

Larkhall – Milngavie Railway Project Evaluation Study

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1. Introduction

1.1 The Larkhall – Milngavie Railway Project

The Larkhall – Milngavie railway project opened in December 2005 and comprised two engineering schemes:

- re-instatement of 4.7km of track from the junction near Hamilton to a new station at Larkhall with two additional stations at Merryton and Chatelherault; and
- a 1.6km extension of the Northern Suburban line from Maryhill to Anniesland, with a new station at Kelvindale.

As well as the line re-instatements and station re-openings, two significant service enhancements to the Glasgow suburban rail network were implemented:

- enhanced service frequency on the Milngavie branch from 2 to 4 trains per hour; and
- enhanced service frequency on the Newton – Hamilton Central line from 2 to 4 trains per hour.

A map of the route is shown in Figure 1.

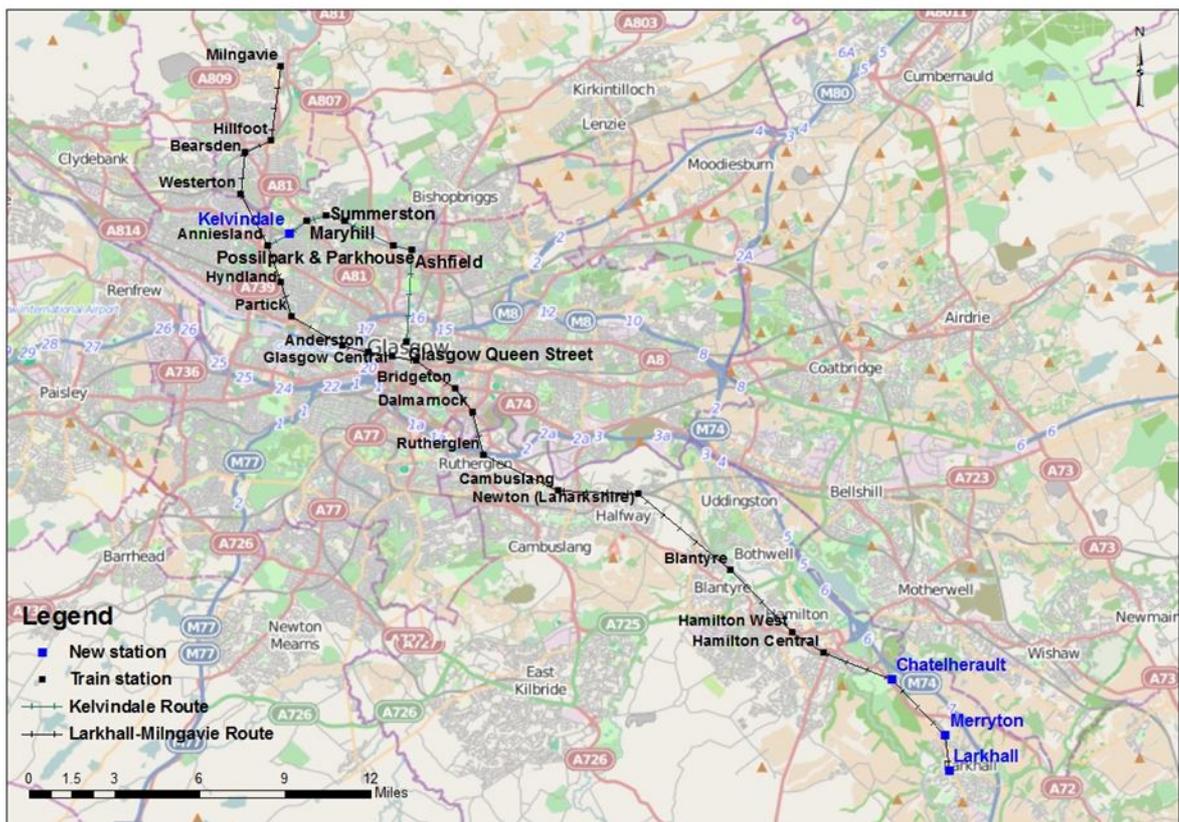


Figure 1 Larkhall – Milngavie Rail Project

Cost-benefit analysis undertaken at the economic appraisal stage of the Larkhall – Milngavie rail project in 2000 indicated a BCR of 0.66 for the project. The majority of the benefits were expected to come from journey time savings for existing and new public transport users. However, it was expected that the project would bring other benefits that could not be easily monetised and captured within the formal cost-benefit appraisal including:

- assisting economic development and encouraging local investment;
- increasing social mobility;
- creating further opportunities for further public transport orientated land-use development; and
- reducing the local environmental impact.

These benefits were considered by the main project sponsor, Strathclyde Partnership for Transport (SPT), to be more than sufficient to offset the predicted deficit in the monetised appraisal.

Although project targets were not explicitly defined at the outset, the implicit objectives can be summarised broadly as:

1. Reconnect Larkhall to the rail network to allow the introduction of a half-hourly service.
2. Double the frequency of services between Hamilton and central Glasgow and between Milngavie and central Glasgow to four trains per hour.
3. Remove an operational bottleneck on the North Suburban line.
4. Increase the attractiveness of Larkhall and Kelvindale and the surrounding areas for inward investment and land development.
5. Offer social inclusion benefits for residents.
6. Encourage a modal shift towards public transport.

1.2 Evaluation Study Objectives

SYSTRA were commissioned by Transport Scotland in May 2014 to undertake an evaluation of the Larkhall – Milngavie railway project.

The main objectives of the evaluation were:

- to undertake a Stage 2 Outcome Evaluation of the Larkhall – Milngavie project; and
- to review the draft Rail Evaluation Guidance drawn up by Transport Scotland Analytical Services.

A Stage 2 Outcome Evaluation is conducted on a project that has been in existence for a sufficient period to enable a comprehensive examination to be undertaken of actual performance against identified targets. It differs from a Stage 1 Outcome Evaluation which is conducted at an early stage in the life of a project and provides only a high-level, early indication of performance.

The Stage 2 Outcome Evaluation conducted as part of this evaluation study included:

- an assessment of the extent to which the project has met its six objectives above;
- an assessment of the Wider Economic Benefits (WEBs) generated by the project including agglomeration and productivity benefits, and improved labour supply; and
- a comparison of outturn costs and benefits to determine whether the project has offered value for money through a recalculation of the project's Benefit to Cost Ratio (BCR).

