However, the full potential of Borders Railway would only be unlocked by running through services from the WCML providing an alternative route between Carlisle and Edinburgh. This would relieve the constrained northern end of the WCML, provide additional regional benefits and provide an alternative route between the WCML and Scotland during disruption. The predicted journey times are competitive with the route via Carstairs, particularly if the Edinburgh – Tweedbank section can be further enhanced.

A core service pattern of a 1 tph express service with limited stops, a 1 tph stopping service calling at all stations and a 1 tph freight path would provide a useful initial benchmark for testing an analysis.

7 What are key challenges?

Any major civil engineering project comes with significant challenges, particularly at the interfaces with other built or natural features. As a long, linear piece of infrastructure, a new railway will intersect with many features and so there can be a large number of high-risk challenges associated with the project.

7.1 Establishing a clear phasing plan

Clearly in the current financial and economic climate, securing investment into a fully developed and fully operational continuation to Carlisle is unlikely. Not because the case cannot be made nor that the delta between costs and values cannot be closed down, but more because the scrutiny and examination that such a significant decision will demand will likely delay any commencement and present constant challenge to how funds are prioritised.

Instead, the Border Railway continuation should be considered as a series of incremental projects under an overarching programme. The programme should establish the vision and overall context, including the optimised specification, delivery vehicles and a targeted cocktail of funding.

The phasing will naturally disaggregate the programme into 'bite-sized' elements that, when combined will deliver the outcomes. The challenge is not to commence disaggregation before the overarching case has been made and generally accepted, but rather defer disaggregation until such time as funding pathways become visible and elements within the programme can be shaped and defined to suit the particular funding criteria.

The phasing strategy should also allow flexibility in how, when and what schemes are brought forward and in what order. The Campaign should promote an 'adaptable model' such that the mistakes made in delivering Borders Railway are not repeated and lessons can be truly learnt.

The messaging here can be very difficult as without a clear structure and phasing strategy, initial decisions may focus simply on the first part of the programme losing sight of the ultimate vision. It will take time to fully and faithfully articulate the phasing to secure a common understanding and buy-in from the various agencies and stakeholders.

Whilst retaining this study's high-level nature, the following hopefully provides some an indicative phasing proposal or 'development framework' which will need deeper and more detailed analysis as corridors, alignments and routes are developed.

