

Streamline MONITORING AND EVALUATION

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1. INTRODUCTION

As a result of a groundbreaking quality partnership agreement between Glasgow City Council and bus operator First and close partnership working with West Dunbartonshire Council and SPT, a wide range of measures have been implemented to benefit bus users and provide frequent, reliable services of improved quality across a network of *streamline*TM routes around Glasgow. These measures have been implemented on a phased basis over the last eight years.

A detailed evaluation of the *streamline*TM project outcomes against the stated objectives utilising key results from a public opinion survey has now been undertaken. MVA Consultancy was commissioned to undertake the public opinion surveys and report on the evaluation. A full report detailing the evaluation results are available on the Council's web site www.glasgow.gov.uk/en/Residents/GettingAround/PublicTransport/StreamlineCorridors/

An initial review of the operation of measures introduced on *streamline* routes is currently being undertaken and minor amendments are being introduced where appropriate. Traffic signal control improvement work is also ongoing. The results in this paper therefore form an initial evaluation of the *streamline*TM project. It is envisaged that a further evaluation will be undertaken once the reviews and traffic signal improvements are complete.

2. BACKGROUND

Streamline™ is a high quality, more reliable, efficient and accessible bus service resulting from a groundbreaking quality partnership agreement between Glasgow City Council (GCC) and First to develop, implement and maintain a network of Quality Bus Corridors across Glasgow.

This £31M public / private partnership project with investment from the Scottish Executive, GCC and First has transformed the way public transport services are delivered and integrates with all the council's key policy objectives.

Streamline™ currently operates on eight key arterial routes throughout the city. These are illustrated on the plan below.

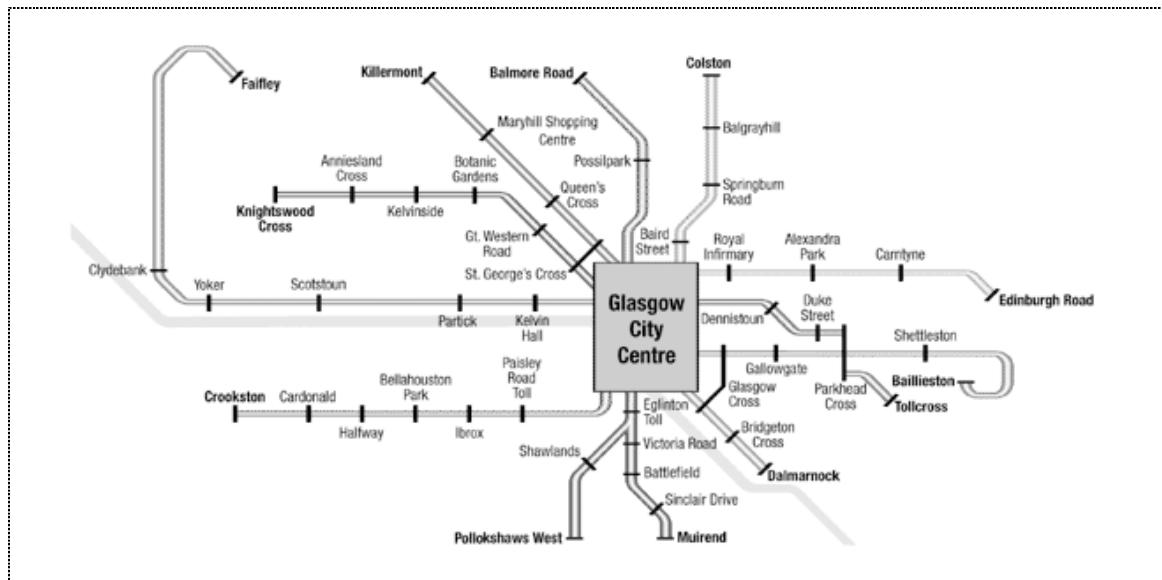


Figure 1– Implemented *Streamline™* Routes

Development work is currently ongoing to expand *Streamline™* into a further four areas of the city, covering Hampden, Pollok, Easterhouse and Sauchiehall St / Berkeley Street to the west of the city centre. It is also envisaged that *Streamline™* will be expanded into adjacent local authorities and include additional bus operators in the future.

Streamline Objectives

The *streamline*TM objectives have been developed taking into account the feedback from consultation undertaken during the development of the Council's Local Transport Strategy.

