Larkhall to Stonehouse Rail Study
Final Report

South Lanarkshire Council
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Larkhall to Stonehouse Rail Study

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Executive Summary

Introduction

South Lanarkshire Council appointed Faber Maunsell in October 2007 to undertake a study to review the feasibility of extending the Hamilton to Larkhall Railway Line to Stonehouse.

The original railway line extended over a length of some 7.3km from the station in Larkhall to the station on the southern edge of Stonehouse. Subsequently, the construction of the Stonehouse Bypass Phase One on the original railway embankment and the inclusion of Phase Two within the Local Transport Strategy are considered to isolate the original Stonehouse Station from the rest of the original line.

This reports sets out the necessary railway engineering, railway operations, transport modelling and appraisal to determine the feasibility of extending the existing line to a new station near Stonehouse.

Planning Policy Context

National, regional and local policies relating to transport and land use have been reviewed, and a number of common priorities identified.

National transport objectives, outlined in the Scottish Executive's 2004 White Paper, are:

- economic growth;
- social inclusion;
- environment;
- safety; and
- integration.

The National Transport Strategy (NTS) (Scottish Executive, December 2006) expectations are to deliver these objectives, improve journey times and connections; reduce emissions; and improve quality and accessibility and tackle affordability.

The Strathclyde Partnership for Transport (SPT) Regional Transport Strategy (RTS) and South Lanarkshire Local Transport Strategy (LTS) both aim to:

- improve safety and security;
- reduce social inclusion and provide access for all;
- alleviate the adverse impacts of traffic and traffic growth and encourage mode shift;
- facilitate economic regeneration;
- provide an excellent transport system with improved effectiveness and efficiency; and
- improve environmental aspects including health by providing better access to and uptake of walking and cycling opportunities.

Scotland's Railways (Scottish Executive, December 2006) sets out the Scottish Executive's aims and objectives for the rail industry in Scotland and acts as an associated document to the NTS, and outlines a programme of planned interventions. The following provides a summary of the key strategic outcomes from Scotland's Railways:

- improving journey times and connections
- reducing emissions
- improving quality, accessibility and affordability

It is recognised that by investing in the rail network, a contribution can be made to reducing road congestion and harmful emissions, and also reducing the impact of transport on the environment.

The common themes among these national, regional and local objectives, along with the objectives of wider development policies, have been considered within this study.

Background to Study Area

Consideration has been given to socio-economic, economic development, transport, environmental and safety issues pertaining to the study area. This has indicated that South Lanarkshire is performing well within the context of Scotland and the indications are that this trend will continue. Larkhall is identified in the Local Plan for new housing and business development and Stonehouse has also been identified for housing development. This is likely to impact on the transport network in these areas.

An analysis of the Social Indices of Multiple Deprivation (SIMD) indicates that:

- Parts of southern Larkhall are among the 5% most deprived zones in Scotland in terms of Education;
- Sections of southern Larkhall are among the 10% most deprived zones in Scotland in terms of Health; and
- Four zones in Larkhall are among the 10% most deprived in Scotland.

The study area is served by the M74 motorway, the main road link between Scotland and England, and there are several other main roads within the study area including the A71 and A72.

The main passenger rail movements within the South Lanarkshire area are on the Glasgow suburban rail network.

There are no Air Quality Management Areas (AQMAs) in the study area. There are several Listed Buildings within the study area though only the Larkhall Railway Viaduct (Category B) is located with the proposed rail extension route. The Avondale SSSI / Clyde Valley Woodland SAC runs close to the proposed rail extension between Larkhall and Stonehouse and would need to be considered carefully should the scheme proceed.

In terms of safety, South Lanarkshire is generally surpassing its targets for road safety and the new Larkhall station has modern safety features albeit it is unmanned.

Milngavie – Larkhall Rail Line

This study has reviewed the success of the Milngavie – Larkhall rail line which makes provision for rail traffic between Larkhall and Dalmuir and a new service from Queen Street to Anniesland via Maryhill.

The new branch extends the railway network to the south of Hamilton by approximately 4.7km opening stations at Larkhall, Merryton and Chatelherault. These stations serve the communities of Larkhall (Larkhall and Merryton stations) and Ferniegair (Chatelherault station).

Funding for the Milngavie – Larkhall scheme was obtained from the Scottish Executive and SPT, with support from South Lanarkshire Council, and the scheme has allowed for timetable increases to services as well as new services.

The Milngavie – Larkhall scheme was completed in December 2005 and provides a number of benefits to the local and wider communities. The new rail link has increased capacity and service coverage on the Greater Glasgow rail network. This resulted in reported patronage figures of 343,000[1] passengers travelling to / from Larkhall, Merryton and Chatelherault in the first year of operation. This figure was 53% greater than the projected 220,000 passengers. Within the last year of operation, until February 2008, the patronage figures for the Larkhall branch line had increased to 415,000[1].

It has been reported that the scheme has increased employment and educational opportunities for Lanarkshire residents by providing easier access to Glasgow. SPT report that the new railway has played a full part in a sustainable, effective and integrated transport system, and

[1] Source First ScotRail Lennon data, supplied 04/03/2008

has also helped support economic development, meet social needs, and provide a better environment.

SPT indicated that the re-opening of the Larkhall branch line is making a significant contribution to the economic regeneration of Lanarkshire and this progress looks set to continue[2].

Railway Engineering

Consideration has been given to the Railway Engineering factors pertaining to the proposed extension of the rail line from Larkhall to Stonehouse. This has included details of the proposed route alignment, a review of each structure on the proposed route, the requirement of railway systems, the general civil engineering work involved on the project and an overall indicative cost estimate.

In terms of Larkhall Railway Station, the Railway Engineering work recommends that re-construction of approximately half of Larkhall Railway Station would be required to follow a curved alignment to allow the proposed track extension to pass under McNeil Street.

A proposed location for the new Stonehouse Railway Station has been identified just to the west of Lawrie Street on the north side of the A71. It is proposed that the new station would be constructed on an embankment approximately 5m above the existing road level at Lawrie Street. Rail Operations modelling has indicated that only one platform is required at Stonehouse, based on current timetabling, however the proposed new station allows the flexibility for a second platform in the future should it be required.

Two new car parks, both with 50 spaces, are proposed at the new Stonehouse Rail Station, albeit the capacity of both car parks could be increased or decreased if necessary. Car park 1 is proposed to be built on wasteland on the south side of the A71, connecting to Lawrie Street. A roundabout is recommended to connect car park 2 to the A71 and this would be constructed on farmland on the south side of the proposed track alignment. It is also proposed that a bus stop and turning area would be located at the east end of car park 2 to allow public transport interchange.

Pedestrian ramps, designed under the current Disabled Discrimination Act (DDA) standards, could be constructed to allow pedestrian access from the car parks and bus stops to the station. The pedestrian footway network and car parks would be illuminated to comply with Local Authority and Network Rail Standards as well as having a CCTV network to help with passenger and parking security.

Shelters would be provided at the new Stonehouse station and at the bus stops, and comprehensive signage would also be implemented to direct passengers using the car park and bus stops, to and from the station.

A concept design has been developed which gives consideration to the alignment of the rail extension, structures, signalling and Overhead Line Equipment (OLE).

Indicative costs for the Railway Engineering works have been set out, with a total estimated cost of **£51,151,000**. This cost includes for Optimism Bias at 44% and is based upon a Dynamic Loop option. In addition, the cost estimate does not include for utility diversions or land purchase.

Railway Operations

Larkhall station is currently served by a half-hourly pattern of services for most of the day, with some modifications during the evening peak. Most trains originate or terminate at Dalmuir, albeit again there are variations during peak times. Trains are formed of a mixture of class 318 and 334 rolling stock. Generally services are formed of a single three-car train, although there is some doubling up during the peaks.

The proposed rail extension has been considered in railway operational terms. This has involved consideration of sectional running times and the impact of extending trains to the

[2] Source First ScotRail, Press Releases, http://www.firstgroup.com/scotrail accessed 09/10/2007

proposed new station site at Stonehouse, given the current timetable. Consultation has been undertaken with First ScotRail to ascertain their view on the proposed rail extension, as well as the implications for driver schedules and stock schedules. Consideration has also been given to the likely performance risks and mitigation measures that may be required to satisfy Network Rail and other stakeholders.

In the current timetable trains arrive at Larkhall (from Glasgow via Haughhead Jn) at xx:00 and xx:30. Trains are scheduled to depart north seven minutes later at xx:07 and xx:37, respectively. This efficient turnaround at Larkhall means that extending these services south to Stonehouse will require additional rolling stock.

Run times between Larkhall and Stonehouse have been calculated at around 4½ minutes. This means that if the existing timetable structure is maintained, northbound and southbound trains will need to pass somewhere between Larkhall and Stonehouse. Two solutions have been examined: a dynamic loop and a single line. A dynamic loop means that one of the trains is not required to stop to allow the other train to pass. A single line would involve northbound and southbound trains passing in the platforms at Larkhall. These two options are summarised below in Table 1.

Table 1: Summary of Results for Two Options

	Option 1	Option 2
Infrastructure	Dynamic Loop	Single Line
Signals Required	6	2
Stock Required (units)	1	1
Journey Time (minutes): Stonehouse to Glasgow Central	35½	38
Turnaround time at Stonehouse (minutes)	26	19

It is considered that both Options are operationally feasible, subject to more detail design and analysis. However, before the scheme would be accepted by industry stakeholders, full operational assessment using RailSys would be required.

Both options could in principle be operated by one additional single three-car unit. However, the extension would change which southbound and northbound services were linked in the rolling stock diagrams. This will affect in particular which services in the peak periods are formed of two three-car units.

Additional crew would be required, since effectively one extra train is operating on the network at any time. It is unlikely that additional crew rest facilities would be needed, unless the Train Operator decided to take advantage of the long turnarounds at Stonehouse to schedule crew breaks there.

The extended turnaround times at Stonehouse mean that potentially extending further to Strathaven is feasible in operational terms. The infrastructure and run times for a further extension to Strathaven have not been examined as part of this commission. However, it is probable that the service could run from Stonehouse to Strathaven and return to Stonehouse within the 19 minutes (single line) or the 26 minutes (dynamic loop) that the service would sit at Stonehouse, however further run time modelling would be required to confirm this. No further additional units or crew would be required over and above that needed for the Stonehouse extension. The extension could consist of a single line operated under Single Train Working.

Performance risks have been considered and measures for mitigating the potential impact have been set out within this report.

Indicative rail operational costs have been prepared assuming one additional single three-car unit, operating a 16-hour day, 363 days per year. The costs assume one driver and one ticket checker would be employed on the additional unit at any one time. The costs also allow for:

- Leasing and operation of the single three-car unit;
- Crew;
- Capacity charge;
- Overhead, applying a 9% uplift (based on best practice); and
- Profit, applying a 6% uplift (based on best practice).

The indicative operational costs are **£704,000 per annum** for the Larkhall – Stonehouse extension.

The extended turnaround times at Stonehouse mean that the impact of potentially extending further to Strathaven is likely to be small in terms of operating costs. The infrastructure and run times for a further extension to Strathaven have not been examined as part of this commission. However, it is expected that the indicative operational costs associated with extending the service from Larkhall to Strathaven would be **£770,000 per annum**.

Transport Modelling

Consideration was given to the available modelling tools at an early stage of the commission. This included a review of:

- The Strathclyde Integrated Transport Model 4 (SITM4);
- The Transport Model for Scotland (TMfS); and
- The Strathclyde Integrated Transport and Land Use Model (SITLUM).

In discussion with SPT and South Lanarkshire Council, it was agreed that the development of a bespoke spreadsheet-based mode choice model would give the most robust results for this study.

A spreadsheet model was therefore developed for the AM peak hour. It was developed for a base year of 2005, and forecasts produced for 2012 and 2022.

The model produced forecast demand by comparing the 2005 demand (taken from TMfS) and future year levels of development, along with the forecast levels of car ownership. It also took into account the phenomena of a transport intervention increasing the amount of trip making ('induced' trips). Travel costs (both monetary and time) were then compared for car, bus, rail and rail-based Park and Ride modes, and the demand split between them.

Table 2, below, presents the forecast demand for extending the rail line from Larkhall to Stonehouse. Operational parameters are taken from the Railway Operations work. Demand is presented for scenarios with and without the extension ('Do Something' and 'Do Minimum' respectively) to enable the effect of introducing the scheme to be clearly identified.

Table 2 – Core Scenario (per annum, 000's of trips)

Zone	2005 Base	2012 Do Minimum	2012 Do Something	2022 Do Minimum	2022 Do Something
Larkhall Station	277	225	166	319	260
Stonehouse Station	-	-	113	-	143
Total	**277**	**225**	**279**	**319**	**403**

The 2012 Do Minimum shows a drop in the number of trips using Larkhall station from 2005. This is due to two factors: a drop in the planning data (population) and an increase in car ownership rates. In 2012 the core Do Something scenario predicts an annual use of Stonehouse station of approximately 113,000 trips. This increases to approximately 143,000 trips in 2022. However, it is important to identify the source of these trips. Larkhall experiences a reduction in use, from 225,000 to 166,000 in 2012 and from 319,000 to 260,000 in 2022, as trips that previously used Larkhall now have direct access to Stonehouse rail station. The source of the trips using Stonehouse station are shown in Table 3.

Table 3 – Previous Mode of Trips Using Stonehouse Station

Mode	2012	2022
Rail (Larkhall Station)	**43%**	**32%**
Car	**36%**	**47%**
Bus	**21%**	**21%**

A series of sensitivity tests were undertaken to test the impact of different factors on the forecast level of demand at Larkhall rail station and the proposed Stonehouse rail station. The sensitivity tests were developed in discussion with South Lanarkshire Council:

- Increased Fuel costs – cost of car fuel increased by 50%;
- Increased Bus fare – cost of bus fares increased by 25%;
- Distance based congestion charging – a charge of 10p per kilometre imposed on cars; and
- Planning data variant – additional 700 households in Stonehouse zone.

All four sensitivity tests resulted in more passengers using the rail stations at Larkhall and Stonehouse, compared to the base scenarios. The sensitivity test modelling distance-based congestion charging demonstrated the largest increases in rail patronage of all sensitivity tests. The planning data variant sensitivity test, where an increase of 700 households in Stonehouse was modelled, revealed minor increases in rail patronage.

An assessment of transport economic benefits has been undertaken, in line with STAG guidelines. In the absence of any land referencing, an assumption for land costs of £5 million was made. Preparation and supervision costs were calculated using standard percentages of the capital cost (12% and 5% respectively).

The outputs were calculated by comparing the forecast outcome with each scheme in place (the Do Something) with the forecast outcome without the scheme (the Do Minimum). The transport benefits and disbenefits identified are therefore only due to the effects of the scheme implementation.

The results of the appraisal are summarised within Tables 4 and 5, below.

Table 4 – Transport Economic Benefits for the Core Scenario (£000's, 2002 values and prices)

Sub-Objective		Core Scenario
Transport Users	Travel time	4,225
	User Charges	0
	Vehicle Operating Costs	0
Private Sector Operator Impacts	Investment Costs	0
	Operating & Maintenance Costs	-23,757
	Revenues	11,218
	Grant/Subsidy payments	12,539

Table 5 – Cost to Government for the Core Scenario (£000's, 2002 values and prices)

Item	Core Scenario
Public sector investment costs	-49,587
Public sector operating and maintenance costs	0
Grant/subsidy payments	-12,539
Revenues	0
Taxation impacts	0

The cost of operating the extended rail services falls upon the private sector, in the form of the franchisee. The revenues and the grant/subsidy balance this cost, resulting in the only net benefit coming from the time benefit experienced by rail passengers. This is calculated as £4.225million over 60 years.

The present value of cost of construction is calculated as £49.587million over the assessment period (2002 values and prices).

Table 6 presents the monetised summary, comparing the benefits and the costs.

Table 6 – Cost to Public Sector (£000's, 2002 values and prices)

Item	Core Scenario
Present Value of Benefits (PVB)	4,225
Present Value of Costs (PVC)	-62,126
Net Present Value (NPV)	-57,901
Benefit to Cost Ratio (BCR)*	0.07

*note: this is a ratio.

The above figures demonstrate that the scheme benefit to cost ratio is 0.07, i.e. the costs of the scheme far outweigh the benefits. However, it should be remembered that not all benefits are monetised. Decongestion benefits for road users, and resulting accident benefits and vehicle operating cost benefits, are not included. Similarly, the effect of slightly reduced traffic congestion on buses is not included. All these items are likely to be positive in nature, but minor in scale, and would be very unlikely to make the overall assessment of the scheme positive.

The TUBA analysis of the change in rail revenue shows that in 2012, the Do Something scenario produces £305,000 more than the Do Minimum. This is expressed in 2002 prices and values. This equates to £394,000 in 2008 prices and values, which compares with per annum costs of £1,254,000 in the same price and cost base. This is made up of £704,000 Operational costs, £200,000 Maintenance costs and £350,000 Renewal costs.

Taking a definition of 'break-even' to be that farebox increases match the year-on-year burden of the scheme on the public purse, the forecast patronage would have to be at least treble for the scheme to be viable. This makes the following, optimistic, assumptions:

- 'Break-even' does not include any element to cover the initial capital costs; and
- There is no abstraction from bus.

Transport Appraisal

High-level consideration has also been given to the performance of the rail extension against each of the Government's five objectives for transport: Economy, Safety, Integration, Environment, and Accessibility and Social Inclusion.

In terms of Safety, it is considered that by removing car trips from the road network, the rail extension would likely have a positive impact on accidents. In addition, rail travel is generally considered to incur fewer accidents than travel by private car. It is expected that safety considerations will be fully considered as part of the design process.

In terms of Integration, the Larkhall – Stonehouse rail extension would offer interchange with bus, rail and Park and Ride. The new station location at Stonehouse would incorporate a bus turning and drop-off facility which would allow interchange between bus and rail. In addition, the new station at Stonehouse would enhance the integration of journeys via car and public transport through the incorporation of a Park and Ride site at the station. This will therefore offer an attractive alternative route into locations such as Hamilton and Glasgow. The design of the station and the provision of cycle parking would facilitate integration with walking and cycling. The provision of an additional station at Stonehouse will provide connections to locations in the corridor, such as Stonehouse town centre and existing and proposed residential developments.

Furthermore, the improvements in public transport brought about by the Larkhall – Stonehouse rail extension are expected to meet or support most local, regional and national policy objectives, in particular those related to sustainable travel (with increased use of public transport and reduced dependence on the car), regeneration and improving access, particularly for those dependent on public transport. The proposed rail extension is also expected to contribute to wider policies beyond transport, including disability, health, rural affairs and social exclusion.

The extension of the Larkhall rail service to Stonehouse will provide additional rail transport in a currently un-served corridor. It is thus likely to have a positive impact on converting car users to public transport passengers utilising an efficient transport mode. The rail extension will also

improve accessibility and social inclusion, particularly in relation to the less advantaged and regenerated communities in the study area.

Environment comprises elements of the natural and built environment as well as people. It is considered that environmental impacts would occur both during construction and operation of the proposed rail extension. However, it is expected that these impacts would be reduced through the implementation of effective mitigation measures. Particular attention will require to be paid to the potential impact on environmentally designated sites / listed buildings etc within the study area and it is recommended that further Environmental assessment would be required should the scheme be taken forward for further consideration.

In terms of Accessibility and Social Inclusion, it is considered that the new station at Stonehouse would improve public transport network coverage through improving accessibility to destinations on the Larkhall rail line including Merryton, Chatelherault, Hamilton, Blantyre, Rutherglen, Glasgow, Partick, Hyndland and Dalmuir. The rail extension would support the existing community of Stonehouse, as well as the proposed housing expansion detailed within the South Lanarkshire Local Plan, including sites at New Street, New Street Kirk Street, Stonehouse Hospital, St Ninians Place, East Mains, Spittal Road and Loch Park Industrial Estate.

It is considered that the extension of the Larkhall rail line to Stonehouse may promote further non-motorised trips to access local services through the provision of improved rail service provision and increased interchange opportunities at Stonehouse.

Improved accessibility to both employment opportunities and services will assist in addressing issues of social exclusion and deprivation. The provision of enhanced rail links between Stonehouse and key destinations such as Hamilton and Glasgow will assist in achieving this.

Conclusions and Recommendations

This report has concluded that in terms of initial consideration of Railway Engineering and Railway Operations the scheme would be feasible.

However, the 26-minute turnaround time at Stonehouse associated with the preferred Dynamic Loop option is not efficient in operational terms. Further discussions with key rail industry stakeholders would indicate if this time could be put to efficient use (for example, for crew rest breaks).

In economic efficiency terms, the scheme benefit to cost ratio is 0.07, i.e. the costs of the scheme far outweigh the benefits. Taking a definition of 'break-even' to be that farebox increases match the year-on-year burden of the scheme on the public purse, the forecast patronage would have to at least treble for the scheme to be viable. This does not include any element to cover the initial capital costs nor abstraction from bus.

Should South Lanarkshire Council wish to consider this scheme further, the following would be required:

- Discussions with potential funding bodies, including Transport Scotland and SPT, to discuss capital and revenue implications;
- More detailed railway operational modelling to establish how the proposed rail extension would affect the overall performance of the rail network;
- More detailed technical and engineering design;
- Consultations with key rail industry stakeholders to discuss issues such as rail operations, performance, compliance with standards, track alignment, gradient, availability of rolling stock etc. Stakeholders would include Network Rail, Her Majesty's Railway Inspectorate (HMRI), First ScotRail and Transport Scotland; and
- Further consideration of cost and benefit impacts using an objective led, multi-modal appraisal methodology in accordance with the advice contained in the Scottish Government's Scottish Transport Appraisal Guidance (STAG).

Table of Contents

1 Introduction

1.1 Background

South Lanarkshire Council appointed Faber Maunsell in October 2007 to undertake a study to review the feasibility of extending the Hamilton to Larkhall Railway Line to Stonehouse.

The original railway line extended over a length of some 7.3km from the station in Larkhall to the station on the southern edge of Stonehouse. Subsequently, the construction of the Stonehouse Bypass on the original railway embankment and the potential development of Phase Two of the bypass is considered to isolate the original Stonehouse Station from the rest of the original line.

This study involves transport modelling and appraisal, railway engineering and railway operations modelling to determine the feasibility of extending the existing line to a new station near Stonehouse.

1.2 The Study Area

South Lanarkshire is located in the Central Belt of Scotland and has a population (estimated at 2004) of 305,410 making it the fifth largest local authority in Scotland in population terms. The Local Authority area covers 177,193 hectares of which almost 80% is in agricultural use. The area includes both urban and rural environments, the four main areas being:

- Clydesdale;
- East Kilbride;
- Hamilton; and
- Rutherglen and Cambuslang.

The immediate study area is between the settlements of Larkhall and Stonehouse which are situated to the south of the urban centres within South Lanarkshire. Larkhall is approximately 6km south of Hamilton town centre with Stonehouse a further 5km south of that. Both Larkhall and Stonehouse are proximal to the M74 motorway which passes to the east of the settlements. Larkhall and Stonehouse lie within the more rural areas of South Lanarkshire however Hamilton and the North Lanarkshire Council towns of Wishaw and Motherwell are within a 12km radius of both. Larkhall and Stonehouse have respective populations of 17,376 and 6,560[3].

[3] Source: South Lanarkshire Council Key Facts; 2005 Datazone Mid Year Estimates, GROS

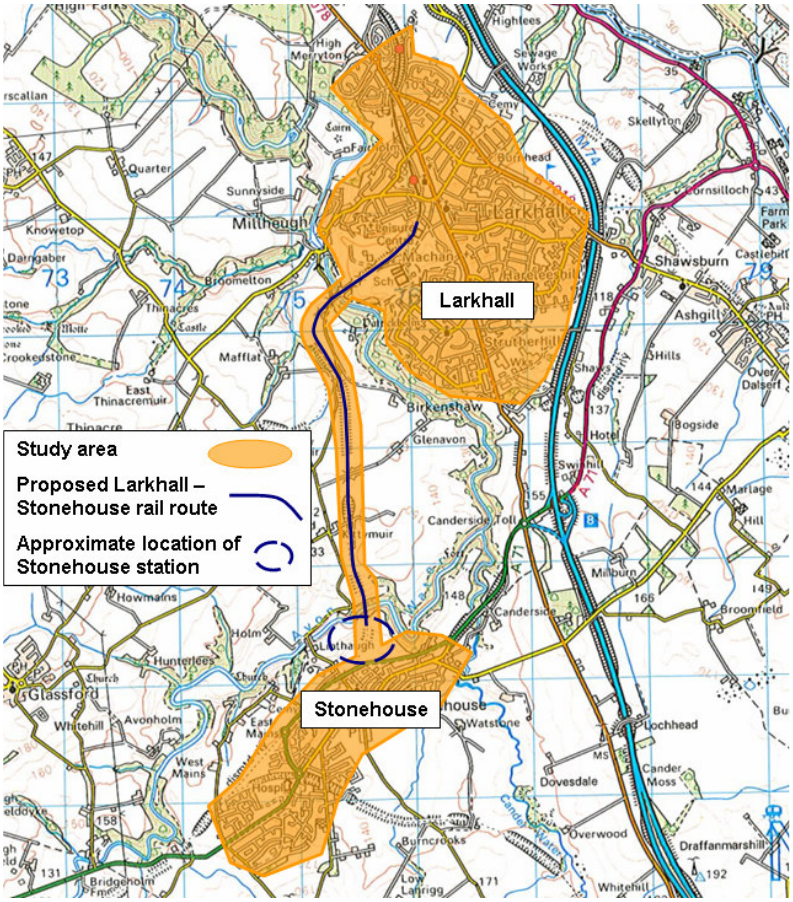


Figure 1.1: Study area

1.3 Overview of Methodology

This study has involved three key tasks, as follows:

- Transport Modelling and Appraisal

The Transport Modelling element has involved the preparation of forecasts of ridership, revenue and transport economic benefits for the proposed scheme. This has been undertaken using a bespoke spreadsheet-based model and using a STAG-based methodology. In addition, high-level consideration has been given to the performance of the scheme against the Government's five key objectives for transport: Environment, Economy, Safety, Integration and Accessibility and Social Inclusion.

- Railway Engineering

The Railway Engineering element has involved producing a concept design for the extension of the Larkhall Railway Line to Stonehouse, including details of the proposed route alignment, a review of each structure on the proposed route, the requirement of railway systems, the general civil engineering work required and an overall indicative cost estimate. This has been undertaken by means of a site visit and consideration of best practice.

- Railway Operations Modelling

The Railway Operations Modelling element has involved calculating the sectional running times from engineering parameters: distance, linespeed and gradient. Consideration has also been given to the impact of extending trains to the proposed new station site at Stonehouse, given the current timetable. This has included whether a passing loop is needed and whether additional rolling stock would be required. Consultations have been undertaken with First ScotRail to obtain their view of the proposed extension, as well as the implications for driver schedules and stock schedules. Consideration has also been given to the likely performance

risks and mitigation measures that may be required to satisfy Network Rail and other stakeholders.