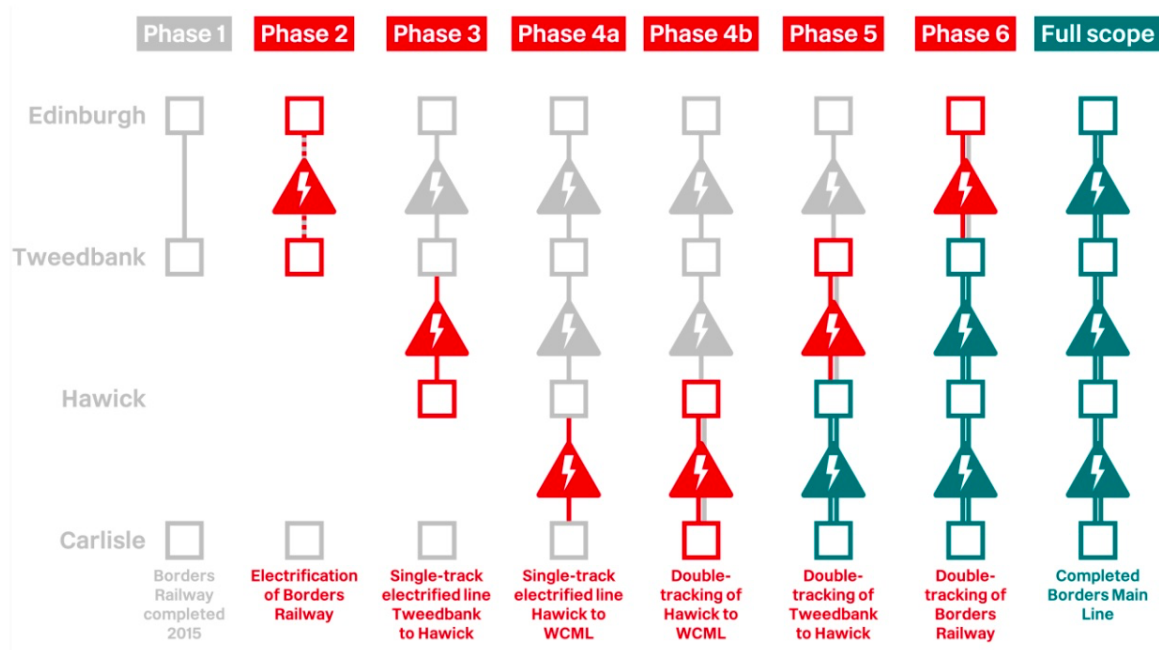


Figure 20: High-level phasing strategy

Phase 4 could potentially be split into 4a and 4b as shown in Figure 20. This will need very careful consideration to ensure 4a (single track with passing loops) is not considered as the final solution.

This sub-phase could result in the new section between Tweedbank and Carlisle suffering the same poor performance as Waverley to Tweedbank and risks the wider economic justification for completing the line to Carlisle. Phase 4b would be to upgrade 4a to a full double-track solution, which is likely to be necessary to provide the passenger and freight capacity that create the economic justification for the line in the first place.

Further, phase 3 must also be very carefully considered to ensure Tweedbank to Hawick is not delivered as a finished solution. A terminus at Hawick, reminiscent of the EHR original, would fail to deliver real impact and risks the line reverting to a slow rural railway which, most likely, would fail to achieve funding to start with.

The framework suggests a high-level implementation philosophy whereby the overarching Borders Railway 'programme' is delivered sequentially, via a series of 'strategic projects', over a period of time.

Each 'strategic project' may contain a blend of route enhancements, stations, public realm, aligned investments in public transport (bus interchanges and adapted quality bus routes), commercial development (housing, employment space, etc) and reinforcing community services and facilities, all woven around a progressive and sequential development of the core railway specification.

The framework structures an incremental development of a core specification (single track with passing loops) which is then developed over time into the strategic rail corridor set out in this report (electrified double-track). This approach allows for demand to grow and capacity to flex, with one lens focused on the broader opportunities and ultimate goal and the other lens watching the balance of costs and values whilst taking on-board the lessons learned on Phase 1.

This adaptable framework approach seeks to ease the burden of decision-making during the early stages, resisting the 'build and they will come' pitfalls and captures win/win opportunities for both investors and stakeholders. The framework essentially moves from north to south and then returns

north, building upon the successes of Phase 1 to Tweedbank, integrating the resolutions of Phase 1 performance, whilst connecting and then reinforcing links with Carlisle.

The development framework shapes the implementation of the over-arching blueprint allowing the 'strategic project' elements to be 'owned' and delivered by the relevant agencies and investors. Each 'strategic project' will, in itself, be a mini programme drawing in funding and finance from multiple sources to support a range of aligned outcomes. This **cocktail of funding and finance** will share the financial load and allow the different funding and financing gateways to be navigated appropriately.

Whether the elements of each 'strategic project' are railway interventions, bus/coach adaptations, highway modification and improvements, investing in relocations, safeguarding corridors through development control, site acquisitions, developing community facilities or enabling commercial development through supplementary planning guidance focused on transport-led regeneration, every element should **align with the over-arching programme and help enable the strategic outcomes**.

Whilst scale of investment will undoubtedly be an issue to overcome, the greater challenge will perhaps be in aligning stakeholder interests, coordinating activities and maintaining shared and mutual progress recognising that this is a long-term strategic pursuit which will need to overcome political, funding and economic cycles.

7.2 Understanding the potential alignments

The indicative corridors presented herein are understandably very high-level, however the corridors have uncovered some key challenges.

The first relates to the horizontal positioning of the route. Only limited information was available for the exercise undertaken as part of this study and so the alignment options are only a broadly defined possible corridor on which the railway could run, allowing an assessment to be made of possible timetables and required structures.