To conduct the evaluation, data was gathered and analysed to provide an evidence base to establish the extent to which the project has met its original objectives and the five Scottish Transport Appraisal Guidance (STAG) criteria. A variety of techniques were employed, using a combination of primary and secondary research including:

- a User Survey of rail passengers to understand their characteristics and the impacts of the project on their travel behaviour – a total of 164 survey responses were received over

the six-week online survey period and information was provided for 309 journeys (respondents provided information on up to three of their most frequent journeys);

- a Business Survey to understand the impact of the project on local businesses – 36 local businesses along the Larkhall – Milngavie line were surveyed to understand how the station re-openings and service frequency improvements have impacted the performance of local businesses by improving accessibility and access to the labour market;
- accessibility analysis to assess how public transport journey times have changed since the completion of the project; and
- secondary data sources to establish actual station demand and revenue, and examine trends in local socio-economic indicators such as population and employment.

2. Assessment against Project Objectives

One of the key evaluation study objectives was to provide a comprehensive assessment of the extent to which the project has met its objectives. For project objectives 1 to 3, assessment was based simply on the current service specification. For project objectives 4 to 6, assessment was achieved primarily through analysis of the User Survey and Business Survey results. Additionally, project objective 5 was informed through the TRACC accessibility analysis.

2.1 Project Objective 1

Project objective 1 was *'to reconnect Larkhall to the rail network to allow the introduction of a half hourly service'*. Passenger services began serving Larkhall again from 12th December 2005, as well as the two new stations at Merryton and Chatelherault. Trains now run every 30 minutes to Glasgow Central throughout the day from Monday to Saturday. An hourly service operates on Sunday.

The objective to reconnect Larkhall to the rail network has been fully achieved with a half-hourly service now running from the town to central Glasgow throughout the day.

2.2 Project Objective 2

Project objective 2 was *'to double the frequency of services between Milngavie and central Glasgow and between Hamilton and central Glasgow'*. Since the re-opening of the Larkhall line in December 2005, there has been a doubling in the frequency of services from typically two to four trains per hour between Hamilton and central Glasgow throughout the day from Monday to Saturday. The Sunday service frequency is typically three trains per hour. Similarly, there has been a doubling in the frequency of services from typically two to four trains per hour between Milngavie and central Glasgow throughout the day from Monday to Saturday. A half-hourly service runs on Sunday.

The objective to double the frequency of services between Hamilton and central Glasgow and between Milngavie and central Glasgow has been fully achieved with at least a four trains per hour service operating on each branch throughout the day.

2.3 Project Objective 3

Project objective 3 was *'to remove an operational bottleneck on the North Suburban Line'*. Before the extension of the North Suburban line from Maryhill to Anniesland, Maryhill Line services had to run empty to Knightswood North Junction (near Westerton) to reverse before returning to Queen Street.

Since the reinstatement of the line, this bottleneck has been removed; Maryhill line services now run into Anniesland (via the new station at Kelvindale) before returning to Queen Street. The extension has also freed up capacity for the extra trains serving the new line to Larkhall to run through Westerton and onwards to Milngavie.

The objective to remove an operational bottleneck on the North Suburban Line has been fully achieved.

2.4 Project Objective 4

Project objective 4 was *'to increase the attractiveness of Larkhall and Kelvindale and the surrounding areas for inward investment and land development'*. To assess the extent to which this objective has been met, information on land development for residential or business purposes was obtained. The responses from the User Survey were also analysed to determine whether the rail improvements have influenced respondents' decisions to move home and/or change jobs, as well as impacted local spending habits. The Business Survey responses were used to assess whether the rail project had been a factor in a firm's decision to relocate to or open a new branch in the area.

Regarding land development for residential purposes, information from South Lanarkshire Council suggests that the reopening of the three Larkhall stations has led to an increase in house building and has contributed to the area being classed a Community Growth Area. In total, 1,800 new homes in the Larkhall area are expected to be built, representing a significant investment in housing infrastructure in the area.

There is little evidence of land development for business or industrial purposes in Larkhall or Kelvindale. Data from South Lanarkshire Council suggests that there has been no significant industrial developments in Larkhall since 2005, with the exception of a new NHS distribution warehouse.

Evidence from the User Survey suggests that reconnecting the stretch of line from Larkhall to Hamilton to the rail network has had an impact on making the Larkhall area a more attractive place to live. For example, the survey data indicated that the rail improvements have influenced residents' decisions to move to Larkhall and that there is a perception that property prices have increased as a result of the new stations. The impact of reopening Kelvindale station has also been beneficial but it has been more limited compared to Larkhall, perhaps because this involved just the re-opening of just one station rather than re-connecting an entire branch. Nevertheless, the survey evidence suggested that the scheme has made some contribution to retaining/attracting residents to the area.

There appears to have been limited impact of increased spending in local businesses. Although over half of respondents living in the Larkhall area and a third of respondents living in the Kelvindale area claim to spend more money as a result of the rail project, the majority stated this was in non-local locations such as central Glasgow. These residents have therefore benefitted by having a greater choice of leisure and shopping locations. Non-local businesses will also have benefitted through increase in trade (although local businesses may have seen some loss). This is an example of an inter-area or 'two-way street' impact in which the rail project has enhanced economic interactions between two areas.

In the Business Survey, businesses that had opened a new branch or relocated to either Larkhall or Kelvindale since the completion of the Larkhall – Milngavie project were asked whether the rail improvements had influenced their decision. Only one of the two survey respondents who had moved to Larkhall since 2005 (there were none to Kelvindale) stated the rail project as a factor in their decision. This is in line with the data from South Lanarkshire Council and suggests that there is insufficient evidence to conclude whether the project has increased inward investment and land development for business purposes.

In the Larkhall area, there is evidence that the rail project has led to land being developed for residential purposes and it is thought to have been a factor in the area being classed as a Community Growth Area which will in time lead to a significant increase in new housing in the area.

The User Survey results suggests that the project has made some contribution to the objective by making these places more attractive places to live.

Although there is no evidence of significant new business investments in the areas impacted by the rail project, these are long-term decisions and could take many years to materialise and so the full benefits of the rail project may yet to be realised.

2.5 Project Objective 5

Project objective 5 was 'to offer social inclusion benefits for residents'. To assess whether this objective has been met, the extent to which the rail improvements have promoted social inclusion by connecting people to employment opportunities, social networks, education and leisure activities, thus allowing disadvantaged people access to opportunities that most people take for granted was assessed.

User Survey Results – Journey Purpose

User Survey respondents' journey purpose and destination were analysed to assess whether the Larkhall – Milngavie project has provided a valuable link to employment, education and leisure opportunities. Weighted according to frequency of travel information, 64% of journeys were for commuting (including access to higher/further education), 26% for leisure and 10% for business. The distribution of purposes shows that passengers on the Larkhall – Milngavie line use it to access a range of opportunities and facilities in the surrounding areas. In particular, the new stations have provided a valuable link to employment and education with 61% of those surveyed on the reopened Larkhall section and 52% on the reopened Maryhill – Anniesland section using it for commuter purposes including access to education and training.