1.4 Structure of Report

Following this introductory Chapter, the remainder of this report is set out as follows:

- Chapter 2 – Background to the Study Area
- Chapter 3 – Planning Policy Context;
- Chapter 4 – Review of Milngavie – Larkhall Railway Line;
- Chapter 5 – Transport Modelling and Appraisal;
- Chapter 6 – Railway Engineering;
- Chapter 7 – Railway Operations; and
- Chapter 8 – Recommendations and Conclusions.

In addition, there are two appendices, as follows:

- Appendix A – Bus Services Within Study Area; and
- Appendix B – Railway Engineering Drawings.

2 Background to the Study Area

2.1 Introduction

This Chapter will provide the background and context for the study area and will consider socio-economic, economic development, transport, environmental and safety issues.

The following sections will deal with each of these aspects in turn.

2.2 Socio-Economic Characteristics

2.2.1 General

South Lanarkshire is located in the Central Belt of Scotland and is the fifth largest local authority in Scotland in population terms. It covers 177,193 hectares, almost 80% of which is in agricultural use. The area includes both urban and rural environments, the four main areas being:

- Clydesdale;
- East Kilbride;
- Hamilton; and
- Rutherglen and Cambuslang.

South Lanarkshire's major settlements lie in the north of the local authority area and include Hamilton, East Kilbride, and Cambuslang and Rutherglen close to the City of Glasgow. The rural part of South Lanarkshire Council includes towns such as Lanark, Stonehouse, Strathaven and Carluke.

Figure 2.1: Map of South Lanarkshire (Source: www.scrol.gov.uk Licence No: C02W0007855)

2.2.2 *Study Area*

The areas of particular relevance to this study are Larkhall and Stonehouse. Larkhall is approximately 6km south of Hamilton with Stonehouse 4km further south again.

Stonehouse, with a population[4] of 5,147 is located to the west of Junction 8 of the M74, approximately 12km south of Hamilton. Larkhall with a population of 15,829[5] is situated approximately equidistant between Hamilton and Stonehouse immediately west of the M74 between junctions 7 and 8. Stonehouse and Larkhall are situated in the South Lanarkshire Council administrative region which spans from Rutherglen, proximal to Glasgow in the north to the Lowther Hills in the south bordering Dumfries and Galloway, and from East Kilbride bordering East Renfrewshire to Biggar adjacent to the Borders.

2.2.3 *Population*

South Lanarkshire had a population of 302,216 at the time of the 2001 Census, representing an increase of 1.2% from 1991. Application of the most recent population estimates shows an increase in population[6] to 307,670 in 2006. The population in Larkhall remained fairly static with a 0.3% increase from 15,493 (in 1991) to 15,549 (in 2001). In contrast, the population of Stonehouse fell by 5.1% over the same period from 5,328 (1991) to 5,056 (2001), respectively[7]. Scottish Government population estimates anticipate that the population of Larkhall and Stonehouse rose between 2001 and 2006 to 15,829 and 5,147 respectively based on the average increase for South Lanarkshire of 1.8%[8]..

2.2.4 *Levels of Employment*

Census data illustrates that unemployment levels in Stonehouse were 3.9% in 2001 compared to the South Lanarkshire average of 3.8%, and 4.0% for Scotland as a whole. Therefore unemployment in Stonehouse is comparable to regional and national averages. However Larkhall unemployment levels are 4.7%, higher than the average in South Lanarkshire Council and Scotland. The variation of levels of unemployment across the South Lanarkshire Council area is illustrated by Figure 2.2.

[4] Source: *Mid-2006 Population Estimates Scotland,* http://www.gro-scotland.gov.uk/
[5] Source: *Mid-2006 Population Estimates Scotland,* http://www.gro-scotland.gov.uk/
[6] Source: *Mid-2006 Population Estimates Scotland,* http://www.gro-scotland.gov.uk/
[7] Source: www.scrol.gov.uk
[8] Source: *Mid-2006 Population Estimates Scotland,* http://www.gro-scotland.gov.uk/

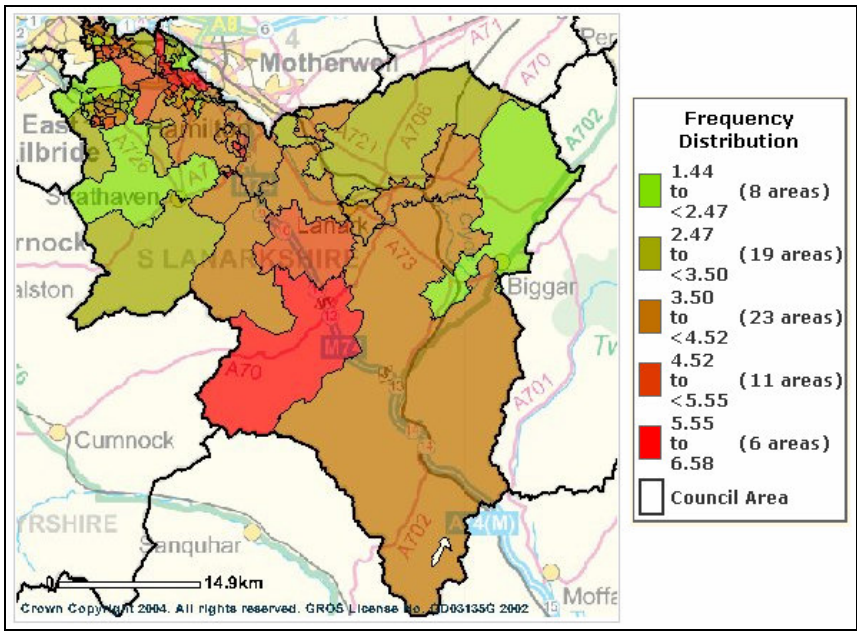


Figure 2.2 Percentage of people aged 16 – 74, unemployed, South Lanarkshire (Source: SCROL http://www.scrol.gov.uk/scrol/common/home.jsp Licence No: C02W0007855)

The variation in unemployment within South Lanarkshire is shown in Figure 2.2, from less than 2% in areas such as Mossneuk in the north west (bright green areas) and higher than 6% in Larkhall and Douglas (red areas). Areas of unemployment are not concentrated in any particular part of South Lanarkshire.

Employment in South Lanarkshire is split over a number of sectors. This information is shown in Table 2.1 below along with similar information for Scotland as a whole.

Table 2.1: Employment by sector in South Lanarkshire (2001 Census)

Industry	South Lanarkshire (%)	Scotland (%)
Agriculture and hunting and forestry	1.58	2.20
Fishing	0.01	0.31
Mining and quarrying	0.47	1.29
Manufacturing	16.86	13.65
Electricity and gas and water supply	1.32	1.02
Construction	8.49	7.76
Wholesale & retail trade and repairs	14.35	13.30
Hotels and restaurants	3.50	4.95
Transport and storage and communication	7.37	6.89
Financial intermediaries	4.67	4.74
Real estate and renting and business activities	10.51	11.42
Public administration and defence and social security	7.57	7.23
Education	6.80	7.42
Health and social work	11.88	12.63
Other	4.62	5.18

The proportions employed in each sector are broadly similar for South Lanarkshire and for Scotland – the largest employment sectors in the area being 'Manufacturing', 'Wholesale and retail trade and repairs', and 'Health and social work'.

Gross value added (GVA) is the value of goods and services produced in an area - a measure of the wealth generated. This information is taken from 2001 Census data. Table 2.2 shows GVA per head in South Lanarkshire, as a percentage of the same values for Scotland and for the UK.

Table 2.2: Gross value added per head in South Lanarkshire (2001 Census)

	1995	1996	1997	1998	1999	2000	2001	2002
Relative to United Kingdom (i.e. 100%)	79.3%	78.3%	78.0%	79.8%	82.4%	82.9%	81.1%	80.1%
Relative to Scotland (i.e. 100%)	80.2%	80.1%	80.4%	83.3%	86.9%	88.3%	86.9%	85.3%

Table 2.2 shows that the wealth generated per head in the area is lower than that for Scotland and the UK, albeit the gap appears to have been closing over time.

Information regarding average weekly earnings is presented in Table 2.3 for South Lanarkshire and compared with data for Scotland and Great Britain.

Table 2.3 Average gross weekly earnings (2001 Census)

Area	Men	Women	Overall
South Lanarkshire	£479.80	£346.90	£421.80
Scotland	£483.70	£372.40	£436.80
Great Britain	£525.00	£396.00	£475.80

Table 2.3 shows that on average both men and women in South Lanarkshire earn less than their counterparts in the rest of Scotland and the UK. The average earnings across South Lanarkshire are likely to be heavily influenced by the areas with greater population.

2.2.5 *Car Ownership*

Levels of car and van ownership in Larkhall, Stonehouse and South Lanarkshire, compared to Scotland as a whole, are shown in Table 2.4. There are higher-than-average car ownership rates in Stonehouse. Fewer households have no car or van in Stonehouse when compared to South Lanarkshire and Scotland (26.0% compared to 32.4% and 34.2%, respectively) whilst a higher proportion of households have one, two or three cars or vans in Stonehouse than in South Lanarkshire or Scotland as whole. However the situation in Larkhall is different with 33.8% of households having only one car and 18.0% with two cars or vans and 3.8% with three cars or more which is very similar to the national average.

Table 2.4 Car Ownership (2001 Census)

	Larkhall	Stonehouse	South Lanarkshire	Scotland
Total number of households (with residents)	6,547	2,028	126,496	2,192,246
No car or van	33.8%	26.0%	32.4%	34.2%
1 car or van	44.4%	44.6%	43.2%	43.4%
2 cars or vans	18.0%	23.5%	20.3%	18.6%
3 or more cars or van	3.8%	5.9%	4.1%	3.8%

2.2.6 *Travel Mode to Work*

Table 2.5, below, shows the transport modes of travel to and from work or study for Larkhall and Stonehouse, and compares these figures to South Lanarkshire and Scotland as a whole. A higher percentage of residents from Stonehouse travel to work by car (81.1%) than from Larkhall (73.9%), South Lanarkshire (71.0%) or Scotland (64.4%). Only 8.0% of Stonehouse residents and 10.0% of Larkhall residents travel to work by train or bus compared to the 14.7% average in South Lanarkshire and the 15.2% average for Scotland. 7.9% of residents in Stonehouse and 12.2% in Larkhall travel to work or study by 'Other' modes compared with 9.6% for South Lanarkshire and 14.7% for Scotland (this may include walking, cycling and motorcycle).

Table 2.5 Travel to Work (2001 Census)

	Larkhall	Stonehouse	South Lanarkshire	Scotland
All persons currently working or studying	6,250	2,192	129,274	2,163,035
Car (including passengers and car pools and taxis)	73.9%	81.1%	71.0%	64.4%
Train or bus	10.0%	8.0%	14.7%	15.2%
Other	12.2%	7.9%	9.6%	14.7%
Mainly at home	3.9%	3.0%	4.7%	5.7%

2.2.7 *Distance to Place of Work*

Stonehouse has a large commuter population with 48.8% of the active population regularly travelling over 10km to their place of work[9]. This is significantly higher than the average for Larkhall (34.6%), the South Lanarkshire Council area (33.0%) and Scotland as a whole (27.1%).

Table 2.6 Distance Travelled to Work (2001 Census)

Distance Travelled to Work	Larkhall	Stonehouse	South Lanarkshire	Scotland
Less than 5km	29.0%	22.4%	34.5%	41.2%
5 – 10km	21.9%	12.3%	18.9%	17.0%
10 – 20km	18.2%	31.3%	21.2%	14.6%
More than 20km	16.4%	17.5%	11.8%	12.5%
Other	14.5%	16.6%	12.9%	14.7%

[9] Source : www.scrol.gov.uk

The average distance travelled to work or study by South Lanarkshire residents is shown in Figure 2.3. There is, perhaps not surprisingly, a clear pattern of those living in the south east travelling furthest and those in the north west (closest to Glasgow) travelling the shortest distance on average.

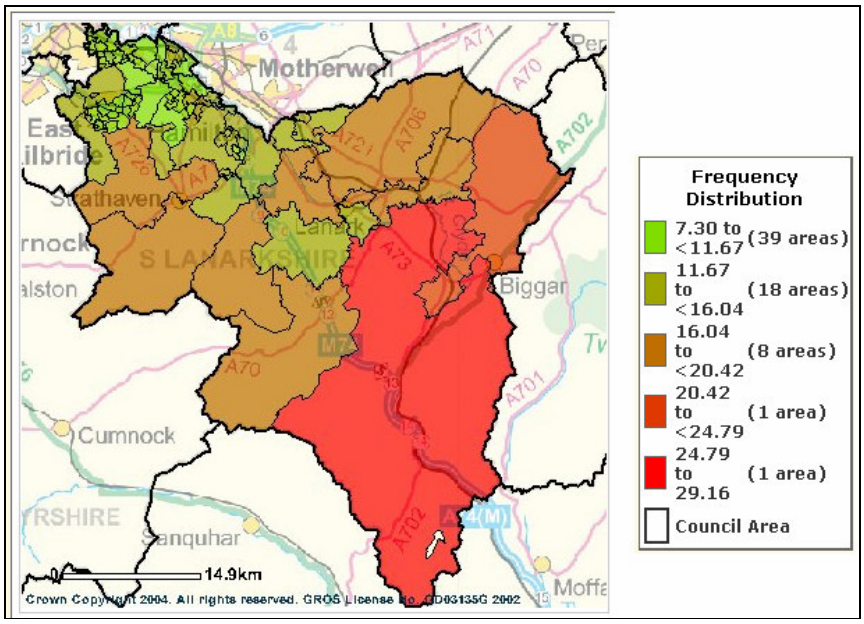


Figure 2.3 Average distance (km) travelled to place of work or study (Source: www.SCROL.gov.uk. Licence No: C02W0007855)

The South Lanarkshire LTS states that the areas which have the highest number of commuters from South Lanarkshire are Glasgow and North Lanarkshire, and also identifies a "*growing desire for travel between South Lanarkshire and the work opportunities in Edinburgh and the Lothians*". Figure 2.4, on the following page, below illustrates the existing commuting patterns described.

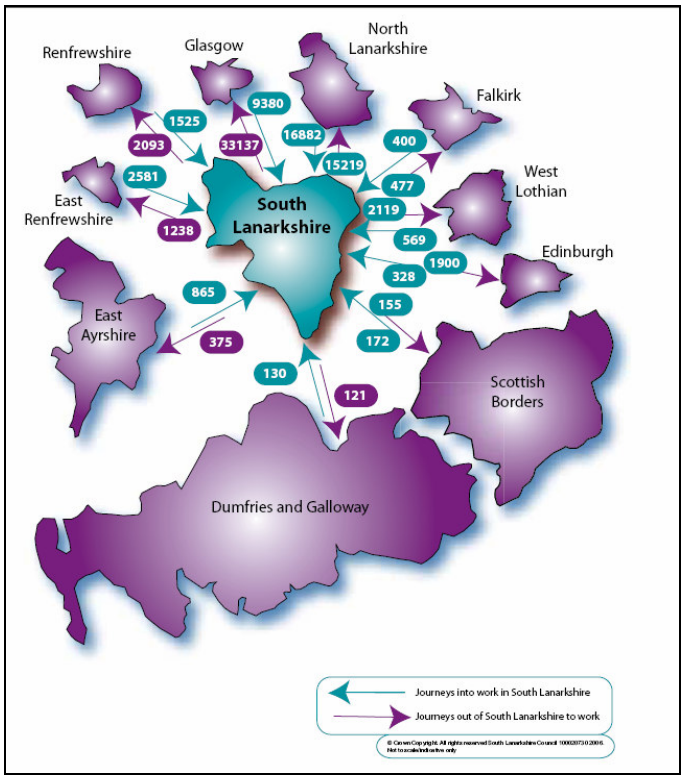


Figure 2.4: Travel to work patterns based on 2001 Census Data (Source: South Lanarkshire Local Transport Strategy)

2.2.8 *Areas of Deprivation*

The Scottish Index of Multiple Deprivation (SIMD[10]) is published by the Scottish Government and is used to identify small area concentrations of multiple deprivation across Scotland.

The SIMD was most recently updated in October 2006. The SIMD 2006 contains 37 indicators in seven 'domains': Current Income, Employment, Health, Education Skills and Training, Geographic Access to Services (including public transport travel times), Housing and Crime. Scotland is divided into data zones for the calculation of SIMD. The SIMD ranks can be used to identify Scotland's most deprived small areas on the overall index and also each individual domain. Each data zone has a deprivation ranking in comparison to all the zones in Scotland. For broad analysis the ranking is divided into five quintiles showing which 20% deprivation segment the zone populates.

With regard to overall index of multiple deprivation, there are pockets of deprivation in Larkhall (four SIMD zones) and one area in Stonehouse (one SIMD zone) which are considered to be in the 20% most deprived of all SIMD zones in Scotland.

Considering individual domains of deprivation, the study area scores relatively well for Health. However, six zones in the south of Larkhall fall within the 10% most deprived and a further four within the 20% most deprived in terms of Health. Stonehouse scores relatively well for Health with none of the seven data zones which make up the settlement within the most deprived 20% in Scotland.

[10] Source: http://www.scottishexecutive.gov.uk/Topics/Statistics/SIMD/Publications (accessed 09/11/07)

The area performs poorly in terms of Education with three zones in Larkhall within the 5% most deprived in Scotland and a further three zones in Larkhall and one zone in Stonehouse within the 10% most deprived in Scotland.

The Health domain identifies areas with a higher than expected level of ill health or mortality given the age-sex profile of the population. The Education domain includes indicators that measure both outcomes of education deprivation, such as lack of qualifications in children and adults, and causes of education deprivation such as absenteeism and lack of progression to further and higher education.

With regard to Employment, there are five zones in Larkhall which are among the 10% most deprived in Scotland. Similarly, in terms of Income, there are three zones in Larkhall which are among the 10% most deprived in Scotland.

With regard to geographic access relative to other areas in Scotland, there is one zone in Stonehouse which is considered among the 15% most deprived in Scotland.

Table 2.7 Study Area zones within most deprived 5%/10% in Scotland

SIMD Domain	Area	Level of deprivation
Overall	4 zones in Larkhall	Among 10% most deprived in Scotland
Health	6 zones in south Larkhall	Among 10% most deprived in Scotland
Education	3 zones in south Larkhall	Among 5% most deprived in Scotland
	3 zones in south Larkhall & 1 zone in Stonehouse	Among 10% most deprived in Scotland
Employment	5 zones in Larkhall	Among 10% most deprived in Scotland
Income	3 zones in Larkhall	Among 10% most deprived in Scotland
Geographic Access*	1 zone in Stonehouse	Among 15% most deprived in Scotland

* The Geographic Access indicator is derived from drive time and public transport access to a range of key services and facilities.

Source: SIMD

2.2.9 *Summary*

The socio-economic characteristics of the immediate study area are characterised by the settlements of Larkhall and Stonehouse surrounded by areas which are rural in nature. Immediately north of the study area is Hamilton, the main administrative centre for South Lanarkshire as a whole.

Similarly the South Lanarkshire Council area is characterised by a heavily populated northern section including settlements such as East Kilbride, Cambuslang and Rutherglen as well as Hamilton. The remainder of the South Lanarkshire Council region is predominantly rural, stretching south beyond Larkhall and Stonehouse and east to Lanark and beyond. There is a large variation across the study area in terms of population density.

Average earnings and gross value added are lower in South Lanarkshire than in Scotland and the UK overall and travel to work by car is higher in South Lanarkshire than it is nationally.

Within the study area, the following are observed as indicators of deprivation:

- Parts of southern Larkhall among 5% most deprived zones in Scotland in terms of Education;
- Sections of southern Larkhall among 10% most deprived zones in Scotland in terms of Health; and
- Four zones in Larkhall among 10% most deprived in Scotland.

2.3 Economic Development

The South Lanarkshire Local Plan asserts that industrial and business land uptake has averaged 10.9 hectares per annum since 1996. Recent employment forecasts indicate this relative success will continue and South Lanarkshire is on track to outperform Scotland as a whole.

The population in South Lanarkshire is increasing (1.2% between 1991 and 2001 Census). Similarly, there are an increasing number of households. Between 1991 and 2001 the total number of households increased by 8.8% and the number of households with access to a car increased by 8.1% over the same time period[11].

2.3.1 Regeneration Initiatives

A number of initiatives are currently, or will be, undertaken with the aim of regenerating South Lanarkshire's local economy. These include:

- Clyde Gateway Urban Renewal Area

The Clyde Gateway project is a partnership between Scottish Enterprise, Glasgow City Council and South Lanarkshire Council to exploit the economic development potential of the M74 completion and the East End Regeneration Route. Clyde Gateway is a £1.6bn project and is planned to include over the next 25 years:

- 10,000 new housing units;
- 400,000 square metres business/commercial property;
- 50,000 square metres retail and services facilities supporting leisure, public and cultural uses new transport and other infrastructure;
- 21,000 jobs to be created; and
- 20,000 population increase.

The Clyde Gateway involves the development of land in Cambuslang / Rutherglen and in Glasgow City, and is identified as the most significant regeneration initiative in the South Lanarkshire Local Plan.

- Lanarkshire Regeneration Outcome Agreement

Within the study area Larkhall is identified as a target Regeneration Outcome Agreement (ROA) area. The aims of the ROA are to secure:

- Successful and Inclusive Communities;
- Safe and Healthy Communities; and
- Working and Learning Communities.

- Larkhall / Ferniegair Community Growth Area

Larkhall / Ferniegair are identified in the Local Plan as a Community Growth Area with capacity for 1,000 additional housing units up until 2018 and a further 1,000 between 2018-2025. This

[11] South Lanarkshire Local Plan Development Strategy Vol 1 (2006)

represents 9.0% of the total Glasgow and Clyde Valley Structure Plan Community Growth Area allocation. The location is illustrated in Figure 2.5

- Milngavie-Larkhall railway link

The new Milngavie-Larkhall railway link provides sustainable non-car based linkages to the main commuter destinations in line with Local Plan objectives for land released from the Green Belt (Policy STRAT2).

- M74 Extension

The M74 Completion project was approved by the Scottish Executive in October 2001. Following this, draft road and compulsory purchase orders were published and a Public Local Inquiry was held. In March 2005, Ministerial agreement was granted to proceed with the scheme. Construction is anticipated to begin in spring 2008, and the road is anticipated to be opened by the end of 2011.

The M74 Completion project will link the existing end of the M74 at Fullarton Road with the M8 to the west of Kingston Bridge. The scheme will be 8km in length and will be a three-lane motorway with hard shoulders, locally reducing to two lanes with a hard shoulder at the connecting link between the M74 and M8.

It is considered by Glasgow City Council that the M74 completion project would play a key role in achieving Ministers' objectives, including:

- growing Scotland's economy by improving transport links in the west of Scotland, as well as to other parts of Scotland and to the UK more generally;
- bring new jobs, particularly along the route but also across the west of Scotland;
- help with the regeneration of the south and east of Glasgow, Rutherglen and Cambuslang, playing a key role in the Commonwealth Games in Glasgow 2014;
- improving journey times and reduce traffic congestion on roads across Glasgow and South Lanarkshire; and
- improve road safety by reducing road accidents by 25 to 35 accidents each year on average in the 20 years after opening.

Glasgow City Council indicates that the new road will:

- complete strategic transport links for West of Scotland business currently handicapped by severe congestion on the M8;
- advance national competitiveness by improving access to Glasgow Airport and other key strategic commercial and industrial facilities;
- assist development of prime sites in areas of high unemployment throughout West Central Scotland;
- open the way for regeneration of derelict land across the south and east of Glasgow and in Rutherglen and Cambuslang;
- relieve traffic congestion on local roads across Glasgow and South Lanarkshire allowing priority to be allocated to public transport cyclists and pedestrians;
- improve road safety and reduce road accidents; and
- complete the missing link between the M74 at Fullarton Road and the M8 to the west of Kingston Bridge.

- Larkhall South / Canderside Strategic Industrial and Business Location

The Larkhall South / Canderside Strategic Industrial and Business Location (SIBL) safeguards the site for industrial/business development with the objective of promoting new employment opportunities as illustrated in Figure 2.5. This site is specifically listed within the objectives of the Local Plan Development Strategy Vol.I:

"*Promote new employment location within Clyde Gateway and safeguard the strategic site released for development at Larkhall South*."

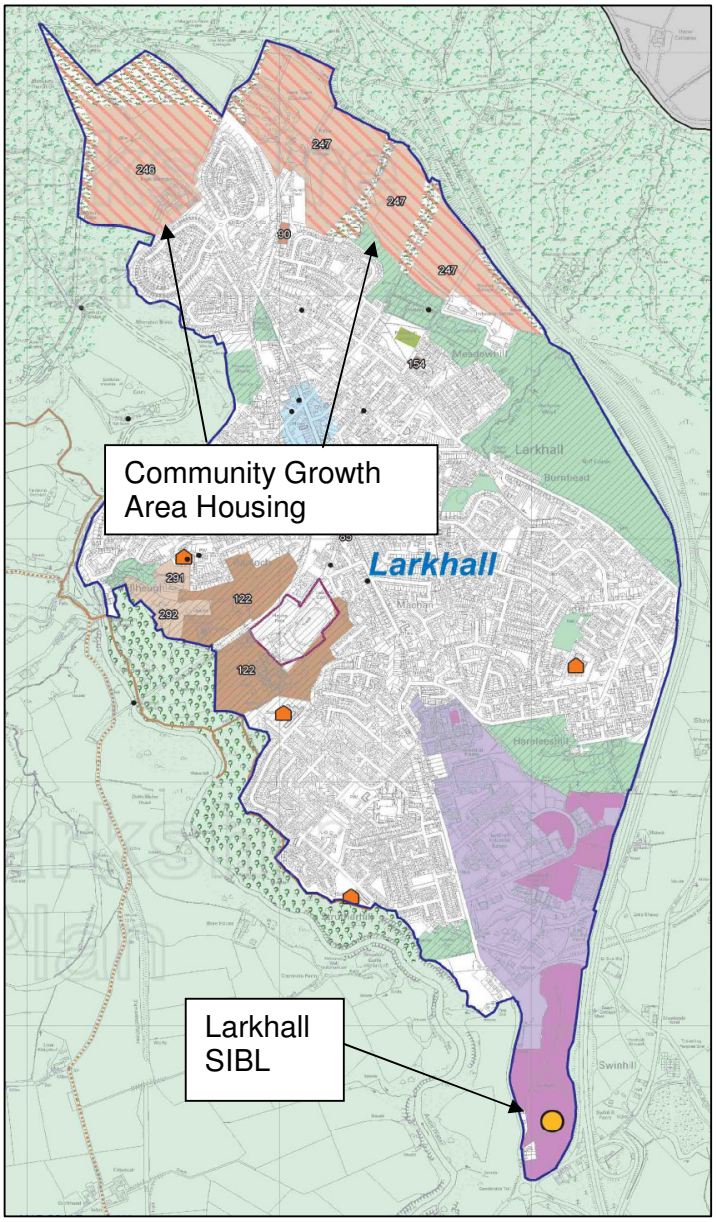


Figure 2.5: Larkhall Settlement

(Source: South Lanarkshire Local Plan, 2006)

- Stonehouse Bypass

Within the study area, land has been safeguarded for a possible second phase to the Stonehouse bypass under Local Plan Policy TRA7B. This is seen as a long-term option as current traffic levels do not merit the expansion of the successful first phase which removed traffic from the village centre. This can be seen in Figure 2.6 as the yellow strip on the north west boundary of Stonehouse.