The second challenge relates to the vertical alignment. For both route options, the vertical gradients along the line are significant. This was true for the legacy Waverley Route, but with alignment smoothing for higher speeds giving a shorter horizontal alignment, gradients will likely be made more severe.

This is not an insurmountable challenge, as electrification can overcome the gradient challenges thanks to the significantly increased power of electric trains and digital train control can ensure that trains – particularly heavy freight trains – are able to keep moving on steep gradients and are not stopped at signals.

However, it can provide challenges during construction, operation and maintenance of the line, such as through presenting a safety risk from on-track machines 'running away' on steep gradients.

It is noted however that much more work is required before any corridor can be confidently identified, assessed and analysed.

7.3 Structures

Excluding earthworks and culverts, both route options involve around 105 structures. For Option 1, which more closely follows the former Waverley Route, this includes 27 structures that can be reused. For Option 2, which uses a completely new alignment between Hawick and Longtown, only 13 structures can be reused.

Within these totals, both options include several major box section crossings where the railway crosses a road at a high skew angle. These structures are large and complex. There are also between 8-11 viaducts with a total length over 100m. Again, these are significant and complex structures.

The largest proposed structure is the new tunnel at Whitrope summit, which is part of the Option 1 route. This structure would be around 1.5 km long, approximately 400m longer than the existing Whitrope Tunnel. Long tunnels come with significant design and construction challenges, including geology and drainage.

Structure type	Structure size	Structure length	Option 1	Option 2
Tunnels	all	all	1	0
Underbridges	Multi-span viaduct	>100m	8	11
		<100m	4	5
	Single span	>30m	7	20
		10-30m	25	23
		<10m	11	7
Overbridges	Multi-span viaduct	all	0	0
	Single span	all	18	21
Box section crossings	all	all	4	6
Extant structures	all	all	27	13
TOTAL			105	106

Table 8: Number of major structures by route option

7.4 Environmental constraints

As a nearly 90km-long linear asset, the new railway intersects a variety of environmental receptors and constraints. Though the alignments investigated at this stage are still very much at a low level of detail, they provide an idea of the challenges that the design and construction of the new railway will face.

This section will briefly tabulate out some of the key environmental receptors and constraints running from Tweedbank southwards towards Carlisle, looking at the proposed alignments rather than the wider railway corridor. This is not intended to be an exhaustive list and further analysis will be required to assess and propose mitigations/alterations to the railway alignment accordingly.

Location	Description	Type	Comments
East of Melrose, both options	Newstead Roman military complex	Scheduled ancient monument	Unlikely to be avoidable, will require extensive archaeological investigation and mitigation
Northeast of Newtown St Boswells	Newtown St Boswells Woods	SSSI	New alignments cross through this SSSI, reuse of former alignment could avoid it
South of Newtown St Boswells	River Tweed/Ale Water	SAC	Will be crossed by all alignment options
Hawick	River Tweed	SSSI	Option 1 will cross river with new structure, Option 2 will involve heavy civil engineering works adjacent to river
South of Hawick	Whitlaw Bank to Hardies Hill	SSSI	Opportunity created by presence of SSSI as this reinforces need for new alignment which will allow improved curvature and thus permissible speeds
South of Hawick	Lynnwood - Whitlaw Wood, Slitrig, Borders Woods	SSSI/SAC	Will be crossed by all alignment options, though proposed alignment options minimise interaction
South of Hawick	River Tweed / Stilrig Water	SAC	Will be crossed by all alignment options

Location	Description	Type	Comments
Southwest of Hawick	River Tweed/Borthwick Water	SAC	Option 2 must cross this feature
Southwest of Hawick	River Tweed	SSSI	Option 2 crosses the River Tweed at multiple points
Southwest of Hawick	Change House, enclosure	Scheduled monument	Option 2 currently intersects this feature; future alignment iterations may be able to avoid it
North of new Whitrope Tunnel	The Catrail, linear earthwork	Scheduled monument	Option 1 must cross this feature, but uses former alignment which will limit impacts on feature
South of Langholm	Langholm - Newcastleton Hills	SSSI/SPA	Option 2 skirts the very edge of this large SSSI/SPA and it is possible that a complimentary design could be undertaken to minimise the impact without compromising the overall track alignment
North of Longtown	Scot's Dike	Scheduled monument	Option 2 must cross this feature
Longtown	Longtown conservation area	Conservation area	Option 1 alignment uses former alignment at this point which brings the railway close to this conservation area
North of Carlisle	Frontiers of the Roman Empire, Hadrian's Wall	World heritage site	The WCML forms the eastern boundary of the world heritage site where the proposed options for Borders Railway link to it – any junction, particularly a grade separated one, would have to take appropriate mitigative actions

