

## FIRST STEPS IN REOPENING YOUR RAILWAY: LESSONS FROM CURRENT EXPERIENCE

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### SUMMARY

This paper provides practical first steps for progressing a rail reopening proposal. In the current climate – with the growth agenda recognising rail's economic value, but also devolution and funding constraints – local stakeholders increasingly need to take the lead on making these projects happen. Critical initial steps are to identify the needs to be met (the real purpose of the railway) and a funding package. Other early tasks include building an economic case and stakeholder support. A realistic approach to likely costs and delivery timescales is required. This paper, based on lessons from reopenings recently completed, in progress or being studied, as well as other relevant rail projects, gives the 'state of the art' and pointers for tackling these issues.

### 1. INTRODUCTION

#### 1.1 Background

Many communities have an old railway corridor or a freight-only line which they would like reopened to passenger service – to tackle congestion, provide access to jobs and services, improve connectivity and productivity, or simply reflect sustainability principles.

There is a long history of such reopenings, and many more are being developed or mooted (Bevan, 1998; ATOC, 2009; Green and Vincent, 2014; Pettitt and Comfort, 2015; Austin and Faulkner, 2015; Shirres, 2016)<sup>1</sup>. The current policy agenda is broadly supportive, particularly with a government focus on using infrastructure investment to support economic growth.

#### 1.2 Scope

This paper focuses on a typical proposition: reopening of an active or mothballed freight-only line or a disused ex-railway corridor, for a new or extended local passenger service as part of Great Britain's national rail network.

Wholly new lines, and introduction of light rail on an urban corridor, are outside its scope. However, some of the issues covered are also relevant to these, and vice versa. Schemes involving private freight or heritage railways raise further issues, which are omitted for brevity.

The paper assumes a basic understanding of the typical processes involved in a reopening proposal. These were helpfully set out in the Countryside

Agency's Rail Re-Opening Toolkit (Independent Rail Consultancy Group, 2004), although some players and roles have changed since then.

### **1.3 Structure**

Section 2 looks at the evidence about timescales, costs and demand forecasting, from 15 relevant reopenings since 2002<sup>2</sup>.

Section 3 describes the 'state of the art' in reopenings. It reviews the concept of conditional outputs; the impact of the growth and devolution agendas; the funding environment; and how these factors affect sponsorship models. It focuses on the situation in England, but much is also applicable in Scotland and Wales.

Section 4 offers pointers for practitioners considering a reopening scheme. It draws particularly on the key lessons from the preceding sections and the authors' own experience in various reopening proposals as well as other locally-promoted rail investments.

The bibliography highlights references of particular interest for descriptions of past schemes and 'lessons learnt'.

## **2. WHAT HAVE WE LEARNT FROM RECENT REOPENINGS?**

### **2.1 What were they?**

Table 1 (next page) summarises the recent reopenings.

### **2.2 How long did they take?**

Defining the start of reopening projects is difficult: they tend to emerge incrementally from ideas and aspirations, sometimes long-held before technical project development starts in earnest.

Those based on an existing active or mothballed railway (Type 1 in this paper) generally opened within 5-7 years of serious study, although this may have been preceded by initial work. Those involving a former railway corridor (Type 2) unsurprisingly have a longer timescale, typically around 10 and sometimes 15 years or more from the first technical studies.

**Table 1: Summary of relevant reopenings since 2002**

Category [1]	Route	Opening year [2]	Length (km) [3]	Cost (£m) [4]
Type 1: Reopenings based on an active or mothballed freight line	Edinburgh Crossrail	2002	2	7 [5]
	Vale of Glamorgan	2005	29	17 [6]
	Ebbw Vale Parkway	2008	29	48 [6]
	Aylesbury Vale Parkway	2008	3	12
	Kettering-Corby	2009	8	10
Type 2: Reopenings partly or wholly on a former railway corridor	Larkhall-Milngavie	2005	6	35
	Stirling-Alloa-Kincardine	2008	22	92 [7]
	Airdrie-Bathgate	2010	22 [8]	375 [9]
	East London Line Extns Phase 2	2012	3	75
	Borders Railway	2015	49	353 [10]
Hybrid I cases	East London Line Extns Phase 1	2010	4 [11]	900 [12]
	Bicester-Oxford [13]	2015	17	320 [14]
	Ebbw Vale Town [15]	2015	2	11
	Todmorden Curve [16]	2015	0.4	10
	Metropolitan Line Extension [17]	due 2020	3	284 [18]

**Source:** Authors' analysis of published data and reports. Key sources are listed in the bibliography. As described in the text, some reopenings are outside the scope of this paper.

**Notes:**

- [1] Authors' typology. Type 1 may include lines with previous diversionary passenger use.
- [2] Opening of first element. Some elements, such as particular stations, may have opened later.
- [3] Length reopened to passenger service, including any wholly new sections. Project may have included additional work beyond the reopened section itself (see also notes to Figure 3).
- [4] Cost as reported in the best evidence found for this paper. Unless otherwise stated below, the cost is a headline figure reported contemporarily in the trade press.
- [5] Excludes £3m of capitalised train rental costs and £1m of operating costs which appeared in the headline £11m figure at the time. Price base not stated.
- [6] Wales Audit Office (2011). Price base not stated but likely to be outturn.
- [7] Audit Scotland (2011). Outturn.
- [8] Plus extensive upgrades on either side of the reopened section.
- [9] Audit Scotland (2011). Price base not given but likely to be forecast outturn.
- [10] Audit Scotland (2013). The often-quoted £299m figure excludes £54m of advance works.
- [11] Dalston Junction to Shoreditch. Project also included conversion of the existing East London Line to Overground operation. Dalston Junction to Highbury & Islington was part of the separate North London Line project and is excluded from the data here.
- [12] Quoted as £1bn including rolling stock. Figure shown is authors' estimate excluding rolling stock. Dalston Junction to Highbury & Islington is excluded as noted above.
- [13] Also known as East West Rail Phase 1. Considered as in scope because it represented a major upgrade of an existing line, comparable to a Type 1 reopening, but also a wholly new chord at Bicester requiring a TWA Order.
- [14] Includes £130m for Chiltern Railways' requirements and £190m for DfT's requirements.
- [15] This used a reserved corridor through the former steelworks site, so neither an active line nor a typical Type 2 case.
- [16] Partly out-of-use spur, partly disused solum still part of railway land.
- [17] Previously known as the Croxley Rail Link. Combination of new-build, reopening and use of existing active passenger line. Although the focus of this table is on completed schemes, it is included because it is a committed scheme with construction in progress and a firm timeline towards opening.
- [18] Estimated cost including risk at 50% percentile (P50).

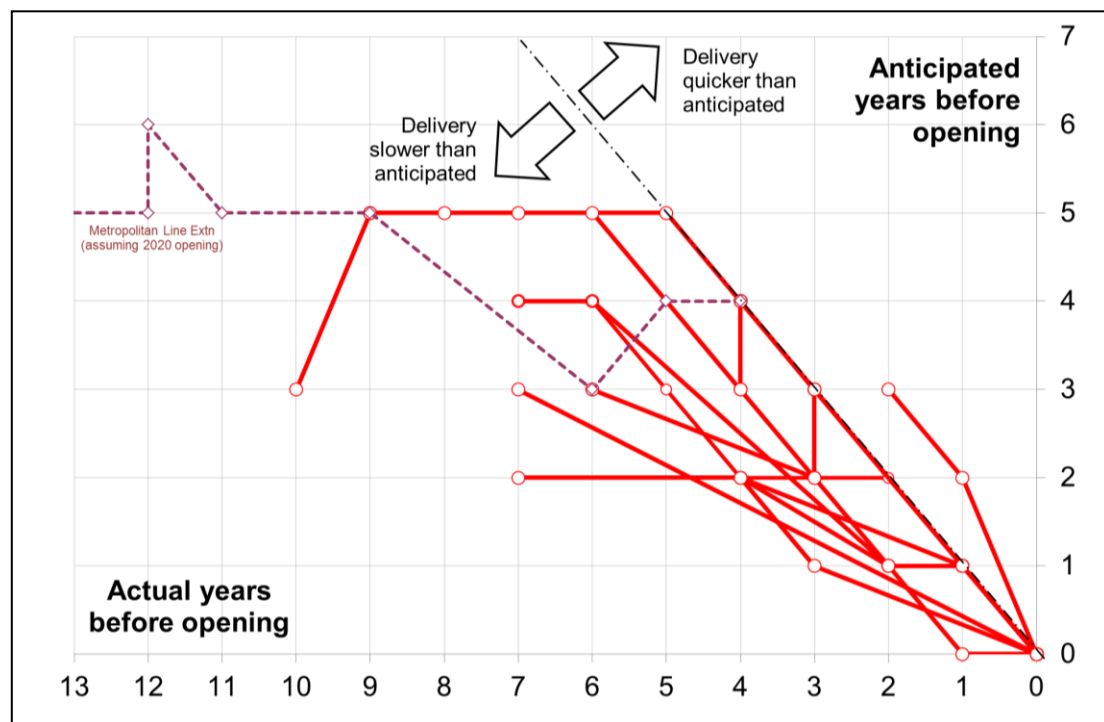
### 2.3 How reliable are the forecast timescales when a project is being developed?