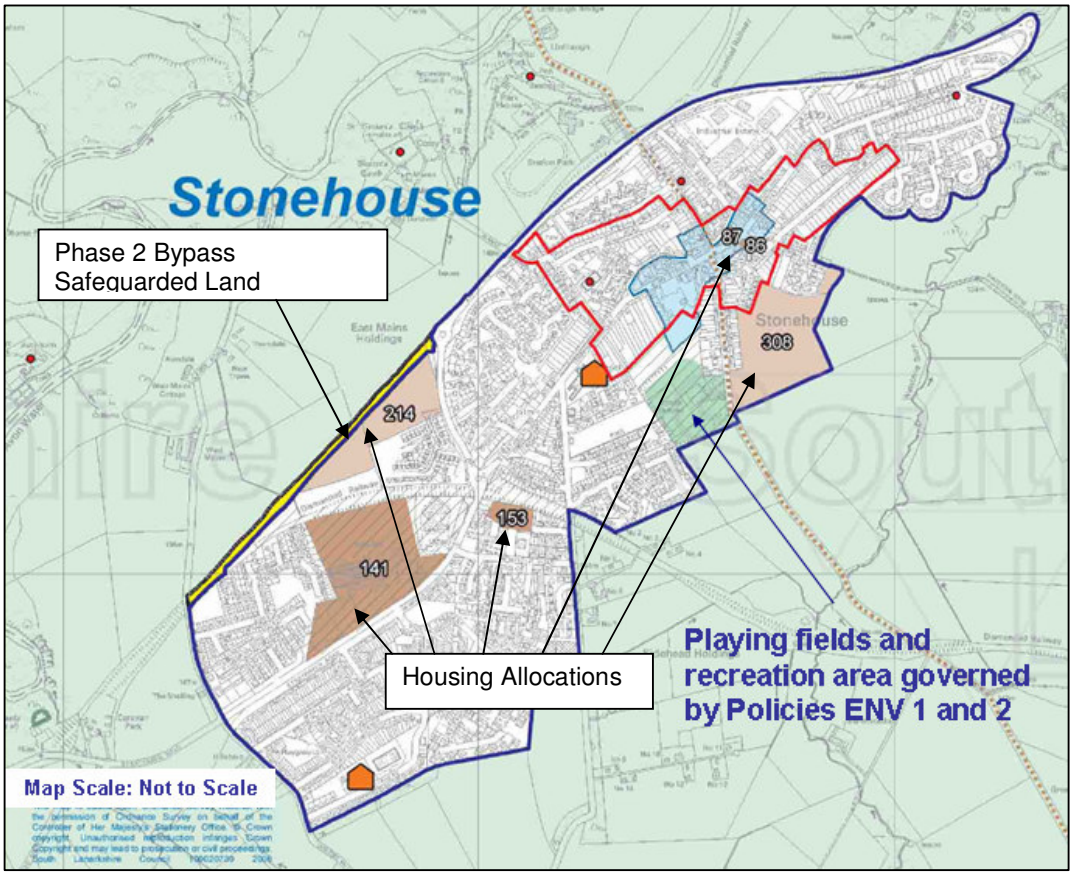


Figure 2.6: Stonehouse Settlement in 2006 South Lanarkshire Local Plan

- Stonehouse Housing Allocation

Stonehouse also has a proposed housing allocation of just under 300 units within Policy RES2 of the Local Plan. The Plan identifies three sites which have received planning consent a further committed site and two proposed sites for housing developments within Stonehouse as shown in Table 2.8 and illustrated in Figure 2.6.

Table 2.8: Stonehouse Residential Development areas

Site Name	Status	Capacity	Map Reference
New Street	Consent	5	86
New Street Kirk Street	Consent	6	87
Stonehouse Hospital	Consent	150	141
St Ninians Place	Commitment	16	153
East Mains	Proposal	60	214
Spittal Road	Proposal	60	308
Total	-	**297**	-

(Source: South Lanarkshire Local Plan)

Furthermore, it is stated within the Local Plan that the Loch Park industrial estate in Stonehouse is proposed for rezoning to residential use as it is underused and it is considered that the major site at nearby Canderside can meet the local employment needs of the community.

Whilst the Local Plan does not specify timescales for the proposed housing expansion, it does state that the development is anticipated to increase the population[12] of the settlement by over 700 based on 2001 Census data results.

2.3.2 *Summary*

South Lanarkshire is performing well with regard to the economy within the context of Scotland and the indications are that this trend will continue. The main growth is earmarked for Cambuslang / Rutherglen as part of the Clyde Gateway initiative. Within the study area Larkhall is identified in the Local Plan for new housing and business development building upon the successful new Milngavie-Larkhall railway link and Stonehouse is proposed for housing allocation. These new development and regeneration projects will impact on the existing transport infrastructure and some will include new infrastructure, most notably the M74 extension. It is expected that these developments will exacerbate levels of traffic within the study area.

2.4 Transport

This section will briefly describe the main characteristics of the transport network within South Lanarkshire for all modes.

2.4.1 *Road Network*

The road network in the study area is dominated by the M74 motorway from Carlisle to Glasgow which runs through South Lanarkshire. However there are other important strategic routes, as outlined below.

- A71

The A71 is a strategic route in Scotland providing a direct link between Irvine and Kilmarnock to the west and Edinburgh to the east. It is directly accessible from Stonehouse as the route forms the Stonehouse bypass, providing a cross country link through the study area.

- A72

The A72 Lanark Road passes to the north of Larkhall providing access to Hamilton in the north-west and Lanark to the south east. This route is primarily for local rural traffic in South Lanarkshire with strategic traffic using the M74 and A71 routes.

- M74

The M74 motorway is the main road link between Scotland and England joining Carlisle in the south and Glasgow in the north. The route has a high percentage of HGV traffic due to its strategic importance. The M74 passes immediately to the east of both Stonehouse and Larkhall providing accessibility to the Scottish motorway network.

2.4.2 *Rail*

The main passenger movements within South Lanarkshire are on the Glasgow suburban rail network. The Glasgow suburban rail network provides access to a number of stations in the South Lanarkshire Council region to / from Glasgow and other settlements within the region. East Kilbride is the most patronised station within South Lanarkshire, with considerable demand also experienced at Hamilton Central, Hamilton West, Uddingston and Rutherglen[13].

[12] Source: www.scrol.gov.uk. Actual figure 727.65 based on an average number of persons per household in the locality of Stonehouse of 2.45.
[13] Source: National Transport Statistics 2006, http://www.scotland.gov.uk/Topics/Statistics/

Larkhall station is currently the end of the line for the Larkhall branch from Hamilton. At present the nearest rail station for residents at Stonehouse is Larkhall station.

Larkhall Station is located at Caledonian Road, Larkhall. It is an unstaffed halt with access ramp and CCTV in operation. There are three cycle racks installed at the station and a large waiting shelter on platform two with a self-service ticket machine. There are a total of 214 car parking spaces for Park and Ride at Larkhall Rail Station. SPT initially specified a provision of 100 spaces which are located on the southern side of MacNeill Road. South Lanarkshire Council have subsequently provided an additional 114 at an adjacent site. Table 2.9 below summarises rail services to Larkhall rail station.

Table 2.9 – Rail Services to Larkhall Rail Station

Route	Monday – Saturday / No Sunday Service			
	Daytime Frequency (no. per hour)	Evening Frequency (no. per hour)	First Service*	Last Service**
Larkhall – Merryton – Chatelherault – **Hamilton Central** – Hamilton West – Blantyre – Rutherglen – Argyle Street – **Glasgow Central** – Anderston – Exhibition Centre – Partick – Hyndland - **Dalmuir**	2	2	0607	2337 (Sat 2307)
Dalmuir – Hyndland – Partick – Exhibition Centre – Anderston – **Glasgow Central** – Argyle Street – Rutherglen – Blantyre – Hamilton West – **Hamilton Central** - Chatelherault – Merryton – **Larkhall**	2	2	0601	2331 (Sat 2301)

Notes; * = time service leaves station of origin; ** = time service leaves station of origin.

2.4.3 *Bus*

Appendix A summarises the bus services currently operating within the study area. There are eight distinct services which rise to 14 services in total when variations of route are included. These are run by three operators albeit Whitelaw is responsible for the majority of these. Only two services cover Stonehouse (Whitelaws 254 and Stonehouse Coaches 354) the latter offering only a Monday to Friday provision. Both services connect Stonehouse with Larkhall.

Service number 254 is the most comprehensive bus service operating through the study area offering a frequency of four buses per hour all week except Sunday where this drops to one per hour. This is the highest frequency operating within the study area and is maintained from 06:00 hours to 22:00 hours Monday to Saturday and 10:00 hours to 22:00 hours on Sunday. Most services operate at one or two buses per hour and only four operate past the evening peak. These are service numbers 191, 253, 254 and 255 and are also the same four offering a Sunday provision.

In terms of destinations, Hamilton is best served. Along the A73 there is provision through Lanark as far as Biggar, south along the B7078 through Lesmahagow as far as Coalburn and along the A71 to neighbouring Strathaven. Smaller settlements in the vicinity of the study area such as Netherburn and Ashgill are also served by some services.

2.4.4 *Walking*

The South Lanarkshire LTS notes the extensive path and footway network maintained by the Council, but highlights that in some areas, paths are lacking or poor in quality. The LTS also acknowledges crossing busy roads can be problematic in some parts of South Lanarkshire.

The Council will prepare a Core Path Plan by February 2008. All Councils are required to produce such Plans, which should set out a system of paths sufficient for giving the public reasonable access throughout an area.

Access to Larkhall rail station is via McNeil Street and Caledonian Road which are well lit and with footpaths on both sides of the road. McNeil Street and Caledonian Road via King Street provide links from Larkhall rail station to Larkhall town centre on Union Street. Crossing facilities are provided at locations between Larkhall rail station and the town centre. The Park and Ride on the southern side of MacNeill Road is directly linked to the station by an off-road underpass underneath MacNeill Road.

The proposed station location in Stonehouse is located to the west of the A71 Larkhall bypass off Lawrie Street. Lawrie Street is well lit and has footpaths on both sides of the road between the proposed station location and the town centre on King Street and New Street. There is a footpath on the northern side of the road as Lawrie Street becomes Millheugh Road to the west of the proposed location. Crossing facilities are available at various locations between the proposed rail station location and town centre.

2.4.5 *Cycling*

The South Lanarkshire Local Transport Strategy contains a ‘proposed cycle route’ connecting Stonehouse to Hamilton skirting Larkhall en route, as illustrated within Figure 2.7, below.

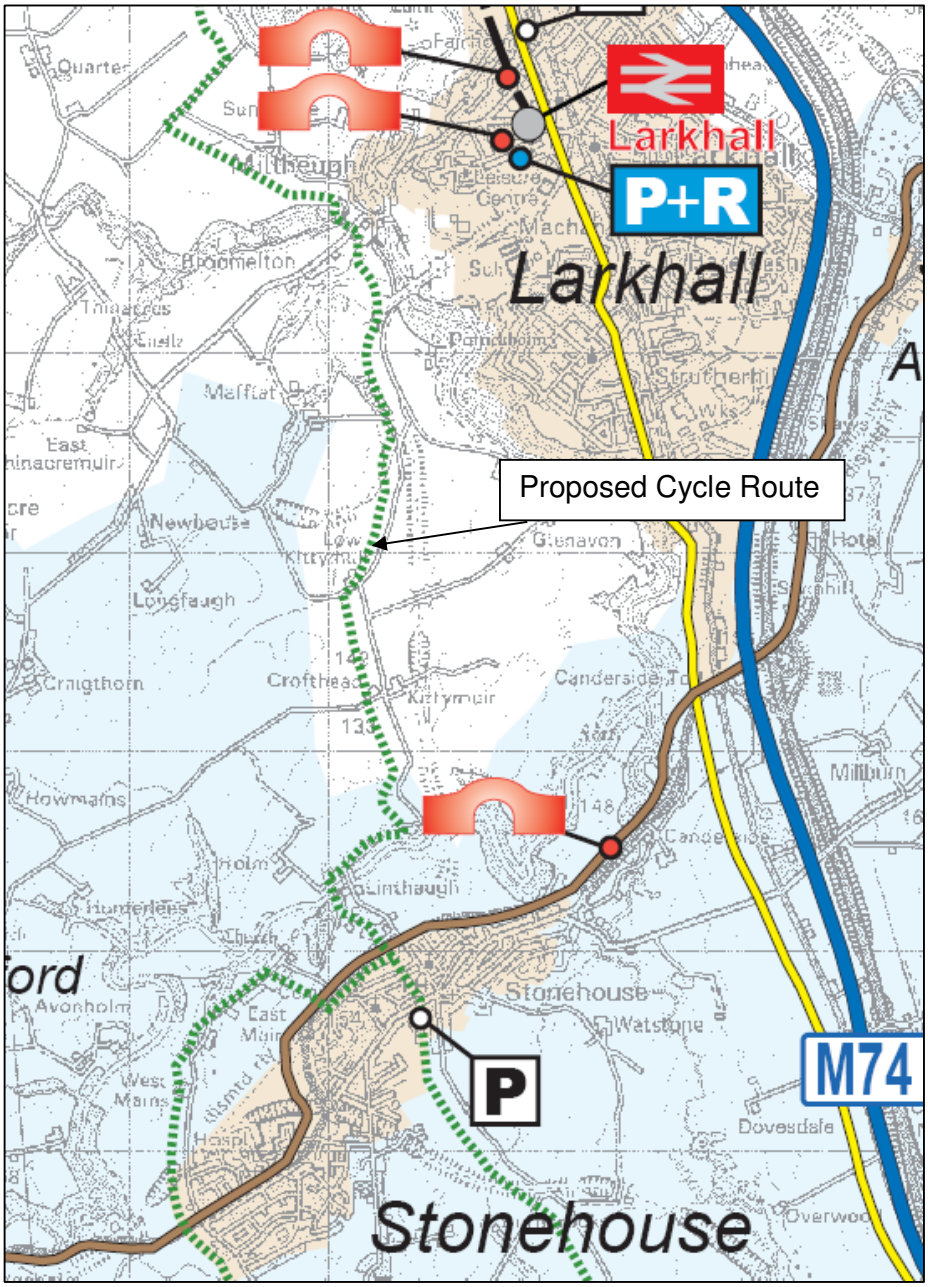


Figure 2.7: Proposed Cycle Route within the study area (Source: South Lanarkshire Council Local Transport Strategy 2006-09 Map)

The December 2007 £50 Million Lottery award to the sustainable transport charity Sustrans was based on proposed cycling and walking routes one of which would link Larkhall with Stonehouse as part of improved sustainable access to Strathclyde Country Park for the surrounding communities[14]. The provisional alignment follows an on-road route between Ferniegair and Stonehouse passing to the west of Larkhall, similar to that illustrated in Figure 2.7. For the majority of the proposed cycle / walk route there would be no conflict with the proposed rail extension from Larkhall to Stonehouse, with the exception of the section at the Larkhall Viaduct. The planned cycle route is on-road between Larkhall and Stonehouse, therefore any potential conflicts with the proposed rail line near the Larkhall Viaduct could be eliminated by diverting the cycle path to an alternative on-road route if necessary.

[14] http://carbon.sustransconnect2.org.uk/files/projects/104_pdf.pdf

2.4.6 *Summary*

The M74 motorway is the main road link between Scotland and England joining Carlisle in the south and Glasgow in the north. The M74 Completion project due to be in place by 2011 will provide increased road access to the south and west of Glasgow bypassing the need to travel on the M8 motorway.

The A71 forms the key road through Stonehouse providing an east-west link.

The main passenger rail movements within the South Lanarkshire area are on the Glasgow suburban rail network. There are currently two trains per hour to Larkhall, Monday to Saturday and there is no Sunday service.

The bus provision is considered to be reasonable and three operators provide a network of local bus services.

A network of footpaths exists within the study area providing pedestrian access to both Larkhall and the proposed Stonehouse rail stations from neighbouring residential areas. The LTS proposes a cycle route in the study area linking Stonehouse to Hamilton via the Larkhall area.

2.5 Environment

2.5.1 *Air Quality*

South Lanarkshire currently has no Air Quality Management Areas (AQMAs), however South Lanarkshire Council continues to monitor air quality to meet statutory requirements. Estimates of PM_{10} levels (particulate matter less than 10µm in diameter) suggest that the National Air Quality Strategy objective of annual mean PM_{10} levels below 18mg/m^3 may be exceeded in 2010 at five junctions in South Lanarkshire. None of these five junctions are situated within the study area.

2.5.2 *Designated Areas*

There are 38 Sites of Special Scientific Interest (SSSI) in South Lanarkshire one of which, Avondale, is within the study area. This designation is classified as national in stature and is covered by Local Plan Policy ENV25.

This site is also designated as a Special Area of Conservation (SAC) as part of the Clyde Valley Woodlands. These woodlands follow the course of the Avon Water within the study area as shown in Figure 2.8. This designation falls under the Natura 2000 sites designation and affords international significance. Local Plan Policy ENV19 relates to this designation.

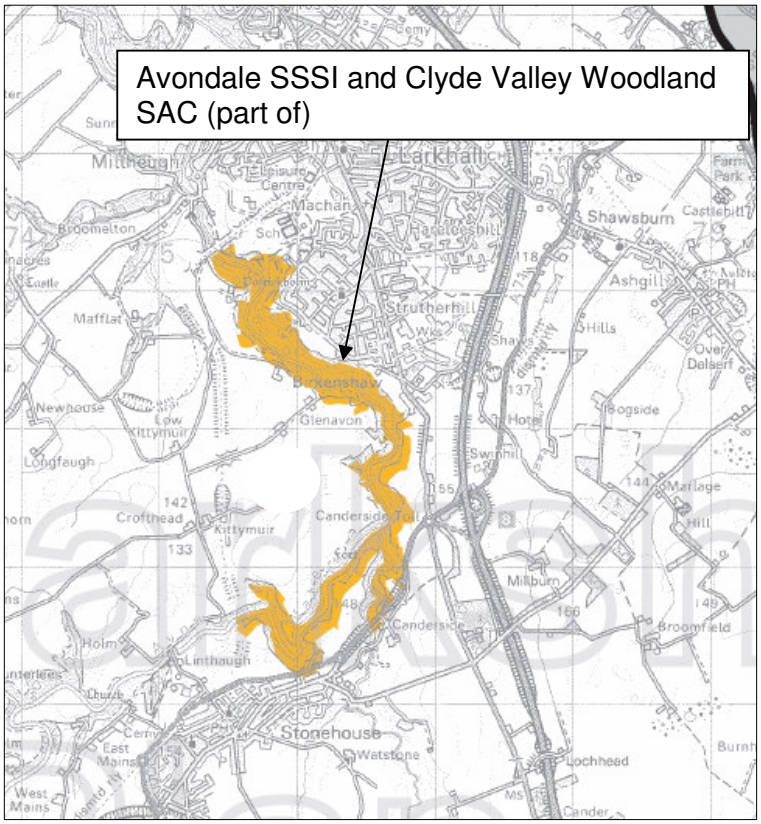


Figure 2.8: Avondale SSSI and Clyde Valley Woodlands SAC within the study area (Source: South Lanarkshire Local Plan)

The area between Stonehouse and Larkhall is classified as an Area of Great Landscape Value within the Local Plan. This designation falls under Local Plan Policies ENV4 and ENV28 and this area is also classified under policy STRAT7 concerning the Strategic Green Network. These two designations are both classified as local / regional in importance.

2.5.3 *Listed Buildings*

There are a number of listed buildings located within the study area. Historic Scotland assigns each listed building to one of three categories to reflect their degree of interest:

- Category A – buildings of national or international importance, either architectural or historic, or fine little-altered examples of some particular period, style or building type;
- Category B – buildings of regional or more than local importance, or major examples of some particular period, style or building type which may have been altered; and
- Category C(S) - buildings of local importance, lesser examples of any period, style or building type, as originally constructed or altered; and simple, traditional buildings which group well with others in Categories A and B or are part of a planned group such as an estate or an industrial complex.

There are only two Category A listed buildings within the study area, the adjacent Old Cander Bridge and Canderside Bridge both on the Cander Water, Canderside near Stonehouse. The positions of all listed buildings within the study area are shown in Figures 2.9 and 2.10, and a list of locations is provided within Tables 2.10 and 2.11, below.

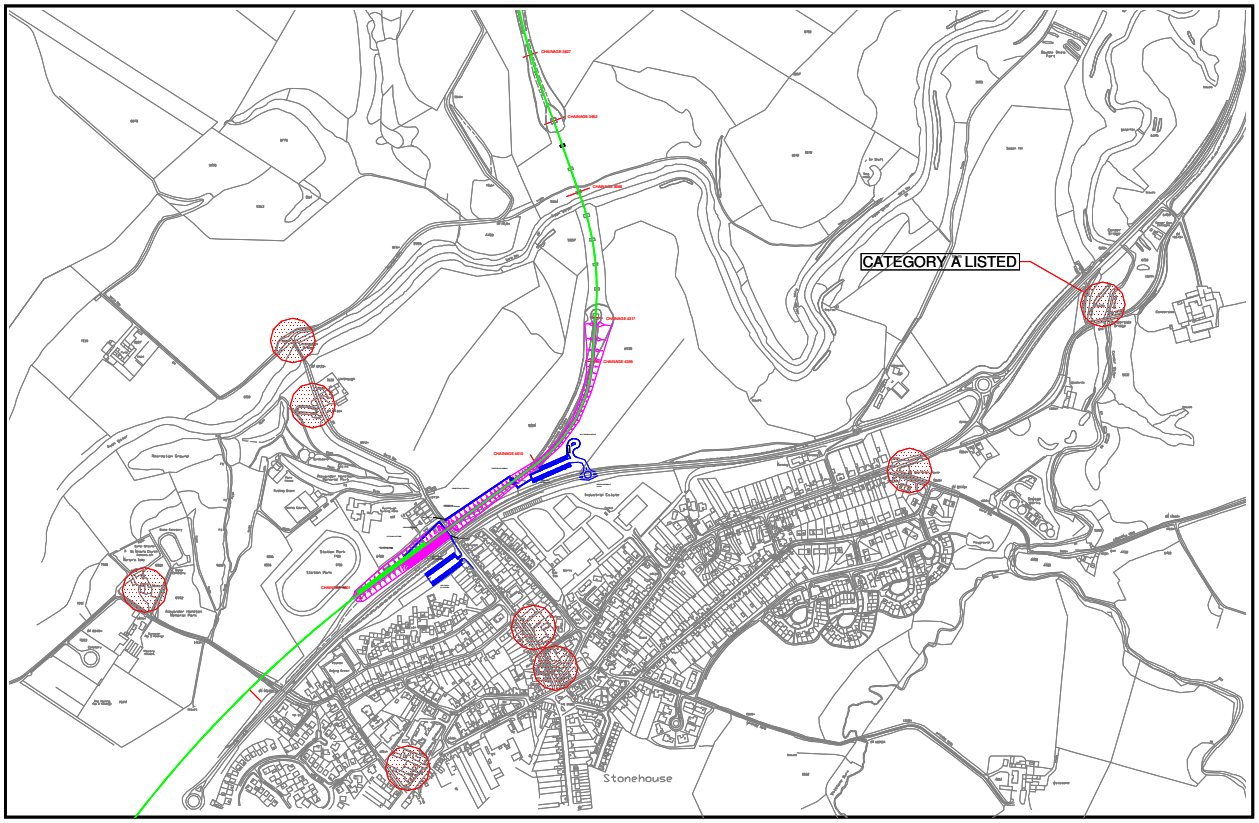


Figure 2.9 Listed Buildings in Stonehouse Area

(Location of listed buildings taken from Historic Scotland website, January 2008).

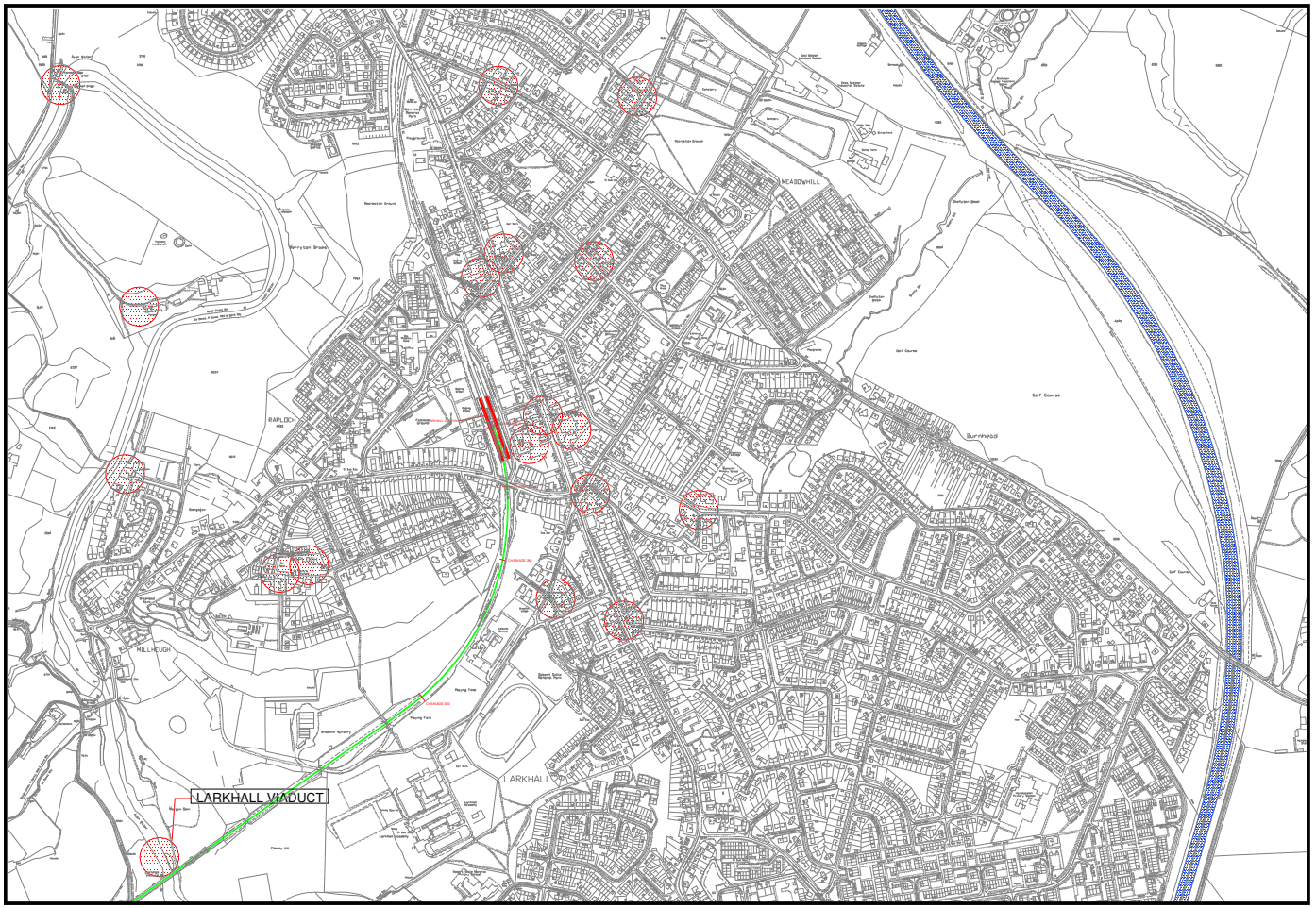


Figure 2.10: Listed Buildings in Larkhall Area

(Location of listed buildings taken from Historic Scotland website, January 2008).