Table 9: List of environmental constraints and receptors

Note that this list excludes ancient woodland as these habitats are widely spread and their quality and value is highly dependent on local conditions. Further ecology surveys would establish the nature of these habitats and would influence any later design proposals accordingly.

7.5 Costs

The potential costs of delivering and maintaining the Borders Railway continuation will undoubtedly be challenging, more especially with the headwinds currently being experienced across the UK's transport infrastructure.

These headwinds have made it difficult to deliver many existing capital programmes with inflation negatively impacting cost plans and delaying progress. Transport schemes that rely heavily on traditional transport economics of journey time improvements, congestion relief or renewals will likely struggle in favour of those schemes that leverage social, climate and environmental benefits.

As a comparative guide, average unit costs of major transport projects can be found in Table 10.

Project (start year)	Average rate per mile in 2021 prices
Borders Railway Edinburgh–Tweedbank (2013)	£12 million per mile
Airdrie–Bathgate rail link (2007)	£28 million per mile
A9 Perth–Inverness dualling (2015)	£45 million per mile
Aberdeen Western Peripheral Route (2015)	£57 million per mile
High Speed 1 (1998)	£162 million per mile
M74 completion (2008)	£189 million per mile

As an historic point of interest, the cost of building the Border Union Railway from Hawick to Edinburgh of £450,000 in 1858 prices gives a 2021 unit rate of £9 million per mile (converted into 2021 prices using labour cost inflation).

7.6 Scope

The successful delivery of the first phase of Borders Railway was quickly mired by the challenges of its immediate popularity. As a result of arguably severe underestimation in the projected passenger demand, the infrastructure capability was quickly being used to its limits, with service reliability and capacity being limited by the extensive single-track sections and diesel trains proving unreliable on the steep gradients.

The lessons of under-scoping must be learnt from this project – even without through trains, significant demand remains unsatisfied for passengers wanting to travel into and out of the Scottish Borders.

As detailed in chapters 3 and 6, a significant proportion of the benefits of the line are to be drawn from its completion as a through railway between England and Scotland and it is reasonable to expect that a significant additional demand for increased services would be generated on top of current unmet demand arising from the link between Edinburgh and Tweedbank.

This report has highlighted the need for, the opportunities arising from, and the potential feasibility of completion of Borders Railway. Further detailed analysis will identify opportunities to unlock early value through the staged delivery of the scheme and in turn this will feed into exercises to maximise the affordability of the scheme.

However, a key challenge through this analysis will be to ensure that the overall vision for a completed additional main line link between Northern England and the Scottish Central Belt is retained, independent of the potential staging and value engineering undertaken to maximise affordability of those stages.

For example, the cost savings associated with single versus double track structures are unlikely to offset the loss in capacity resulting from single track operations. Likewise, electrification is far more cost-effectively constructed before the railway becomes operational and that is before the operational challenges of relying on diesel to traverse the steep gradients on the line.

This is the key role that the Campaign must play – sustaining the vision for a completed Borders Railway, independent of discussions about affordability and deliverability and ensuring that compromises made do not repeat the mistakes of the first phase of Borders Railway.

7.7 Existing Borders Railway enhancements

The original Borders Railway was built to a substantially restricted scope (arguably below a “minimum viable product” scope) which has limited the capacity of the line to accommodate passenger growth and has also impacted on the resilience of the existing services running on the line.

Whilst this is a lesson that should be learned for the development of Borders Railway continuation, it also presents a limitation on the ability to run the required services on the full route that will unlock the maximum benefit and utility from the railway.