Delays for a variety of reasons, leading to revised timelines, are well-reported (eg Clark, 2007a). Figure 1 plots how long the reopening projects took, compared to the expectations during their development. Figure 2 shows each scheme individually for clarity. In both figures, each line traces a project as it develops and anticipated opening dates are published.

There is a clear bias towards underestimating the timelines. Perhaps unsurprisingly, forecasts tend to become increasingly accurate in absolute terms as a project continues. Once funding is committed and construction starts, the forecasts tend to be accurate, although some projects encounter delays in construction. Before that point, schemes are very vulnerable to external circumstances such as business case approval processes, funding availability or simply wider circumstances in the rail industry. There is little commonality between schemes in this respect.

Echoing the current use of optimism bias in costs, there is a case for using a 'timescale optimism bias' factor. Figure 1 suggests a factor of around 50% might be appropriate for future reopenings.

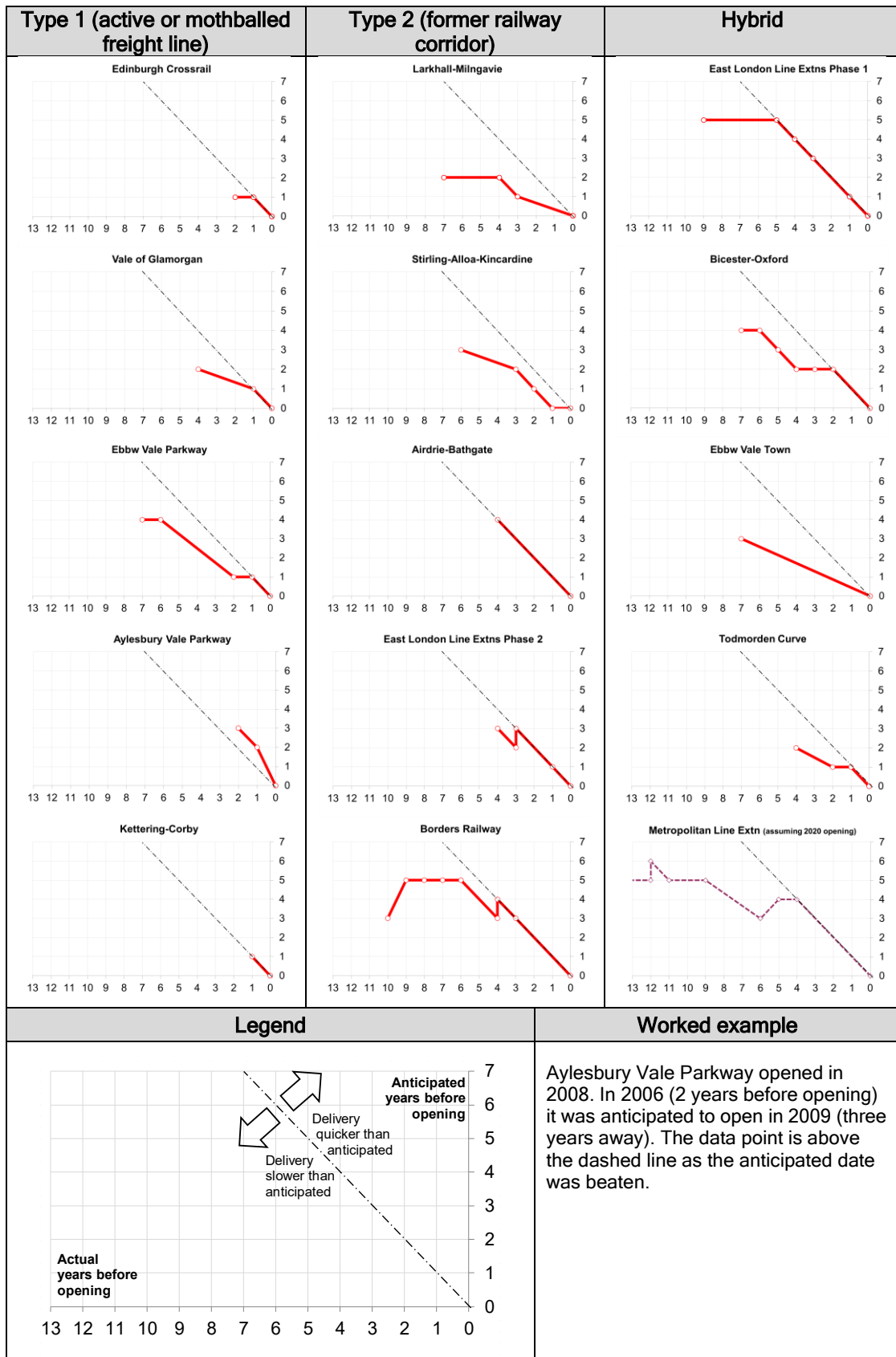
**Figure 1: Anticipated versus actual implementation timescales (all reopenings)**



A worked example of interpreting the graph is provided with Figure 2 (below).

**Source:** Authors' compilation of published sources. For simplicity, the chart uses calendar years 1 January to 31 December, and thus changes of a few months may be overstated or understated depending on where they fall in the calendar. Vertical lines occur when more than one anticipated opening date was given in a calendar year. The term 'anticipated' is used to represent dates quoted in published sources; in early stages of a project these may be 'best-case' aspirations (eg on the assumption that funding is provided) rather than developed timelines. Data for the Metropolitan Line Extension are shown (purple dashes) based on the currently anticipated 2020 opening date.

**Figure 2: Anticipated versus actual implementation timescales (individually)**



Source: As for Figure 1.

## 2.4 How much did they cost?

Understanding the final capital costs of completed reopenings is, as with other major infrastructure investments, a challenge (Wales Audit Office, 2011; Audit Scotland, 2011). For example, the Ebbw Vale Parkway line was quoted as £30m at the time of reopening, but later assessed as £48m (Clark, 2008; Wales Audit Office, 2011).

Reasons are various. Project development costs may disappear from view once they are 'sunk'. For example, the headline £299m cost of the Borders Railway excludes £54m of advance work costs (Audit Scotland, 2013, p19). Published figures, even at opening, tend to be budget estimates and are subject to change during and after construction. Final accounts, following resolution of defects and other claims, may not be settled with contractors for several years. Part of the project scope may actually be delivered through, and counted as part of, another project. Finally, additional rolling stock, if required, is a particular challenge as it may be treated as a capital cost, an operating cost, or part of a separate wider procurement.

Table 1 summarised the costs, using the best data available for this paper. Figure 3 (on the next page) converts these into today's money, on a per-kilometre basis, taking account of additional lengths newly-built or heavily upgraded as part of the project. This represents a broadly comparable basis between schemes, although the comparison is inevitably never exact.

Reopenings on existing freight lines (Type 1) ranged from £1m-8m per km. The two projects representing the upper end of this range (Edinburgh Crossrail and Aylesbury Vale Parkway) included extensive new park-and-ride stations on a relatively short length of route.