Table 2.10 – Listed Buildings in Stonehouse Area

ADDRESS	CATEGORIES
CANDERSIDE BRIDGE, CANDER WATER (CANDERSIDE, CANDER WATER, CANDERSIDE BRIDGE)	Category: A
OLD CANDER BRIDGE OVER CANDER WATER (CANDERSIDE, CANDER WATER, CANDERSIDE BRIDGE)	Category: A
LINTHAUGH BRIDGE (STONEHOUSE, MILLHEUGH ROAD, LINTHAUGH BRIDGE)	Category: B
106 LOCKHART STREET, MEADOWSIDE COTTAGE, FORMER EAST BAR TOLLHOUSE INCLUDING OUTBUILDINGS AND BOUNDARY WALL (STONEHOUSE, 106 LOCKHART STREET, MEADOWSIDE COTTAGE)	Category: C(S)
ST NINIAN'S CHURCH AND GRAVEYARD (STONEHOUSE, MANSE ROAD, ST NINIAN'S CHURCH, CHURCHYARD AND MARTYR'S TOMB)	Category: B
MILLHEUGH ROAD, ALEXANDER HAMILTON MEMORIAL PARK BANDSTAND (STONEHOUSE, MILLHEUGH ROAD, ALEXANDER HAMILTON MEMORIAL PARK, BANDSTAND)	Category: B
PATERSON UNITED FREE CHURCH, LAWRIE STREET (STONEHOUSE, LAWRIE STREET, PATERSON UNITED FREE CHURCH)	Category: C(S)
10 ARGYLE STREET, FORMER REX CINEMA	Category: B
ST NINIAN'S PARISH CHURCH, INCLUDING BOUNDARY WALLS, GATEPIERS AND RAILINGS, VICARS ROAD, STONEHOUSE (STONEHOUSE, VICARS ROAD, STONEHOUSE CHURCH)	Category: B

(source: Historic Scotland website, January 2008)

Table 2.11 – Listed Buildings in Larkhall Area

ADDRESS	CATEGORIES
FAIRHOLM	Category: B
LARKHALL, 76 CHURCH STREET, DALVEEN, INCLUDING GATEPIERS AND BOUNDARY WALL (LARKHALL, 76 CHURCH STREET, DALVEEN)	Category: C(S)
LARKHALL, DUKE STREET, LARKHALL CEMETERY, INCLUDING GATES GATEPIERS, BOUNDARY WALLS AND RAILINGS (LARKHALL, MEADOWHILL, DUKE STREET, LARKHALL CEMETERY)	Category: C(S)
LARKHALL, GALLOWHILL ROAD, ROBERT SMILLIE MEMORIAL PARK GATES (LARKHALL, GALLOWHILL ROAD, ROBERT SMILLIE MEMORIAL PARK GATE)	Category: B
LARKHALL, 51 HAMILTON STREET (LARKHALL, 51 HAMILTON ROAD)	Category: C(S)
LARKHALL, RAPLOCH ROAD, ST MARY'S RC CHURCH (LARKHALL, RAPLOCH ROAD, ST MARY'S ROMAN CATHOLIC CHURCH)	Category: C(S)
LARKHALL, UNION STREET AND KING STREET, TRINITY PARISH CHURCH, CHURCH OF SCOTLAND, INCLUDING GATEPIERS, BOUNDARY WALLS, RAILINGS AND GATES (LARKHALL, UNION STREET, TRINITY PARISH CHURCH)	Category: B
LARKHALL, CALEDONIAN ROAD, LARKHALL POLICE STATION, INCLUDING FORMER FIRE STATION, BOUNDARY WALLS GATEPIERS AND RAILINGS (LARKHALL, CALEDONIAN ROAD, POLICE STATION)	Category: C(S)

ADDRESS	CATEGORIES
LARKHALL, VICTORIA STREET AND PERCY STREET, SOUTH LANARKSHIRE COUNCIL OFFICES, INCLUDING BOUNDARY WALLS, GATES, GATEPIERS AND RAILINGS (LARKHALL, VICTORIA STREET, SOUTH LANARKSHIRE COUNCIL OFFICES)	Category: C(S)
WISHAW, CASTLEHILL ROAD, CAMBUSNETHAN HOUSE, THE COACH HOUSE (CAMBUSNETHAN HOUSE, FARMSTEADING)	Category: B
FAIRHOLM BRIDGE	Category: B
LARKHALL, 16 RAPLOCH STREET, CURLY'S PUBLIC HOUSE (FORMERLY CROSSGATE PUBLIC HOUSE) (LARKHALL, 16 RAPLOCH STREET, CURLY'S PUBLIC HOUSE)	Category: C(S)
CHATELHERAULT COUNTRY PARK, LAIGH QUARTER, LAIGH QUARTER BRIDGE OVER BURN (CHATELHERAULT COUNTRY PARK, LAIGH QUARTER BRIDGE)	Category: C(S)
LARKHALL, AVONBANK ROAD, AVONBANK HOUSE, INCLUDING BOUNDARY WALLS AND GATEPIER (LARKHALL, AVONBANK ROAD, AVONBANK HOUSE)	Category: C(S)
LARKHALL, CHURCH STREET, ST MACHAN'S CHURCH, CHURCH OF SCOTLAND, INCLUDING HALL, WAR MEMORIAL, BOUNDARY WALLS, GATEPIERS, RAILINGS AND GATES (LARKHALL, CHURCH STREET, ST MACHAN'S PARISH CHURCH)	Category: B
LARKHALL, CHURCH STREET, ST MACHAN'S CHURCH, CHURCH OF SCOTLAND, INCLUDING HALL, WAR MEMORIAL, BOUNDARY WALLS, GATEPIERS, RAILINGS AND GATES (LARKHALL, CHURCH STREET, ST MACHAN'S PARISH CHURCH, HALL)	Category: B
LARKHALL, CHURCH STREET, ST MACHAN'S CHURCH, CHURCH OF SCOTLAND, INCLUDING HALL, WAR MEMORIAL, BOUNDARY WALLS, GATEPIERS, RAILINGS AND GATES (LARKHALL, CHURCH STREET, ST MACHAN'S PARISH CHURCH, WAR MEMORIAL)	Category: B
LARKHALL, 3-5 LONDON STREET, THE VILLAGE TAVERN	Category: C(S)
LARKHALL, RAPLOCH ROAD, ST MARY'S PRIMARY SCHOOL, INCLUDING GATEPIERS AND BOUNDARY WALLS (LARKHALL, RAPLOCH ROAD, ST MARY'S PRIMARY SCHOOL AND HOUSE)	Category: C(S)
LARKHALL, UNION STREET, GLENGOWAN PRIMARY SCHOOL, INCLUDING BOUNDARY WALLS, GATEPIERS AND RAILINGS (LARKHALL, UNION STREET, GLENGOWAN PRIMARY SCHOOL)	Category: C(S)
LARKHALL, LARKHALL VIADUCT (LARKHALL, AVON WATER, LARKHALL VIADUCT)	Category: B
LARKHALL, 10 MARGARET'S PLACE, WEST MACHAN HOUSE (LARKHALL, 10 ST MARGARET'S PLACE, WEST MACHAN HOUSE)	Category: C(S)

(source: Historic Scotland website, January 2008)

Of note for this study is the Category B Larkhall Viaduct which would be used for the proposed rail extension to Stonehouse. Should the rail extension study be taken forward for further consideration, discussions would require to be undertaken with Historic Scotland to discuss the implications of sympathetically upgrading this structure to its former railway use.

2.5.4 *Conservation Areas*

The most important areas of green space within urban areas were identified through a review of green space in the larger South Lanarkshire Council settlements. As the most valued areas of green space in the Local Plan's urban areas, their loss to development is not supported. Partial development may be supported in specific circumstances. The existing sports pitches and disused land in Stonehouse bordered by existing developments and King Street to the north, Union Street to the east and existing developments to the west is covered within the Local Plan under Policy ENV 1 and shown in Figure 2.6.

The area is also governed by Policy ENV 2 as it forms part of a Local Green Network. The Local Plan identifies connected areas of green space that form linear corridors through urban areas and provide valued areas for their benefits to access, residential amenity, townscape and biodiversity.

The town centre and immediate vicinity of Stonehouse is classified as a conservation area. This affords protection as detailed in policies ENV 4 and ENV 24 of the Local Plan and is illustrated in Figure 2.6 by a red line.

2.5.5 *Summary*

There are no Air Quality Management Areas (AQMAs) within the study area. There are Listed Buildings within the study area though only the Larkhall Viaduct infringes with the proposed rail extension route.

The Avondale SSSI / Clyde valley Woodland SAC is close to the proposed rail extension between Larkhall and Stonehouse and would need to be considered carefully should the scheme proceed.

2.6 Safety

Accident data was analysed by South Lanarkshire Council for the period of 1994 to 2005. Figure 2.11 shows the number of persons of all ages killed and seriously injured (KSIs) in South Lanarkshire in road accidents from 1994 to 2005, along with target reductions. Figure 2.12 shows the same data focussed on child KSIs. The figures show a reduction in KSIs over the time period, exceeding the targets set.

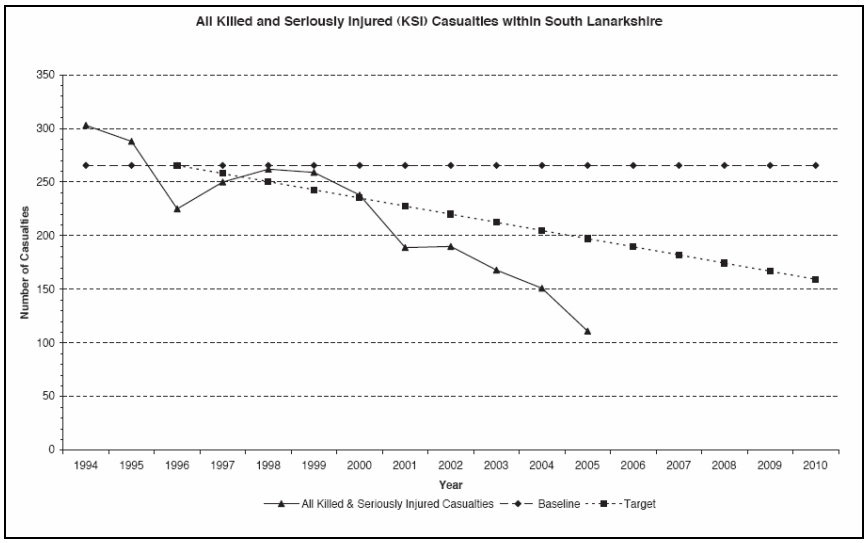


Figure 2.11: Killed and Seriously Injured (all ages) trend in South Lanarkshire

(Source: South Lanarkshire Local Transport Strategy, 2006-09)

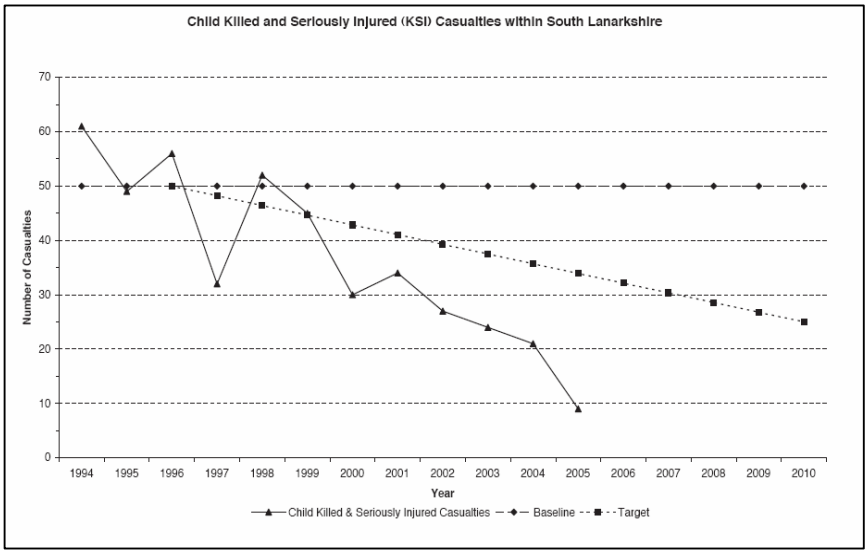


Figure 2.12: Child Killed and Seriously Injured trend in South Lanarkshire

(Source: South Lanarkshire Local Transport Strategy, 2006-09)

Accident statistics collected by Police forces are classified by the severity of casualties resulting. There are three separate levels of severity: fatal, serious and slight. The distinction between serious and slight accidents is that a serious accident is where a person incurs a serious injury that results in hospital treatment and usually an overnight stay in hospital, whilst a slight injury may require medical treatment although not usually an overnight stay in hospital. It should be noted that these accident statistics do not include 'damage only' accidents where no injuries are sustained. They include only those accidents which are reported to the Police.

The new Larkhall rail station has several safety and security features. CCTV cameras are installed with standard 40 Lux lighting covering both sides of the tracks. The side currently used is connected to the road network via a sloping footpath and stairway and a shelter is provided. The other currently unused side is accessed around the end of the track and does not have a shelter. The station is unmanned although it has Customer Information Service (CIS) monitors and Driver Only Operation (DOO) mirrors. Larkhall rail station is illustrated in Photograph 3.1.

Photograph 1 – Safety features at Larkhall Rail Station (source: Faber Maunsell)

2.6.1 *Summary*

This section has provided an overview of safety in the study area. The available data shows that the overall casualty rate in South Lanarkshire continues to fall. Larkhall station, whilst unmanned, has good safety features installed including CCTV, CIS monitors and DOO mirrors.

2.7 Summary

South Lanarkshire is performing well with regard to socio-economic indicators within the context of Scotland and the indications are that this trend will continue. Larkhall is identified in the Local Plan for new housing and business development and Stonehouse has also been identified for housing development.

SIMD data shows that:

- Four zones in Larkhall are among the 10% most deprived in Scotland; and
- A further five zones in Larkhall and one zone in Stonehouse fall within the most deprived Scottish quintile.

The study area is served by the M74 motorway, the main road link between Scotland and England, and there are several other main roads within the study area.

The main passenger rail movements within the South Lanarkshire area are on the Glasgow suburban rail network.

The bus provision is limited due to the rural nature of the study area although is comparable with service levels observed in similar low population density settings.

There are no Air Quality Management Areas (AQMAs) in the study area. There are several Listed Buildings within the study area though only the Larkhall Viaduct (Category B) infringes with the proposed rail extension route. The Avondale SSSI / Clyde Valley Woodland SAC runs close to the proposed rail extension between Larkhall and Stonehouse and would need to be considered carefully should the scheme proceed.

In general, South Lanarkshire is surpassing its targets for road safety and the new Larkhall station has modern safety features albeit it is unmanned.

3 Planning Policy Context

3.1 Introduction

The aim of this Chapter is to set out the national, regional and local planning policy context relevant to the study.

3.2 National and Regional Planning and Policy Framework

The overarching transport and planning policy for Scotland is highlighted in the policy papers outlined below.

3.2.1 Scotland's Transport Future

Scotland's Transport Future is the transport White Paper which was published by the Scottish Executive in June 2004. The policy document outlines a vision for Scotland's transport future as follows:

"*An accessible Scotland with safe, integrated and reliable transport that supports economic growth, provides opportunities for all and is easy to use; a transport system that meets everyone's needs, respects our environment and contributes to health; services recognised internationally for quality, technology and innovation, and for effective and well-maintained networks; a culture where fewer short journeys are made by car, where we favour public transport, walking and cycling because they are safe and sustainable, where transport providers and planners respond to the changing needs of businesses, communities and users, and where one ticket will get you anywhere.*"

The overall aim of the strategy is "to promote economic growth, social inclusion, health and protection of our environment through a safe, integrated, effective and efficient transport system".

The objectives are to:

- "Promote economic growth by building, enhancing, managing and maintaining transport services, infrastructure and networks to maximise their efficiency;
- Promote social inclusion by connecting remote and disadvantaged communities and increasing the accessibility of the transport network;
- Protect our environment and improve health by building and investing in public transport and other types of efficient and sustainable transport which minimise emissions and consumption of resources and energy;
- Improve safety of journeys by reducing accidents and enhancing the personal safety of pedestrians, drivers, passengers and staff; and
- Improve integration by making journey planning and ticketing easier and working to ensure smooth connection between different forms of transport."

3.2.2 National Transport Strategy

The Scottish Executive and Transport Scotland published a National Transport Strategy (NTS) for Scotland in December 2006. The NTS sets out the context for the activities of Regional Transport Partnerships and local authorities, and further develops the Scottish Executive's aims and objectives for transport, as set out within the White Paper. The NTS thus considers Scotland's transport needs, and the needs of travellers, over the medium to long-term.

The NTS identifies the following key trends and projections in transport:

- overall growth in travel - In Scotland, the estimated average distance travelled per person per year has increased by 59% between 1985/86 and 2004/05;
- increasing dominance of the car – 23% of journeys under one mile and 57% of journeys between one and two miles were undertaken by car in 2004/2005. Latest forecasts suggest

road traffic in Scotland will grow by 12 % between 2005 and 2010 and by 22% between 2005 and 2015;
- increase in aviation - There has been a dramatic growth in air transport in Scotland, with an eight-fold increase in passenger numbers between 1970 and 2005. Air travel is predicted to rise by 150% between 2004 and 2030; and
- a recovery in bus and rail passenger numbers – Bus passenger numbers have risen in six of the last seven years (to 2006). Rail passenger numbers have been rising and are now comparable with 1960s levels.

The NTS goes on to outline the key factors influencing the trends above as follows:

- economic growth;
- rising disposable income;
- changes in land use patterns; and
- transport users do not pay full costs of journeys.

Based on the trends and drivers outlined above, the NTS identifies the key challenges affecting transport in Scotland as follows:

- congestion and journey time reliability – In 2005, 11% of car journeys were reported as delayed by congestion, with this figure rising to nearly 25% of journeys undertaken in the weekday rush hours;
- emissions – The transport sector is the second biggest contributor of greenhouse gas emissions in Scotland, behind energy supply, contributing 22% of emissions. Between 1990 and 2004 the emissions from the transport sector increased by 7%, and during the same period, emissions from aviation increased by 50%; and
- social inclusion issues – Access to high quality affordable public transport is particularly important for certain groups, such as those seeking education, training or employment, older or disabled people or those with young children. Access to transport can be a particular challenge for those living in disadvantaged communities. Improving public transport for all is a key requirement.

The key high-level expectations detailed in the NTS are therefore summarised below.

- delivery of the White Paper objectives;
- improve journey times and connections;
- reduce emissions; and
- improve quality and accessibility and tackle affordability.

3.2.3 *Scotland's Railways*

Scotland's Railways (Scottish Executive, December 2006) sets out the Scottish Executive's aims and objectives for the rail industry in Scotland and acts as an associated document to the NTS.

The aims for the rail network, as set out within Scotland's Railways, are as follows:

"*Support our high level objective to promote economic growth by focussing on our rail network moving large volumes of people quickly and reliably within and between our city regions as a priority; and*

Support our high level objective to protect the environment and improve health by recognising the role of rail as an integral part of Scotland's National Transport Strategy and the contribution rail makes to a sustainable, efficient and effective transport system which minimises the impact of travel on the environment. We will do so with full regard to Scotland's Sustainable Development Strategy Choosing Our Future and to Scotland's Climate Change Programme Changing Our Ways."

In order to meet the above aims, the following aspirations are set out for the rail network:

- *"offer world class train services which connect our city regions and major towns, providing journey times and quality of service that are competitive with car and air;*

- *provide access to inter-urban services through high quality interchange stations that link with feeder rail services from intermediate stations and offer easy transfer from car, bus, tram, subway, ferry, cycle and walking;*
- *make commuter train services attractive to passengers by ensuring that the journey to work is a high quality, reliable travel option and by ensuring that our rolling stock choices take account of environmental considerations, including air quality and noise emissions;*
- *support heavily loaded freight trains carrying an increasingly wide range of products with effective interchange to road and sea; and*
- *achieve a rail industry that delivers efficiently and effectively to support our aims and vision."*

The following provides a summary of the key strategic outcomes from Scotland's Railways:

- improving journey times and connections
  - timetabling and frequency enhancements to reduce inter-urban journey times;
  - infrastructure enhancements to reduce inter-urban journey times; and
  - maintain current improvements to reliability of services.
- reducing emissions
  - electrification to minimise emissions and reduce fossil fuel reliance (in some cases may also reduce journey times); and
  - capacity improvements to enable increased passenger numbers and freight volumes.
- improving quality, accessibility and affordability
  - enhancing integration with other modes;
  - enhancements to stations to improve capacity, passenger experience and to encourage modal shift; and
  - timetable and service enhancements.

It is recognised that by investing in the rail network, a contribution can also be made to reducing road congestion and harmful emissions, and also reducing the impact of transport on the environment. As such, an implementation plan has been identified to assist in the delivery of the above and increase demand for rail services.

Scotland's Railways outlines a programme of planned interventions, including those listed below, that may directly or indirectly impact on the South Lanarkshire or the Larkhall to Stonehouse railway:

Glasgow Suburban network

Two thirds of rail journeys in Scotland are made on the Glasgow Suburban network which is divided into South East, South West and North. The South East routes are relevant for this study and serve South Glasgow including the Cathcart Circle, Whifflet, Motherwell, Lanark, Hamilton and Larkhall. Scotland's Railway's anticipates that a number of pressures will arise on these lines with the following relevant actions proposed to address these:

Medium-term

- deliver enhanced capacity and connections across Glasgow in light of conclusion of Strategic Transport Projects Review;

Long-term

- continue to target capacity issues.

The key aims and objectives of Scotland's Railways are summarised within Table 3.1, below.

Table 3.1 Scotland's Railways Aims and Objectives

Source	Aim	Objective
Scotland's Railways	Improving journey times and connections	Timetabling and frequency enhancements to reduce inter-urban journey times.
		Infrastructure enhancements to reduce inter-urban journey times.
		Maintain current improvements to reliability of services.
	Reducing emissions	Electrification to minimise emissions and reduce fossil fuel reliance (may also reduce journey times).
		Capacity improvements to enable increased passenger numbers and freight volumes.
	Improving quality, accessibility and affordability	Enhancing integration with other modes.
		Enhancements to stations to improve capacity, passenger experience and to encourage modal shift.
		Timetable and service enhancements.

3.2.4 *Strathclyde Partnership for Transport Regional Transport Strategy*

The relevant Regional Transport Partnership (RTP) for the study area is Strathclyde Partnership for Transport (SPT). SPT has taken over the roles and functions of the Strathclyde Passenger Transport Authority and Executive, and incorporates the former WESTRANS Regional Partnership. The Regional Transport Strategy (RTS) builds upon the strategy documents previously implemented by the voluntary partnerships including the Joint Transport Strategy by WESTRANS. "A Catalyst for Change: The Regional Transport Strategy for the west of Scotland 2007-2021" was submitted to Scottish Ministers on 30 March 2007.

The vision of the RTS is:

"A world-class, sustainable transport system that acts as a catalyst for an improved quality of life for all," while the overall goals are to develop the economy, promote social inclusion and equality, and improve health and protect the environment.

The Objectives of the RTS are:

- Safety and Security: To improve safety and personal security on the transport system;
- Modal Shift: to increase the proportion of trips undertaken by walking, cycling and public transport;
- Excellent Transport System: To enhance the attractiveness, reliability and integration of the transport network;
- Effectiveness and Efficiency: To ensure the provision of effective and efficient transport infrastructure and services to improve connectivity for people and freight;
- Access for All: to promote and facilitate access that recognises the transport requirements of all;
- Environment and Health: To improve health and protect the environment by minimising emissions and consumption of resources and energy by the transport system;
- Economy, Transport and Land-Use Planning: To support land-use planning strategies, regeneration and development by integrating transport provision.

3.2.5 *Scottish Planning Policy 17 – Planning for Transport*

The Scottish Planning Policy (SPP) 17, Planning for Transport (August 2005), sets out Government policy on the integration of land use and transport planning under the following relevant principles (which are also referred to by the accompanying Planning Advice Note (PAN) 75):

- Manage motorised traffic to contribute to sustainable development objectives;
- Constrain car parking for new developments;
- Locate development where it is most accessible to more sustainable modes of travel; and
- Provide for travel by public transport, on foot and by cycle.

SPP 17 suggests that relating land use to existing and proposed networks should be a key issue in local plans and transport projects. SPP 17 states: "*The process of preparing a local plan should relate the existing land use development pattern to the capacity of the transport network, and appraise the pattern of new land allocations in relation to transport opportunities and constraints. The location of significant travel-generating uses is critical to the number and length of trips, particularly for shopping, employment and leisure*."

SPP 17 outlines the importance of planning for all travel modes. It states that within an approach to integrated land use and transport planning, mode of personal travel should be prioritised inclusive of walking, cycling and public transport. Public transport can be made more appealing "*when interchange and timetabling and ticketing are well integrated, and can provide an alternative to the private car, although [public transport is] less sustainable than foot or pedal power*".

3.2.6 *Glasgow and Clyde Valley Structure Plan*

The Glasgow and Clyde Valley Joint Structure Plan 2000 set out the long-term development strategy for the Glasgow and Clyde Valley area. The Plan was subsequently updated to take account of significant economic growth in Glasgow and the Clyde Valley, including Ravenscraig's strategic planning role (2003 revision) and Glasgow International Airport's strategic planning role (2004 revision).

A draft update of the plan was released in April 2006, following extensive consultation with key public and private agencies, local community interests and with the adjoining Councils and other city regions of Scotland.

The Plan covers eight local authorities in Glasgow and the Clyde Valley, including South Lanarkshire, North Lanarkshire, Glasgow City, East Renfrewshire, Renfrewshire, Inverclyde, West Dunbartonshire and East Dunbartonshire. It encompasses the whole of the natural region of the River Clyde catchment area and the major part of the SPT suburban rail system.

The Strategic Vision for the development of the Structure Plan area is to achieve a radical change in the competitive position and quality of life and environment of Glasgow and the Clyde Valley, thus:

- "*The area will be amongst the most attractive business locations in Europe because of the improved quality of the transport system, the labour force and the physical environment;*
- *The quality of life in all settlements will be valued because of the improved quality of access to jobs, town centre facilities and residential environment, reinforced by a well defined high quality Green Belt;*
- *The image of the area as a place to live, work and visit will be transformed by the greening of urban and rural areas; and*
- *Public transport, walking and cycling will be as attractive modes of travel as the car for most trips, because of their improved quality and integration*."

In order to achieve this Vision, the Structure Plan sets out four inter-related aims:

- Aim 1: To increase economic competitiveness – by identifying a framework of development opportunities which will meet the needs of new and expanding businesses, develop an inclusive economy and improve the attractiveness of the area for investment;

- Aim 2: To promote greener social inclusion and integration – by improving the quality of life and identity of local communities in terms of jobs, housing, services and environmental conditions, particularly for the most disadvantaged in society;
- Aim 3: To sustain and enhance the natural and built environment – particularly by the re-use of existing urban land and buildings and the sustainable use of natural resources;
- Aim 4: To integrate land uses and transportation – by promoting improved access to and between work, home, leisure and shops, in particular by public transport, and an increase in the proportion of goods moved by rail.