7.7.1 Essential

The currently degraded performance of Borders Railways must be investigated in detail with a clear action plan put in place to remedy the problems. Without this, a throttle will be placed upon any continuation work and overall line performance will fail to deliver the ambition and expected outcomes.

Full conventional electrification, capacity enhancements up to full double-tracking and loading gauge enhancement to enable container freight trains to use the line would be considered the minimum required interventions to the existing Borders Railway.

Lower levels of enhancement may be viable but extensive analysis and service integration will be necessary and could still restrict the long-term growth potential of the continuation.

Upgrades, nevertheless, as detailed below, are essential to enable the full route to unlock the maximum opportunity for the communities along the line, for the wider region, and for both Scotland and England as a whole.

7.7.1.1 Electrification

Performance of the existing diesel multiple units on the steep gradients and sharp curvature of the existing Borders Railway have severely limited the capacity and reliability of the line. Combined with high ridership, this has made electrification of the route a priority for the Scottish Government.

In mid-2022, the Transport Scotland progressed development of the partial electrification of the existing Borders Railway. In the short- to medium-term, they plan to rely on battery electric multiple units to lower the up-front cost of electrification works.

For frequent and freight services to operate reliably, partial electrification is unlikely to provide an acceptable level of performance. To act as a main line diversionary route, the infrastructure specification should match that of the WCML and ECML.

Furthermore, as detailed in 6.2.1 and 6.3.1, significant journey time improvements are achievable through the electrification of the line and use of electric trains. The potential for through services on Borders Railway continuation should therefore be considered as part of the long-term planning for complete electrification of the line.

It is assumed that complete electrification will be complete, or at least significantly progressed, by the late stages of development of Borders Railway continuation.

7.7.1.2 Capacity enhancement

The connection between Borders Railway and ECML at Portobello Junction, and the shortage of train paths into Edinburgh Waverley, will remain a challenge.

Service patterns will continue to develop dynamically with some long-term investments coming to fruition including HS2 and the Waverley station masterplan. These will naturally place different demands on the existing junctions and throat, as well as alleviating some existing pressures.

Ensuring Borders Railway continuation is suitably factored into the capacity changes at these junctions will be a key part of developing the route and securing its success.

The existing Borders Railway consists primarily of single-track railway with dynamic passing loops. Of the roughly 50km railway, only 15km are currently double track.

This arrangement was well-suited to the initial timetable but was quickly shown to be inadequate once the timetable was expanded to accommodate the significant excess demand beyond the levels predicted.

Borders Railway continuation will require capacity and resilience that is beyond what the existing Borders Railway can provide, therefore physical works will be required to the line prior to the full through timetable being able to operate. This may include signalling enhancements and extension of the length of double track lines.

Detailed analysis will be required to establish if full double-tracking is required, or if extended/new dynamic passing loops are suitable. Any analysis would have to consider all of the following:

- minimum required infrastructure to accommodate the proposed Borders Railway continuation service level of 4 tph in each direction.
- providing adequate resilience in this timetable to satisfy the required level of resilience.
- maximising the ability to accommodate an enhanced timetable given the proven potential for growth in both passenger and freight traffic on this corridor.

Such works would have immediate benefits to the users of the current Borders Railway, as the current service is constraining demand. Enhancements are already being developed as part of the electrification works.

7.7.1.3 Loading gauge enhancement

The existing Borders Railway was built as a passenger railway only and hence no allowances have been made for the larger loading gauge (cross sectional space for train operation) associated with freight trains.

For infrastructure in Scotland and England, the W12 profile refers to the loading gauge that provides (largely) unencumbered operation of container freight services.

In providing passive provision for electrification, some structures were built to a larger loading gauge.

However, arch overbridges and tunnels that were retained may not provide W12 clearance. Similarly, many original underbridge structures were retained on the route and these already provide limited clearance to rolling stock according to the Sectional Appendix.

As with electrification, to act as a main line diversionary route, the infrastructure specification should match that of the WCML and ECML. A full study will be required to assess the level of work necessary to clear W12 along the route.