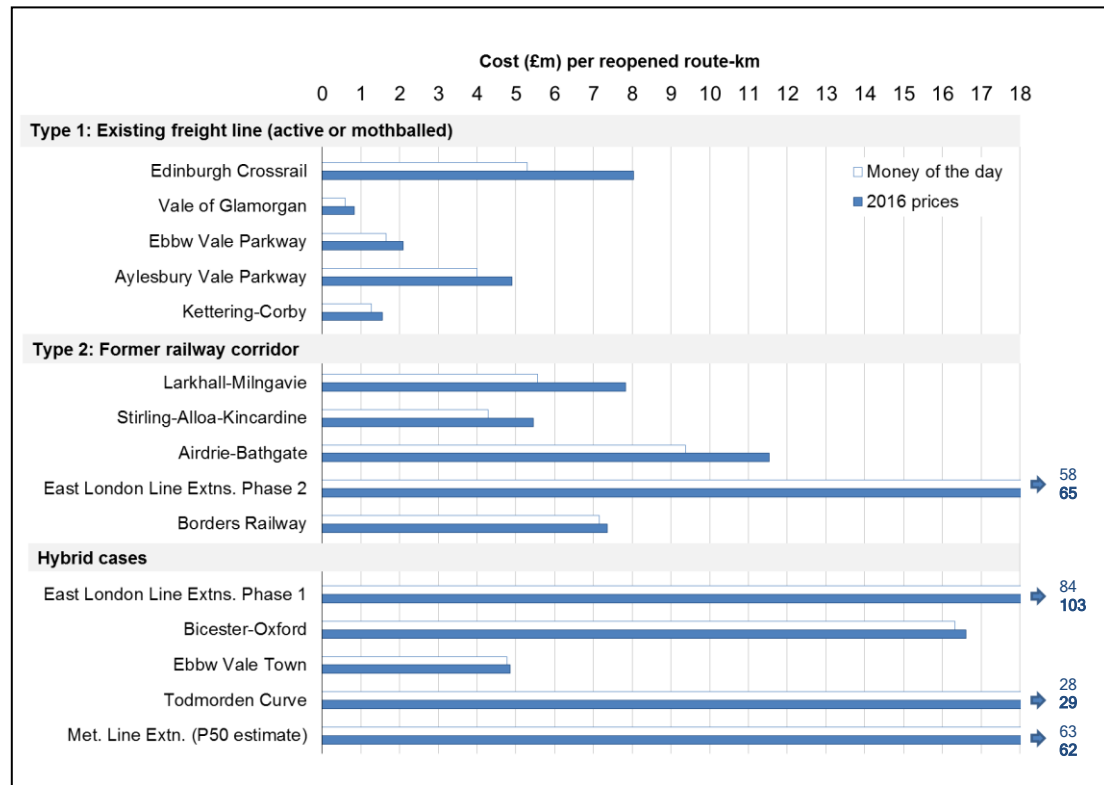
Reopenings on former railways (Type 2) cost broadly £5m-11m per km, except the East London Line Extension (ELLX) Phase 2 (£65m per km) which unlike the others was in effect a metro line built through a dense urban area.

The hybrid cases were extremely variable. At the low end, Ebbw Vale Town fell within the Type 2 range. The Todmorden Curve figure (£29m per km) is skewed by the very short length (0.36km) reopened at the cost of two new junctions. At the high end, the costs of ELLX Phase 1 and the Metropolitan Line Extension (£103m and £62m respectively per km) reflect their urban metro nature.

## 2.5 Are previous reopenings a reliable indicator for future scheme costs?

As noted above, the cost figures are caveated, and real construction cost trends also need to be considered. But cost per kilometre is a crude measure, as projects have different scopes and needs. For example, £10m-11m has recently bought a 2.4km single-track extension with a station and linespeed improvements, or alternatively 300m of single track with junctions and associated signalling at each end (Ebbw Vale Town and Todmorden Curve, both opened in 2015) (Clark, 2015; Fender, 2015).

**Figure 3: Costs of recent reopenings (per route-km in 2016 prices)**



**Notes:** The "Money of the day" series uses the cost as given in Table 1. The "2016 prices" series is adjusted for Retail Price Index (RPI) change between the money of the day (using a selected year representing the main construction period) and the Office of Budget Responsibility's (OBR's) current RPI forecast for 2016. RPI is used for simplicity. Although use of a construction output price index would also correct for real construction cost trends, the recent transition between BIS and ONS data series with different methodologies makes that more difficult.

Some schemes involve extensive rebuilding or other investment on existing routes that were already open. This would make the project cost per reopened route-km appear artificially high. To reflect this, the calculations for the routes below are based on the length that best reflects the most significant work, not the reopened length shown in Table 1:

- Airdrie-Bathgate: Airdrie-Newbridge Junction (40km)
- East London Line Extensions: Dalston Western Junction to New Cross / New Cross Gate (11km)
- Metropolitan Line Extension: Croxley to Watford Junction (5km)

**Sources:** Published cost estimates and route lengths, supplemented by authors' calculations. A full data table and list of sources is available on request. The horizontal scale is truncated for clarity.

This chart has been compiled to show the broad scale and range of costs. It is based on published data that may not exactly represent the final cost figure. Each reopening (past or potential) is unique and the route length is not a full indicator of project scope or complexity.

## 2.6 Were the demand forecasts accurate?

### *Background*

Readers seeking an introduction to the relevant demand forecasting processes and techniques should start with the Department for Transport's (DfT's) guidance note on the subject (DfT, 2011).

In principle, ridership may differ from the forecast for a range of reasons:

- The limitations and approximations inherent in forecasting models (“modelling is not a precise science”)
- The appropriateness of the forecasting techniques (“getting the modelling right”)
- External (exogenous) factors, such as economic growth or anticipated housing development, not turning out as forecast (“the modelling was right but the world didn't turn out as expected”)
- The project changing significantly after the forecasts were made (“the modelling was fine but the goalposts moved”)

### *The 2010 review of new lines and stations*

A 2010 study for the DfT examined whether actual demand at new stations on existing or reopened lines was significantly different from forecast, and if so, why (SDG, 2010)<sup>3</sup>. It found that actual demand was in most cases within +/- 50% of the forecast, with no clear tendency to over-forecasting or under-forecasting.

On reopened lines specifically, most stations were within +/- 25% of the forecast, again with no clear tendency to over- or under-forecast. The study picked out the outliers and suggested possible reasons behind them:

- Assumptions about local employment patterns and development not being borne out (Ebbw Vale Parkway: the steelworks closed but had been assumed to stay open; also rail demand arising from local regeneration was excluded)
- Assumptions about the service pattern not being borne out (Ebbw Vale Parkway again: the line has services to Cardiff, not both Cardiff and Newport as anticipated in the original forecasts<sup>4</sup>)
- Outturn value of input assumptions being significantly different from those in the forecast (Aylesbury Vale Parkway: housing development slowed during the recession<sup>5</sup>)
- Misunderstanding the likely function of the station (Newcraighall: seen as a park-and-ride station but this role was actually limited)
- Suppressed demand due to a small car park (Merryton: see below)
- A limited focus on passenger demand (Alloa: the station was delivered as part of a primarily freight scheme, so the passenger demand forecast was only a high-level one)

The study also examined abstraction from existing stations, but the data were limited and the results were inconclusive. The overall conclusion was that promoters should work with those preparing the demand forecasts to ensure

that the sources of demand and key local factors were understood and reflected in the forecasting.

#### *Larkhall-Milngavie evaluation*

Transport Scotland's post-project evaluation of Larkhall-Milngavie (Systra, 2015)<sup>6,7</sup> revisited that scheme's forecasts. In total, across the four new stations, the original forecast was reasonable: almost exactly right for 2006/7, the first full year, and then within broadly 20-25% of the actual results for the next six years. However, the forecast for individual stations varied heavily: demand at Kelvindale was consistently more than twice the forecast, and demand at Merryton was never more than two-thirds of the forecast, during this period. Chatelherault saw a strong growth rate which saw demand move from well below forecast to well above forecast.

The report found no single key reason for the differences between forecast and actual demand. It highlighted that exogenous factors were probably important. Economic and population growth had been higher than forecast, particularly in the pre-recession period. Back-casting with actual values for these inputs brought the overall forecast within 6% of actual overall. But this still left large differences for individual stations, which were thought to be due to:

- Some Merryton residents driving to Chatelherault, which had a large and easily-reached car park and the rail fares were cheaper
- Merryton housing development being lower than anticipated
- Possibly abstraction from existing stations, and/or the new stations acting as park-and-ride locations (it was not clear whether the original forecasts had allowed for these factors)

These results support the conclusion that key local factors need to be understood and reflected in demand forecasting.

#### *Borders Railway*

At the time of writing, data for only the first six months of the Borders Railway have been published (Transport Scotland, 2016a). This is too soon to reach definitive conclusions<sup>8</sup>, but as it is topical we will summarise the situation. Overall there were 0.69 million reported journeys in that period, 22% above forecast. For individual stations, however, there were very considerable variations above or below the forecast.

The business case (Ernst & Young, 2012) presented a central forecast in opening year of 1.29m journeys<sup>9</sup>. This was the mid-point of two separate forecasts: one based on a stated preference survey (seen as potentially overestimating demand), and one based on a trip generation approach (seen as tending to underestimate demand). Details of these two forecasts have not been released (Local Transport Today, 2016) but published data imply that they were for approximately 1.8m or 0.8m journeys respectively<sup>10</sup>. This difference illustrates the potential impact of the choice of forecasting method.

*Compilation and conclusions*

Figure 4 (supported by Table 2 to Table 4) summarises the data from the sources listed above (excluding the Borders Railway), plus selected updates and additions compiled for this paper.