User Survey Results – Availability of Public Transport

One of the key criteria in achieving social inclusion is improving the *availability* of public transport, ensuring that is within easy reach of where people live and preferably within walking distance so that those who do not drive and/or who are infirm are not disadvantaged.

The User Survey data was assessed to determine how the reopening of Larkhall, Merryton, Chatelherault and Kelvindale stations has made public transport more available by calculating how much nearer the new stations are 'as the crow flies' to a respondent's home address than the nearest station before 2005. It is important to note that actual distances travelled by walking or driving will be slightly higher than the 'crow fly' distances reported here.

Prior to the opening of the new stations, the nearest station for those residents now using Larkhall, Merryton or Chatelherault would most likely have been Hamilton Central. The median¹ 'crow fly' distance from respondents' homes to Hamilton Central is 6.4km. The median distance from respondents' homes to their nearest station is now just 0.7km and hence these stations are now within easy walking distance for the majority of respondents living in these area. As a result, walking is the station access mode for 63% of journeys made from these three stations, with just 23% of trips driving to the station and a further 4% travelling to the station as a car passenger.

The nearest pre-2005 station for Kelvindale residents would most likely have been either Maryhill or Anniesland. The pre-2005 median 'crow fly' distance from respondents' homes to their closest station (either Maryhill or Anniesland) is 0.64km. The median distance from respondents' homes to Kelvindale is now just 0.36km. Whilst this is less than the step-change seen in the Larkhall area, the reopening of the station has still nearly halved the median distance from the Kelvindale respondents'

¹ The median was used rather than mean to avoid distortion by outlying values

homes to their nearest railway station, with the improvement in actual rather than 'crow fly' distances likely to be greater given the canal and road layout.

Accessibility Analysis

To demonstrate how public transport journey times have changed as a result of the Larkhall – Milngavie project, accessibility analysis was undertaken to assess the impact on journey times between the Larkhall and Hamilton areas and Glasgow Central Station. The analysis was undertaken using TRACC, a multi-modal transport accessibility software tool. This is designed to generate travel times by public transport and highway modes to give accurate journey times from many origins to many destinations in one calculation.

The public transport (rail, bus and coach) journey time from each postcode centroid within the Larkhall and Hamilton areas² to Glasgow Central station was calculated. Glasgow Central station was chosen as a proxy for access to central Glasgow employment, education and leisure opportunities. Two calculations were performed during the morning peak period (07:00-10:00). The first produced the minimum journey time from each postcode centroid to Glasgow Central Station with the Larkhall – Milngavie extension in place, while the second performed the same calculation without it. For each calculation, the minimum journey times produced consist of in-vehicle time and walk times to, from and between stations and stops. In addition, time penalties³ were applied in order to reflect the change in frequency of services as a result of the Larkhall – Milngavie extension. The differences between the two estimated journey times to central Glasgow calculations were used to estimate the change in public transport journey times (Figure 2).

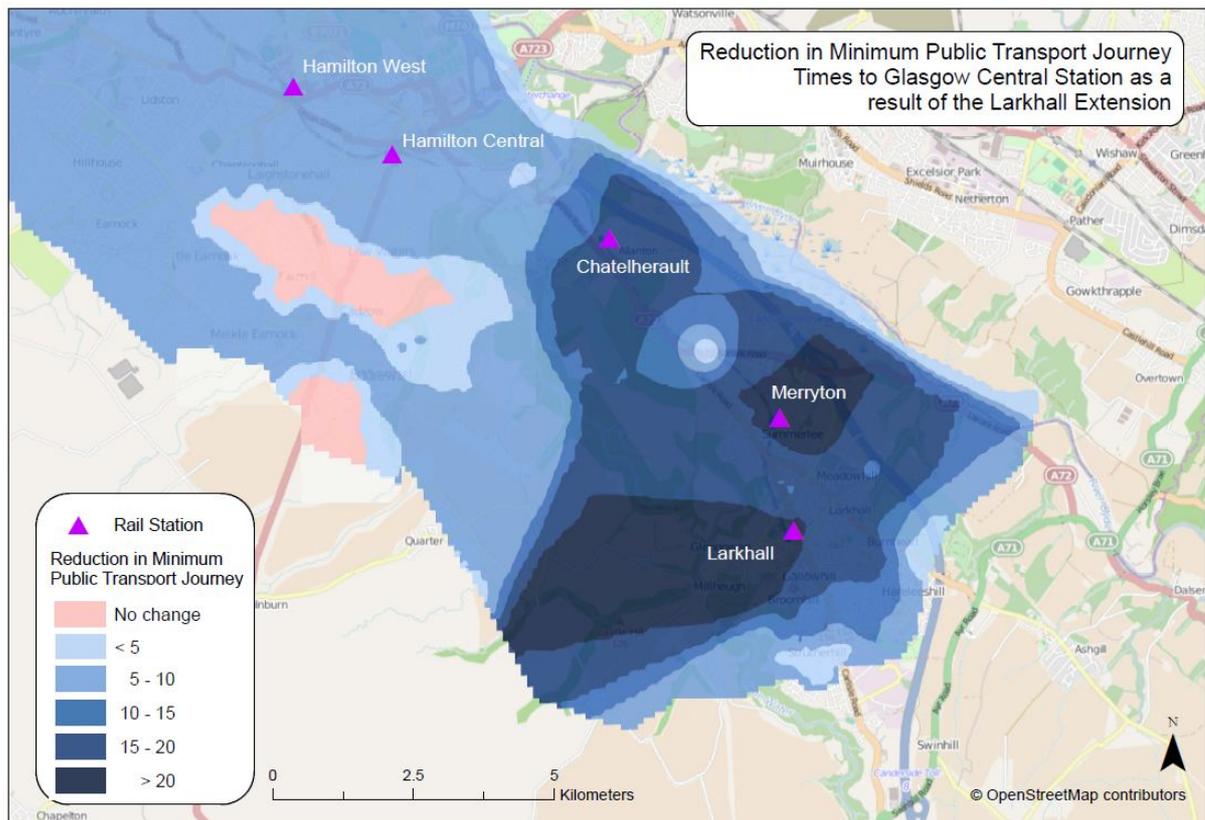


Figure 2 Reduction in Minimum Public Transport Journey Times

As expected, the largest reductions are in the Larkhall area which benefitted from the three new stations and removed the need for passengers to travel to Hamilton to access rail. Here, the journey times to Glasgow Central by public transport have reduced typically by between 10 and 20 minutes.