The Scottish Government plans for electrification of Borders Railway currently under development provide a significant opportunity to minimise overall infrastructure costs.

Where electrification work is taking place, W12 clearance should be achieved wherever possible and ongoing development work should take due cognisance of this.

7.7.1.4 Structural capacity enhancement

As well as providing enough space for larger trains to operate, the existing Borders Railway will require its supporting structures to provide enough capacity to support heavier trains.

Referred to as “route availability”, the structural capacity of the overall line will be severely limited by the retention of some lightweight legacy structures from the original railway.

As with electrification and gauge clearance, to act as a main line diversionary route, the infrastructure specification should match that of the WCML and ECML. A full study will be required to assess the level of work necessary to enable the required route availability along the existing railway.

7.7.2 Desirable

Whilst the above interventions are essential to provide the minimum level of service necessary for the new railway to unlock as many opportunities as possible, the following upgrades would be desirable to add further value and achieve the maximum benefit locally, regionally and nationally.

7.7.2.1 Control, command and signalling systems

Whilst Borders Railway continuation would be expected to be built to enable the latest digital railway control, command and signalling systems, this would be developed in such a way to enable compatibility with legacy signalling given that through trains operating on the line would interact with legacy systems on the rest of the railway network.

However, the use of modern train control and traffic management systems (ETCS and ERTMS) on the full length of Borders Railway from Edinburgh to Carlisle would unlock additional benefits in capacity and resilience.

Further assessment should consider the value of extending the new control, command and signalling systems on Borders Railway extension to include the entire route.

7.7.2.2 Journey time improvement

All of the essential enhancements detailed above would provide measurable improvements in journey time for passenger and freight services – in particular electrification, which can offer as much as a 30% journey time benefit alone. However, further physical works may provide opportunities for additional benefits.

Journey time improvements are generally achieved not through the increase of higher speeds, but through the lifting of lower speed restrictions, such as those through tight curves, low-capacity structures or junctions.

Whilst not essential, further improvements to journey times would make the completed Borders Railway even more desirable as an alternative for road transport for passengers and freight customers. Upgrades would also provide an immediate benefit to passengers using the current line.

An assessment of possible improvements should be completed as part of the wider assessment of the enhancement of the existing line.

7.8 Answering the question

What are the key challenges?

The key technical challenges include securing access onto WCML and into Carlisle station as well as resolving Borders Railways challenges and navigating Portobello Junction and Edinburgh Waverley.

Land acquisitions are never easy and there are some particularly challenging environments routing through Hawick and the Newtown St Boswells to Melrose corridor where safeguarding has been compromised. The costs of relocations and the impacts on businesses, livelihoods and communities should not be underestimated.

The environmental challenges are also significant with ecology, SSSI, habitats and heritage challenges along whichever route is preferred. The risks from construction impacts and long-term pollution from light, noise and waste will need very careful monitoring and mitigation.

From the railway's perspective, the primary challenge is maintaining line speed and reducing gradients to maximise train performance, mitigate energy use and improve reliability.

Strategically, three areas of risk are notable:

Implementation – deliverability, constructability, impact, phasing and sequence.

These challenges focus on the order and ease with which the railway can be delivered including the negative construction impacts and what an incremental development of the railway might look like. Where stakeholders are being asked to support 'passive provisions' careful narration will be required to keep the ambition in focus.

Programme – the accrual of costs and realisation of benefits over short, medium and long term.

Clearly, with the current constraints on the public purse and scrutiny over value for money and minimum viable, securing long-term commitment to a 20 to 30-year programme will be very challenging. But short-term challenges must not be allowed to mask or mis-direct the long game vision. The vision must be allowed to transcend recessionary cycles and focus on the long-term societal priorities of combating climate change, reducing carbon reliance and supporting recovery and good growth.

Affordability – funding, financing, business case strength and benchmarking.

Undoubtedly the scale of investment will be significant even if phased, and hence finding the money will perhaps be one of the greatest challenges. What will need support and/or subsidy? How can the private sector support? And how do we create and capture the broadest possible bandwidth of benefits? Ensuring 'no stone is left unturned' in searching for, monetising and capturing value will be critical to closing the BCR gap. Yet we know Waverley to Tweedbank was financially very effective, so how can this be replicated whilst maintaining the long-term vision?