Key conclusions are:

- Although it is often suggested that patronage on reopened lines is usually under-forecast, the evidence for this from recent openings is weak. There is a broad balance between over- and under-forecasting. Pre-2011 experience showed similar variability (Clark, 2006a).
- Our best estimate from this dataset is that on average demand was 8% above forecast (final line of Table 4).
- Some station forecasts are close to the actual result - approximately half of forecasts in Table 2 are within +/-25% of actual. But others are further off, sometimes extremely so.
- For a new route with multiple stations, experience has shown a mix of over-forecasting and under-forecasting within the route. Put another way, the total for the route, which may or may not be close to the actual total, can mask some extreme forecasting results for individual stations.

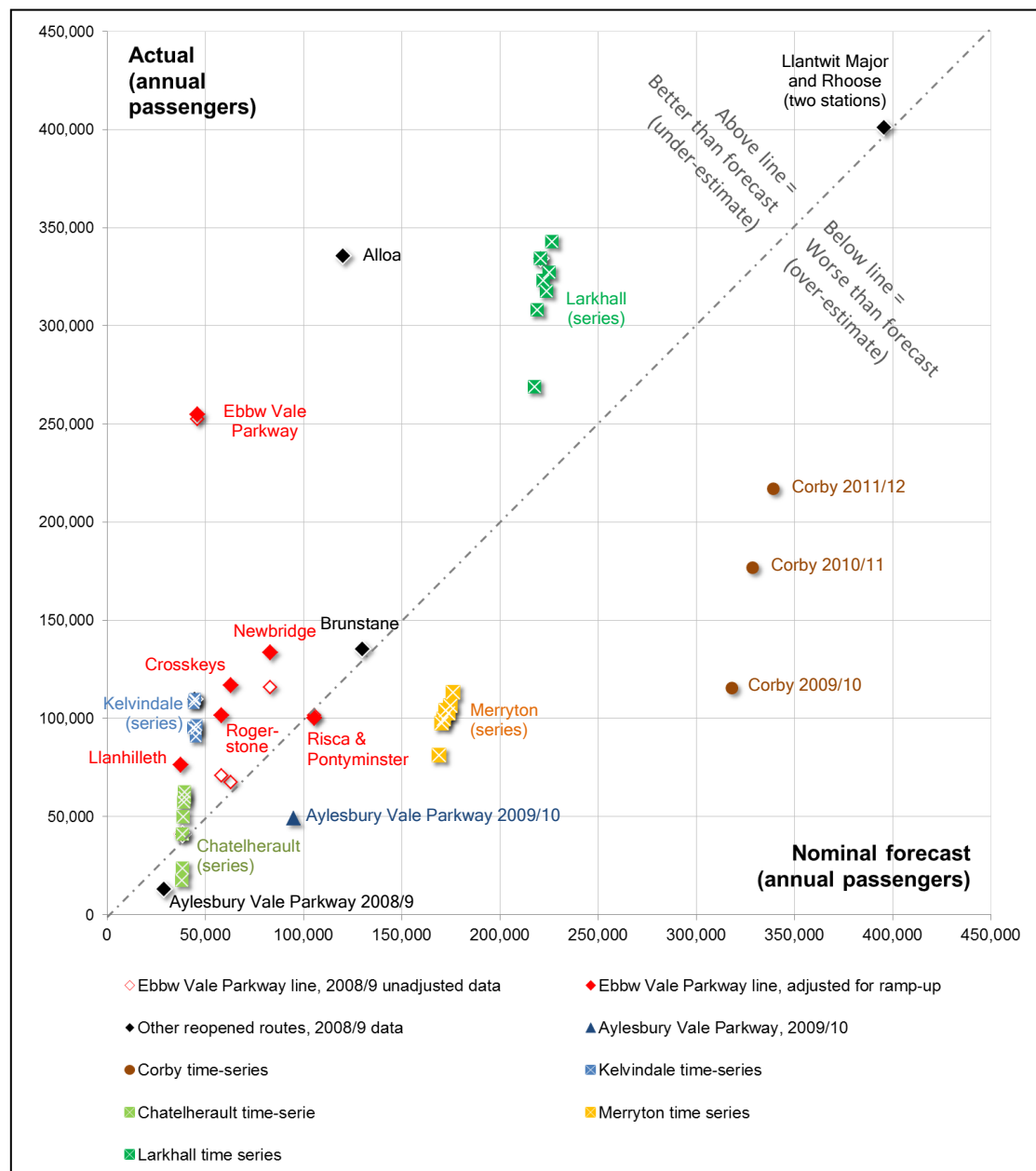
These conclusions tend to endorse the points made in previous studies:

- The impact of exogenous factors is important. If these change, actual demand is very likely to differ from the forecast.
- Key local factors, including the characteristics of individual stations, need to be understood and properly reflected in demand forecasting.

In addition, the Borders Railway experience confirms the importance of the modelling technique that is chosen.

Finally, the case for a 'demand optimism bias' adjustment in reopening schemes is not strong. Although demand was slightly under-forecast on average, the level of variation in individual forecasting results was far more significant.

**Figure 4: Forecast versus actual demand (meta-analysis)**



**Source:** Authors' compilation and updating of published sources.

**Notes:**

*Ebbw Vale Parkway line, 2008/9 unadjusted data:* Relevant entries from Table 2. Labels are omitted for clarity. See also note 4 at end of paper.

*Ebbw Vale Parkway line, adjusted for ramp-up:* Data from Table 4, which also explains the rationale for this series.

*Other reopened routes, 2008/9 data:* Other data from Table 2. This uses data from the 2010 *New lines and stations* study, with some adjustments as described in the notes to that table.

*Aylesbury Vale Parkway 2009/10:* additional data point for this station. See Table 2 for reason and Table 3 for data.

*Corby time series:* actuals from ORR data, compared to nominal forecasts given in the 2010 study. The 2009/10 data point also appears in Table 3.

*Kelvindale, Chatelherault, Merryton and Larkhall time series:* data from Larkhall-Milngavie post-project evaluation (Systra, 2015). The 2009/10 data also appear in Table 2.

**Table 2: Forecast versus actual demand: 2008/9 basic data**

Line	Station	Nominal forecast [1]	Actual (ORR) [2]	Actual as % of forecast	Comments
Aylesbury Vale Parkway (AVP)	Aylesbury Vale Parkway	29,000	13,042	45%	2008/9 figure was part-year (4 periods); nominal forecast was pro-rated accordingly. The supplementary table below shows figures for 2009/10, the first full year of the station.
Ebbw Vale Parkway	Ebbw Vale Parkway	45,858	252,414	550%	Opened 7 June 2008, so actual figure represents a part-year (circa 10 months). Nominal forecast appears to be on full-year basis but this is not clear so no adjustment has been made in the present analysis.
	Crosskeys	62,982	67,334	107%	
	Newbridge	82,951	115,676	139%	
	Risca & Pontyminster	105,412	101,594	96%	
	Rogerstone	58,087	71,030	122%	
Edinburgh Crossrail	Llanhilleth	37,529	40,946	109%	Opened 27 April 2008, so actual figure represents almost a full year. Nominal forecast appears to be on full-year basis.
	Brunstane	129,920	135,150	104%	
Larkhall-Milngavie	Newcraighall	467,600	182,890	39%	[3]
	Larkhall	220,700	334,308	151%	
	Chateherault	38,600	40,958	106%	
	Merryton	171,400	99,506	58%	
Stirling-Alloa-Kinross	Kelvindale	44,500	109,534	246%	[3]
	Alloa	120,000	335,654	280%	
Vale of Glamorgan	Llantwit Major and Rhoose (two stations)	395,650	400,922	101%	Treat forecast with caution, as it was an estimated back-calculation from the forecast present value of passenger revenue.
Corby	Corby	n/a	n/a	n/a	Station only open for latter part of year and with much reduced service. Presenting figures for the year is therefore not appropriate. See below for the subsequent year.
<b>Route sub-totals</b>	Ebbw Vale Parkway	392,819	648,994	165%	
	Edinburgh Crossrail	597,520	318,040	53%	
	Larkhall	475,200	584,306	123%	
<b>2008/9 totals</b>		<b>2,010,189</b>	<b>2,300,958</b>	<b>114%</b>	

Shading denotes forecast within +/-25% of actual

**Notes:**

- [1] Except for Larkhall-Milngavie stations, this is an annual total for 2008/9, as created in the 2010 *New lines and stations* study (SDG, 2010). That study annualised and/or growthed-up the original project forecasts to create these 'nominal forecasts' on a common basis for comparison with actual usage.
- [2] From ORR station usage data (ORR, 2016a). All figures are for 2008/9 entries/exits; these stations all show zero interchanges. The 2010 study used Lennon data, which in most of these cases is not significantly different from the ORR data. This paper uses ORR data in preference, recognising the adjustments that the ORR data makes to capture non-Lennon tickets, and also because of the 'open' status of the ORR data which facilitates future updating of this analysis.
- [3] For Larkhall-Milngavie stations, this paper uses the nominal forecasts created in the 2015 post-project evaluation (Systra, 2015), in preference to the equivalents in the *New lines and stations* study. This is because the former growthed-up the original forecasts based on exogenous demand growth as originally modelled, whereas the latter assumed a growth-rate which differed significantly from what was modelled, and did not include Kelvindale.