3.2.7 *High Level Output Specification (HLOS)*

The HLOS (July 2007) sets out the requirements of Scottish Ministers with respect to the functions and powers devolved to them under the Railways Act 2005.

It is a blueprint aimed at improving reliability, reducing journey times and increasing capacity to meet expected growth in rail passenger numbers between 2009 and 2014. It is provided to the Office of Rail Regulation (ORR) under the provisions of the Railways Act 2005, which transferred additional responsibilities for rail in Scotland to Scottish Ministers, to support the ORR's periodic review of Access Charges. This includes:

- *"Information about what they* [The Scottish Ministers] *want to be achieved by Scottish railway activities during the review period; and*
- *Such information as it is reasonable for them to provide about public financial resources that are or are likely to become available to be applied during that period for purposes that contribute (directly or indirectly) towards the achievement of what they want."*

No interventions of the HLOS specifically identify any measures which will be directly relevant to the Larkhall to Stonehouse railway or the existing Hamilton Central to Larkhall section.

3.3 Local Planning and Policy Context

3.3.1 *South Lanarkshire Local Plan*

The finalised South Lanarkshire Local Plan was published in August 2006 and is due to be approved in 2008.

The Local Plan has the following overall aim:

"*To promote the continued growth and regeneration of South Lanarkshire by seeking sustainable economic and social development within an improved urban and rural environment.*"

In order to support this aim, five sub-aims have been developed:

- Sustainable Growth;
- Urban Renewal;
- Rural Regeneration;
- Improving Travel Choice; and
- Promoting Environmental Quality.

It is considered that the sub-aim relating to Improving Travel Choice is of most relevance to this study. Details of this sub-aim and its objectives are as follows:

Improving Travel Choice

The Local Plan aims to support sustainable growth by facilitating improved choices in travel mode and more efficient travel patterns, including reducing the need to travel long distances by private car. The Plan will do this by:

- Supporting development locations which offer good access to public transport;
- Supporting the availability of a range of services to support local communities;

- Requiring major developments to plan for public transport access and to undertake Green Travel Plans; and
- Protecting land required for the purposes of alleviating road traffic congestion as identified in the South Lanarkshire Local Transport Strategy.

It is noted that the land along the boundary of the proposed rail extension is not protected under the Local Plan.

3.3.2 *South Lanarkshire Local Transport Strategy*

South Lanarkshire Council published its Local Transport Strategy (LTS) 2006-2009 in July 2006. The LTS aims to set out an integrated transport strategy for the South Lanarkshire Council area that works towards economic, environmental and social sustainability by providing an accessible and integrated transport network.

The overall vision outlined in the LTS is:

"Our transport system will be fully accessible and integrated with well served internal and external links to essential services, employment and education opportunities. It will support economic development and regeneration without prejudicing the environment and will be safe and attractive for users. It will be sustainable, offer genuine travel choices and be recognised nationally as an example of best practice."

In order to meet this vision, the LTS sets out six objectives which have been developed through an analysis of local problems and travel trends. The objectives are:

- Ensure that transport supports and facilitates regeneration and sustainable development;
- To reduce the social exclusion effects of poor transport access;
- To alleviate the adverse impacts of traffic and traffic growth throughout South Lanarkshire;
- Improve quality and safety by maintaining and improving the transport infrastructure;
- Promote accessibility through enhancing access for all, especially those without a car, to key services, job opportunities and community facilities and through the development of accessible and affordable public transport; and
- To improve health through facilitating and encouraging active travel.

These objectives have been developed to address the key transport issues identified across the local authority area, which can be summarised as follows:

- Congestion, particularly in town centres and pinch points;
- Existing and future development pressures and the associated infrastructure requirements;
- The need to improve quality and attractiveness of public transport infrastructure;
- Limited public transport access within and between urban areas; and
- Varying levels of safety and security, particularly for pedestrians, cyclists and those on public transport.

To work towards the above objectives, a range of policies and actions have been developed, grouped around the five themes of:

- Sustainable transport and modal integration

Including policies and actions relating to bus and rail services; ticketing, information and marketing; Park and Ride and interchange; community transport and car-based schemes; walking and cycling; taxis; motorcycles, mopeds and scooters; and travel awareness.

- Accessibility and social inclusion

Including policies and actions relating to access to jobs and services; transport measures for people with disabilities; and specific rural issues.

- Safety and maintenance

Including policies and actions relating to road safety and personal safety; roads maintenance; bridges; street lighting; and winter maintenance.

- Transport for a sustainable economy

Including policies and actions relating to regeneration of town and village centres; managing transport and new development; parking and demand management; traffic growth; new roads schemes; and freight transport.

- Environmental sustainability

Including policies and actions relating to air quality; noise pollution; light pollution; water quality; and climate change and flooding.

Phase One of the Stonehouse Bypass was constructed and completed in October 1994. This completed section runs between the roundabout with Lockhart Street to the north and the roundabout with Strathaven Road to the south removing traffic from the main traffic route through the town centre.

The assessment conducted for the LTS highlighted that Phase Two of the Stonehouse Bypass would not provide a significantly high benefit to users in terms of capital costs. It was concluded that, although the bypass did not offer value for money, future development in the area could lead to the requirement for a link or access road. It is envisaged that the provision of this scheme would be development-led with Council support provided through the development control process.

Public realm improvements within Stonehouse were identified in the 2006 LTS involving improvements to the appearance of the Cross and parking and traffic management measures. The Cross improvements were completed in August 2007 and the remainder are on-going.

With regard to rail, the LTS encourages the use of rail as an alternative to the private car. The LTS proposes to improve footlink paths to railway stations, and proposes to identify opportunities to improve rail service to and within South Lanarkshire. The LTS does not make reference to a Larkhall – Stonehouse rail extension.

3.4 Summary

National, regional and local policies relating to transport and land use have been reviewed, and a number of common priorities can be identified.

National transport objectives, outlined in the Scottish Executive's 2004 White Paper, are

- economic growth;
- social inclusion;
- environment;
- safety; and
- integration.

The NTS expectations are to deliver these objectives, improve journey times and connections; reduce emissions; and improve quality and accessibility and tackle affordability.

The RTS and South Lanarkshire LTS both aim to:

- improve safety and security;
- reduce social inclusion and provide access for all;
- alleviate the adverse impacts of traffic and traffic growth and encourage mode shift;
- facilitate economic regeneration;
- provide an excellent transport system with improved effectiveness and efficiency; and
- improve environmental aspects including health by providing better access to and uptake of walking and cycling opportunities.

The common themes among these national, regional and local objectives, along with the objectives of wider development policies, can be used to inform this study.

4 Review of Milngavie – Larkhall Railway Line

4.1 Introduction

The first reopening of a major branch line in Scotland in 25 years occurred in December 2005 with the reopening of the Larkhall to Glasgow Central service via Hamilton Central. The line was part of the Milngavie – Larkhall project which makes provision for rail traffic between Larkhall and Dalmuir and a new service from Queen Street to Anniesland via Maryhill. Strathclyde Partnership for Transport (SPT) took the lead role in the £35m construction project which was primarily funded by the Scottish Executive and involved rail industry partners and support from South Lanarkshire Council.

The new branch extended the railway network to the south of Hamilton by approximately 4.7km opening stations at Larkhall, Merryton and Chatelherault. These stations serve the communities of Larkhall (Larkhall and Merryton stations) and Ferniegair (Chatelherault station).

The original line to Larkhall was withdrawn in 1965 on the recommendation of the Beeching Report (1963), which proposed wholesale route closures of all but core rail routes. This resulted in the closure of railway stations at the Lanarkshire towns of Blackwood, Coalburn, Lesmahagow, Stonehouse and Strathaven.

The new 1.6km section from Maryhill to Anniesland opened in September 2005 and included a new station at Kelvindale and an additional platform at Anniesland. The link from Maryhill (Maryhill Park Junction) to Anniesland (Knightswood South Junction) follows the course of the former Stobcross Railway which was closed and lifted in the late 1980s. The line passes under the Forth and Clyde Canal.

4.2 Rail infrastructure upgrades

The Milngavie – Larkhall project involved rail infrastructure upgrades in two parts. This included the construction of a branch line from the existing rail line south of Hamilton to Larkhall, with station openings at Chatelherault, Merryton and Larkhall, and the extension of the Glasgow Queen Street to Maryhill line to Anniesland with a further station opening at Kelvindale.

The Larkhall line was built on the previously disused rail line between Haughhead Junction and Larkhall, with signalling control from Motherwell. A 4.7km electrified branch line (Larkhall line) has been constructed between Haughhead Junction and the former Larkhall Central Station, as a single line railway, incorporating a passing loop at Allanton to cater for peak hour demand.

The North end of the loop is approximately 1.2km from the Haughhead Junction, with a loop length of approximately 400 metres and twin tracks at Larkhall Station. The maximum line speed is 60 mph, and signalling control is located at Motherwell Signalling Centre.

In addition to the Larkhall branch line, the project re-opened the Glasgow Northern Suburban Line between Maryhill Park Junction and Anniesland station. This removed the need for the existing Maryhill train service turning back at Westerton allowing the Motherwell via Hamilton train service access to the Milngavie Branch Line.

This 1.6 km line uses the disused railway between Maryhill and Anniesland. The Glasgow North Suburban Line is not electrified, with two-aspect signalling employed on the Anniesland Branch Line. The maximum line speed for the branch is 40 mph and signalling control is located at Cowlairs Signalling Centre.

Both the Larkhall branch line and the Maryhill Park to Anniesland sections were multi disciplinary projects involving earthworks, structures upgrades, new build structures, station construction, track works, overhead line works and signalling and telecommunications works.

4.3 Station Facilities

The four new stations operated by First ScotRail offer the following facilities:

Larkhall Station is located at Caledonian Road, Larkhall. It is an unstaffed halt with access ramp and CCTV in operation. There are three cycle racks installed at the station and a large waiting shelter on platform two with a self-service ticket machine. There is a large Park and Ride site adjacent to the station.

Merryton Station is located at Fyne Crescent, Larkhall, on the Larkhall branch of the Argyle line. Merryton is an unstaffed halt with an access ramp to the bi-directional platform and CCTV surveillance in operation. There are three cycle racks at this station, a waiting shelter on the platform and a large Park and Ride site adjacent to the station.

Chatelherault Station is located at Valleyfield Road, Ferniegair, on the Larkhall branch of the Argyle line. The station is an unstaffed halt with an access ramp to the bi-directional platform and CCTV surveillance in operation. There are three cycle racks at this station and a waiting shelter on the platform.

Kelvindale Station is located off Cleveden Road. The station is an unstaffed halt with an access ramp to the bi-directional platform and CCTV in operation. There are two cycle racks at the station and a large waiting shelter on the platform.

4.4 Timetabling Improvements

The completion of the Milngavie – Larkhall project has allowed for timetable increases to services as well as new services, giving the following benefits:

- Two new trains an hour serve Larkhall, running to Dalmuir via Singer;
- An additional two trains an hour between Hamilton and Glasgow Central;
- The previous two trains an hour which operated from Motherwell to Dalmuir via Hamilton and Singer have been diverted to Milngavie;
- Milngavie line retained the twice hourly service to/from Queen Street via Springburn;
- Two trains an hour serve Anniesland and Kelvindale stations as part of the Anniesland to Glasgow Queen Street via Maryhill service; and
- The project allowed for an additional two trains per hour in each direction through Westerton which were accommodated following the extension of the Queen Street to Maryhill service to / from Anniesland.

The rail improvements resulting from the Milngavie – Larkhall scheme provide new services for the communities at Larkhall, Merryton, Chatelherault and Kelvindale stations. The scheme has improved service frequency for rail stops between Milngavie and Hamilton Central via Glasgow Central. Service hours of operation at the new stations are displayed within Table 4.1, below.

Table 4.1 – Service Hours of Operation at New Stations

Route	Station	First Train	Last Train
Larkhall – Glasgow Central	Larkhall	0607	2337
Glasgow Central – Larkhall	Larkhall	0700	0030
Larkhall – Glasgow Central	Merryton	0609	2339
Glasgow Central – Larkhall	Merryton	0658	0028
Larkhall – Glasgow Central	Chatelherault	0612	2342
Glasgow Central –	Chatelherault	0654	0024

Larkhall			
Glasgow Queen Street – Anniesland	Kelvindale	0640	0010
Anniesland – Glasgow Queen Street	Kelvindale	0625	2325

4.5 Project Team and Costs

Funding for the Milngavie – Larkhall scheme was obtained from the Scottish Executive and SPT, with support from South Lanarkshire Council. The scheme development and implementation was managed by Network Rail whilst construction was undertaken by Carillion Rail. All rail services are operated by First ScotRail.

The funding breakdown for the project was:

- Scottish Executive - £25million;
- SPT - £9.1million;
- South Lanarkshire Council - £400,000 plus £1.3million in supporting works.

4.6 Benefits

The Milngavie – Larkhall project was completed approximately two years ago and provides a number of benefits to the local and wider communities. The new rail link has increased capacity and service coverage on the Greater Glasgow rail network. This resulted in reported patronage figures of 343,000[15] passengers travelling to / from Larkhall, Merryton and Chatelherault in the first year of operation. This figure was 53% greater than the projected 220,000 passengers. Within the last year of operation, until February 2008, the patronage figures for the Larkhall branch line had increased to 415,000.

It has been reported[16] that the project has increased employment and educational opportunities for Lanarkshire residents by providing easier access to Glasgow. SPT report that the new railway has played a full part in a sustainable, effective and integrated transport system, and has also helped support economic development, meet social needs, and provide a better environment.

SPT indicated that the re-opening of the Larkhall branch line is making a significant contribution to the economic regeneration of Lanarkshire and this progress looks set to continue. It was reported that the early benefits of the scheme have included the development of a new NHS distribution Centre at Canderside Toll and inclusion of Larkhall within the Glasgow and Clyde Valley Joint Structure Plan as a Community Growth Area[17]. It is considered that these investments would not have been achieved without the existence of a modern rail link.

4.7 Patronage

Reports on patronage have varied depending on the reporting process and date, however all figures have shown patronage levels above predicted levels. It was reported that the first 70 days witnessed an increase of 68,749 passengers on the new lines, 34% higher than projected. Higher than expected passenger numbers were also reported for the first year, with passenger journeys reported at 343,000 on the new routes, 53% over projected levels[16]. These passenger increases have led to an increase in the number of overall journeys by 13%[16]. These figures include all increases in travel on these routes and may also be a result of the increased frequency of services on the Larkhall to Dalmuir via Singer and the Milngavie to Motherwell via Hamilton lines.

[15] Source First ScotRail Lennon data, supplied 04/03/2008
[16] Source First ScotRail, Press Releases, http://www.firstgroup.com/scotrail accessed 09/10/2007
[17] Source: Scottish Government, http://www.scotland.gov.uk/News/Releases, accessed (12/10/2007)

In the last year of operation, until February 2008, patronage figures on the Larkhall branch line increased to 415,000[18]. The majority of these trips were to / from Larkhall, with 299,000 ticket sales recorded. Patronage figures for Merryton and Chatelherault were 95,000 and 21,000 respectively over the last year of operation.

Individual station figures were published in Scottish Transport Statistics 25 (December 2006) and most recently updated in August 2007. The Statistics provide information on passenger journeys using national rail tickets to and from rail stations in Scotland. The figures for 2005-2006 for the newly opened stations following the Milngavie – Larkhall project are shown in Table 4.2.

Table 4.2 – passenger journeys using national rail tickets[19,20], to and from the four new stations (2005-2006)

Station (year of opening)	Tickets (thousands)[6]
Chatelherault (2005)	3.5
Merryton (2005)	20.0
Larkhall (2005)	83.2
Kelvindale (2005)	17.4
Total	**124.1**

(Source: Scottish transport Statistics 25)

The patronage level increases detailed in the text above are estimates from SPT and First ScotRail. The passenger numbers shown in Table 4.2 are determined by actual ticket purchases and may more fairly represent the actual level of passengers who have directly benefited from the new station openings. However, it is noted that the figures in Table 4.2 do not account for journeys made by Zonecards.

4.8 Summary

This Chapter has provided an overview of the Milngavie – Larkhall scheme including infrastructure and facilities, timetabling, benefits and patronage. The following Chapter will outline the Railway Engineering elements associated with the proposed rail extension.

[18] Source First ScotRail Lennon data, supplied 04/03/2008

[19] Through journeys made using tickets whose sales were recorded directly by the rail industry's central ticketing system. The figures in this table do not include estimates of journeys made using Zonecards, and they do not "double-count" passenger journeys which involved the use of more than one train during a journey.

[20] The system cannot count against any individual destination station a ticket which specifies that the destination is a particular SPT zone, nor can it count against any individual origin station a ticket which specifies that the traveller may depart from any station in an SPT zone.

5 Railway Engineering

5.1 Introduction

This Chapter will outline the Railway Engineering element of the study. This has involved producing a concept design for the extension of Larkhall Railway Line to Stonehouse, including details of the proposed route alignment, a review of each structure on the proposed route, the requirement of railway systems, the general Civil Engineering work involved on the project and an overall indicative cost estimate.

The extension is proposed to start at Larkhall station, run along approximately 90% of the old alignment and then terminate at a newly built railway station at Stonehouse.

The proposed track alignment will have to negotiate 11 structures including the Larkhall and Stonehouse viaducts as well as the requirement of major civil engineering works to construct Stonehouse Railway Station.

These elements are discussed in further detail below. Associated railway engineering drawings are contained within Appendix B.

5.2 Stations

5.2.1 Larkhall Railway Station

Larkhall branch line and Larkhall Railway Station were re-opened in 2005 after a closure of almost 40 years. The current platform is constructed on a straight section of track deviating from the previous curved alignment. As a result, this creates alignment issues when considering an extension of the track beyond McNeil Street. Two options have been considered at this location, as discussed below.

The first option would require the reconstruction of the over bridge on McNeil Street. The existing over bridge on McNeil Street creates a severe problem with regard to track alignment. If the current platform was to remain as a straight section, the retaining wall, bridge and surrounding roads would have to be re-constructed to allow the proposed track alignment to pass safely under McNeil Street. This would also severely jeopardise the structural integrity of surrounding properties and at the very least render them inhabitable during the re-construction.

The alternative option would require the re-construction of approximately half of Larkhall Railway Station to follow a curved alignment to allow the proposed track extension to pass under McNeil Street. This option is preferred due to the reduced amount of engineering works required as well as avoiding extremely complicated, time consuming and more costly works.

5.2.2 Stonehouse Railway Station

The current commission includes the requirement to identify a suitable station location at Stonehouse and to develop a station layout. The following design parameters were considered for the station layout and locations:

- Station to be located on a straight section of track, as preferred by Network Rail.
- All access to the station to be Disabled Discrimination Act (DDA) compliant i.e. ramps provided for wheelchair access.
- Platform lengths of 150m which are more than adequate to accommodate a six-car train, as per the existing branch line to Larkhall.
- Two car parks with 50 spaces in each, which can be increased or decreased if necessary.
- Station located as close as possible to the town centre of Stonehouse with good pedestrian access from Stonehouse.
- Good access for road users from the local road network including the A71 Stonehouse Bypass.
- Station location allows for any future extension to Strathaven.

When considering possible station locations it became apparent that there was only a short section along the proposed route that could be appropriate. A station further east of Lawrie Street was not possible because of the constraints to position the platforms on a straight section of track.

A station further west than the existing western roundabout on the A71 bypass was also considered, but was deemed to be too far away from the town centre. Therefore the constraints of the station location study were set between Lawrie Street to the east and the existing western roundabout on the A71 to the west.

It should also be noted that two properties adjacent to the A71 bypass on Lawrie Street will require to be compulsory purchased regardless of any station option as this land is required for the proposed route.

Based on the above parameters and study constraints, two possible locations for a Park and Ride Station at Stonehouse where identified. Following consultation with South Lanarkshire Council, it was agreed that the most appropriate location of Stonehouse Railway Station would be just to the west of Lawrie Street on the north side of the A71.

The station will be constructed on an embankment approximately 5m above the existing road level at Lawrie Street. Following the completion of the rail operations modelling, it was found that only one platform is required at Stonehouse, as based on current timetabling (please refer to drawing number 60035434_A3_20_REV B). The proposed location will allow the flexibility for another platform in the future should it be required.

Also included in the proposal are two newly constructed car parks with 50 spaces each. Car park 1 can be accessed via Lawrie Street with car park 2 from the A71. Car park 1 is proposed to be built on wasteland on the south side of the A71, connecting to Lawrie Street. A roundabout is proposed to connect car park 2 to the A71, constructed on farmland on the south side of the proposed track alignment. There will also be a bus stop located at the east end of car park 2 to allow public transport interchange.

Pedestrian ramps, designed under the current DDA standards, could be constructed to allow pedestrian access from the car parks and bus stop to the station. The pedestrian footway network and car parks will be illuminated to comply with Local Authority and Network Rail Standards as well as having a CCTV network to aid passenger and parking security.

Shelters will be provided at the station and at the bus stop and comprehensive signage will also be implemented to direct passengers using the car park and bus stop, to and from the station.

5.3 Alignment

The proposed alignment will follow the previous alignment from Larkhall Railway Station to Stonehouse.

5.3.1 Larkhall Railway Station (Chainage 0m) – Larkhall Viaduct (Chainage 1372m)

(Drawing Numbers 60035434_A3_01_REV A and 60035434_A3_02_REV A)

The track will begin at Larkhall Station with a curved alignment underneath McNeil Street Bridge. The existing ground south of Larkhall Station will require to be reformed to ensure that there will be no height restrictions of the McNeil Street under bridge. After leaving the station and passing under McNeil Street, the track will rise to an embankment that will continue to Larkhall Viaduct. The alignment will pass Larkhall Academy on the south side of the track and pass over several proposed structures before reaching Larkhall Viaduct. These structures are the Larkhall Academy subway, Broomhill Road under bridge, a local access road/footpath under bridge and then Larkhall Viaduct. The gradient in this section of the track will be approximately 1/100 (incline).

5.3.2 Larkhall Viaduct (Chainage 1372m) – Millheugh Road (Chainage 2157m)

(Drawing Numbers 60035434_A3_03_REV A)

When leaving Larkhall Viaduct the proposed alignment will sweep tightly across a newly constructed, small embankment before straightening and passing over Millheugh Road. Due to the tight radius of this curve that approaches 340m, the Network Rail Design Standards dictate that the maximum speed limit on this section to be 40mph. The gradient in this section of the track will be approximately 1/66 (incline).

5.3.3 Millheugh Road (Chainage 2157m) – Stonehouse Viaduct (Chainage 4317m)

(Drawing Numbers 60035434_A3_04_REV A, 60035434_A3_05_REV A and 60035434_A3_06_REV A)

From Millheugh Road under bridge, the track straightens for approximately 1300m and it is in this section where a passing loop is proposed to be constructed. The embankment carrying the previous track remains, however, reforming and regrading would be required to satisfy current standards. Kittymuirhill Farm Access over bridge and Kittymuir Farm Access over bridge are bridges that will be passed on this straight section as the alignment reaches Stonehouse Viaduct. The gradient in this section of the track will be approximately 1/50 (incline) in the straight section and just before the Stonehouse Viaduct the gradient will be approximately 1/200 (incline).

5.3.4 Stonehouse Viaduct (Chainage 4317m) – Stonehouse Station (Chainage 5003m)

(Drawing Numbers 60035434_A3_07_REV A and 60035434_A3_08_REV A)

This is the only section of the proposed alignment which deviates from the previous rail alignment. A new curved embankment will be constructed leading the track to the proposed Stonehouse Railway Station. A new under bridge will also be required to be constructed over Lawrie Street. Due to the tight radius of this curve which is 250m, the Network Rail Design Standards dictates that the maximum speed limit on this section to be 40mph.The gradient in this section of the track will be approximately 1/160 (incline).

5.4 Structures

There are a number of structures that will comprise sections of the proposed route. These include:

5.4.1 McNeil Street Over Bridge

Due to the proposed track alignment and due to height restrictions, the ground would be required to be lowered. There may be other repair works to the structure such as re-pointing, steelwork remediation etc. required.

5.4.2 Larkhall Academy Subway (Drawing Number 60035434_30_REV A)

The railway will be positioned on an embankment crossing a pedestrian footpath providing access to Larkhall Academy. A new pedestrian subway should be installed to allow the existing path to remain open.

5.4.3 Broomhill Road Under Bridge (Drawing Number 60035434_30_REV A)

Broomhill Road does not appear to be well used and it could be worth considering closure of the road at the railway line location. If the road was closed and gap filled with material to create an embankment, the costs are estimated at approximately £10,000. If a bridge is required, then a total deck area of 192 square metres is its estimated size, at a total cost of approximately £510,000.

5.4.4 Local Access Road Under Bridge (Drawing Number 60035434_30_REV A)

This access road appears to be more like a footway than a road, however it is paved. Assuming that it remains an access road, a new bridge is estimated to produce a total deck area of 128 square metres.

5.4.5 Larkhall Viaduct (Drawing Number 60035434_31_REV A)

The existing deck is still present although rust is evident over the majority of the superstructure and the waterproofing has totally failed. However, all piers appear to be in good condition although the joints would probably require re-pointing. The reinstatement of Larkhall Viaduct will assume a total replacement of the deck area estimated at 2500 square metres.

5.4.6 Farmer's Field Subway (Drawing Number 60035434_30_REV A)

The railway will be positioned on an embankment crossing a farmer's field. To enable animals to access both side of field that the track dissects, a subway would be installed.

5.4.7 Millheugh Road Bridge (Drawing Number 60035434_32_REV A)

This existing structure appears to be in good condition although showing evidence of surface rust. Assuming that the bridge can be refurbished, a full bridge inspection would be necessary to allow a detailed assessment to be carried out and the resulting conclusions may require repair or strengthening to be carried out. The deck area has been approximated as 192 square metres.

5.4.8 Kittymuirhill Farm and Kittymuir Farm Access Bridge (Drawing Number 60035434_30_REV A)

Currently there appears to be no bridge structure present to carry the farm access roads over the proposed railway line. A new over bridge would be required in both locations to span over two tracks as this section of track has a passing loop.

5.4.9 Stonehouse Viaduct (Drawing Number 60035434_33_REV A)

The piers are the only remaining feature of the previous viaduct at this location and a full deck construction would be required. It is assumed that the piers need re-pointing and can be suitably re-used. The total estimated deck area will be 3500 square metres.

5.4.10 Car Park 1 Subway (Drawing Number 60035434_30_REV A)

The new track alignment leading to Stonehouse will pass over a small pedestrian subway, similar to the structure proposed near to Larkhall Academy. This will provide station access to those pedestrians using car park 2 and the bus stop.