² Postcodes beginning ML3 and ML9

³ Time penalties based on Non-London Urban PDFH v5.1 frequency penalties

For postcodes within the immediate vicinity of Merryton and Larkhall stations, the reduction is in excess of 20 minutes. Unsurprisingly, the reduction in the Hamilton area is less (typically between 0 and 10 minutes) as the two Hamilton stations benefited merely from the service frequency enhancements.

Table 1 shows the impact of the reduced public transport journey times by proportion of population in the areas assessed. This shows that for 60% of the population in this area, public transport journey times to Glasgow Central have reduced by at least 10 minutes.

Table 1 Reduction in Public Transport Journey Times by Larkhall/Hamilton Population

PT Journey Time to Glasgow Central Reduction	0	< 5	5 - 10	10 - 15	15 - 20	> 20
Population	27,822	1,819	4,229	41,308	5,580	2,153
Percentage	34%	2%	5%	50%	7%	3%

The rail project has therefore reduced public transport journey times to Glasgow Central for the majority of the Larkhall and Hamilton population. This will have promoted social inclusion for local residents, particularly those without a car, and made employment, education and leisure opportunities more accessible.

The User Survey data suggests that the project has contributed to the objective 'Offer social inclusion benefits to residents' by:

- **promoting access to a range of opportunities and facilities in the surrounding areas, in particular employment and education opportunities with 64% of respondents using the line for commuting purposes;**
- **improving the availability of public transport through the re-opening of stations. This is particularly true for Larkhall residents where the nearest station is now within walking distance for the majority of residents, whereas previously their nearest station was over 6km away on average and therefore only accessible by car or bus; and**
- **providing a reduction in public transport journey times therefore promoting accessibility to employment, education and leisure opportunities and promoting social inclusion.**

2.6 Project Objective 6

Project objective 6 was *'to encourage a modal shift towards public transport'*. To assess whether this objective has been met, User Survey respondents were asked questions to understand how changes to rail services since completion of the Larkhall – Milngavie rail project have affected their travel behaviour. Respondents were also asked whether the rail improvements have influenced their car ownership.

User Survey Results – Level of Abstraction from Other Modes

To deduce how the User Survey respondents would have travelled in the absence of the project (i.e. the counterfactual), they were asked how they would travel for their most frequent journeys under the following circumstances:

- users of the four new stations (Larkhall, Merryton, Chatelherault and Kelvindale) were asked how they would travel in the future if rail was not available from their nearest station; and
- users of other stations which benefitted from a frequency improvement were asked how they would travel in the future if the current train service frequency was reduced.

In general, the project appears to have encouraged greater use of public transport, with the most significant impact being from the re-opening of the Hamilton – Larkhall railway line. For those journeys by rail to or from the three re-opened stations (Larkhall, Merryton, Chatelherault, n=201) 43% of journeys would be made by car if the three new stations were unavailable. A further 26% would be made by bus and 5% as a car passenger. The remaining journeys would either not be made at all (13%), the respondent would travel to a different location to board the train (e.g. Hamilton (8%)) or the respondent was not sure how they would travel (4%). Similar results were observed on other parts of the line.

The results presented above indicate stated preference (i.e. what respondents would do in the future), rather than revealed preference (i.e. what they actually did when the rail improvements were implemented in 2005). However, for the purposes of this exercise, it was reasonable to assume that they are equivalent. The results were therefore used to deduce the levels of abstraction from other modes so for example, for Larkhall a 75% abstraction rate is implied (43% car driver, 27% bus and 5% car passenger).

Impact on Car Ownership

User Survey respondents were also asked whether the changes to local rail services have impacted the number of vehicles owned in their household as a result of the rail improvements (Table 2). Overall, the majority (87%, n=143) stated that there had been no impact. There is some variation by scheme (with respondents allocated to scheme according to their home station), perhaps reflecting the different nature of the four scheme components.

The number of respondents reporting a reduction in household vehicles consistently outweighs those reporting an increase so, from the User Survey results, it appears that there has been a small net decrease in household car ownership as a result of the rail improvements.

Table 2 Impact on Car Ownership by Scheme

Scheme	Reduction in Household Cars/Vans	Increase in Household Car/Vans	No Change in Household Cars/Vans
1: Re-opening of the Hamilton – Larkhall railway line (n=82)	11%	4%	82%
2: Re-opening of the Maryhill – Anniesland railway line (n=15)	13%	7%	80%
3: Enhanced frequency of service on the Newton – Hamilton line (n=34)	12%	-	88%
4: Enhanced frequency of service on the Milngavie branch (n=12)	9%	-	91%
All respondents	10%	2%	87%

The User Survey data suggests that the project has contributed to the objective ‘encourage a mode shift towards public transport’:

- **evidence suggests that there has been an abstraction of trips from car and bus, with the impact most pronounced in the Larkhall area where approximately half of journeys made to or from the three re-opened stations would be made by car if it were no longer possible to access rail at the three new stations; and**
- **there is also evidence of a small net decrease in car ownership as a result of the rail improvements.**

3. Impact on Wider Economy

The impact of the Larkhall – Milngavie railway project on the wider economy was assessed by examining a number of local socio-economic indicators:

- population;
- key benefits and Jobseeker’s Allowance claimants;
- house prices and house sales; and
- housing completions.

Identifying and isolating the impacts of a new transport scheme is a challenging task as these indicators are typically influenced by a number of factors simultaneously. To assess whether the project has had an impact, it was therefore important to understand the counterfactual (i.e. what would these socio-economic indicators in the local area have been had the project not been implemented). A control group was therefore defined against which the areas impacted by the Larkhall – Milngavie project were compared. Assuming economic conditions are similar in the control group and the areas impacted by the project, the rail project is then the key differentiating factor and may therefore explain any differences between the indicators in the control group and the project area. While the approach applied in this context is not perfect, it is regarded as reasonable and within the principle of proportionality emphasised by STAG.

Due to the large geographical coverage of the Larkhall – Milngavie project (it extends over three unitary authorities: Glasgow, East Dunbartonshire and South Lanarkshire), the national average (i.e. Scotland as a whole) was selected as the most appropriate control group. Socio-economic data was sourced from the General Register Office for Scotland and Scottish Neighbourhood Statistics. Data was taken from the years immediately prior to the completion of the project in 2005 as well as from 2006 to the present to establish whether post-2005 trends were simply a continuation of the pre-2005 trend or were impacted by the rail project.

3.1 Population

It is reasonable to assume a new railway line or improved rail frequency will, over time, lead to an increase in the local population due to improved accessibility (although this may take many years to materialise). There was some evidence from the User Survey that people’s decision to move home had been influenced by the rail improvements. To assess this, the population since 2002 to the present from the General Register Office for Scotland was analysed to identify whether there has been any change in trends.