8 What needs to happen next?

With the limited funds available, this report cannot and does not seek to provide answers to key questions yet rather it outlines the potential of the new railway, some of the challenges and hurdles to overcome and the key opportunities and values that could potentially be derived.

Clearly much further work is required to fully explore the details and develop a reasoned, justified and balanced view on the nature of the case for investment.

In order to initiate the further work required, the following potential activities may provide some useful direction for the Campaign.

8.1 Study synopsis

The technical aspects of this report require a level of understanding of the railways, its language and contexts. In order to distil a more public-friendly summary of this report, it is recommended the Campaign invest in producing an easy-to-read public-facing 'Synopsis'.

Such a synopsis should capture the key themes, objectives and proposition that this report shapes with clear diagrams, icons and text written in plain English. Most likely the document would not be more than 15-20 pages with photos, graphics and type-setting that makes it an interesting, useful and compelling high-level summary that shapes the case for investment and provides the Campaign with a valuable tool to communicate its vision and ambitions for Borders Railway continuation.

8.2 Stakeholder engagement

Whilst developing the synopsis mentioned above, the Campaign should focus on developing a clear stakeholder map and engagement process for leveraging the value of the synopsis and setting the right environment in which this report might be shared with key people.

In addition, many of the features within this report identify opportunities which require the communities along the route to begin to shape the solutions that they want in their location. The type, nature, character and functions of the stations needs local ownership to drive outcomes beyond traditional railway requirements.

The Campaign could play an active part in bringing together communities to fuel ideas, criteria and the concepts that the communities want, recognising the needs of the railway and constraints of affordability.

8.3 ES1 and ES2 feasibility assessments

Before embarking upon detailed investigations into line of route, safe-guarding, land referencing and design optioneering, the Campaign should target a series of initial exercises that sequentially builds a robust strategic case and co-creates, with key stakeholders, the primary vision and scale of ambition.

Initially, the core requirements should be investigated with key stakeholders to establish the scale of the ambition and align the agendas and perspectives of the key agencies. The requirements should remain live throughout the programme initial development, being progressively developed and reinforced, however capturing an agreed and shared 'vision' would be a valuable first step.

Following this, a high-level feasibility study and high-level viability assessment should be undertaken collaboratively with primary stakeholders and investors to agree the core requirements, underlying specification and phasing strategy. The object of this exercise would not be to establish the route or station locations, but more the feasibility and technical challenges of the new railway alongside agreeing the needs and wants of individual stakeholder agencies.

8.4 Business case development

Naturally once the core objectives, initial requirements and feasibility assessments are complete, the next stage would be to focus on developing a programme-level blueprint and compelling Strategic Case developed in accordance with 'Transport Scotland: Guidance for the evaluation of rail projects', Transport Scotland's Scottish Transport Appraisal Guidance (STAG) and Greenbook.

Alongside developing the Strategic case, time should be committed to establishing the high-level context of the programme's governance, commercial arrangements and financial scope, albeit retaining the aggregated power of the programme in order to pursue funding and finance through multiple routes and via multiple agencies and government departments.

8.5 Analysis of timetable and service potential

As witnessed with the existing Borders Railway, making accurate predictions regards the demand growth and service levels potentially required will either make or break the case for investment. Under-estimate and the railway will fail to deliver transformational change and could falter in the same way Waverley to Tweedbank has. Over-estimate and one potentially risks initial project phases overstretching funding envelopes and putting reputations at risk.

Whilst within the technical specifications, allowances can be made to invoke greater flexibility, the core funding argument will need to focus on what level of service is viable, fundable and deliverable.

Therefore, a more detailed analysis of the service potential should be undertaken engaging with the wider network to explore the potential of capacity release on WCML, HS2-readiness, freight and connections into Carlisle and through Portobello Junction and into Waverley.

To support this, a more detailed analysis of Borders Railways should also be undertaken to single out potential quick wins and investable propositions to drive service levels and punctuality closer to the original predictions.