The objectives of the *streamline*TM project are to support social and economic development and improve the environment by:

- O1 - encouraging modal shift from car to public transport;
- O2 - increasing bus reliability;
- O3 - improving bus journey times;
- O4 - enhancing provision of information and facilities;
- O5 - improving safety and security;
- O6 - increasing accessibility;
- O7 - reducing harmful emissions; and
- O8 - improving conditions for pedestrians and cyclists;
- O9 - improving conditions for business.

Policy Integration

The *streamline*TM project's integration with national policy is demonstrated by the fact that most of the funding was awarded through the Public Transport Fund which was established following the Travel Choices for Scotland White Paper. Since then National and Regional Transport Strategies have been developed and following extensive consultation Glasgow City Council has developed a Local Transport Strategy, Keeping Glasgow Moving 2007 – 2009, which outlines how the national and regional objectives will be implemented at a local level.

The objectives set out in 'Keeping Glasgow Moving' are to

LTS1 - Support the continuing physical, social, economic, cultural and environmental regeneration of the City by maintaining and promoting efficient and effective transportation services and infrastructure within Glasgow

LTS2 – Promote social inclusion and tackle poverty by seeking to ensure that transport is accessible to all sections of the community and provides good links to employment, health care, education and leisure

LTS3 - Promote healthy and environmentally sustainable methods of transport that minimise harmful emissions and energy consumption including those that involve physical activity

LTS4 - Improve the safety and the actual and perceived security of travelling within the City by reducing accidents and enhancing the personal security of all users of the transport network; and

LTS5 - Promote integration of the transport system and provision of travel information within Glasgow

The expansion of *streamline*TM is a key action within the Local Transport Strategy. It is also one of the key council actions in response to the Road Traffic Reduction Act and the council's designation of an Air Quality Management Area under the Environmental Protection Act.

Consultation / Works

Making better use of road space to aid delivery of reduced congestion, improved journey reliability and modal shift is a key element of the project. By providing bus services that are attractive, accessible, reliable and frequent, the public can be encouraged to more readily choose to use the bus over a car alternative. If planned journey times can be achieved on a consistent basis the service can be operated more efficiently

The traffic management element of the project was not only aimed at priority for buses but also to seek to ensure that conditions for other traffic essential to social and economic development were also improved where possible.

Initial extensive consultation involved identifying issues and encouraging greater public participation by the entire community. This voluntary process was additional to the statutory obligations placed on the Council and involved the distribution of some 75,000 leaflets and questionnaires to every business and resident along the route, together with media coverage and over 50 public exhibitions.

The second stage involved a series of over 70 local area workshops to enable community representatives and other interest groups to participate in the design process and enable the project team to continue to receive feedback.

The measures adopted varied depending on the environment, with a consistent emphasis placed on protecting buses from the adverse effects of traffic congestion and access to the kerbside at stops. These included:

- bus lanes (peak period and 24 hour)
- bus pre-signals and priority pre-emption for late running buses
- bus gates / cut throughs
- new traffic signals and pedestrian crossings with improved operation (including SCOOT)
- more appropriate waiting and loading restrictions and parking meters to facilitate turnover of parking spaces outside shops
- banned turn movements / road closures
- high access kerbs at bus stops, extending the bus stop clearways (cage markings) to enable the bus to access and egress the kerbside and build outs where parking spaces were at a premium.

A new Bus Information and Signalling (BIAS) System, the most sophisticated in the UK, has also been developed to assist in tackling the city's traffic congestion problems whilst improving bus services. (Figure 2) A dynamic traffic control system assists buses to progress through the city's traffic signals on *streamline*TM routes. By giving priority to buses running behind schedule, timetables can more readily be maintained even allowing for the unpredictable nature of congestion.