Comparing the population change before (2002 to 2005) and after (2005 to 2013) the project was completed shows whilst there was a higher growth post-completion in all three unitary authorities, this was also true of the control group (i.e. Scotland as a whole) and so growth was likely due to other factors rather than the rail project (Table 3).

Table 3 Population Change, 2002 - 2013

Region	Population Change		
	2002 – 2005	2005 – 2013	2002 - 2013
East Dunbartonshire	-1.3%	-0.1%	-1.4%
Glasgow	0.2%	3.1%	3.3%
South Lanarkshire	1.4%	2.8%	4.2%
Scotland	0.8%	4.6%	5.4%

The data therefore suggests that the evidence to link population growth to the Larkhall – Milngavie railway project is inconclusive. The population change between 2005 and 2013 in the three unitary authorities impacted by the project has actually been lower than the national average since 2002. In Larkhall, the main beneficiary of the project with two new stations, the population has shown a consistent decline from 2007 onwards. However, as evidenced in the User Survey the rail project may have contributed to retaining or attracting residents to the area and therefore mitigated some of the population decline.

3.2 Key Benefits & Jobseeker’s Allowance Claimants

Evidence from chapter 2 suggests the Larkhall – Milngavie project has improved accessibility and increased employment opportunities. Additionally, the impact of the new stations in Larkhall may have helped to promote more local economic activity with the creation of new job opportunities.

To assess whether the rail project has had an impact on local employment opportunities, the percentage of the working population claiming key benefits and Jobseeker’s Allowance since 2002 to the present from the Scottish Neighbourhood Statistics was assessed to identify whether there has been any change in trends.

Figure 3 shows the index of the percentage of working age population claiming key benefits from 2002 to 2013 for the areas impacted by the rail project and the control group. All areas show broadly the same trend in the rate of decrease of claimants from 2003 to 2007 in line with the economic growth experienced during this period. This was followed by an increase in 2008 and 2009 presumably as a result of the recession. Since 2010 there has been a gradual decrease in line with the economic recovery.

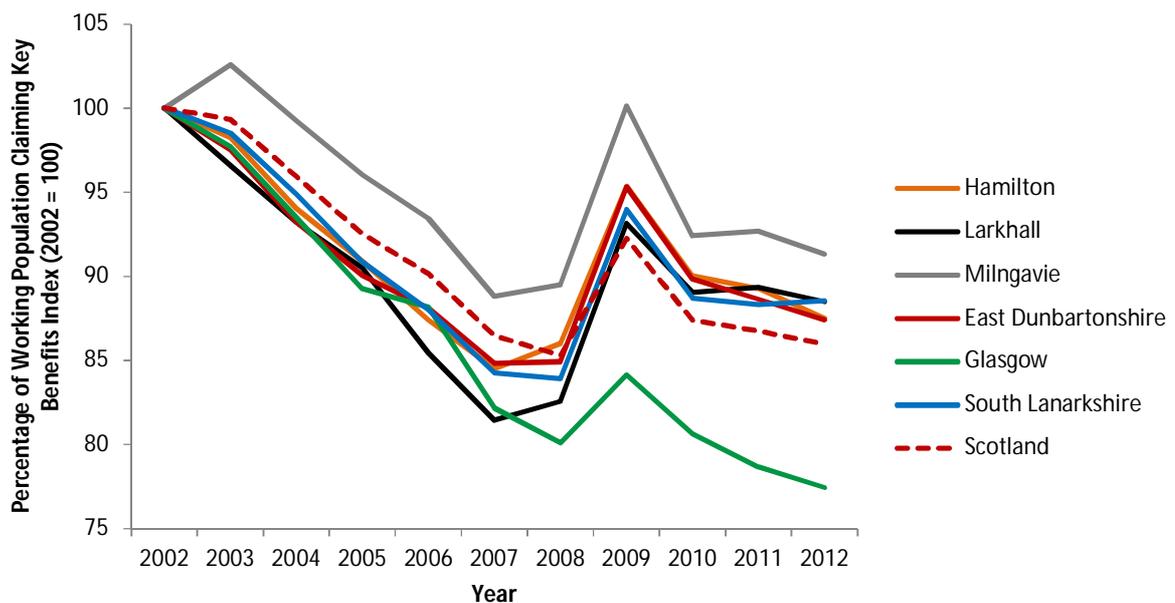


Figure 3 Percentage of Working Population Claiming Key Benefits Index, 2002 – 2012

As the 2006 to 2008 trend appears to be a continuation of the pre-2006 trend, there does not appear to be any clear evidence that the Larkhall – Milngavie project has had an impact on the number of key benefits claimants.

As per the key benefit claimants, the trends in Jobseeker's Allowance observed appear to be in line with the macro-economic conditions rather than the impact of the Larkhall – Milngavie project, with no noticeable difference between the areas impacted by the improvements and the control group from 2006 onwards.

There is therefore no conclusive evidence to link the percentage of benefit claimants to the Larkhall – Milngavie railway project. The changes observed since 2005 are most likely as a result of the economic recession and subsequent recovery rather than the impact of the rail improvements.

3.3 House Prices & House Sales

The User Survey suggested there was anecdotal evidence that residents close to the new stations believed the Larkhall – Milngavie project had helped raise house prices and influenced people's decision to move. To assess whether the rail project has had an impact on house prices and the number of house sales, data from 2002 to the present from the Scottish Neighbourhood Statistics was analysed to determine whether there has been any change in trends.

Figure 4 shows the index of median house prices from 2002 to 2012 for the unitary authorities and settlements impacted by the rail project and the control group. Across all areas including the control group, a similar trend is observed. Between 2002 and 2007 a substantial increase was observed with median prices increasing by a least 70% in all areas; in Glasgow and Scotland as a whole, prices almost doubled. There was a notable increase of 22% in Milngavie in 2006 which could perhaps be an immediate response to the rail improvements. From 2008 however median prices have decreased, with notable falls in Milngavie and Hamilton. In Larkhall, which has seen the biggest improvement in connectivity, the decrease has been less and more in line with the national trend.