5.4.11 Lawrie Street Bridge (Drawing Number 60035434_30_REV A)

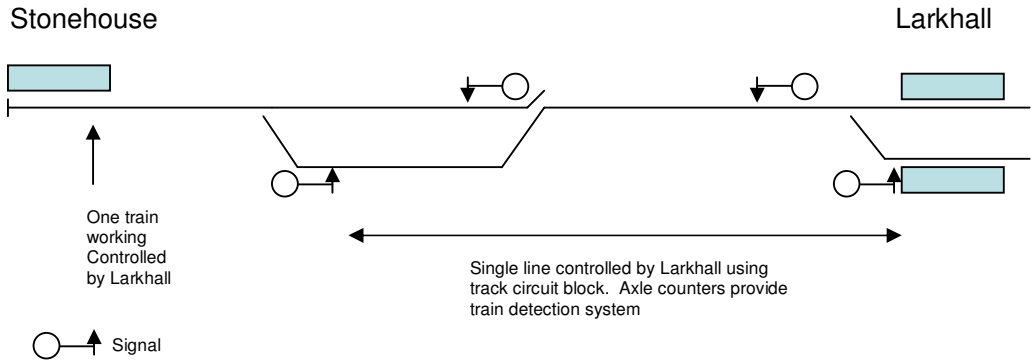
This new structure is proposed to be of similar dimensions to that of Broomhill Road Bridge and will be located over Lawrie Street, Stonehouse. The deck area has been approximated as 192 square metres.

5.5 Signalling and Overhead Line Equipment

The signalling and Overhead Line Equipment (OLE) requirements for the proposed route are outlined below.

5.5.1 Signalling

It is estimated that 4 No signals are required with train detection by means of axle counters. The passing loop points are trailable spring points with points indicators and points onto the single line are worked at Larkhall. Alterations would be required to interlocking at both ends and to the panel/diagram. For costing purposes this equates to a total of 8 Signal Equivalent Units (SEU). A schematic showing the signalling arrangement is shown below.



5.5.2 Overhead Line Equipment

OLE would run along the full length of the track, similar in design to the OLE currently installed on the Larkhall branch. Typically this would include foundation installation, steelwork erection and installation of registration equipment, conductors including the catenary, contact and droppers. Finally, when completed, testing and commissioning must be carried out. The existing Larkhall branch is fed from the main line by a Track Sectioning Location (TSL) located at Haughhead Junction extending the branch line a further 6km, doubling the length of fed section. A new switching station may be required and has been included in the costs.

5.6 Cost Estimate

The cost estimates outlined below are based on a current understanding of the work involved, an informed view of the likely costs of the elements, previous project experience and using SPONS 2008.

5.6.1 Optimism Bias

The current Department for Transport (DfT) guidance states that *"there is a demonstrated, systematic, tendency for project appraisers to be overly optimistic when estimating costs and that to redress this tendency appraisers should make explicit, empirically based judgements to the estimates of a project's costs, benefits and duration"* (The British Department for Transport, Procedures for Dealing with Optimism Bias in Transport Planning Guidance Document, June 2004).

Any uplift in project costs to allow for optimism bias is taken to subsume any specific allowances for contingencies. The current DfT guidance proposes a starting Optimism Bias value of 44%. This value is reduced throughout the life of the project by mitigating any risks.

5.6.2 Limitations

The following items have not been taken into account in the cost estimates at this stage:

- No allowance has been made with respect to utility diversions; and
- No allowance has been made with respect to land purchase.

5.6.3 Cost Estimate

Table 5.1, below, summarises the capital cost estimates for the proposed line. The cost estimate provided within Table 5.1 assumes a Dynamic Loop option[21].

Table 5.1 – Capital Cost Estimate (Summary, 2008 prices)

Description of works	**Total Cost**
Site Clearance	£640,000
Earthworks	£765,000
Track	£4,230,000
Signalling	£2,200,000
OLE	£1,785,000
Structures	£12,390,000
Station Works	£3,490,000
Station Facilities	£31,000
Civils Works	£1,180,000
Cost Allowances*	£8,810,000
Project Total	**£35,521,000**
Optimism Bias	**£15,630,000**
Grand total	**£51,151,000**

* includes preliminaries, overheads and Promoter's costs and approvals.

5.7 Summary

This Chapter has provided details of the Railway Engineering work. This has included consideration of station layout, railway alignment, structures, signalling and OLE. In addition, indicative cost estimates for the proposed railway extension have been provided. The following Chapter will provide an overview of the Rail Operations work.

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[21] As agreed with SLC at progress meeting 07/02/08.

6 Railway Operations

6.1 Introduction

This Chapter will provide an overview of the Rail Operations work which has been undertaken to inform the study. It will set out the methodology adopted, and provide an overview of the current railway operations. It will then consider running times over the new infrastructure; operating issues including crew requirements and the potential for a further extension to Strathaven; and performance risk and mitigation impacts. Finally, an indication is provided of the likely operational costs.

6.2 Methodology

Running times over the new infrastructure have been calculated using RailSys in timetabling mode. RailSys is Network Rail's standard performance simulation software. It is used to test the impact of changes in the timetable, infrastructure and reliability on network performance. RailSys is also used by Network Rail to calculate Sectional Running Times.

The RailSys timetabling mode was used to calculate the running times of trains over the infrastructure layout based on inputting the distances, gradients, and speed limits. Rolling stock performance was based on traction parameters for Class 334.

Further assessment of the proposals is required using RailSys in performance simulation mode, which is not part of this work. RailSys tests the performance of a scheme by simulating 250 days of performance under perturbed running. Such assessment is outside the scope of the current remit, but would be required by industry stakeholders as the scheme is developed through the appraisal process.

Consideration has been given to the impact of extending trains to the proposed new station site at Stonehouse, given the current timetable. This has included whether a passing loop is needed and whether additional rolling stock would be required.

Consultation has been undertaken with First ScotRail to ascertain their view on the proposed rail extension, as well as the implications for their driver schedules and stock schedules.

Finally, consideration has been given to the likely performance risks and mitigation measures that may be required to satisfy Network Rail and other stakeholders.

These elements are considered in further detail within the sections below.

6.3 Description of Current Operations

Larkhall station is currently served by a half-hourly pattern of services for most of the day, with some modifications during the evening peak. Most trains originate or terminate at Dalmuir, albeit again there are variations during peak times. Trains are formed of a mixture of Class 318 and Class 334 rolling stock. Generally services are formed of a single three-car train, although there is some doubling up during the peaks.

Trains are not stabled overnight at Larkhall, but are kept at Motherwell depot. Empty stock trains run in the early morning from Motherwell to Larkhall (to form the first trains in the morning) and again in the evening (to return stock to the depot).

Table 6.1 lists one hour of the current timetabled service. The journey time from Larkhall to Glasgow Central is 30 minutes.

Table 6.1: One Hour Summary of Timetable

		Unit 1	Unit 2
From		Dalmuir	Dalmuir
Glasgow Central Low Level	dep	10:59:00	11:29:00
Hamilton Central	dep	11:20:00	11:50:00
Haughhead Jn		11:22:30	11:52:30
Chatelherault		11:24:30	11:54:30
Allanton Loop		11:26:00	11:56:00
Merryton		11:28:00	11:58:00
Larkhall	arr	11:30:00	12:00:00
		7 minute turnarounds	
Larkhall	dep	11:37:00	12:07:00
Merryton		11:39:00	12:09:00
Allanton Loop		11:40:00	12:10:00
Chatelherault		11:42:00	12:12:00
Haughhead Jn		11:43:00	12:13:00
Hamilton Central	arr	11:45:30	12:15:30
Glasgow Central Low Level	arr	12:07:00	12:37:00
To		Dalmuir	Dalmuir

In the current timetable trains arrive at Larkhall (from Glasgow via Haughhead Jn) at xx:00 and xx:30. Trains are scheduled to depart north seven minutes later at xx:07 and xx:37, respectively. This efficient turnaround at Larkhall means that extending these services south to Stonehouse will require additional rolling stock.

6.4 Running Times Over New Infrastructure

Running times over a single line extension between Larkhall and Stonehouse were calculated as 4 minutes 36 seconds (southbound – uphill) and 4 minutes 19 seconds (northbound – downhill). The timetable was based on the existing timetable being extended south from Larkhall to Stonehouse, as shown below in Table 6.2. This results in an extra train unit being used and less efficient turnarounds of 26 minutes at Stonehouse.

Table 6.2: One Hour Summary of Timetable Extended to Stonehouse

		Unit 1	Unit 2	Unit 3
From			Dalmuir	Dalmuir
Glasgow Central Low Level	dep		10:59:00	11:29:00
Hamilton Central	dep		11:20:00	11:50:00
Haughhead Jn			11:22:30	11:52:30
Chatelherault			11:24:30	11:54:30
Allanton Loop			11:26:00	11:56:00
Merryton			11:28:00	11:58:00
Larkhall	arr		11:30:00	12:00:00
	dep		***11:31:00***	***12:01:00***
Stonehouse	arr		***11:35:36***	***12:05:36***
		26 minute turnarounds		
Stonehouse	dep	***11:32:00***	***12:02:00***	
Larkhall	arr	***11:36:19***	***12:06:19***	
	dep	11:37:00	12:07:00	
Merryton		11:39:00	12:09:00	
Allanton Loop		11:40:00	12:10:00	

Chatelherault		11:42:00	12:12:00	
Haughhead Jn		11:43:00	12:13:00	
Hamilton Central	arr	11:45:30	12:15:30	
Glasgow Central Low Level	arr	12:07:00	12:37:00	
To		Dalmuir	Dalmuir	

Table 6.2 shows that if the existing timetable structure is maintained, northbound and southbound trains will need to pass somewhere between Larkhall and Stonehouse. Possible solutions to this include:

- Only one train an hour is extended from Larkhall to Stonehouse. This removes the need for a loop, but reduces the attractiveness of the service through reduced frequency of service.
- Building a simple passing loop. This would be cheaper than the dynamic loop below, but would require one of the trains to stop (impacting journey times).
- Building a dynamic loop, allowing trains to pass each other.
- Extending dwell times at Larkhall to 4 minutes in each direction, so trains no longer need to cross between Larkhall to Stonehouse. There would be a resultant impact on journey times.
- Recasting the timetable to change the times that services arrive at Larkhall to make them more compatible. This has inherent risks and may not be possible to achieve since the timetable is structured to fit in with West Coast Main Line services.

The following sections detail the options that may be developed to accommodate service operations.

6.4.1 Infrastructure Layout 1: Dynamic Loop

The ideal solution to allow trains to pass is the provision of a dynamic loop. A dynamic loop means that one of the trains is not required to stop to allow the other train to pass.

However, this requires more complex signalling and additional point-ends. The location of the loop is also constrained by the location of bridges and the availability of land. Figure 6.1 shows a schematic view of the proposed layout, with the line-speeds shown. It has been assumed that the loop will be designed to 40mph operation and will be used by services in the northbound direction. Table 6.3 shows the timetable developed using RailSys for this layout.

Figure 6.1: Dynamic Loop Layout

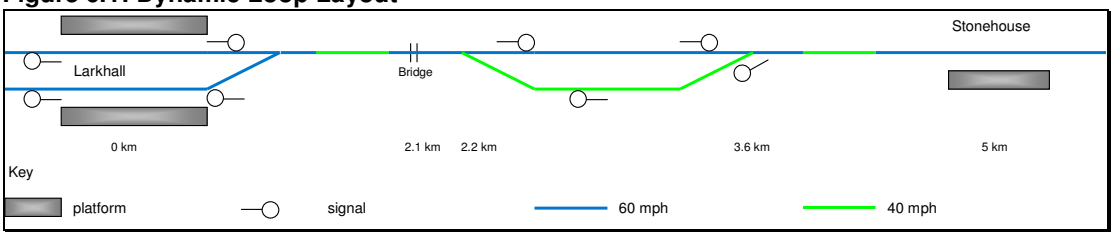

Table 6.3: One Hour Summary of Timetable Extended to Stonehouse (Dynamic Loop)

		Unit 1	Unit 2	Unit 3
From			Dalmuir	Dalmuir
Glasgow Central Low Level	dep		10:59:00	11:29:00
Hamilton Central	dep		11:20:00	11:50:00
Haughhead Jn			11:22:30	11:52:30
Chatelherault			11:24:30	11:54:30
Allanton Loop			11:26:00	11:56:00
Merryton			11:28:00	11:58:00
Larkhall	arr		11:30:00	12:00:00

	dep		***11:31:00***	***12:01:00***
Loop	north		***11:33:11***	***12:03:11***
	south		***11:34:03***	***12:04:03***
Stonehouse	arr		***11:35:37***	***12:05:37***
		26 minute turnarounds		
Stonehouse	dep	***11:31:30***	***12:01:30***	
Loop	south	***11:33:01***	***12:03:01***	
	north	***11:34:07***	***11:04:07***	
Larkhall	arr	***11:36:21***	***12:06:21***	
	dep	11:37:00	12:07:00	
Merryton		11:39:00	12:09:00	
Allanton Loop		11:40:00	12:10:00	
Chatelherault		11:42:00	12:12:00	
Haughhead Jn		11:43:00	12:13:00	
Hamilton Central	arr	11:45:30	12:15:30	
Glasgow Central Low Level	arr	12:07:00	12:37:00	
To		Dalmuir	Dalmuir	

This layout results in journey times between Stonehouse and Glasgow Central of 35½ minutes. The timetable is conflict free according to RailSys. However, there are performance risks if trains are running out of path, and therefore may miss their 'passing' slot on the loop. This is illustrated by Table 6.4 below, which shows the tight margin between a northbound and southbound train on the dynamic loop.

Table 6.4: Margins at the Ends of the Dynamic Loop

	southbound train ↓	northbound train ↑	margin (hh:mm:ss)
North end of loop	***11:33:11***	***11:34:07***	00:00:56
South end of loop	***11:34:03***	***11:33:01***	00:01:02

The turnaround time at Stonehouse associated with the Dynamic Loop option is 26 minutes. It is considered that this turnaround time could not be reduced without a full recast of the rail timetable. As highlighted above, this has inherent risks and may not be possible to achieve since the timetable is structured to fit in with West Coast Main Line services.

6.4.2 *Infrastructure Layout 2: Single Line*

A simpler (and cheaper) infrastructure solution has also been examined, in the form of a single line. This would be facilitated by extending the dwell-time at Larkhall from one to four minutes in each direction. As a result, northbound and southbound trains would pass in the platforms at Larkhall.

This simpler solution would be a single bi-directional line extended from Larkhall to Stonehouse. The line would be operated as 'Single Train Working', which means that only one train would be allowed onto the line at a time. Figure 6.2 shows the layout examined in RailSys and Table 6.5 shows the timetable.

Figure 6.2: Single Line Layout

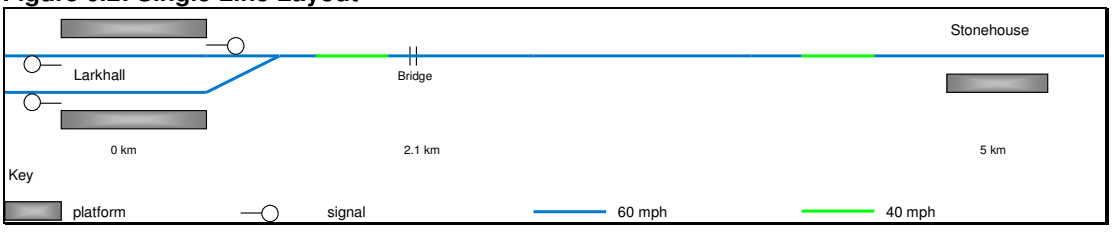

Table 6.5: One Hour Summary of Timetable Extended to Stonehouse (Single Line)

		Unit 1	Unit 2	Unit 3
From			Dalmuir	Dalmuir
Glasgow Central Low Level	dep		10:59:00	11:29:00
Hamilton Central	dep		11:20:00	11:50:00
Haughhead Jn			11:22:30	11:52:30
Chatelherault			11:24:30	11:54:30
Allanton Loop			11:26:00	11:56:00
Merryton			11:28:00	11:58:00
Larkhall	arr		11:30:00	12:00:00
	dep		***11:34:00***	***12:04:00***
Stonehouse	arr		***11:38:36***	***12:08:36***
		20 minute turnarounds		
Stonehouse	dep	***11:28:30***	***12:58:30***	
Larkhall	arr	***11:32:49***	***12:02:49***	
	dep	11:37:00	12:07:00	
Merryton		11:39:00	12:09:00	
Allanton Loop		11:40:00	12:10:00	
Chatelherault		11:42:00	12:12:00	
Haughhead Jn		11:43:00	12:13:00	
Hamilton Central	arr	11:45:30	12:15:30	
Glasgow Central Low Level	arr	12:07:00	12:37:00	
To		Dalmuir	Dalmuir	

This layout results in journey times between Stonehouse and Glasgow Central of 38 minutes. It is worth noting that the journey time associated with the single line option is only 2½ minutes greater than Option 1, because the speed of trains is limited to 40mph through the loop.

Whilst impacting journey times, the extended dwell time at Larkhall provides a degree of robustness to delays north of Larkhall. However, the margin at Larkhall between a train arriving from Stonehouse and a train departing to Stonehouse is tight at only 71 seconds.

6.4.3 *Summary*

Run times between Larkhall and Stonehouse have been calculated at around 4½ minutes. This means that if the existing timetable structure is maintained, northbound and southbound trains will need to pass somewhere between Larkhall and Stonehouse. Two solutions were examined, which are summarised below in Table 6.6.

Table 6.6: Summary of Results for Two Options

	Option 1	**Option 2**
Infrastructure	Dynamic Loop	Single Line
Signals Required	6	2
Stock Required (units)	1	1
Journey Time (minutes): Stonehouse to Glasgow Central	35½	38
Turnaround time at Stonehouse (minutes)	26	19

It is considered that both Options are operationally feasible, subject to more detail design and analysis. However, before the scheme would be accepted by industry stakeholders, full operational assessment using RailSys would be required.

6.5 Operating Issues

Both options could in principle be operated by one additional single three-car unit. However, the extension would change which southbound and northbound services were linked in the rolling stock diagrams. This will affect in particular which services in the peak periods are formed of two three-car units.

Additional crew would be required, since effectively one extra train is operating on the network at any time. Crew hours could be estimated from the time between the first and last services on the extension. However, crew working practices and the requirement for rest breaks could increase the number of shifts this implies. It is unlikely that additional crew rest facilities would be needed, unless the Train Operator decided to take advantage of the long turnarounds at Stonehouse to schedule crew breaks there. More detailed discussions would be required with First ScotRail as to how both the crew and stock diagrams would be affected by the proposals.

The extended turnaround times at Stonehouse mean that extending further to Strathaven would be operationally feasible. The infrastructure and run times for a further extension to Strathaven have not been examined as part of this commission. However, it is probable that the service could run from Stonehouse to Strathaven and return to Stonehouse within the 19 minutes (single line) or the 26 minutes (dynamic loop) that the service would sit at Stonehouse, however further run time modelling would be required to confirm this. No further additional units or crew would be required over and above that needed for the Stonehouse extension. The extension could consist of a single line operated under Single Train Working.

6.6 Performance Risks

Table 6.7 lists the performance risks which the proposals may incur, along with measures for mitigating the impact.

Table 6.7: Performance Risks

Risk	Likely Impact	Mitigation Measures
Train failure south of Larkhall.	Delays to Glasgow bound services and hence disruption to the wider network.	Services are cut-short at Larkhall and operate what is effectively today's timetable.
Train arrives late at Larkhall.	Southbound train will miss the 'passing' slot on the loop and hence will delay the northbound train. This would result in a delayed departure towards Glasgow and hence disrupt the wider network.	Southbound service held at Larkhall, until the northbound services arrives. The southbound service arrives late at Larkhall, but this can be absorbed by the lengthy turnaround.

6.7 Operational Costs

Indicative rail operational costs have been prepared. The costs assume one additional single three-car unit, operating a 16-hour day, 363 days per year. In addition, the costs assume one driver and one ticket checker would be employed on the additional unit at any one time. The costs also allow for:

- Leasing and operation of the single three-car unit;
- Crew;
- Capacity charge;
- Overhead, applying a 9% uplift (based on best practice); and
- Profit, applying a 6% uplift (based on best practice).

The indicative operational costs are £704,000 per annum for the Larkhall – Stonehouse extension. Should a future extension to Strathaven be implemented, it is expected that the indicative operational costs for a service from Larkhall to Strathaven would be £770,000 per annum.

6.8 Summary

This Chapter has considered the rail operational issues associated with extending the Larkhall rail line to Stonehouse. It has provided an overview of current rail operations, running times over the proposed infrastructure operational requirements and performance risks. Two options

have been identified: a dynamic loop and a single line. It is considered that both options are operationally feasible, subject to more detail design and analysis.

The indicative operational costs are £704,000 per annum for the Larkhall – Stonehouse extension. Should a future extension to Strathaven be implemented, it is expected that the indicative operational costs for a service from Larkhall to Strathaven would be £770,000 per annum.

The following Chapter will provide details of the transport modelling and appraisal.

7 Transport Modelling and Appraisal

7.1 Introduction

This Chapter will provide an overview of the transport modelling element of the study. It will set out the methodology involved and the key findings.

This Chapter will also provide high-level consideration of the performance of the rail extension against each of the Government's five objectives for transport.

7.2 Methodology

This Section will provide an overview of the methodology adopted for the transport modelling element of the study.

7.2.1 Review of Modelling Packages

As detailed within the Inception Report, consideration was given to the available modelling tools at an early stage of the commission. This included a review of:

- The Strathclyde Integrated Transport Model 4 (SITM4);
- The Transport Model for Scotland (TMfS); and
- The Strathclyde Integrated Transport and Land Use Model (SITLUM).

SITM4 is a multi-modal transport and assignment model developed for SPT by Jacobs. It is a 'four stage' multi-modal transport model, which is comprised of: trip generation; trip distribution; mode split; and trip assignment. The lack of any response in the model of travel distributions to changes in travel costs mean that the introduction of the M74 Northern Extension will not affect the pattern of trip making. This is considered to be unrealistic. As such, discussions with SPT regarding the suitability of the model for this study agreed that it would not be appropriate.

TMfS is a multi-modal transport and assignment model developed for Transport Scotland by MVA. Like SITM4, it is a 'four stage' multi-modal transport model. Unlike SITM4, the distribution model uses forecast costs, and can therefore model the effect of transport interventions on the distribution of trip making. In discussion with SPT, it was agreed that TMfS would not be suitable for the purposes of this study as TMfS was not designed to undertake localised modelling. It lacks network and zonal detail in this area, in particular the Stonehouse and Larkhall zone centroid connectors which load trips onto the network.

SITLUM is a transport / land use model developed for the SPT by the Transport Research Laboratory. It is a model that contains the permissions for developments by year, by seven types of land use. The zonal detail is coarse when compared with SITM4 or TMfS. This is not an assignment model, as it does not contain algorithms that vary routes from origins to destinations depending upon transport costs. Routes are fixed. Additionally, there is not a realistic representation of the transport network, just 'spider-links' that connect zone to zone. As such, it was agreed with SPT that SITLUM would not be fit for the purposes of this study.

Given the disadvantages of the existing assignment models, it was agreed with SPT and South Lanarkshire Council that the development of a bespoke spreadsheet model would give the most robust results for this study. As such, a spreadsheet-based mode choice model was developed, as outlined below.

7.2.2 Model Development

A spreadsheet model was developed for the AM peak hour (0800 – 0900 hours). It was developed for a base year of 2005, and forecasts produced for 2012 and 2022.

The model produced forecast demand by comparing the 2005 demand (taken from TMfS) and future year levels of development, along with the forecast levels of car ownership. It also took into account the phenomena of a transport intervention increasing the amount of trip making

('induced' trips). Travel costs (both monetary and time) were then compared for car, bus, rail and rail-based Park and Ride modes, and the demand split between them.

The cost information for the modes was taken from various sources:

- Car time – TMfS;
- Car fuel cost – TMfS;
- Bus and rail times and number of interchanges – Traveline Scotland website;
- Bus and rail fares – SPT website.

Forecast planning data for numbers of households and employees was supplied by MVA Consultancy from their previous work for South Lanarkshire Council.

The parameters used for the Mode Choice element of the model were taken from previous studies, adjusted where necessary to reflect changes in wealth, both over time, and to reflect the relative wealth levels of South Lanarkshire and the original area of data collection.

7.3 Core Scenario Patronage Forecasts

Table 7.1, below, presents the forecast demand for extending the rail line from Larkhall to Stonehouse. Operational parameters are taken from the Railway Operations work (refer to Chapter Six). Demand is presented for scenarios with and without the extension ('Do Something' and 'Do Minimum' respectively) so that the effect of introducing the scheme can be clearly identified.

Table 7.1 –Core Scenario (per annum, 000's of trips)

Zone	2005 Base	2012 Do Minimum	2012 Do Something	2022 Do Minimum	2022 Do Something
Larkhall Station	277	225	166	319	260
Stonehouse Station	-	-	113	-	143
Total	**277**	**225**	**279**	**319**	**403**

The 2012 Do Minimum shows a drop in the number of trips using Larkhall station from 2005. This is due to two factors: a drop in the planning data (population) and an increase in car ownership rates. In 2012 the core Do Something scenario predicts an annual use of Stonehouse station of approximately 113,000 trips. This increases to approximately 143,000 trips in 2022. However, it is important to identify the source of these trips. Larkhall experiences a reduction in use, from 225,000 to 166,000 in 2012 and from 319,000 to 260,000 in 2022, as trips that previously used Larkhall now have direct access to Stonehouse rail station. The source of the trips using Stonehouse station is shown in Table 7.2, below.

Table 7.2 – Previous Mode of Trips Using Stonehouse Station

Mode	2012	2022
Rail (Larkhall Station)	**43%**	**32%**
Car	**36%**	**47%**
Bus	**21%**	**21%**

As indicated within Table 7.2, approximately one-fifth of the trips using the new rail station are abstracted from bus in both 2012 and 2022. Approximately two-fifths simply board the rail service at a different station in 2012, dropping to approximately one-third in 2022. The remainder of trips change mode from car.

7.4 Sensitivity Tests Forecast Patronage

In addition to the core scenarios outlined above, four sensitivity tests have been undertaken to test the impact of different factors on the forecast level of demand at Larkhall rail station and the proposed Stonehouse rail station. The sensitivity tests were developed in discussion with South Lanarkshire Council, and are as follows:

- Increased Fuel costs – cost of car fuel increased by 50%;

- Increased Bus fare – cost of bus fares increased by 25%;
- Distance based congestion charging – a charge of 10p per kilometre imposed on cars; and
- Planning data variant – additional 700 households in Stonehouse zone.

Tables 7.3 to 7.6 present the demand forecasts for these scenarios. The forecasts for the core scenario presented in Table 7.1 are included in brackets to aid comparison.

Table 7.3 – Increased Fuel Cost (per annum, 000's of trips)

Zone	2012 Do Min	2012 Do Something	2022 Do Min	2022 Do Something
Larkhall	262 (225)	196 (166)	359 (319)	296 (260)
Stonehouse	-	127 (113)	-	159 (143)
Total	**252 (225)**	**323 (279)**	**359 (319)**	**455 (403)**

As would be expected, increasing the cost of fuel for cars by 50% results in more passengers using the rail stations at Larkhall and Stonehouse. Compared with the base scenarios shown in Table 7.1, the increase in fuel cost has resulted in a greater increase in the number of trips using Larkhall than Stonehouse.