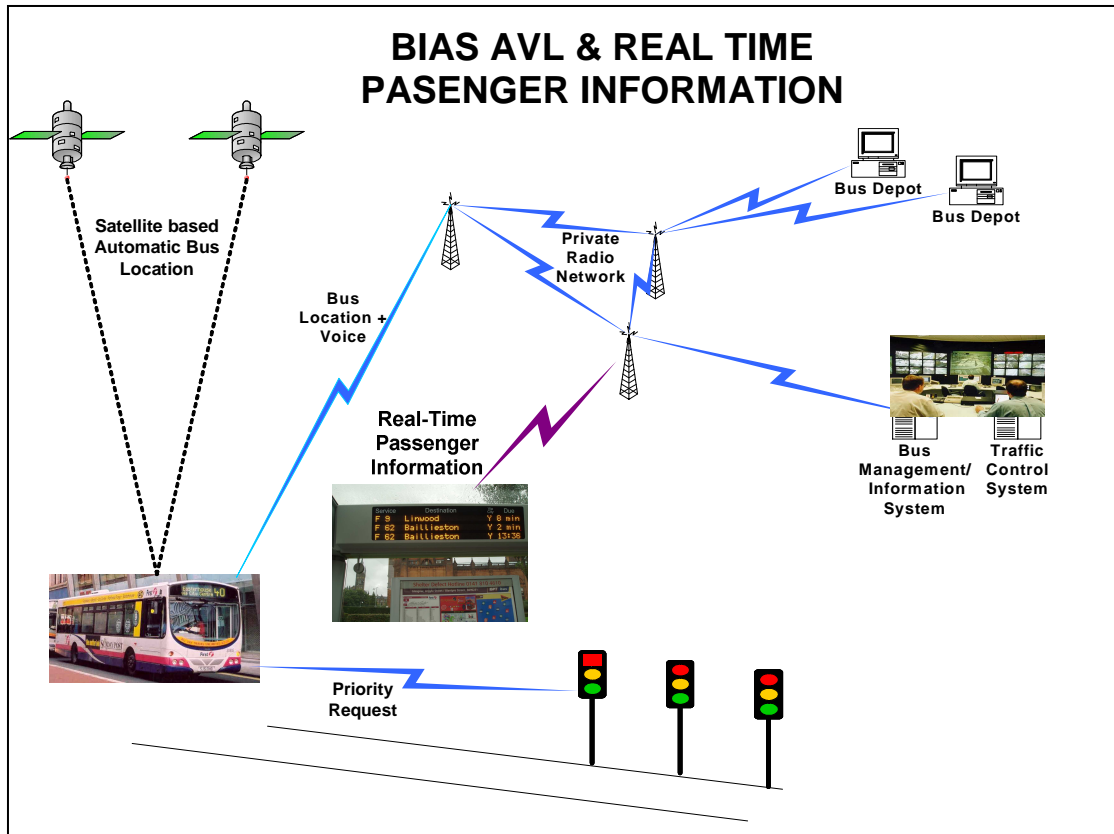


Figure 2 – BIAS System

An additional benefit of the BIAS system is that the system's data management tools enables improvements to be made to service operation by being able to view graphically, in real time, the location of each bus in relation to its schedule.

3. MONITORING AND EVALUATION

Introduction

In January 2008, Glasgow City Council commissioned consultants MVA to undertake an initial evaluation of the bus service enhancements that had been introduced as part of the *streamline*TM project.

The evaluation consisted of undertaking and analysing the results from a public opinion survey on the measures introduced. This was supplemented by the analysis of a wide range of 'before and after' transport related data.

Methodology

The public opinion survey consisted of face-to-face interviews with bus users on *streamline*TM routes. For comparison purposes bus users travelling on non-streamline routes and non-bus users were also interviewed. The sample sizes were chosen to achieve a good degree of confidence in the overall aggregate results. A cross section of age ranges and journey time periods were surveyed.

A total of 1,532 passengers were interviewed on board buses on streamline corridors, a further 368 respondents were interviewed on-board buses on non-streamline corridors and 272 non-bus-users were interviewed via household interviews.

Surveys were conducted with both frequent and non-frequent bus users, and across AM peak, inter-peak, PM peak and evening services on all routes.

Opinions were sought on the introduction of, and / or changes to a number of service elements including:

- Real – time passenger information
- On-bus next stop information
- Bus reliability
- Accessibility at bus stops
- Waiting environment at bus stops
- Quality of buses; and
- Personal security on bus and at bus stops.

Further, general information was sought regarding respondent's awareness / knowledge of *streamline*TM and any alterations in journey patterns, such as any transfer from car to bus for certain journeys. In order to provide a measure of satisfaction, bus users were asked to indicate their level of satisfaction on a scale of one to five, where one was a very negative response and five was a very positive response, for the key service elements.

Other information utilised in the analysis included data on car and bus journey times, accidents, air quality, on street parking, number of pedestrian

crossings, traffic signals with tactile cones, Real Time Passenger Information signs and bus stops.