**Table 3: Reopenings where 2009/10 data is more appropriate than 2008/9**

Line	Station	Year	Nominal forecast [1]	Actual (ORR) [2]	Actual as % of forecast
Aylesbury Vale Parkway	Aylesbury Vale Parkway	2009/10	95,000	49,212	52%
Corby	Corby	2009/10	317,880	115,372	36%
<b>2008/9 or 2009/10 totals [3]</b>			<b>2,394,069</b>	<b>2,452,500</b>	<b>102%</b>

Shading denotes forecast within +/-25% of actual

**Notes:**

- [1] From 2010 study, as per previous table
- [2] From ORR data, as per previous table
- [3] As per previous table, but using the 2009/10 data shown here for Aylesbury Vale Parkway (instead of 2008/9) and Corby (instead of omitting the station)

**Table 4: Adjustment for ramp-up on Ebbw Vale Parkway line**

Line	Station	Year	Nominal forecast [1]	Actual (ORR) [2]	Actual as % of forecast
Ebbw Vale Parkway	Ebbw Vale Parkway	Year 5	45,858	254,956	556%
	Crosskeys	Year 5	62,982	117,012	186%
	Newbridge	Year 5	82,951	133,672	161%
	Risca & Pontyminster	Year 5	105,412	100,236	95%
	Rogerstone	Year 5	58,087	101,366	175%
	Llanhilleth	Year 5	37,529	76,308	203%
Route sub-total	Ebbw Vale Parkway	Year 5	392,819	783,550	199%
<b>2008/9, 2009/10 or Year 5 totals [3]</b>			2,394,069	2,587,056	108%

Shading denotes forecast within +/-25% of actual

**Notes:**

The nominal forecasts for Ebbw Vale Parkway line stations covered 2004/5 to 2008/9 explicitly, including demand ramp-up as per the original forecasts. The 2008/9 forecasts are thus *after* ramp-up. Actual data for 2008/9 represent the first full year for most stations on the line, and are thus *at the start of* any actual ramp-up period. This has the potential to distort the results (and does so significantly at some stations). This correction addresses this, by comparing the fifth year of the forecast (2008/9) with the factual data for what is broadly the fifth full year of actuals (2012/13). For simplicity, no adjustment is made for exogenous growth between those two years.

[1] From 2010 study, as per previous table

[2] From ORR data, as per previous table

[3] As per Table 3, but using the adjusted Ebbw Vale Parkway line data from this table instead of the unadjusted data in Table 2. The percentage figure in this row represents an overall best estimate for average demand compared to forecast.

### 3. WHAT IS THE STATE OF THE ART?

#### 3.1 Conditional Outputs

Conditional Outputs (COs) are a useful way of succinctly describing what a reopening (or a capacity enhancement scheme) must deliver. They are:

- Outputs, such as “a half-hourly service between A and B”. This focuses on the desired service or capacity, recognising that the infrastructure required to deliver it may not be defined at this early stage.
- Conditional on a feasible and value-for-money scheme being found to deliver them. This recognises that some desirable outputs may not be achievable.

COs now feature in Network Rail’s long term planning process. Market Studies and stakeholder aspirations determine the COs, and Route Studies determine whether, and how best, they can be delivered.

The Shaw report (Shaw, 2016, para. R5.27) echoed the idea of COs, referring to the importance of allocating government funding on the basis of outputs rather than specific projects.

Planning for East-West Rail Central Section has used COs in a different way (Atkins, 2014). Its train services could potentially connect a very wide range of origins and destinations. As a growth-focused scheme, these were prioritised on the basis of potential economic benefits and whether rail could be competitive with car. The prioritisation produced a set of COs consisting of

'very high priority' or 'high priority' journey pairs. These fed into subsequent examination of operational and engineering feasibility. Critically, it was accepted that only a selection of the COs would be achievable.

### 3.2 The growth agenda and the importance of local leadership

This section refers to policy developments in England, but many of the principles apply elsewhere in Britain.

The growth and devolution agendas mean that not only are the wider economic impacts of transport investment accepted, but also that local authorities, Local Enterprise Partnerships (LEPs) and Combined Authorities are increasingly tasked with the lead role.

There are two aspects to the economic growth agenda:

- Increased economic output per capita, created by new connections (bringing people and businesses closer together in time terms, even if not in physical terms) having agglomeration effects and raising productivity levels.
- Accommodating and attracting additional housing and jobs. The extent to which this can be done, and is acceptable in order to secure the desired investment, is ultimately for local planners and stakeholders to judge, and relies on local communities' willingness to accommodate growth.

Meanwhile, although there is still strong government support for and funding of rail schemes, the focus is increasingly on funding packages involving development contributions, other local funding, and locally-determined use of central funding pots such as Growth Deal funding (eg Roberts, 2014).

This adds up to the need for investment to be considered in the context of a region's economic ambitions, not just its transport ambitions.

A distinction has emerged between rail schemes where the case is transport-led (ie benefits largely accrue directly to the transport system and its users), and those where the case is led by wider economic impacts (ie benefits accrue to the economy at large). In the latter case, schemes are based largely on supporting economic activity in local areas – and indeed on actively *changing the pattern of activity* for the better, rather than simply benefiting the existing pattern. The resulting tangible benefits are cited as being in areas such as jobs, development and Gross Value Added (GVA), all of which can contribute to a stronger 'adjusted' benefit-cost ratio (BCR). A perceptive paper by Network Rail (2010) set this out in more detail. In this context, assessment and prioritisation of potential schemes goes beyond the traditional welfare-based appraisal methods (see Forster, 2016a and much other literature), although WebTAG has increasingly found ways of assessing (and monetising some of) these wider economic benefits.

Such schemes, focused on local and regional roles and impacts, would be most successfully promoted by those stakeholders that benefit from these outcomes. In the main this is (in England) the county or unitary authority in its

role as local transport authority and the LEP in its role as promoter of local economic growth.

### 3.3 Capital funding

However, there are key issues for these locally specified and promoted schemes:

- Lack of certainty as to where funding will ultimately come from
- Difficulty in measuring benefits that accrue to the schemes
- The payback for any private sector investor

Central government may still be the source of significant funding but not necessarily via a transport-related 'pot'. Currently rail schemes are being developed under City Deal and Growth Deal packages. The key to unlocking these funding sources is the need to develop robust business cases following central government's five-case business case model, supported by an economic appraisal following DfT's WebTAG guidance. Recent guidance on devolved 'single pot' funds made clear that recipients are to follow WebTAG and that large schemes must have at least 'high' value for money<sup>11</sup> unless in exceptional circumstances (DCLG (2016), Appendix B).

Developer contributions can be made available through Section 106 agreements or a Community Infrastructure Levy (CIL). Forward-funding may be required to bridge the gap between infrastructure spend and anticipated receipt of contributions. These are dependent on the economic conditions and there is a danger that the contributions do not materialise if development is delayed. Retained business rates or a business rate supplement are also being used on major rail schemes but have not yet featured in reopenings.

Table 5 summarises potential capital funding sources.

**Table 5: Potential capital funding sources**

Funding source	Financing	Examples / notes
<b>International</b>		
EU funding streams	National budgets / debts	Various rail projects
<b>Central</b>		
Grant funding pots (eg local major schemes process)	National budget / debt	Edinburgh Crossrail, MLE
Specific grants	National budget / debt	VOG, Ebbw Vale, MLE, Elizabeth Line
HLOS / SoFA process and similar arrangements	Via RAB (or PFI), to national budget / debt	Borders Railway, Bicester-Oxford
<b>Quasi-local [1]</b>		
LEP (Growth Deal or City Deal)	National budget / debt	MLE, Portishead proposal
<b>Local</b>		
Local authority capital funding	Cash or prudential borrowing	MLE, Elizabeth Line
Section 106 contributions from developers	Cash or forward-funding [2]	Borders Railway, MLE, NLE
CIL revenue from developers	Cash or forward-funding	Elizabeth Line, MLE, NLE
Business rate supplement	Cash or forward-funding	Elizabeth Line

Funding source	Financing	Examples / notes
Business rate retention	Forward-funding against incremental rate income	NLE
Property development income (public sector takes a stake in developing land)	Forward-funding	Elizabeth Line
Negotiated private contributions (usually key landowners)	Cash or debt-funding (may also construct elements of project as in-kind contribution)	Elizabeth Line
Council Tax precept	Cash or forward-funding	London 2012 Games
<b>Users</b>		
Farebox revenue	Debt-funded through Facility Charge, similar commercial arrangements with NR, or forward-funding	Bicester-Oxford, Elizabeth Line

**Sources:** Shaw (2016) p116-117; TfL (2015); Hertfordshire County Council (2015); Porter (2014); PWC (2014); other miscellaneous sources

**Notes:**

HLOS = High Level Output Specification. SoFA = Statement of Funds Available.