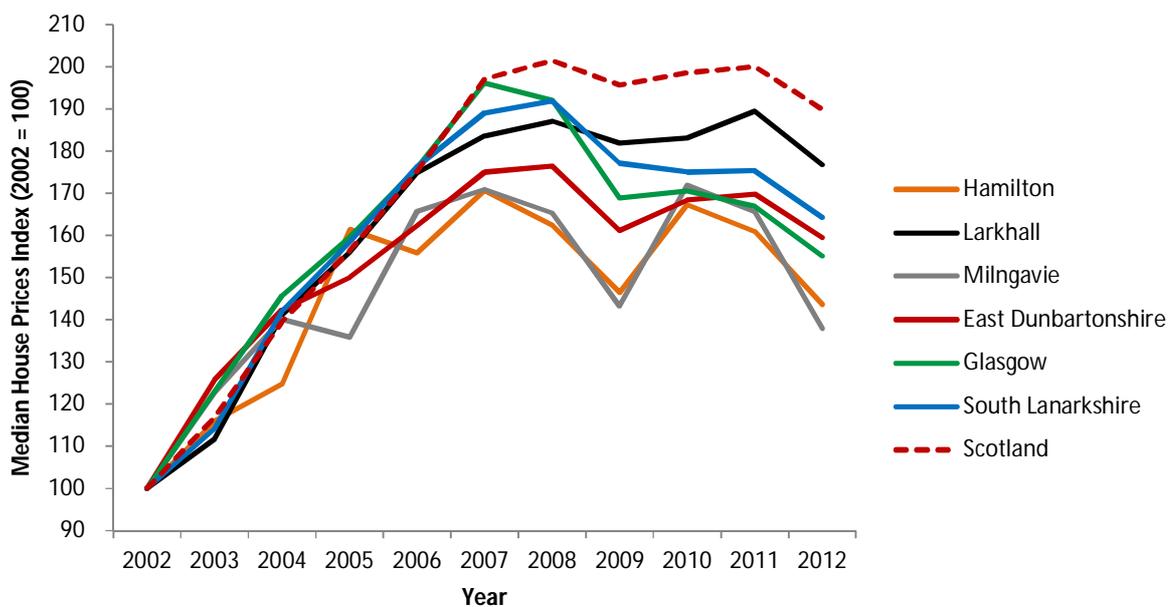


Figure 4 Median House Prices Index, 2002- 2012

A similar trend was observed in house sales. The areas impacted by the rail project typically follow the control group trend with an increase up to 2007 (in line with house prices) followed by a significant fall in 2008 and 2009. Since 2010, there has been a small recovery. There are however some local variations, notably in Hamilton and Larkhall which had a decrease in the number of home sales at the start of the period.

The data therefore does not provide a firm link between house prices or the number of houses sold and the Larkhall – Milngavie railway project. The variations in the housing market since 2005 are most likely in response to the period of strong economic growth to 2007 followed by the recession in 2008 and 2009.

However, evidence from the User Survey suggests the rail project may have had a small beneficial impact on the housing market with the perception that the improvements have boosted house prices.

3.4 Housing Completions and New Developments

To assess whether the rail project has led to more housing being built, housing completion data since 2003/4 to the present from the Scottish Neighbourhood Statistics was assessed to determine whether there has been any change in trends.

Figure 5 shows the index of housing completions from 2003/04 to 2013/14. This shows that the number of completions in East Dunbartonshire has been most volatile compared to South Lanarkshire, Glasgow and the national average and in particular has shown a strong recovery since 2009/10. However, given the relatively small number of homes built (typically between 100 and 300 per annum), this is unsurprising. In South Lanarkshire there was an increase of over 300 completions between 2005/06 and 2006/07 which may have been in response to the opening of the new stations in the Larkhall area. However, since 2006/07 there has been a broadly declining trend in completions in South Lanarkshire and Glasgow, in line with the national average.

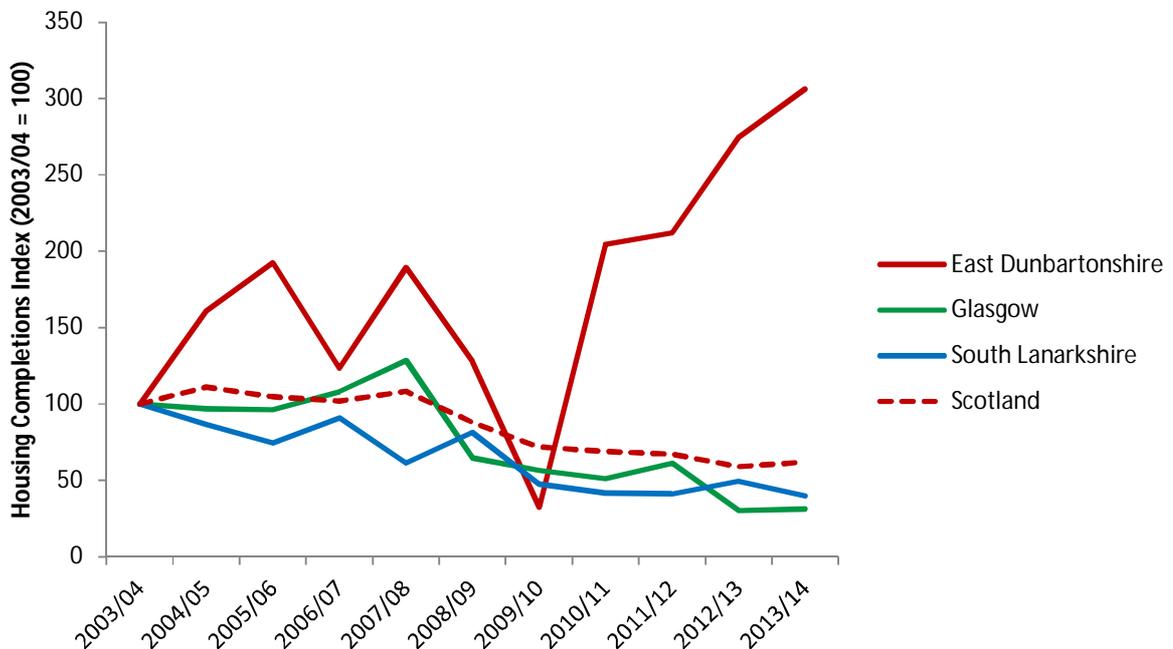


Figure 5 Number of Housing Completions Index, 2003/04 – 2013/14

To assess whether there was an impact on housing completions at a more local level, data from South Lanarkshire Council was obtained regarding private sector housing completions since 2005 in Larkhall and Ferniegair (the settlement served by Chatelherault station) as shown in Figure 6. This shows that the highest level of completions in Larkhall were in 2005 (63) and 2006 (45). This may in

part have been in response to the opening of Larkhall and Merryton stations in 2005. Since 2006, there has been a lower level of activity in Larkhall but in Ferniegair there were nearly 150 completions between 2008 and 2012; again the rail improvements may have been a factor.