Results

Progress towards achieving each of the stated *streamline™* objectives is summarised below:

01 - Encourage modal shift from car to public transport

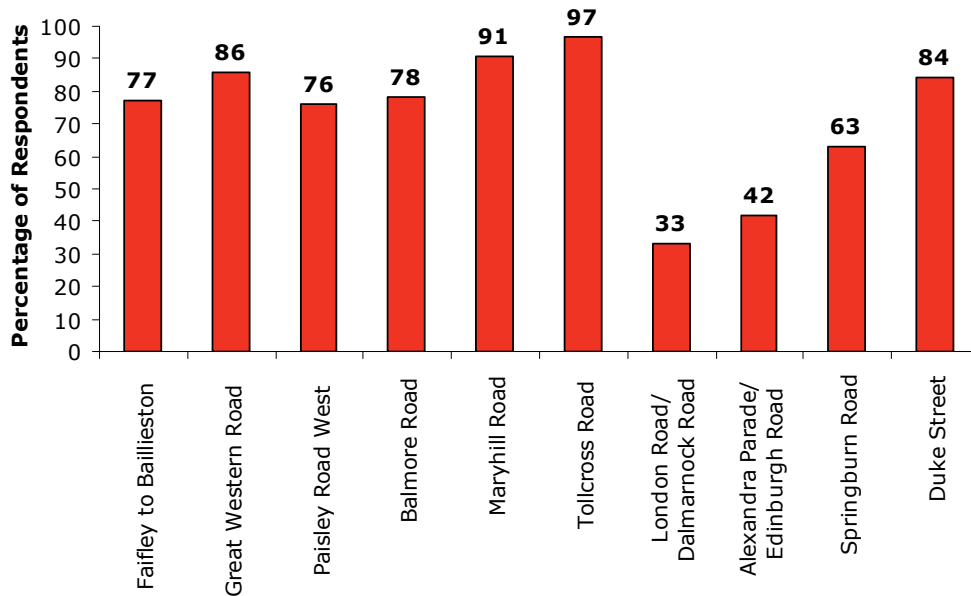
The main data utilised to measure performance against this objective was results from the public opinion survey and patronage figures.

The public opinion survey results indicate that there has been an average of a *5% shift from car to public transport* along the *streamline™* corridors. Although there is less confidence in the results by route, this ranges from 10% transfer from car on Great Western Road to 0% on Balmore Road. In addition *bus patronage has increased* on all corridors with the exception of Springburn Road.

Any changes in the difference between the average bus and car journey times were also used as an indicator of likely modal shift with the closer the bus journey times become compared to the car journey times, the more likely people are to transfer from car to bus. Where data was available indications are that the difference in journey time between the bus and car is reducing on some of the key streamline corridors.

02 -Increase Bus Reliability

Although changes in the standard deviation was analysed for some corridors, the most useful guide available to assess reliability was the results from the public perception survey. The results from this indicated *that 75% of bus users considered that bus services on the streamline™ corridors have become more reliable* since the measures have been introduced. The results by corridor are illustrated below:



O3 - Improve Bus Journey Times

Only a limited amount of bus journey time data based on manual surveys is available prior to the streamline network being introduced, therefore any conclusions drawn from the journey time data should be treated with caution. However, the before and after bus journey time data available indicates that there *has been some improvement on most corridors*.

O4 - Enhance provision of Information and Facilities

The provision of shelters has increased greatly on the *streamline™* corridors and has exceeded the original target of 60% coverage on all corridors.



The results from the public opinion survey indicate that around 75% of users are satisfied with the standard of these shelters. Indeed *73% of users feel that the general waiting environment at bus stops has improved* since the introduction of *streamline*.

In addition Real Time Information signs are now in place at 23% of bus stops on the corridors and the majority of bus users find them accurate and helpful. The results indicate that bus user satisfaction with on board facilities such as next stop information signs is also high.