Table 7.4 – Increased Bus Fare (per annum, 000's of trips)

Zone	2012 Do Min	2012 Do Something	2022 Do Min	2022 Do Something
Larkhall	237 (225)	168 (166)	331 (319)	262 (260)
Stonehouse	-	119 (113)	-	149 (143)
Total	**237 (225)**	**288 (279)**	**331 (319)**	**411 (403)**

As indicated within Table 7.4, increasing bus fares by 25% results in an increase in rail patronage at the stations of Larkhall and Stonehouse. However, the increase is smaller that that given by the fuel price elasticity scenario set out within Table 7.3.

Table 7.5 – Distance Based Congestion Charging (per annum, 000's of trips)

Zone	2012 Do Min	2012 Do Something	2022 Do Min	2022 Do Something
Larkhall	389 (225)	308 (166)	552 (319)	456 (260)
Stonehouse	-	181 (113)	-	232 (143)
Total	**389 (225)**	**488 (279)**	**552 (319)**	**688 (403)**

The sensitivity test modelling distance-based congestion charging demonstrates the largest increases in rail patronage of all sensitivity tests. A charge of 10 pence per kilometre was imposed on all car journeys. When compared with the core scenarios reported in Table 7.1, the increases in rail patronage for the combined total show the following increases: 2012 Do Minimum 70%; 2012 Do Something 73%; 2022 Do Something 70%; and 2022 Do Minimum 69%.

Table 7.6 – Planning Data Variant (per annum, 000's of trips)

Zone	2012 Do Min	2012 Do Something	2022 Do Min	2022 Do Something
Larkhall	229 (225)	166 (166)	324 (319)	260 (260)
Stonehouse	-	130 (113)	-	162 (143)
Total	**229 (225)**	**296 (279)**	**324 (319)**	**422 (403)**

The planning data variant sensitivity test, where an increase of 700 households in Stonehouse was modelled, revealed minor increases in rail patronage.

7.5 Transport Economic Benefits

7.5.1 Overview

This section describes the transport economic benefits associated with the Larkhall – Stonehouse rail extension. The analysis has been adopted the approach set out within STAG. Section 8.2.1 of STAG describes the transport economic benefits as assessing *"…the*

contribution which a transport proposal may make to economic welfare through consideration of the resultant transport costs and benefits." It also includes an assessment of value for money, comparing the costs of the scheme with the monetised benefits.

This section describes the key issues in the calculation of the transport economic benefits and then provides the outcomes themselves.

7.5.2 *Methodology*

The methodology adopted follows the guidance given in STAG sections 8.2 to 8.6. It makes use of the standard HM Government guidance contained in WebTAG section 3.5.6, and of the Department for Transport (DfT) software TUBA (Transport User Benefits Appraisal), which was developed by the DfT for undertaking economic appraisals for transport schemes. The assessment period is the standard 60-years.

The spreadsheet model was used to provide cost and patronage figures, for the rail mode only, for input into TUBA. The model represents the AM peak (0800 – 0900 hours), for two future year scenarios (2017 and 2022). There is no assessment of the benefits or disbenefits to bus passengers and car drivers, as the spreadsheet model is not able to represent the change in travel times due to the downstream decongestion effects of transferring trips previously undertaken by car onto rail.

The capital, maintenance, renewal and operating costs used were as described in Chapters Five and Six. In the absence of any land referencing, an assumption for land costs of £5 million was made. Preparation and supervision costs were calculated using standard percentages of the capital cost (12% and 5% respectively).

The outputs were calculated by comparing the forecast outcome with each scheme in place (the Do Something) with the forecast outcome without the scheme (the Do Minimum). The transport benefits and disbenefits identified are therefore only due to the effects of the scheme implementation.

7.5.3 *Outputs*

Table 7.7 presents a summary of the transport economic benefits, and Table 7.8 presents a summary of the Cost to Government. It should be noted that the 'Grant/Subsidy' section has been used to balance the difference between the revenues and the operating costs.

Table 7.7 – Transport Economic Benefits for the Core Scenario (£000's, 2002 values and prices)

Sub-Objective		Core Scenario
Transport Users	Travel time	4,225
	User Charges	0
	Vehicle Operating Costs	0
Private Sector Operator Impacts	Investment Costs	0
	Operating & Maintenance Costs	-23,757
	Revenues	11,218
	Grant/Subsidy payments	12,539

Table 7.8 – Cost to Government for the Core Scenario (£000's, 2002 values and prices)

Item	Core Scenario
Public sector investment costs	-49,587
Public sector operating and maintenance costs	0
Grant/subsidy payments	-12,539
Revenues	0
Taxation impacts	0

The cost of operating the extended rail services falls upon the private sector, in the form of the franchisee. The revenues and the grant/subsidy balance this cost, resulting in the only net benefit coming from the time benefit experienced by rail passengers. This is calculated as £4.225million over 60 years.

The present value of cost (PVC) of construction is calculated as £49.587million over the assessment period.

There is a need for a level of subsidy, as Operating and Maintenance Costs exceed the Revenue collected.

Table 7.9 presents the monetised summary, comparing the benefits and the costs.

Table 7.9 – Cost to Public Sector (£000's, 2002 values and prices)

Item	Core Scenario
Present Value of Benefits (PVB)	4,225
Present Value of Costs (PVC)	-62,126
Net Present Value (NPV)	-57,901
Benefit to Cost Ratio (BCR)*	0.07

*note: this is a ratio.

The Cost to Public Sector compares the benefits that have been expressed in money terms with the costs of constructing, operating and maintaining the scheme over the assessment period (60 years). The above figures demonstrate that the scheme benefit to cost ratio is 0.07, i.e. the costs of the scheme far outweigh the benefits. However, it should be remembered that not all benefits are monetised. Decongestion benefits for road users, and resulting accident benefits and vehicle operating cost benefits, are not included. Similarly, the effect of slightly reduced traffic congestion on buses is not included. All these items are likely to be positive in nature, but minor in scale, and would be extremely unlikely to make the overall assessment of the scheme positive.

The TUBA analysis of the change in rail revenue shows that in 2012, the Do Something scenario produces £305,000 more than the Do Minimum. This is expressed in 2002 prices and values. This equates to £394,000 in 2008 prices and values, which compares with per annum costs of £1,254,000 in the same price and cost base. This is made up of £704,000 Operational costs, £200,000 Maintenance costs and £350,000 Renewal costs.

Taking a definition of 'break-even' to be that farebox increases match the year-on-year burden of the scheme on the public purse, the forecast patronage would have to at least treble for the scheme to be viable. This makes the following, optimistic, assumptions:

- 'Break-even' does not include any element to cover the initial capital costs; and
- There is no abstraction from bus.

7.6 Appraisal

This Section will provide a high-level consideration of the performance of the rail extension against each of the Government's five objectives for transport: economy, safety, integration, environment and accessibility and social inclusion.

7.6.1 Economy

The Economy objective encompasses an assessment examining how the proposal will affect traffic volumes, journey times, and the reliability of travel times. It also considers how levels of economic activity would be affected by the proposal.

The link between transport investment and economic performance has been widely debated, and depends heavily upon local circumstances. Whilst there is a theoretical basis for assuming that transport improvements will lead to improved economic competitiveness, observed evidence is less clear. At best, it appears that transport investment is one of a number of issues affecting economic performance, but is by no means the most important or critical factor. At worst, there is a risk that improved transport infrastructure may open up the local economy to more competition, and thus cause a net disbenefit to the local economy.

Overall it is considered that the rail extension from Larkhall to Stonehouse may help to support local economic development opportunities through a contribution of managed congestion

brought about by increased accessibility, and improved journey times along the local road network.

Whilst many of the proposed and committed developments within the study area are already planned to proceed, there may be some development areas where the full development potential or realisation, as well as the timing and scale of development, could be influenced by the implementation of the rail extension. These development areas are considered within Chapter Two and include:

- Clyde Gateway Urban Renewal Area;
- Lanarkshire Regeneration Outcome Agreement Area;
- Larkhall / Ferniegair Community Growth Area;
- M74 Extension;
- Larkhall South / Canderside Strategic Industrial and Business Location;
- Stonehouse Bypass; and
- Stonehouse Residential Development Areas.

As outlined within Chapter Two, several areas within Larkhall in particular fall within the 10% most deprived in Scotland when considered within the context of the SIMD. Furthermore, in terms of car ownership, fewer households have no car or van in Stonehouse when compared to South Lanarkshire and Scotland (26.0% compared to 32.4% and 34.2% respectively), however within Larkhall 33.8% of households have no car or can.

It is anticipated that those areas which are deprived or within which levels of car ownership are low will seek to benefit from the transport improvements brought about by the rail extension, primarily by virtue of increased accessibility and greater job and labour market opportunities being created in the wider study area.

7.6.2 *Safety*

The Safety objective considers how the proposal will enhance safety for different types of transport users.

It is considered that by removing car trips from the road network, the rail extension would have a positive impact on accidents. In addition, rail travel is generally considered to incur fewer accidents than travel by private car.

The popular perception about travelling by public transport is that specific groups in society are at greater risk than others, for example, women are at greater risk of sexual attack and the elderly more likely to be targeted by muggers. This perception results in lower proportions of these user groups travelling by public transport, as they feel at greater risk and more susceptible to attack. Rail stations require to incorporate good design to mitigate feelings of insecurity.

Stations should be constructed to take account of passenger safety and security, with lighting, closed circuit television (CCTV) and open areas, where waiting passengers are easily visible. Cycle parking facilities should be located where there is, as far as possible, plenty of human activity to avoid feelings of isolation; and, for cyclists, to minimise the risk of cycle theft.

Provision of an attractive waiting facility is part of a package approach towards making public transport welcoming to the individual. It is recommended that the new Stonehouse station is staffed. However, there can be no single technical solution to the problems of ensuring complete passenger safety. CCTV is perceived by many as ‘reactive’ (that is, it may help convict an attacker but is not a great deal of help to the victim). An interchange with prominently located signs, citing the presence of discreetly positioned cameras, may however have a stronger deterrent effect. These measures are included within the concept design for the new station. Panic buttons and PA links/help lines are possibly more reassuring for a passenger waiting alone at a train station early in the morning or late at night.

It is important to undertake extensive consultation, through a combination of social research and discussion with consumer bodies, about questions of safety and security.

In summary, the personal security concerns of many individuals when using public transport can be dealt with in the provision of mitigating facilities designed into the station development.

For example, new stations fitted with high quality lighting and CCTV. In addition it is possible to provide emergency help telephones if necessary. Similarly, on board the rail services it is possible to design a safe and secure environment. Thus it is fair to assume that the Larkhall – Stonehouse rail extension will provide a degree of improved security for potential patrons and system employees, meeting the security objective.

7.6.3 *Integration*

The Integration objective considers how the proposal will promote or enhance transport integration and whether services will be able to function in a more complementary manner. The Integration objective considers whether the scheme fits with other modes of transport, land uses and policies. The appraisal also considers how the proposal fits with wider Government policy including national transport targets.

Published in June 2004, the Transport White Paper, "Scotland's Transport Future", is the framework within which the Government aims to develop a transport system which satisfies the overall aim to:

"…promote economic growth, social inclusion, health and protection of our environment through a safe, integrated, effective and efficient transport system."

The Government's transport policies seek to achieve *"improved integration by making journey planning and ticketing easier and working to ensure smooth connection between different forms of transport."*

The National Transport Strategy (NTS) (Scottish Executive, December 2006) further develops the Scottish Executive's aims and objectives for transport, as set out within the White Paper. The NTS sets out three strategic outcomes, including:

"Improve journey times and connections, to tackle congestion and the lack of integration and connections in transport which impact on our high level objectives for economic growth, social inclusion, integration and safety".

Environment integration is considered in Section 7.5.4 and integration with social inclusion is dealt with in Section 7.5.5. Issues relating to transport, land-use and policy integration will be reviewed in this Section.

Transport Integration

An integrated transport system must operate as a true network across all modes in order that passengers can move easily from one service to another in a comfortable environment. Integrated transport can, thus, reduce the need to travel, tackle congestion and pollution and support a strong economy, a sustainable environment and a healthy and inclusive society.

Important elements which should be considered when planning integrated transport facilities include through-ticketing / joint ticketing arrangements; enhanced connections and co-ordination of services; clear, accessible and wider availability of information; improved waiting facilities; appropriate location and accessibility for the elderly and mobility impaired.

The attractiveness of the rail network in the study area can be enhanced with the implementation Larkhall – Stonehouse scheme by:

- The existence and quality of infrastructure facilities at Stonehouse station, such as seating and covered waiting areas;
- Maximising bus interchange with rail at Stonehouse station. In addition, there will be opportunities for the provision of cycle racks at Stonehouse station;
- Maximising public transport interchange with car (Park and Ride) at Stonehouse station; and
- Potential for real-time passenger information at Stonehouse station.

For an integrated public transport system to be fully exploited by the public, it must provide a truly "seamless" journey in which passengers can have sufficient confidence to use it as an alternative to the private car. Interchange facilities therefore form a key component of transport integration. The Larkhall – Stonehouse rail extension would offer interchange with bus, rail and Park and Ride.

The provision of an additional station at Stonehouse will provide connections to key locations in the corridor, such as Stonehouse town centre and existing and proposed residential developments.

The new station location at Stonehouse would incorporate a bus turning and drop-off facility which would allow interchange between bus and rail.

The new station at Stonehouse will enhance the integration of journeys via car and public transport through the incorporation of a Park and Ride site at the station. This will therefore offer an attractive alternative route into locations such as Hamilton and Glasgow.

It is estimated that all users of the Larkhall – Stonehouse rail service will benefit, to varying degrees, from the various aspects of transport integration improvements identified above, when compared to the existing level of service. The overall impact of the Larkhall – Stonehouse rail service on transport integration is expected to lead to an improvement in the accessibility of the public transport network.

Land Use Integration

Recent developments in UK and Scottish Government policy have provided a clear framework for the integration of land use and transport planning with a general requirement to promote sustainability and reduce the need to travel to relevant existing or future developments.

The land-use transport integration sub-objective should consider whether:

- Any land required for the proposal is preserved for uses which are incompatible with transport (for example, protected or conservation areas);
- The proposal fits with the general policies of all authorities at all levels concerning transport and land use; and
- The proposal conflicts with any other existing or planned development.

Thus, there is a requirement for the identification of the land use policies or proposals conflicting with statutory planning documents at local, regional and national levels.

Specifically at the national level, Scottish Planning Policy sets out the policies on land use and sustainable transport. National policies supported include:

- Scottish Planning Policy (SPP) 17: Planning For Transport (Scottish Executive, August 2005) SPP17 sets out Government policy on the integration of land use and transport planning, and indicates *that "for the transport network to most effectively support the economy, land use planning should assist in reducing the need to travel; in creating the right conditions for greater use of sustainable transport modes; and in avoiding or mitigating adverse environmental impacts."* The policy is underpinned by the following principles:

  - Locate and support development in places well served by public transport and restrict associated car parking, so that access to significant travel-generating developments by non-car modes improves significantly;
  - Need to prioritise accessibility within the integrated transport system by sustainable modes of travel; and
  - Manage traffic demand effectively and support the provision of high quality public transport services on the road network.

The regional policies supported include:

- The aims of the RTS in relation to economic growth, promoting social inclusion, improving quality and accessibility and tackling affordability;
- The aims of the NTS in relation to providing access for all and supporting land use planning strategies, regeneration and development by integrating transport provision; and
- The aims of Scotland's Railways in relation to quality, accessibility and affordability.

Further planning objectives have been described in Chapter Three, including those in the Glasgow and Clyde Valley Joint Structure Plan, South Lanarkshire Local Plan, and South Lanarkshire Local Transport Strategy.

It can be summarised that the improvements in public transport brought about by the Larkhall – Stonehouse rail extension are expected to meet or support most local, regional and national policy objectives, in particular those related to sustainable travel (with increased use of public transport and reduced dependence on the car), regeneration and improving access, particularly for those dependent on public transport.

Policy Integration

The White Paper, Scotland's Transport Future, quotes economic growth, social inclusion, health and protection of the environment through a safe, integrated, effective and efficient transport system as key areas for consideration when planning transport. The White Paper recognises that transport decisions have wide impacts upon communities.

Building on these key objectives, the NTS identifies three key strategic outcomes in order to achieve the vision and objectives set out within Scotland's Transport Future: improve journey times and connections; reduce emissions and improve quality and accessibility and tackle affordability.

The Policy Integration criterion examines whether the proposed scheme contributes to, and is consistent with, other Government policies and legislation beyond transport. It is considered that the Larkhall – Stonehouse rail extension can contribute to the following wider Government policies:

- Disability – The design of Stonehouse station, fully DDA compliant, will provide easy access to wheel chairs and push chairs, thus facilitating access not only for the mobility impaired but also the elderly and those with young children;
- Health – The expected modal shift from car to public transport for journeys by local residents, particularly in the vicinity of the new station, and others travelling to local employment and recreational facilities will provide greater opportunities for increased walking and cycling trips to reach the new rail station. In addition, the use of rail (as opposed to cars) will reduce the adverse environmental impacts of traffic, particularly harmful local emissions, with an overall positive effect on health;
- Rural affairs – The scheme reaches relatively rural areas and therefore would go some way to contributing to improved rural affairs and retaining rural communities.
- Social exclusion – The scheme fits in with policies to promote social inclusion, by enabling the socially deprived (particularly those with no access to a car) access to the public transport network.

It can therefore be said that the scheme is consistent with national policies beyond transport.

The local and regional planning policy context is set within national guidance and particularly reflects priorities for sustainability and integration. The Glasgow and Clyde Valley Joint Structure Plan sets out a common strategy for the long-term planning and development of Glasgow and the Clyde Valley. A key element is that adequate transport provision is essential to enable any additional development in the area and public transport is seen as paramount to improve access to and between work, home, leisure and shops.

The extension of the Larkhall rail service to Stonehouse will provide additional rail transport in a currently un-served corridor. It is thus likely to have a positive impact on converting car users to public transport passengers utilising an efficient transport mode. The rail extension will also improve accessibility and social inclusion, particularly in relation to the less advantaged and regenerated communities in Larkhall and Stonehouse.

7.6.4 *Environment*

Environment comprises elements of the natural and built environment as well as people. In the following sections, a high-level review of the impacts of the proposed Larkhall – Stonehouse rail extension is provided. It should be noted that should the study be progressed to a review under the Scottish Transport Appraisal Guidelines (STAG), a more detailed environmental assessment will be required.

- Noise and Vibration

Exposure to high levels of noise and vibration can have an adverse impact on both human health and on the perceived quality of life. Levels of noise and vibration would occur both during construction of the rail extension, and during operation.

Nuisance from construction noise can be minimised in the form of reduction at source, control of noise spread and in areas of very high noise levels, insulation at receptors. A code of construction practice or environmental management plan would include provisions at locations where noise is likely to be a problem. In general, good public relations and extensive consultation with local authorities would be necessary to help to minimise the impact of construction work.

Operational noise will depend on a number of factors, for example the location of sensitive receptors, the number of train movements and operating times, the type of trains and their operational characteristics (including speeds), local topography and effectiveness of mitigation. Indicative timetabling suggests that the Larkhall – Stonehouse rail extension would be used by two trains per hour. As such, average noise levels would increase, due to the construction and operation of new infrastructure on land not currently used by rail. Train horn noise could increase but this will be very much dependent on the operational and enforcement practices of the relevant Train Operating Company.

Vibration impacts would be an issue where infrastructure lies in close proximity to buildings.

Mitigation measures would be required to reduce the impact on temporary and permanent noise and vibration. This may include, where appropriate, the use of acoustic noise barriers; installation of vibration isolation measures; and noise insulation for receptors that may experience a major negative impact as a result of ongoing noise.

- Air Quality

The principal impacts of transport schemes on air quality result from the extent to which they affect road traffic, either increasing or decreasing traffic levels. Transport schemes, through physical development and initiatives to promote and improve public transport, can influence the volume of road traffic and hence impact on air quality. Improvements to public transport, such as the introduction of additional rail services, can encourage modal shift by reducing private car use and attracting people onto public transport.

There may be some localised short-term negative effects associated with the construction of the Larkhall – Stonehouse rail infrastructure, however overall these are likely to be minor in nature.

During operation, it is considered that the rail extension, through the promotion of modal shift, would lead to a reduction in traffic levels and consequently a reduction in the emission of pollutants.

All potential dust-generating activities and locations should be identified prior to commencement of work, and controlled at source by the use of appropriate plant handling techniques, good maintenance and housekeeping. The use of vegetation screens or barriers can assist in mitigating these impacts.

- Water Quality, Drainage and Flood Defence

Consideration of water quality, drainage and flood defence would require to be undertaken should the rail extension be taken forward for further consideration. The overall temporary and permanent effects of the scheme could be effectively mitigated by adherence to legislation and

the adoption of best practice such as Sustainable Urban Drainage Systems (SUDS) and Scottish Environmental Protection Agency (SEPA) Planning Policy Guidelines (PPGs) such that impacts are neutral.

- Geology, Contaminated Land and Groundwater

The rail extension could impact on geology in a number of ways including:

- Through damage to geologically valuable sites;
- Overloading of geological strata;
- Reductions in groundwater quality;
- Changes to groundwater flow; and
- Damage to important mineral reserves that could be worked in the future.

Further work would be required to establish the extent of these impacts.

During construction of the Larkhall - Stonehouse infrastructure there will be the requirement to dispose of material from within the route as required by the detailed design. It is possible that some of this waste material would come from areas that are potentially contaminated.

In general, waste material is likely to comprise Inert and Non-Hazardous waste, although there is the possibility of encountering material that could be classed as Hazardous Waste, for example drums of chemicals or paint, etc. Appropriate handling and disposal of this waste would be required. Measures would require to be put in place to ensure that as much of the excavated material as possible generated through construction is re-used on other areas of the development.

Mitigation of temporary (construction) impacts focus on ensuring effective environmental management of construction activities. This should include, for example, that runoff from construction areas will be contained/controlled and that adequate bunding and storage arrangements be put in place to prevent spills of fuel or other liquids escaping and potentially entering groundwater supplies.

- Biodiversity

The construction of the rail extension is likely to require the removal of trees, shrubs and hedges, due to the infrastructure works being undertaken on land not currently used by rail. This will have a negative impact on biodiversity. Hedges in particular offer good nesting habitat for a variety of breeding birds. The removal of trees can potentially impact breeding birds, and may potentially impact roosting bats.

Disturbance, killing and injury are the greatest potential impacts to wildlife associated with the rail extension. These may occur through clearance of vegetation, demolition and the use of plant, destruction of foraging and/or sheltering habitat, trapping and/or poisoning of animals by materials left on site and disturbance and disruption to successful breeding.

Detailed mitigation proposals would require to be worked up prior to the construction of the rail extension. This would involve the contractor being required to work under a strict code of practice. This would incorporate wildlife and habitat protection best practice including: requirements to erect hoardings to restrict the working area, standards of dust control to protect adjacent habitats, and suitable precautions to prevent entry of pollutants into any bodies of water. Protected species surveys would also be required prior to work commencing.

Mitigation in the form of replacement planting could include woodland, scrub, amenity planting and areas for habitat creation. With respect to protected specifies, such as badgers, discussions would require to be held with Scottish Natural Heritage (SNH) to identify appropriate measures to protect these animals.

- Visual Amenity

Transport schemes can have a significant impact on town/landscape character. In turn, this can result in negative impacts on visual amenity where receptors' views are affected by the introduction of new infrastructure. Intrusive development associated with transport schemes

can affect the quality of an existing panorama; however, conversely, proposals that result in the reduction of traffic levels could have a positive impact on visual amenity.

The visual impact assessment determines the degree of anticipated change to visual amenity, considering buildings, areas of public open space, roads and footpaths that would occur as a result of the proposed scheme. The buildings, open spaces, roads and footpaths that would yield views of the proposed scheme options are collectively referred to as 'receptors'.

In summary, the principal scheme elements will comprise: OLE, portals, the train vehicles themselves, and the construction of major new structures and buildings. Due to their vertical dimension and bulk, the new structures, surmounted by OLE and portals, will be likely to have the most significant impact on the landscape and visual amenity. Due to their elevated levels the viaduct structures will have the most significant visual impact, which for the most part cannot be screened or hidden.

During construction of new rail infrastructure, fencing around the perimeter of construction sites could reduce the negative impacts on visual amenity by preventing views into working areas, particularly for those sections of the rail extension which are located adjacent to residential properties.

- Agriculture and Soils

Detailed surveys would be required to determine the loss or severance of agricultural land and the potential for soil contamination, including the identification of existing contaminated land areas. Due to the rural nature of the study area, it is anticipated that there may be some impact on agricultural land and soils during construction and operation of the rail extension.

During construction any materials encountered that may be contaminated would require to be tested for potential chemical contaminants associated with known past uses of the site. In addition, all standard health and safely measures would require to be followed to ensure the minimum contact between site workers and members of the pubic and potential contaminants. Areas of significant contamination that may impact on construction materials or introduce increased environmental risk would require to be removed, treated or isolated to avoid contact with any sensitive materials and receptors.

Mitigation in terms of contaminated land would prevent and/or contain spills so that land associated with the rail extension is not contaminated by operational activities. Design of infrastructure would require to take into account potentially contaminated land so that structures would be protected from aggressive ground conditions and/or gas protection measures put in place to prevent ingress/migration of landfill gas if present. Monitoring and or venting of gas may be required.

- Cultural Heritage

Cultural heritage encompasses elements of the built environment such as historic buildings and monuments and known/unknown archaeology. Transport schemes can result in direct and indirect impacts on cultural heritage interests including physical impacts to buildings or archaeological sites or impacts on the setting of historic buildings or monuments.

The key considerations with respect to the rail extension are:

- Potential increase/decrease in traffic flows

The noise and vibration generated by vehicles can cause physical damage to historic buildings and monuments.

- Impacts on setting

Historic buildings and monuments as well as conservation areas are vulnerable to improper development. Modern developments can impact on their wider setting and affect the historical context and value of a building or area.

- Potential loss of unknown archaeology

Physical developments may result in the loss of previously unrecorded archaeological interests. Buried items may be damaged or lost as a result of construction activities associated with the development infrastructure.

In the course of developing the proposals for the Larkhall – Stonehouse rail extension, the quality of the built heritage of the line will have to be assessed in liaison with Historic Scotland to ensure the works are undertaken in a manner which is sensitive to the quality of the heritage asset. An archaeological survey may be required to determine the potential presence of unknown archaeology.

The new Stonehouse rail station would require to be designed such that it integrates with the existing heritage character.

- Landscape

Transport related developments can, as a result of the physical infrastructure associated with them, have a major impact on landscape. Impacts such as the removal of boundaries or vegetation or the introduction of foreign materials can affect specific components of the landscape which are fundamental to landscape or townscape character.

The main considerations are:

- The extent to which existing landscape components and features would be lost or modified by the proposals (such as lost woodland or modified landform);
- The existence of the proposed form of development within the landscape and its current role as a determinant of existing character; and
- The extent to which new or additional development of the type proposed would alter the balance and hence perception of the landscape character of the area under development.