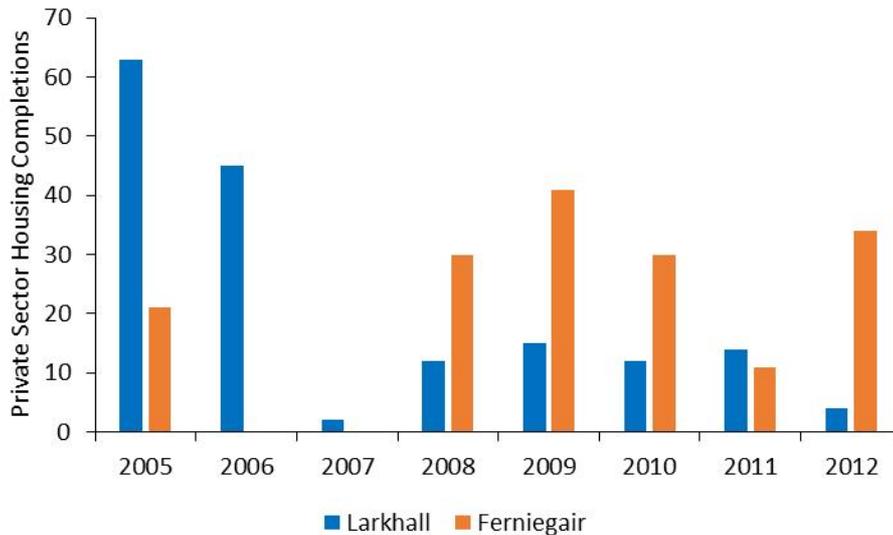


Figure 6 Number of Housing Completions in Larkhall and Ferniegair, 2005 – 2012

Further housing developments in Larkhall and Ferniegair are due with construction work already started or planning consent given. This is primarily a result of the local area being classed as a Community Growth Area⁴. In Larkhall, this is expected to deliver 1,500 new homes and in Ferniegair, 300 new homes are expected with 150 of these completed by 2020. South Lanarkshire Council believe that the rail improvements were a key factor in securing the growth area status and boosting the level of housing investment in the area. The sites for new developments are considered as more sustainable as a result of the new rail link and developers are more prepared to invest as a result; it is unlikely the same scale of building would have been seen without the existence of the rail link. In the long term, therefore, the station re-openings have contributed to the building of new homes in Larkhall and Ferniegair.

Housing completions is the one indicator examined where there is evidence to support the positive impact of the rail improvements. The station re-openings is thought to have been fundamental to the designation of the Larkhall area as a Community Growth Area. In the long term, this will deliver 1,800 new homes in Larkhall and Ferniegair. In time, these new developments may deliver wider positive social and economic impacts.

4. Assessment of Wider Economic Benefits

4.1 Introduction

In addition to the conventional user and non-user benefits such as journey time savings, reliability improvements and environmental impacts, new transport infrastructure can also impact the local economy. An improved transport network can lead to greater efficiency within the economy through improved links between firms, and between firms and their employees. New stations in particular can also lead to increased investment and regenerate an area. These economic impacts are known as Wider Economic Benefits (WEBs).

STAG identifies four possible types of WEB:

- agglomeration impacts;

⁴ Community Growth Areas are places that can accommodate large-scale, urban growth as identified in the Glasgow and Clyde Valley Structure Plan

- wider benefits arising from improved labour supply;
- increased competition as a result of better transport; and
- increased output in imperfectly competitive markets.

WEBs are harder to quantify than conventional transport benefits and are a relatively new feature of economic appraisal within the transport sector; they were not formally assessed at the time the Larkhall – Milngavie railway project appraisal was undertaken in 2000. It was however acknowledged that there would likely be additional effects beyond those captured by conventional appraisal including effects on the economy of the area. The extent to which WEBs have been generated by the Larkhall – Milngavie rail project and their impact on local economies, communities and businesses was therefore assessed.

As acknowledged by STAG, WEBs are difficult to identify and quantify. The aim of the analysis was therefore to provide an indicative exploration of the existence and scale of the WEBs generated as a direct result of the rail project, rather than attempt to provide a precise monetary value of the impacts. The findings will inform the extent to which WEBs should be investigated in future appraisal and evaluations of similar schemes.

4.2 Methodology

Given the limited impact of the Larkhall-Milngavie rail project, a proportionate assessment was carried out in line with STAG. The main source used to provide the required data for the WEBs analysis was the Business Survey. The objective of the survey was to understand how the station re-openings and service frequency improvements have impacted the performance of local businesses by improving accessibility and access to the labour market. 36 businesses within the vicinity of the Larkhall – Milngavie line participated.

Businesses that have been in the area for more than 9 years (i.e. before the completion of the rail project in 2005) were asked questions concerning the impact the Larkhall – Milngavie rail project has had on the following areas:

- business performance;
- turnover and profitability;
- access to suppliers, customers and key services;
- staff recruitment and retention;
- business travel; and
- supply chain linkages.

Businesses that have opened or relocated to the area since 2005 were asked the extent to which the rail project had influenced this decision.

Additionally, the User Survey results and accessibility analysis undertaken to calculate the impact of the rail project on public transport journey times to key business destinations across Glasgow (see section 2) were drawn upon.

4.3 WEBs Analysis

Although there are limits to the conclusions that can be drawn from a small business survey, the analysis carried out suggests that the rail project has been overall beneficial to businesses, with nearly half of those surveyed stating it has had a positive impact on their performance. However, evidence of sustained and significant WEBs is limited.

Agglomeration Benefits

The accessibility analysis has demonstrated that connectivity and public transport journey times to key destinations from locations along the Larkhall-Milngavie route have been improved. There is some evidence that this has created opportunities for agglomeration benefits to materialise through, for example, increased use of rail for better access to markets, suppliers and customers.

However, quantifiable evidence is more limited with few businesses able to demonstrate any substantial reduction in business costs as a direct result of the rail improvements.

Improved Labour Supply

There is evidence that the rail project has improved the labour supply to local businesses with nearly half of the Business Survey respondents stating that the rail improvements have made it easier to retain and/or recruit staff.

This is reinforced by rail users stating that the rail improvements have reduced their commuting times and, particularly in the Larkhall area, influenced their decision to move jobs.

Land Use Changes

There is little evidence that the rail improvements have influenced businesses' decisions to open new branches or relocate. In the Larkhall area, there has so far been no significant change in land use for new business developments.

Reasons for limitations to WEBs

There are several reasons why WEBs arising from the Larkhall-Milngavie rail project may have been limited:

- main benefits are restricted to service improvements along one corridor;
- Larkhall was already well-connected and is primarily a residential area; and
- business investment due to rail improvements may take many years to materialise

5. Recalculation of the Benefit-Cost Ratio

5.1 Introduction

Cost-benefit analysis undertaken at the economic appraisal stage of the Larkhall-Milngavie rail project in 2000 indicated a BCR of 0.66 for the project. The majority of the benefits were expected to come from journey time savings for existing and new public transport users. However, it was expected that the project would bring other benefits that could not be easily monetised and captured within the formal cost-benefit appraisal including assisting economic development and encouraging local investment.