05 - Improve Safety and Security

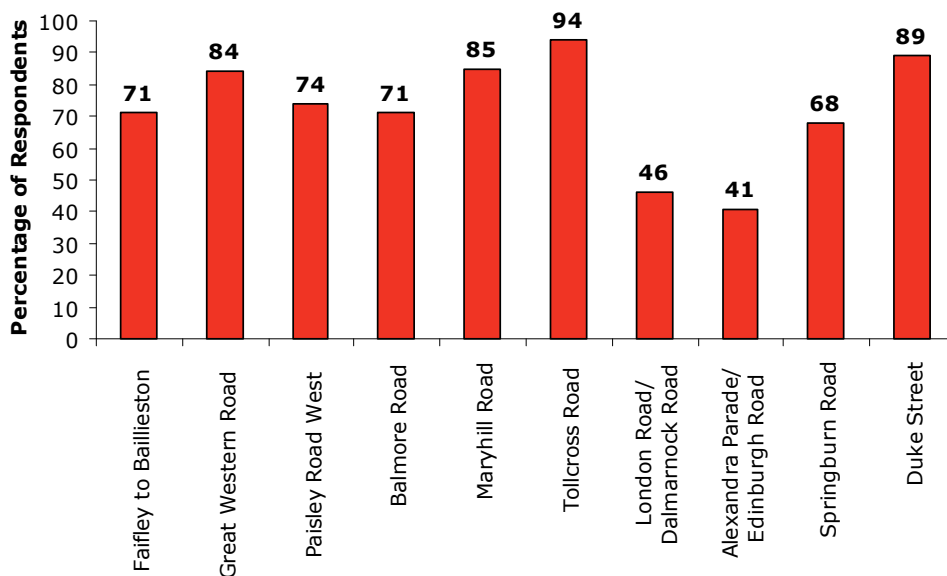
*Accident numbers have decreased significantly on **streamline**TM corridors* since measures have been introduced. In addition, survey results indicate that bus users generally feel safe while at bus stops and on board the buses. Over half of passengers felt that security on board buses has improved.

Road traffic accidents on *streamline* routes have been reduced by a total of 426 which is an encouraging 42% compared with the successful reduction of around 15% citywide for a similar period. Examples of junctions which have been significantly improved and removed from the city's list of worst accident sites are Garscube Road / Dobbies Loan; Gorbals Street / Clelland Street and Maryhill Road / Queen Margaret Drive.

06 - Increase Accessibility

In order to improve accessibility at bus stops along the *streamline™* routes measures introduced include raised access kerbs, clearway regulations with bus stop cages emphasised with red colouring and lengthened bus stops to allow the bus to access the kerb.

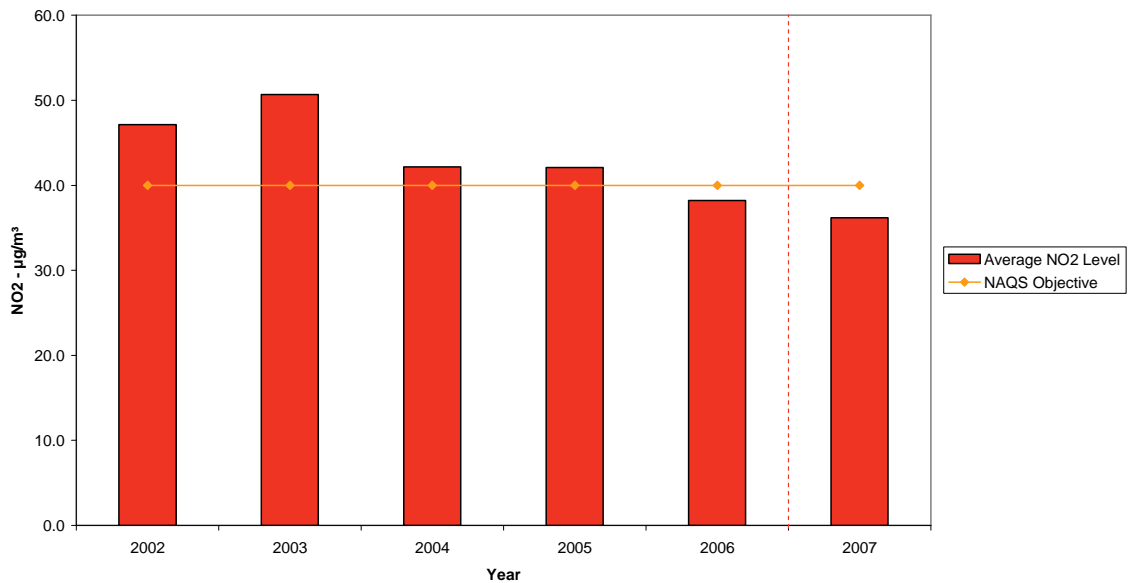
Following the introduction of these measures *73% of bus users feel that accessibility has improved*. The responses for each individual corridor are illustrated below



Illegally parked vehicles restricting access at bus stops is still considered to be an issue that requires more enforcement. In recognition of this, there is an on-going campaign to discourage illegal parking in bus stops with 150 posters currently placed in bus shelters throughout the city.