Impacts can be detrimental where features or key characteristics such as established planting, old buildings or structures have to be removed. Alternatively it can prove beneficial where derelict buildings or poorly maintained landscape features are repaired, replaced and maintained or there is the introduction of new tree planting and a landscape structure where none currently exists.

It is considered that the construction impacts will be short-term. The permanent impacts of the rail extension are likely to be negative due to the construction of the new Stonehouse station and construction on land not currently used for rail.

Mitigation measures, typically planting or landform, could minimise potentially detrimental impacts or improve the landscape composition of the areas affected by the rail infrastructure.

During construction of new rail infrastructure, fencing around the perimeter of construction sites can reduce the negative impacts on landscape.

In the long-term, soft landscaping such as planting of trees, bushes and long grasses could be used to reduce the visual prominence of new rail infrastructure. However, as indicated previously, the opportunities for soft landscaping along the viaduct structures may be limited.

7.6.5 *Accessibility and Social Inclusion*

Accessibility defines the ability of people and businesses to access goods, services, people and opportunities.

It is considered that the study area is relatively well served by local bus services, as outlined within Chapter Two. There are approximately three buses per hour between Larkhall and Stonehouse, with an average journey time of 11 minutes. The onward journey to Glasgow City Centre takes an additional 30 minutes by rail or approximately 45 minutes by bus.

It is considered that the rail extension between Larkhall and Stonehouse, alongside the new station at Stonehouse, will improve public transport network coverage. The new station at Stonehouse will improve accessibility to destinations on the Larkhall rail line including Merryton, Chatelherault, Hamilton, Blantyre, Rutherglen, Glasgow, Partick, Hyndland and Dalmuir. It will support the existing community of Stonehouse, as well as the proposed housing expansion detailed within the South Lanarkshire Local Plan, including sites at New Street, New Street Kirk

Street, Stonehouse Hospital, St Ninians Place, East Mains, Spittal Road and Loch Park Industrial Estate.

It is considered that the extension of the Larkhall rail line to Stonehouse may promote further non-motorised trips to access local services through the provision of improved rail service provision and increased interchange opportunities at Stonehouse.

Chapter Two involved a high-level review of social exclusion and concluded that several areas within both Larkhall and Stonehouse suffer particular problems. The change in accessibility experienced by residents in these areas provides a good proxy for the social inclusion benefits of the rail extension scheme. The SIMD 2004 indicates that four zones in Larkhall are amongst the 10% most deprived in Scotland.

Improved accessibility to both employment opportunities and services will assist in addressing issues of social exclusion and deprivation. The provision of enhanced rail links between Stonehouse and key destinations such as Hamilton and Glasgow will assist in achieving this.

7.7 Summary

This Chapter has provided an overview of the transport modelling element of the study and has concluded that in 2012 the core Do Something scenario predicts an annual use of Stonehouse station of approximately 113,000 trips. This increases to approximately 143,000 trips in 2022. However, it is important to identify the source of these trips. Larkhall experiences a reduction in use, from 225,000 to 166,000 in 2012 and from 319,000 to 260,000 in 2022, as trips that previously used Larkhall now have direct access to Stonehouse rail station.

Results of the transport economic benefits appraisal have been set out within this Chapter. This appraisal indicates that the scheme benefit to cost ratio is 0.07, i.e. the costs of the scheme far outweigh the benefits.

This Chapter has also provided high-level consideration of the performance of the rail extension against each of the Government's five objectives for transport: Economy, Safety, Integration, Environment and Accessibility and Social Inclusion. It has concluded that the rail extension would likely have a positive impact in terms of each of the objectives, with the exception of Environment. However, it is considered that the implementation of appropriate mitigation measures would negate the environmental impacts of the rail extension during both construction and operation.

8 Conclusions and Recommendations

8.1 Conclusions and Recommendations

This report has set out the necessary railway engineering, railway operations, transport modelling and appraisal work undertaken to determine the feasibility of extending the Hamilton to Larkhall Railway Line to a new station in Stonehouse. This Chapter sets out the key conclusions and recommendations of the study, together with the anticipated way forward.

8.2 Planning Policy Context

Consideration has been given to the relevant national, regional and local planning policy context pertaining to the study area. National transport objectives, outlined in the Scottish Executive's 2004 White Paper, are centred on economic growth; social inclusion; environment; safety; and integration and regional and local planning policy expectations are to deliver these objectives.

8.3 Background to Study Area

A review has been undertaken of the socio-economic, economic development, transport, environmental and safety issues pertaining to the study area. This has indicated that in socio-economic terms South Lanarkshire is performing well within the context of Scotland and the indications are that this trend will continue. Larkhall is identified in the Local Plan for new housing and business development and Stonehouse has also been identified for housing development. This is likely to impact on the transport network in these areas.

Within the study area there are particular zones where levels of deprivation are amongst the highest in Scotland.

There are no AQMAs in the study area. There are several Listed Buildings within the study area though only the Larkhall Viaduct (Category B) infringes with the proposed rail extension route. The Avondale SSSI / Clyde Valley Woodland SAC is located close to the proposed rail extension between Larkhall and Stonehouse and would need to be considered carefully should the scheme proceed.

In terms of safety, South Lanarkshire is generally surpassing its targets for road safety and the new Larkhall station has modern safety features albeit it is unmanned.

8.4 Milngavie – Larkhall Rail Line

Consideration has been given to the success of the Milngavie – Larkhall rail line which makes provision for rail traffic between Larkhall and Dalmuir and a new service from Queen Street to Anniesland via Maryhill. Funding for the Milngavie – Larkhall scheme was obtained from the Scottish Executive and SPT, with support from South Lanarkshire Council, and the scheme has allowed for timetable increases to services as well as new services. The new rail link has increased capacity and service coverage on the Greater Glasgow rail network resulting in a reported increase of 343,000[22] passengers travelling to / from Larkhall, Merryton and Chatelherault in the first year of operation. This figure was 53% more than the projected 220,000 passengers. SPT indicated that the re-opening of the Larkhall branch line is making a significant contribution to the economic regeneration of Lanarkshire and this progress looks set to continue[23].

[22] Source First ScotRail Lennon data, supplied 04/03/2008

[23] Source First ScotRail, Press Releases, http://www.firstgroup.com/scotrail accessed 09/10/2007

8.5 Railway Engineering

Consideration has been given to the Railway Engineering factors pertaining to the proposed extension of the rail line from Larkhall to Stonehouse. This has included details of the proposed route alignment, a review of each structure on the proposed route, the requirement of railway systems, the general civil engineering work involved on the project and an overall indicative cost estimate.

In terms of Larkhall Railway Station, the Railway Engineering work recommends that re-construction of approximately half of Larkhall Railway Station would be required to follow a curved alignment to allow the proposed track extension to pass under McNeil Street.

A proposed location for the new Stonehouse Railway Station has been identified just to the west of Lawrie Street on the north side of the A71. It is proposed that the new station would be constructed on an embankment approximately 5m above the existing road level at Lawrie Street. Rail Operations modelling has indicated that only one platform is required at Stonehouse, based on current timetabling, however the proposed new station allows the flexibility for a second platform in the future should it be required.

Two new car parks, both with 50 spaces, are proposed at the new Stonehouse Rail Station, albeit the capacity of both car parks could be increased or decreased if necessary. It is also proposed that a bus stop would be incorporated into the station design to allow public transport interchange.

Indicative costs indicate that the Railway Engineering works would incur a total estimated cost of **£51,151,000 (2008 prices)**. This cost includes for Optimism Bias at 44%. In addition, the cost estimate does not include for utility diversions nor land purchase. In addition, this cost does not include for railway operational costs (see below).

8.6 Railway Operations

The proposed rail extension has been considered in railway operational terms. This has involved consideration of sectional running times and the impact of extending trains to the proposed new station site at Stonehouse, given the current timetable. Consultation has been undertaken with First ScotRail to ascertain their view on the proposed rail extension, as well as the implications for driver schedules and stock schedules. Consideration has also been given to the likely performance risks and mitigation measures that may be required to satisfy Network Rail and other stakeholders.

The Rail Operations analysis has concluded that if the existing timetable structure is to be maintained, northbound and southbound trains will need to pass somewhere between Larkhall and Stonehouse. Two solutions have been examined: a dynamic loop and a single line. These two options are summarised below in Table 8.1.

Table 8.1: Summary of Results for Two Options

	Option 1	Option 2
Infrastructure	Dynamic Loop	Single Line
Signals Required	6	2
Stock Required (units)	1	1
Journey Time (minutes): Stonehouse to Glasgow Central	35½	38
Turnaround time at Stonehouse (minutes)	26	19

It is considered that both Options are operationally feasible, subject to more detail design and analysis. However, before the scheme would be accepted by industry stakeholders, full operational assessment using RailSys would be required.

Both options could in principle be operated by one additional single three-car unit. Additional crew would be required, since effectively one extra train is operating on the network at any time.

Indicative rail operational costs have been prepared assuming one additional single three-car unit, operating a 16-hour day, 363 days per year. The costs assume one driver and one ticket checker would be employed on the additional unit at any one time. The costs also allow for:

- Leasing and operation of the single three-car unit;

- Crew;
- Capacity charge;
- Overhead, applying a 9% uplift (based on best practice); and
- Profit, applying a 6% uplift (based on best practice).

The indicative operational costs are **£704,000 per annum** for the Larkhall – Stonehouse extension.

The extended turnaround times at Stonehouse mean that the impact of potentially extending further to Strathaven is likely to be small in terms of operating costs. The infrastructure and run times for a further extension to Strathaven have not been examined as part of this commission. However, it is expected that the indicative operational costs associated with extending the service from Larkhall to Strathaven would be **£770,000 per annum**.

8.7 Transport Modelling

The proposed railway extension has been considered in terms of patronage demand and transport economic efficiency.

A bespoke spreadsheet model was developed for the AM peak hour (0800 – 0900 hours). It was developed for a base year of 2005, and forecasts produced for 2012 and 2022.

The model produced forecast demand by comparing the 2005 demand (taken from TMfS) and future year levels of development, along with the forecast levels of car ownership. It also took into account the phenomena of a transport intervention increasing the amount of trip making ('induced' trips). Travel costs (both monetary and time) were then compared for car, bus, rail and rail-based Park and Ride modes, and the demand split between them.

Table 8.2, below, presents the forecast demand for extending the rail line from Larkhall to Stonehouse.

Table 8.2 – Core Scenario (per annum, 000's of trips)

Zone	2005 Base	2012 Do Minimum	2012 Do Something	2022 Do Minimum	2022 Do Something
Larkhall Station	277	225	166	319	260
Stonehouse Station	-	-	113	-	143
Total	**277**	**225**	**279**	**319**	**403**

The 2012 Do Minimum shows a drop in the number of trips using Larkhall station from 2005. This is due to two factors: a drop in the planning data (population) and an increase in car ownership rates. In 2012 the core Do Something scenario predicts an annual use of Stonehouse station of approximately 113,000 trips. This increases to approximately 143,000 trips in 2022. However, it is important to identify the source of these trips. Larkhall experiences a reduction in use, from 225,000 to 166,000 in 2012 and from 319,000 to 260,000 in 2022, as trips that previously used Larkhall now have direct access to Stonehouse rail station. This source of the trips using Stonehouse station are shown in Table 8.3.

Table 8.3 – Previous Mode of Trips Using Stonehouse Station

Mode	2012	2022
Rail (Larkhall Station)	**43%**	**32%**
Car	**36%**	**47%**
Bus	**21%**	**21%**

A series of sensitivity tests were undertaken to test the impact of different factors on the forecast level of demand at Larkhall rail station and the proposed Stonehouse rail station. The sensitivity tests were developed in discussion with South Lanarkshire Council:

- Increased Fuel costs – cost of car fuel increased by 50%;
- Increased Bus fare – cost of bus fares increased by 25%;

- Distance based congestion charging – a charge of 10p per kilometre imposed on cars; and
- Planning data variant – additional 700 households in Stonehouse zone.

All four sensitivity tests resulted in more passengers using the rail stations at Larkhall and Stonehouse, compared to the base scenarios. The sensitivity test modelling distance-based congestion charging demonstrated the largest increases in rail patronage of all sensitivity tests. The planning data variant sensitivity test, where an increase of 700 households in Stonehouse was modelled, revealed minor increases in rail patronage.

An assessment of transport economic benefits has been undertaken, and the results are summarised within Tables 8.4 and 8.5, below.

Table 8.4 – Transport Economic Benefits for the Core Scenario (£000's, 2002 values and prices)

Sub-Objective		Core Scenario
Transport Users	Travel time	4,225
	User Charges	0
	Vehicle Operating Costs	0
Private Sector Operator Impacts	Investment Costs	0
	Operating & Maintenance Costs	-23,757
	Revenues	11,218
	Grant/Subsidy payments	12,539

Table 8.5 – Cost to Government for the Core Scenario (£000's, 2002 values and prices)

Item	Core Scenario
Public sector investment costs	-49,587
Public sector operating and maintenance costs	0
Grant/subsidy payments	-12,539
Revenues	0
Taxation impacts	0

The cost of operating the extended rail services falls upon the private sector, in the form of the franchisee. The revenues and the grant/subsidy balance this cost, resulting in the only net benefit coming from the time benefit experienced by rail passengers. This is calculated as £4.225million over 60 years.

The present value of cost (PVC) of construction is calculated as £49.587million over the assessment period (2002 prices and values).

Table 8.6 presents the monetised summary, comparing the benefits and the costs.

Table 8.6 – Cost to Public Sector (£000's, 2002 values and prices)

Item	Core Scenario
Present Value of Benefits (PVB)	4,225
Present Value of Costs (PVC)	-62,126
Net Present Value (NPV)	-57,901
Benefit to Cost Ratio (BCR)*	0.07

*note: this is a ratio.

The above figures demonstrate that the scheme benefit to cost ratio is 0.07, i.e. the costs of the scheme far outweigh the benefits. However, it should be remembered that not all benefits are monetised. Decongestion benefits for road users, and resulting accident benefits and vehicle operating cost benefits, are not included. Similarly, the effect of slightly reduced traffic congestion on buses is not included. All these items are likely to be positive in nature, but minor in scale, and would be extremely unlikely to make the overall assessment of the scheme positive.

8.8 Transport Appraisal

High-level consideration has also been given to the performance of the rail extension against each of the Government's five objectives for transport: Economy, Safety, Integration, Environment, and Accessibility and Social Inclusion.

In terms of Safety, it is considered that by removing car trips from the road network, the rail extension would have a positive impact on accidents. In addition, rail travel is generally considered to incur fewer accidents than travel by private car. It is expected that safety considerations will be fully considered as part of the design process, including the new Stonehouse station.

In terms of Integration, the Larkhall – Stonehouse rail extension would offer interchange with bus, rail and Park and Ride. The new station location at Stonehouse would incorporate a bus turning and drop-off facility which would allow interchange between bus and rail. In addition, the new station at Stonehouse would enhance the integration of journeys via car and public transport through the incorporation of a Park and Ride site at the station. This will therefore offer an attractive alternative route into locations such as Hamilton and Glasgow.

The provision of an additional station at Stonehouse will provide connections to key locations in the corridor, such as Stonehouse town centre and existing and proposed residential developments.

Furthermore, the improvements in public transport brought about by the Larkhall – Stonehouse rail extension are expected to meet or support most local, regional and national policy objectives, in particular those related to sustainable travel (with increased use of public transport and reduced dependence on the car), regeneration and improving access, particularly for those dependent on public transport. The proposed rail extension is also expected to contribute to wider policies beyond transport, including disability, health, rural affairs and social exclusion, by promoting public transport.

The extension of the Larkhall rail service to Stonehouse will provide additional rail transport in a currently un-served corridor. It is thus likely to have a positive impact on converting car users to public transport passengers utilising an efficient transport mode. The rail extension will also improve accessibility and social inclusion, particularly in relation to the less advantaged and regenerated communities in Larkhall and Stonehouse.

Environment comprises elements of the natural and built environment as well as people. It is considered that environmental impacts would occur both during construction and operation of the proposed rail extension. However, it is expected that these impacts would be reduced through the implementation of effective mitigation measures. Particular attention will require to be paid to the potential impact on environmentally designated sites / listed buildings etc within the study area and it is recommended that further Environmental assessment would be required should the scheme be taken forward for further consideration.

In terms of Accessibility and Social Inclusion, it is considered that the new station at Stonehouse would improve public transport network coverage through improving accessibility to destinations on the Larkhall rail line including Merryton, Chatelherault, Hamilton, Blantyre, Rutherglen, Glasgow, Partick, Hyndland and Dalmuir. The rail extension would support the existing community of Stonehouse, as well as the proposed housing expansion detailed within the South Lanarkshire Local Plan, including sites at New Street, New Street Kirk Street, Stonehouse Hospital, St Ninians Place, East Mains, Spittal Road and Loch Park Industrial Estate.

It is considered that the extension of the Larkhall rail line to Stonehouse may promote further non-motorised trips to access local services through the provision of improved rail service provision and increased interchange opportunities at Stonehouse.

Improved accessibility to both employment opportunities and services will assist in addressing issues of social exclusion and deprivation. The provision of enhanced rail links between Stonehouse and key destinations such as Hamilton and Glasgow will assist in achieving this.

8.9 Way Forward

This report has set out the Railway Engineering, Railway Operations and Transport Modelling and Appraisal considerations pertaining to the feasibility of extending the Larkhall rail link to Stonehouse, and has concluded that in terms of initial consideration of Railway Engineering and Railway Operations the scheme would be feasible.

However, the 26-minute turnaround time at Stonehouse associated with the preferred Dynamic Loop option is not efficient in operational terms. Further discussions with key rail industry stakeholders would indicate if this time could be put to efficient use (for example, for crew rest breaks).

In economic efficiency terms, the scheme benefit to cost ratio is 0.07, i.e. the costs of the scheme far outweigh the benefits.

Should South Lanarkshire Council wish to consider this scheme further, the following would be required:

- Discussions with potential funding bodies, including Transport Scotland and SPT, to discuss capital and revenue implications;
- More detailed railway operational modelling to establish how the proposed rail extension would affect the overall performance of the rail network;
- More detailed technical and engineering design;
- Consultations with key rail industry stakeholders to discuss issues such as rail operations, performance, compliance with standards, track alignment, gradient, availability of rolling stock etc. Stakeholders would include Network Rail, Her Majesty's Railway Inspectorate (HMRI), First ScotRail and Transport Scotland; and
- Further consideration of cost and benefit impacts using an objective led, multi-modal appraisal methodology in accordance with the advice contained in the Scottish Government's Scottish Transport Appraisal Guidance (STAG).

Appendix A – Bus Services Within Study Area

Service	Operator	Route	Stopping in Study Area	Monday – Friday					Saturday				Sunday			
				Frequency (no. per hour)			First Service	Last Service	Frequency (no. per hour)		First Service	Last Service	Frequency (no. per hour)		First Service	Last Service
				Peak	Daytime	Evening			Daytime	Evening			Daytime	Evening		
31	**McKindless**	**Lanark – Clydeside – Larkhall – Hamilton**	**Larkhall**	**1**	**1**	**1**	**06:45**	**17:25**	**1**	**1**	**06:45**	**17:25**	**-**	**-**	**-**	**-**
		Hamilton- Larkhall – Clydeside - Lanark		**1**	**1**	**1**	**06:35**	**17:22**	**1**	**1**	**06:35**	**17:22**	**-**	**-**	**-**	**-**
191	**Whitelaw**	**Hamilton – Larkhall – Lanark - Biggar**	**Larkhall**	**1**	**1**	**1**	**06:15**	**22:15**	**1**	**1**	**06:15**	**22:15**	**1**	**1**	**09:05**	**22:05**
		Biggar – Lanark – Larkhall - Hamilton		**1**	**1**	**1**	**06:45**	**22:45**	**1**	**1**	**06:45**	**22:45**	**1**	**1**	**09:35**	**22:35**
250	**Whitelaw**	**Birkenshaw - Larkhall – Hamilton – East Kilbride**	**Larkhall**	**1**	**1**	**1**	**07:26**	**16:26**	**1**	**1**	**07:26**	**16:26**	**-**	**-**	**-**	**-**
		East Kilbride – Hamilton - Larkhall - Birkenshaw		**1**	**1**	**1**	**08:22**	**17:22**	**1**	**1**	**08:22**	**17:22**	**-**	**-**	**-**	**-**
250	**Whitelaw**	**Birkenshaw - Larkhall – Hamilton** (inc. East Kilbride service)		**2**	**2**	**2**	**06:56**	**16:58**	**2**	**2**	**06:56**	**16:58**	**-**	**-**	**-**	**-**
		Hamilton – Larkhall – Birkenshaw (inc. East Kilbride service)		**2**	**2**	**2**	**07:21**	**17:51**	**2**	**2**	**07:21**	**17:51**	**-**	**-**	**-**	**-**
253	**Whitelaw**	**Coalburn – Lesmahagow – Larkhall – Hamilton**	**Larkhall**	**-**	**-**	**1**	**19:37**	**22:37**	**-**	**1**	**19:37**	**22:37**	**1**	**1**	**06:37**	**22:37**
		Hamilton – Larkhall – Lesmahagow -		**-**	**-**	**1**	**19:50**	**22:50**	**-**	**1**	**19:50**	**22:50**	**1**	**1**	**07:50**	**22:50**

Service	Operator	Route	Stopping in Study Area	Monday – Friday					Saturday				Sunday			
				Frequency (no. per hour)			First Service	Last Service	Frequency (no. per hour)		First Service	Last Service	Frequency (no. per hour)		First Service	Last Service
				Peak	Daytime	Evening			Daytime	Evening			Daytime	Evening		
		Coalburn														
253	**Whitelaw**	**Coalburn – Lesmahagow – Larkhall – Hamilton – Wishaw Hospital**	**1**	**1**	**1**	**1**	**06:15**	**15:15**	**1**	**1**	**08:15**	**15:15**	**-**	**-**	**-**	**-**
		Wishaw Hospital - Hamilton – Larkhall – Lesmahagow - Coalburn	**1**	**1**	**1**	**1**	**07:36**	**15:36** *(16:36 terminates at Hamilton)*	**1**	**1**	**09:36**	**15:36** *(16:36 terminates at Hamilton)*	**-**	**-**	**-**	**-**
253	**Whitelaw**	**Coalburn – Lesmahagow – Larkhall – Hamilton** (inc. Wishaw Hospital service)	**2**	**2**	**2**	**2**	**05:02**	**18:35**	**2** (1 before 07:45)	**2**	**05:02**	**18:35**	**-**	**-**	**-**	**-**
		Hamilton – Larkhall – Lesmahagow – Coalburn (inc. Wishaw Hospital service)	**2**	**2**	**2**	**2**	**06:00**	**18:51**	**2** (1 before 09:30)	**2**	**06:00**	**18:51**	**-**	**-**	**-**	**-**
254	**Whitelaw**	**Hairmyres (hospital) – East Kilbride – Hamilton – Larkhall - Stonehouse**	**Larkhall; Stonehouse**	**1**	**1**	**1**	**08:57**	**16:57**	**1**	**1**	**08:57**	**16:57**	**-**	**-**	**-**	**-**
		Stonehouse – Larkhall Hamilton – East Kilbride – Hairmyres (hospital)		**1**	**1**	**1**	**08:00**	**16:00**	**1**	**1**	**08:00**	**16:00**	**-**	**-**	**-**	**-**
254	**Whitelaw**	**Hamilton – Larkhall – Stonehouse** (inc. Hairmyres service)		**3**	**3** (1 before 08:57)	**2** (1 from 18:26)	**06:30**	**22:30**	**3** (1 before 08:57)	**2** (1 from 18:26)	**06:30**	**22:30**	**1**	**1**	**10:30**	**22:53**
		Stonehouse –	**Larkhall;**	**4**	**4** (1	**4** (1 from	**06:00**	**22:00**	**4** (1	**4** (1	**06:00**	**22:00**	**1**	**1**	**10:06**	**22:06**

Service	Operator	Route	Stopping in Study Area	Monday – Friday					Saturday				Sunday			
				Frequency (no. per hour)			First Service	Last Service	Frequency (no. per hour)		First Service	Last Service	Frequency (no. per hour)		First Service	Last Service
				Peak	Daytime	Evening			Daytime	Evening			Daytime	Evening		
		Larkhall – Hamilton(inc. Hairmyres service)	**Stonehouse**		before 07:00)	18:00)		(23:00 terminates at Larkhall)	before 07:00)	from 18:00)		(23:00 terminates at Larkhall)				(23:06 terminates at Larkhall)
254	**Whitelaw**	**Stonehouse – Strathaven**		**-**	**-**	**1**	**18:54**	**22:53**	**-**	**1**	**18:54**	**22:53**	**1**	**1**	**10:55**	**22:30**
		Strathaven - Stonehouse		**-**	**-**	**1**	**19:00**	**20:00**	**-**	**1**	**19:00**	**20:00**	**1**	**1**	**10:00**	**23:00**
255	**Whitelaw**	**Netherburn – Ashgill – Larkhall – Hamilton – East Kilbride**	**Larkhall**	**1**	**1**	**1**	**06:45**	**16:45**	**1**	**1**	**06:45**	**16:45**	**-**	**-**	**-**	**-**
		East Kilbride – Hamilton – Larkhall – Ashgill - Netherburn		**1**	**1**	**1**	**07:42**	**17:37**	**1**	**1**	**07:42**	**17:37**	**-**	**-**	**-**	**-**
255	**Whitelaw**	**Netherburn – Ashgill – Larkhall – Hamilton (inc. East Kilbride service)**		**2**	**2**	**2** (1 from 17:45)	**07:15**	**22:40**	**2**	**2** (1 from 17:45)	**07:15**	**22:40**	**1**	**1**	**08:40**	**22:40**
		Hamilton – Larkhall – Ashgill – Netherburn (inc. East Kilbride service)		**2**	**2**	**2** (1 from 18:15)	**07:11**	**23:10**	**2**	**2** (1 from 18:15)	**07:11**	**23:10**	**1**	**1**	**09:10**	**23:10**
354	**Stonehouse Coaches**	**Larkhall – Stonehouse – Strathaven Not School Holidays**	**Larkhall; Stonehouse**	**1** (Not School Holidays)	**1** (Not School Holidays)	**1** (Not School Holidays)	**08:53** (07:36 & 08:36 begin at Stonehaven)	**16:53**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Strathaven – Stonehouse - Larkhall		**1** (Not School Holidays)	**1** (Not School Holidays)	**1** (Not School Holidays)	**08:30** (07:50 (terminates at Stonehaven)	**16:30** (17:30 terminates at Stonehaven)	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
L2	**Stonehouse Coaches**	**Birkenshaw - Larkhall**	**Larkhall**	**2** (Not School	**2** (Not School	**2** (Not School	**08:35**	**17:05**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Service	Operator	Route	Stopping in Study Area	Monday – Friday					Saturday				Sunday			
				Frequency (no. per hour)			First Service	Last Service	Frequency (no. per hour)		First Service	Last Service	Frequency (no. per hour)		First Service	Last Service
				Peak	Daytime	Evening			Daytime	Evening			Daytime	Evening		
				Holidays)	Holidays)	Holidays)										
		Larkhall - Birkenshaw		**2** (Not School Holidays)	**2** (Not School Holidays)	**2** (Not School Holidays)	**07:50**	**16:50**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Appendix B – Railway Engineering Drawings