RAB = Regulatory Asset Base. PFI = Private Finance Initiative.

MLE = Metropolitan Line Extension. NLE = Northern Line Extension. VOG = Vale of Glamorgan

Not all funding sources listed are available throughout Great Britain. Potential financing methods (ie how the funding is initially provided and then repaid) are listed for completeness, but full consideration of financing is outside the scope of this paper. Some relevant non-reopening examples are provided where appropriate.

[1] Sources with a degree of local control or input, but ultimately from central government

[2] Forward-funding = finance from investment banks or other sources to cover the time-lag between expenditure and income

### 3.4 Operating costs

Although construction costs are often the most significant barrier, operating costs must also be considered. Ideally the service can be shown to make an operating surplus (as is forecast for East-West Rail Western Section and the Metropolitan Line Extension) giving a good prospect of the rail industry and its funders taking it on after construction.

If not, ongoing operating funding needs to be identified as part of the package. The local transport authority is the default source, and might also receive incremental revenue (ie take the revenue risk). Some authorities currently provide such support for rail enhancements (eg Lancashire and others support services on the Todmorden Curve) but clearly this is not easy in the current financial climate.

The funding packages for some previous reopenings, including Edinburgh Crossrail and Vale of Glamorgan, included successful bids for operational cost support from the (then) Rail Passenger Partnership fund. However there is currently no fund of this nature.

The DfT has recently taken a 'three-year' approach to operational costs of locally-promoted new or enhanced services (DfT, 2012, Annex C). The promoter must fund any operating subsidy for the first three years. After that, subject to conditions including affordability and an acceptable ongoing BCR, DfT would consider incorporating the service and its costs within a base

franchise specification. This has happened with some recent enhancements funded by Cornwall Council which are now part of the DfT-funded franchise. However, the affordability condition is key, and given current funding constraints, promoters would be wise not to rely on this.

In theory, alternative local funding sources such as a CIL could be used for revenue support, but these seem more apt for capital costs.

### 3.5 Sponsorship

Once the economic case has been made and a funding package devised, the local promoter would logically 'client' or 'sponsor' the reopening scheme.

The wider policy agenda, particularly in England and Wales, is moving towards local funders being able to take more of a sponsorship role within projects (Forster, 2016c; Shaw, 2016, para.R5.36). In any case, central government and the rail industry are already committed to an extensive and challenging programme of investment and change. It may not be possible in the near future (and irrespective of the funding / financing / delivery arrangements) for those parties to take on sponsorship of all new schemes.

The regulatory framework allows for local third party sponsorship of rail projects (ORR, 2010). But it is currently unusual for parties outside national government or the rail industry to do so, perhaps because of their specialist nature and the interfaces with the operational railway<sup>12</sup>. Recent reopenings in Scotland and Wales have generally seen national government take the client or promoter role, reflecting perhaps the overall nature of transport governance in those nations. Recent experience in England is more limited, but as contrasting case studies, East-West Rail Western Section is in effect jointly sponsored by the local partners, DfT and Network Rail, while leadership of the Metropolitan Line Extension has been transferred from the local transport authority to London Underground.

The options potentially available to local promoters include:

- Seeking to have the scheme adopted at national level as a High Level Output Specification (HLOS) commitment, with governance through the normal regulatory mechanisms for enhancement projects. This may still involve partnership working and local funding or contributions in kind, perhaps with joint sponsorship, but essentially it becomes a national-level project.
- Sponsoring the scheme, with commercial agreement with the delivery body (whether Network Rail or otherwise). This would involve a significant organisational commitment for the local body as client.
- Sponsoring the scheme as above, engaging a specialist consultancy (or potentially an existing train operator) to act as 'sponsor's agent' and provide expertise.

Subsequent choices of delivery model and financing, including the topical issues about Network Rail's Regulatory Asset Base (RAB) and potential alternative financing methods, are beyond the scope of this 'first steps' paper.

#### 4. POINTERS FOR PRACTITIONERS CONSIDERING REOPENINGS

This final section provides 'hints and tips' based on key points from the preceding sections and other experience.

##### 4.1 Identify the need

No scheme will progress simply because there is an old railway. To build both the political case and the economic case, it needs a clear purpose that cannot be met by existing infrastructure and services, and is commensurate with the scale of investment required. Table 6 shows some typical rationales.

**Table 6: Typical rationales for reopening**

Typical reasons	Examples [1]
Social inclusion and access to jobs (especially on corridors to a city centre where existing public transport options do not provide access within a realistic commuting time)	Borders Railway, Airdrie-Bathgate, Ebbw Vale
Reverse-commuting access to peripheral centres	Metropolitan Line Extension
Regeneration and land development (especially unlocking housing development on specific sites)	EWR Western Section, Larkhall-Milngavie, Todmorden Curve
Strategic freight route	Stirling-Alloa-Kinross, EWR
Agglomeration benefits	EWR Central section
Diversification value during planned or unplanned disruption	Lewes-Uckfield proposal
Commercial opportunity - strong rail market	Oxford-Bicester
Inward tourism	Borders Railway
Alternative to road congestion (see also text of report)	Airdrie-Bathgate

[1] As stated by promoters or supporters. Not an exhaustive list. EWR = East-West Rail.

Some reopenings have aimed to provide a public transport alternative to a congested road network, although this is more commonly seen in urban light rail or BRT schemes. Reducing congestion (not just providing an alternative to it) is desirable but the relative volumes, plus background traffic growth in many areas and suppressed demand in some, mean a significant dent in congestion is unlikely to be measurable from a reopening scheme.

We would also advise caution in most cases about being able to capture road freight movements and therefore reduce lorry volumes. Generally rail is not competitive for the types of lorry-load movements produced by typical industrial estates, even if the reopening scheme were to provide them with rail access.

##### 4.2 Consider setting prioritised Conditional Outputs

As section 3.1 explained, these put the focus on what the project needs to achieve, while accepting that this may be tempered by what is deliverable.

##### 4.3 Plug into growth, and ask 'what if...?'

Section 3.2 explained the significance of the growth agenda. Productivity and agglomeration, inward investment, and housing / job growth are currently key

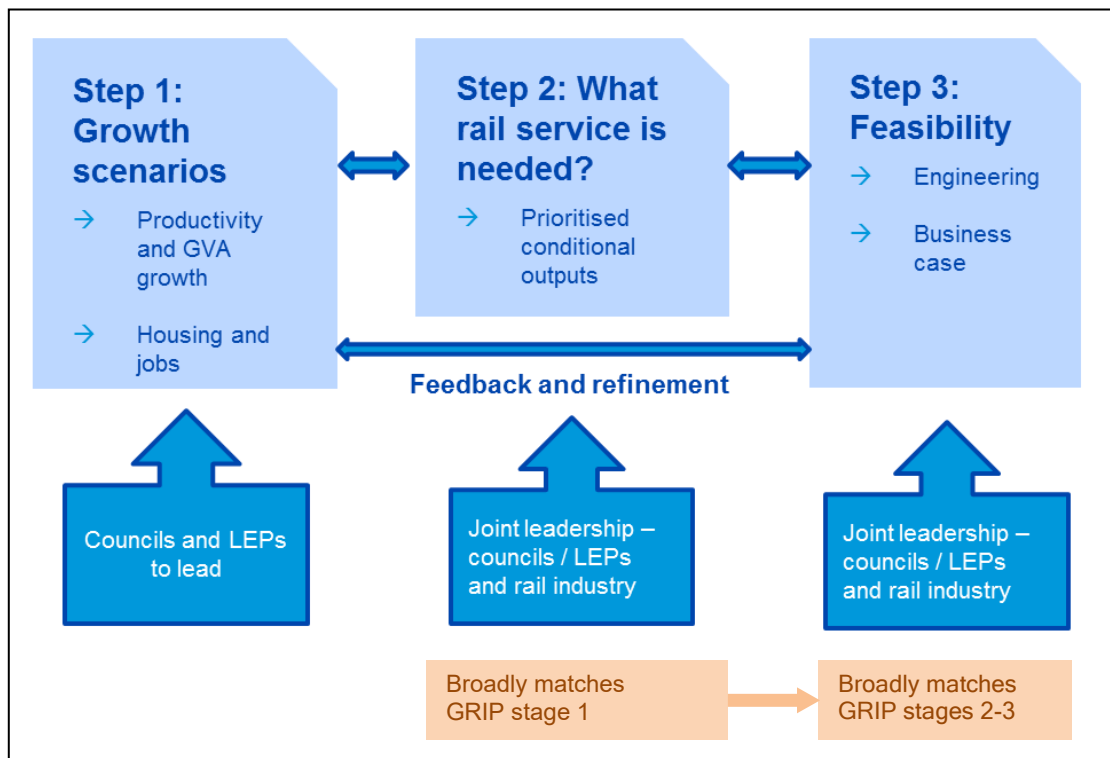
political factors at central and local levels of government. A rail reopening has the potential to not only incrementally support economic growth, but also help actively shape patterns of growth.