Since the original economic appraisal of the Larkhall – Milngavie project, there have been methodological developments to economic appraisal (e.g. extension of the appraisal period from 30 to 60 years and changes to the discount rate applied to future year costs and benefits). Additionally, as the project was completed in 2005, outturn values to replace some of the forecast values are now available, as well as evidence to inform certain elements of the appraisal (e.g. the level of abstraction from car). The economic appraisal was therefore repeated to provide a quantitative breakdown of the benefits and costs associated with the Larkhall – Milngavie project and allow the BCR to be recalculated to determine whether the project has offered value for money.

5.2 Project Benefits

The main project benefits and dis-benefits are:

- change in public transport revenue (rail, bus);
- rail user (both existing and new) benefits, predominantly journey time savings;
- lower indirect tax revenue as increased spending on rail means less spending elsewhere.

STAG guidance was used to monetise each one to calculate the Present Value of Benefits (PVB). The total PVB over 60 years is £443.9m as shown in Table 4.

Table 4 Present Value of Benefits

Benefit	Value £m
Public Transport Revenue	67.4
User Benefits	390.4
Indirect Tax Impacts	-13.9
Total	443.9

Values are 60 year totals discounted to 2010 prices and values

5.3 Project Costs

The costs of the Larkhall – Milngavie rail project can be broken down as follows:

- capital costs;
- operational costs;
- maintenance costs; and
- renewal costs.

The total Present Value of Costs (PVC) over 60 years is £160.4m as shown in Table 5.

Table 5 Present Value of Costs

Cost	Value £m
Capital Costs	39.9
Operational Costs	104.6
Maintenance Costs	7.5
Renewal Costs	8.4
Total	160.4

Values are 60 year totals discounted to 2010 prices and values

5.4 Benefit Cost Ratio

Table 6 shows the PVB, PVC, Net Present Value NPV (calculated as PVB – PVC) and BCR (PVB/PVC) as recalculated on the basis of the analysis described above.

Table 6 Benefit Cost Ratio

Item	Value
PVB (£m)	443.9
PVC (£m)	160.4
NPV (£m)	283.5
BCR	2.77

PVB, PVC and NPV are 60 year totals discounted to 2010 prices and values

The BCR is therefore recalculated as 2.77. With a BCR greater than 1, this indicates the benefits outweigh the costs.

The original project BCR calculated at the appraisal stage was 0.66. The recalculated BCR therefore represents a significant improvement over the original BCR. However, as discussed above, due to changes in appraisal methodology, a direct like-for-like comparison is not possible.

To overcome this, two sensitivity tests were run as shown in Table 7:

- as per current STAG guidance but assuming a 30 year appraisal period;
- as per current STAG guidance but assuming a 30 year appraisal period, a 1994 price base year and a discount rate of 6%.

Note however that even when implementing the above, inconsistencies remain between the two appraisal methodologies e.g. appraisal values such as values of time which will have been updated since 2000 as a result of new research.

Table 7 Benefit Cost Ratio Sensitivity Tests

Sensitivity Test	Assumption	BCR
1	30 year appraisal period; 2010 price base year; 3.5%/3.0% discount rate	2.35
2	As per Test 1 but with 1994 price base year and 6% discount rate	1.83

The sensitivity tests show that, even with a shorter appraisal period and higher discounting of future year benefits, the project's benefits still outweigh its costs.

It can therefore be concluded that the outturn benefit cost ratio of the Larkhall – Milngavie rail project is significantly higher than that reported in the original appraisal and indicates that the project's benefits outweigh the costs.

6. Recommendations for Rail Evaluation

The study concluded with a number of recommendations to be considered for inclusion in Transport Scotland's Rail Evaluation Guidance. The basis for these recommendations was primarily SYSTRA's experience in conducting this evaluation study and in particular the challenges experienced undertaking the different aspects of the study including the Outcome and Process Evaluations, conducting surveys and reviewing passenger forecasts.

The key recommendations are to:

- develop 'SMART' project objectives which can be effectively and continuously monitored post-project completion;
- conduct the Process Evaluation soon after project completion;
- identify the data required to effectively appraise, monitor and evaluate the project including the use of surveys to better understand the characteristics and behaviour of users and potential users both before and after project completion;
- ensure data collection is an ongoing exercise rather than a task that is only considered as part of the Outcome Evaluation;
- consider innovative survey design including the use of new technology and social media to ensure a more targeted yet cost-effective survey approach;
- ensure all project documentation is comprehensively archived and safe-guarded to make sure the relevant and correct information is readily accessible which will aid the future monitoring of the project;
- ensure all demand modelling assumptions made and outputs prepared at the appraisal stage are comprehensively documented; and
- undertake sensitivity tests using a range of economic conditions when preparing demand forecasts to reflect the inherent uncertainty in forecasting.

Inclusion of these recommendations will promote a more robust, evidence-based evaluation of rail projects. This will enhance the ability to demonstrate that the observed project outcomes and impacts have been caused by the intervention rather than external influences.

7. Conclusions

The evaluation found that the project has been a success in terms of standard Transport Economic Efficiency (TEE) measures with the project's benefits outweighing its costs which is primarily due to higher than expected demand. However, there is only limited evidence to support the success of the project's wider objectives.

The first three operational objectives have all been achieved. For the remaining three, in the absence of quantitative targets, it was more difficult judge the extent to which they have been achieved. There was certainly evidence from the two surveys undertaken and the accessibility analysis that positive contributions have been made for objectives 5 and 6, particularly in Larkhall:

- the rail improvements have led to reductions in public transport journey times to key destinations across the project area, improving accessibility and promoting social inclusion;
- there is evidence from the survey findings that the rail improvements have encouraged a mode shift towards public transport which has likely resulted in abstraction of car trips as well as a small net decrease in car ownership.

For objective 4, although there was some evidence from both the User and Business Surveys that the project had increased the attractiveness of Larkhall and Kelvindale, this was not supported by examination of local economic indicators; this suggested that overall the rail project has not had a significant or measurable wider economic or social impact. There is some evidence however of the rail project being a factor in the increased levels of homes being built in the Larkhall area in particular. It is also acknowledged that the full benefits of the rail improvements could take many years for to materialise. The analysis of WEBs generated by the project also suggested that these too had been limited to localised, small-scale impacts.

Nevertheless, overall the project can be considered a success in terms of utilisation, with actual passenger demand exceeding forecasts and the recalculation of the BCR showed this was significantly higher than that reported in the original appraisal and indicates that project has delivered 'value for money'.

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