Some potential reopenings are long-standing transport infrastructure goals for local bodies. The growth agenda can be an opportunity to secure that infrastructure if it can unlock growth, perhaps beyond levels previously assumed. Thus local promoters may wish to consider development scenarios: “what would it take to justify the railway?” More specifically, “what level of housing or employment growth along the route would be needed, to make a rail link viable or necessary?” Local stakeholders can then take a view on whether that level of growth would be deliverable or welcome.

**4.4 Be ready to lead, and to build a funding package**

Section 3 explained how local bodies increasingly need to lead on reopening projects, rather than looking to central government or the rail industry to do so. Figure 5 summarises how this and preceding ‘pointers’ form a process for developing a reopening proposal under the growth and devolution agendas.

**Figure 5: Initial stages for a reopening proposal in the current policy climate**



**4.5 With the growth agenda and local leadership, is the BCR irrelevant?**

Far from it:

- WebTAG is increasingly attempting to take the wider economic impacts into account in core or supplementary versions of the BCR.

- Even if there are wider factors to consider, a good BCR is still desirable as an important demonstration to decision-makers and stakeholders that a project is value for money.
- As described in section 3.3, the devolution agenda has not taken away the need to demonstrate value for money in BCR terms.

Thus it remains important to draw into the BCR as many monetised benefits as possible, including potentially aspects of Table 6 that are not part of the core 'need'.

It may also be possible to draw in other aspirations to create a more attractive package. As an example, the need for one recent major highway scheme was mainly about economic development, but combining the scheme with remodelling of an adjacent gyratory allowed decongestion benefits to be drawn in.

In England and Scotland, schemes which bring the railway back to a community and offer commuting opportunities can have option and non-use values monetised to appear in the 'sensitivity test' BCR (WebTAG unit A4-1, STAG Technical Database para.11.2.1). The Borders Railway and recent analysis for the March-Wisbech proposal showed that these benefits can be significant (Ernst & Young, 2012, p14; Mott MacDonald, 2015, p50).

Under WebTAG, private investment (such as Section 106 contributions) reduces the 'cost' line of the BCR calculation and thus increases the BCR.

Finally, if the BCR is still disappointing, look out for changes to appraisal rules. These can alter a BCR significantly (see, for example, Systra, 2015, p.85-86 and SDG, 2009, p.16.4).

#### **4.6 Seek widespread stakeholder support – and consensus**

Visible stakeholder support is important in the political arena. Weight of numbers is beneficial, as shown by the success of regional coalitions such as the Great Eastern Main Line Taskforce. Active legwork by MPs can be helpful in building coalitions, and has seen success in recent funding allocations. Support from the business community is particularly helpful when it brings evidence of how a 'missing' rail link is hampering their growth and productivity.

A clear 'ask', and a common message about the benefits, are vital. One reopening project stalled for years because stakeholders were divided about whether it was actually a good thing.

#### **4.7 The train timetable is the core of the product...**

A successful reopening needs a train service that reflects travellers' needs. As an example of the pitfalls, an earlier attempt at Kettering-Corby reopening was closed again after a few years, because of poor patronage: it only had an unreliable shuttle service to Kettering, not to the key destination of London (Clark, 2006a). Furthermore, the type and level of service to be run, and the

level of timetabling flexibility and resilience required, determines what the engineers will be asked to design.

We recommend having (at the start of Step 3 above) an approximate but credible timetable, using standard industry planning data as far as possible. For a typical reopening proposal this can be done manually in early optioneering stages. Simulation and performance modelling can come later.

#### **4.8 ...but keep your options open**

The do-nothing (baseline) timetable will change during project development, so aim to show that the proposed service pattern is robust to this.

This is also one reason why headline journey time estimates should be cautious at first. Other reasons are that they are only approximations; refinements to engineering design (perhaps in response to cost challenges) may affect them; and the available rolling stock may change over time.

#### **4.9 Make friends with your train operator and infrastructure manager**

A good working relationship with a relevant train operator is invaluable. Usually the nature of their franchises means they are not in a position to lead or fund the long-term commitment involved in a reopening. But they represent a great store of practical operating, planning and financial knowledge, particularly as their staff often have long continuity across franchise changes. They can supply invaluable guidance, data and 'reality checking' to ensure a proposal is credible, and tips on the best way forward.

A similar relationship with Network Rail can also pay dividends. They will of course need to be heavily involved in later stages: usually as delivery body and/or as the eventual line's landowner and infrastructure manager, and always through the interface with the existing network. But in early stages they can also contribute practical guidance and experience on processes, interfaces, deliverability and constructability.

#### **4.10 Make sure the demand forecasts reflects local factors**

This follows from the evidence in section 2. The forecasting process and assumptions should be tailored to the nature of the proposed service and its markets. The DfT guidance note has a very useful checklist of the issues and the questions to ask. As the Borders Railway showed, it may be worth corroborating one forecasting method with another, if only as a sense-check.

#### **4.11 Treat cost forecasts with caution until preliminary design is complete**

Experience from not just reopenings (section 2) but other rail and non-rail projects is that costs are difficult to determine with any accuracy in the early stages (eg Forster, 2016b). The addition of optimism bias is not just an accounting nicety for 'appraisal wonks' but a genuine reflection of a real tendency to underestimate. Some costs, such as land acquisition, are often excluded from early estimates when relevant information is unknown.

Table 7 summarises the reasons why reported costs might change. It is not just about scope or simply better-understood costs, but also about technical matters such as the base year (a recent apparent 'increase' in HS2 costs was simply due to updating the base year).

**Table 7: Potential reasons for changes in reported costs**

Category	Potential changes
Scope changes	<ul style="list-style-type: none"> <li>• Changes in required outputs</li> <li>• Changes in scope required to deliver outputs</li> </ul>
Other real-world changes	<ul style="list-style-type: none"> <li>• Inflation or real cost changes differing from assumptions</li> <li>• Delay exposes projects to additional cost inflation</li> <li>• Changes to design standards</li> </ul>
Accounting and estimating issues	<ul style="list-style-type: none"> <li>• Early estimates exclude land and compensation costs</li> <li>• Early estimates exclude cost inflation over assumed project lifetime</li> <li>• Later estimates exclude sunk project development costs</li> <li>• Costs initially reported in appraisal base year or price base year, not as anticipated outturn costs</li> <li>• Change in appraisal base year or price base year</li> <li>• Part of scope is transferred to/from another project</li> <li>• Optimism bias not applied in headline figure, or at all</li> <li>• Early broad allowances replaced with actual values (eg land acquisition, and as individual risks materialise or are closed)</li> </ul>

There is much to be said for the approach outlined in the recent DfT-Network Rail memorandum of understanding on enhancements in England (DfT, 2016; Forster, 2016b). The 'decision to develop' (represented by approval of the Strategic Outline Business Case and then the Outline Business Case) will be distinct from 'decision to deliver' (represented by approval of the Full Business Case). The latter represents definitive cost, time, resource and risk estimates and only at that stage would announcements be specific about scope, cost and schedule. It remains to be seen how this principle is sustained in reality or could be extended to locally promoted schemes.

Nevertheless, it is still worth taking costing seriously in early stages. Table 8 (on the next page) summarises some issues to be aware of.

Quantified Risk Assessment (QRA) is not generally done by local promoters at the earliest stages, but a proportionate exercise could be useful in illustrating the potential cost range – and not just the 50<sup>th</sup> percentile (P50) figure which by definition will be too low half of the time (see also Forster, 2016b).

**Table 8: Tips on understanding potential costs at early stages**

<b>Disused and mothballed corridors</b>
<ul style="list-style-type: none"> <li>• In principle a disused corridor with integrity is much more promising than one which has been blocked. But that does not automatically make it 'cheap'.</li> <li>• Asset condition knowledge will initially be poor, affecting cost certainty.</li> <li>• Any remaining earthworks or structures may require attention to meet modern standards.</li> <li>• There can be surprises such as old mine workings requiring remediation (found on Stirling-Alloa-Kincardine).</li> <li>• Mothballed corridors may also face some of these issues.</li> </ul>
<b>Level crossings</b>
<ul style="list-style-type: none"> <li>• New level crossings, even at their historic locations and/or on minor roads, are unlikely to be deliverable. The Office of Rail and Road will not authorise these in normal circumstances (ORR 2014, 2016b) and recently rejected such a proposal for the Portishead reopening scheme (ORR, 2015).</li> <li>• On active or mothballed freight lines reopened for passenger service, the significant increases in train volumes may require existing level crossings to close for safety or other practical reasons, and alternative provision to be made.</li> </ul>
<b>Be ready to understand...</b>
<ul style="list-style-type: none"> <li>• ...key cost drivers, and whether derogations or deviations to requirements and standards are possible. (Full discussion of this, and the potential impact of different delivery methods, is outside the scope of this paper.)</li> <li>• ...whether critical timescales affect the cost. Track or signalling changes, for example, tend to be much cheaper as part of a planned renewal than as a standalone project. But if linked in this way, slippage of these plans becomes a risk to the reopening timeline.</li> </ul>

#### **4.12 Treat project timelines with caution**

Section 2.2 reported on experience with recent reopenings, which suggested a 'time optimism bias factor' of around 50%. Many of the issues with costs (section 4.11) are also relevant to timescales.

#### **4.13 Don't let the best be the enemy of the good**

As noted in section 4.7, the intended timetable and operational capability affects the design, but also vice versa. Experience on Ebbw Vale and the Borders Railway showed the potential for designs to be pared-down over time, reducing the potential level / flexibility of service or the ability to upgrade later (Clark 2006, 2016; Spaven 2014, 2015). Such design changes and value-engineering are beyond the 'first steps' covered by this paper, but the basic issue applies just as much to the early stages when Conditional Outputs are being whittled down to those which go forward.

Ultimately promoters and funders must strike a balance between capability / future-proofing and deliverability, judging what is acceptable without jeopardising the project. Upgrades are much more expensive on an operating railway than as part of the initial reopening project. But in a financially constrained climate, and where there are other deliverability issues, any (viable) railway is better than no railway, and can be a starting-point for a later upgrade if required.

It can be helpful to ask “what is the cheapest way of achieving our basic objective?” This might be the most viable option, even if it does not cover all the ‘nice-to-haves’.

#### **4.14 Keep the corridor safeguarded**

On a disused corridor, ensure the alignment is protected as far as possible, through planning designations. Experience suggests that a demonstrably-practical, defined area may be better than simply a conceptual line. In some cases there could be interim pedestrian/cycle use. Airdrie-Bathgate and the Borders Railway showed that paths and cycle tracks along the solum can be accommodated or re-routed.

#### **4.15 Persevere**

Good schemes – those where the essential case is clear and sound – can survive false starts and stumbling-blocks. All the following have been overcome:

- Rail industry structural change, other uncertainties or staff shortages (Edinburgh Crossrail, Larkhall-Milngavie, Stirling-Alloa-Kincardine (SAK), Metropolitan line extension (MLE))
- The need for additional business case work (Larkhall-Milngavie, MLE)
- Procurement issues (Borders Railway)
- A new promoter requiring their own studies and due diligence (MLE)
- Legal, contractual or risk-allocation issues (Vale of Glamorgan, East London Line Extensions Phase 1)
- Issues with standards and acceptance (Ebbw Vale, SAK)
- Rolling stock shortage (Kettering-Corby, Todmorden Curve)
- Cost escalation (SAK, MLE)
- Lack of available funds (MLE)

Take opportunities when they arise. Changes to external circumstances can bring a stalled project alive. When it was realised that East West Rail was not merely a transport scheme in a growing area, but could help unlock development and economic growth, its prospects blossomed. Later the realisation that it could be part of a strategic freight corridor added to the impetus. The less happy circumstances of the Ebbw Vale steelworks closure were the impetus to that line’s reopening.

In conclusion, we endorse the final comment in the Rail Reopening Toolkit: “Realism coupled with perseverance will win the day.”

## ACKNOWLEDGEMENTS

The authors are grateful to a number of colleagues and other fellow professionals for their contributions and helpful discussions as this paper was being developed. Particular thanks are due to Simon Winfield and Rod Sillence of Network Rail for generously sharing their experience from East-West Rail. The authors also thank WSP | Parsons Brinckerhoff for permission to give this paper.

All opinions expressed in the paper are nevertheless the authors' own.

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## NOTES

<sup>1</sup> See also:

- [www.railfuture.org.uk](http://www.railfuture.org.uk)
- <http://trundleage.co.uk>
- <http://www.bettertransport.org.uk/re-opening-rail-lines>

<sup>2</sup> Nothing in this paper, even when discussing delays and costs, represents a criticism of any particular project. Quite the reverse: all the schemes discussed are successes, as they have been implemented or have a clear route to delivery. Hiccups are often due to external circumstances and analysing their causes is beyond the scope of this paper. Our aim is to help promoters and planners of future schemes understand, based on this recent experience, what is likely to happen.

<sup>3</sup> The study examined 40 stations which had opened since privatisation, of which 17 were on reopened lines. Demand forecasts and supporting information were available for 27 of these, including 15 of the 17 that were on new lines. The study used 2008/9 LENNON data as the measure of observed demand. Because the original documentation presented demand using a variety of measures (eg daily or peak) and a variety of forecast years, the demand forecasts were converted (with some assumptions being required) to an annual equivalent for consistency with the LENNON actuals.

<sup>4</sup> The nominal forecasts created for the 2010 study (and quoted in this paper) for each station on the line were amended to represent the Cardiff service only; the nominal forecasts would have been higher without this amendment. This affected Ebbw Vale Parkway station more than others on the line, for what appeared to be technical reasons associated with the original forecasting methodology.

<sup>5</sup> To confirm the significance of this factor, the study included a backcasting exercise using the outturn housing development, which brought the forecast (originally a 55% overestimate) within 10% of actual.

<sup>6</sup> It converted the original forecasts into annualised figures for the first seven years of service, and compared these to actual demand.

<sup>7</sup> A similar evaluation of Airdrie-Bathgate (CH2M Hill, 2015) reported on actual annual demand from LENNON data, but did not compare it to forecasts, perhaps because the stated project objectives did not include a specific patronage target. The scheme's demand forecasts, as submitted to the Scottish Parliament, came from a national-level multimodal transport model and represented a 12-hour modelled day. Making a comparison with actual data would require a further exercise to bring forecast and actual data onto a common basis, and is outside the scope of this paper.

<sup>8</sup> Short periods can be a poor indicator of long-term demand. In the Borders Railway case:

- Initial ridership will have been boosted by one-off trips to sample the high-profile new service
- It has been suggested that early crowding problems led to conductors being unable to issue tickets to all passengers, with ridership consequently under-reported (Local Transport Today, 2016; Spaven, 2016)
- Conversely, ridership may have been dampened by initial performance issues and/or the crowding itself (sources above; Midlothian Council, 2015, 2016)

<sup>9</sup> The business case referred to approximately 647,000 return trips, but the recent data quote single trips. For clarity, this paper uses single trips, doubling the figures quoted in the business case to represent this. Note also that the figures published by Transport Scotland imply that their forecast for the first six months was not exactly half of the full-year forecast.

<sup>10</sup> Section 1.13 of the business case reported a sensitivity test based on the higher (stated preference) forecast, involving an increase of approximately 250,000 trips (39%) over the central forecast. The percentage confirms that the 250,000 is return trips, ie 500,000 single trips. Adding this to the 1.29m central forecast gives approximately 1.8m single trips. As the central forecast was the mid-point of the two methods' results, the sensitivity test implies that the lower (trip generation) forecast was approximately 0.8 million single trips.

<sup>11</sup> High VFM means an adjusted BCR of 2.0 or better, unless non-monetised impacts justify this categorisation for a scheme with a lower BCR (DfT, 2013).

<sup>12</sup> The same is true for smaller schemes such as station enhancements or incremental infrastructure upgrades, when the local funder typically contributes to what remains essentially a rail industry project.