07 - Reduce Harmful Emissions

Air quality data was collected on routes 1 to 4 and on these there has been an overall reduction in NO_2 (*nitrogen dioxide*) levels since the introduction of *streamline™*



In general, NO₂ levels have reduced since 2003, and a further drop was recorded between 2006 and 2007, ie the first year after the introduction of *streamline*TM. In fact, 2007 had the lowest levels across all years. While it is too early to conclude that *streamline*TM is a primary reason for this, the first signs are that it is having a positive effect on NO₂ levels. (the red dashed line highlights when *streamline*TM works were introduced onto the corridor)

08 - Improve Conditions for Pedestrians and Cyclists

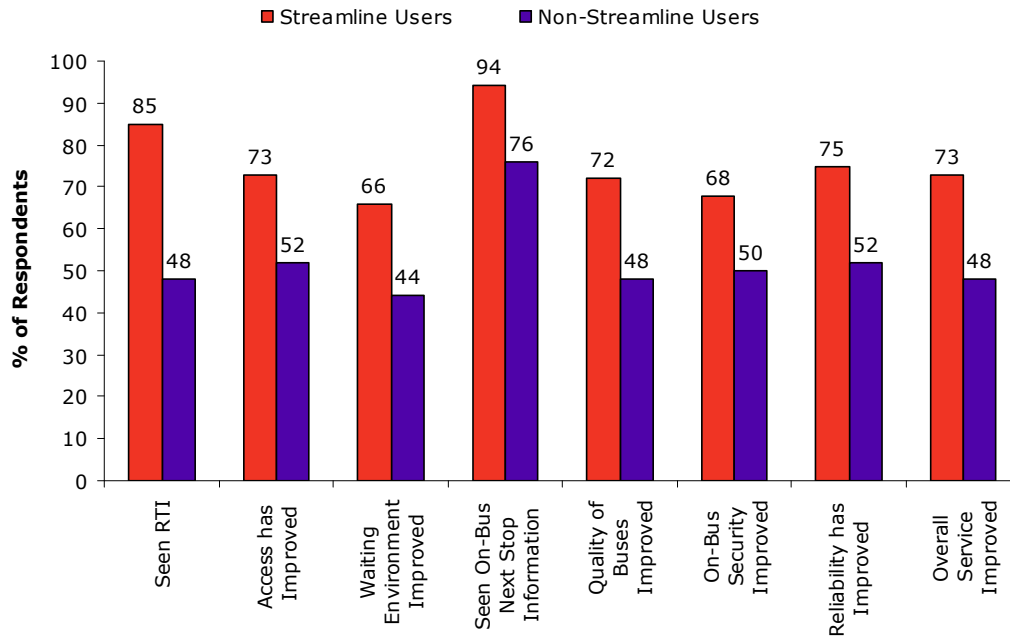
There has been an *increase in pedestrian crossings, tactile cones, tactile paving, targeted footway widening, cycle advance areas and bus / taxi / cycle lanes* across the *streamline* corridors. The majority of the corridors where there were a number of accidents involving pedestrians and cyclists have seen a decrease in the number occurring.

09 - Improve Conditions for Businesses

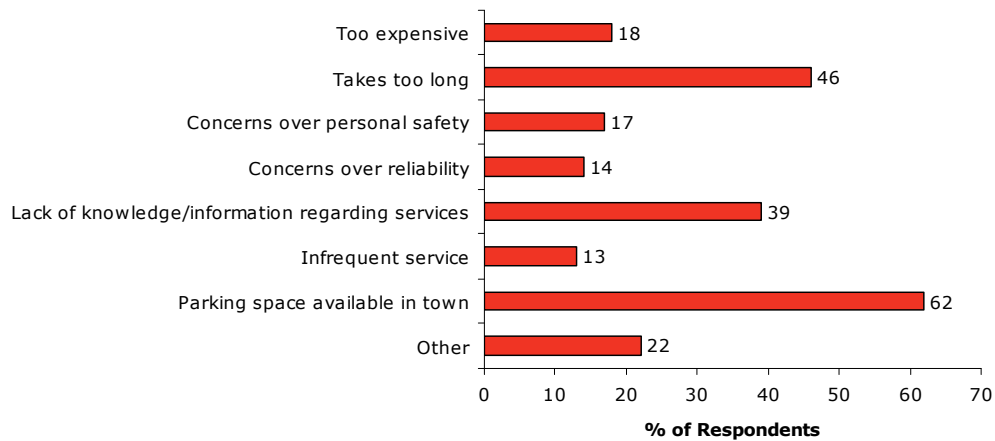
There has been an increase in the number of dedicated loading bays along the *streamline*TM corridors and time limited parking has been introduced in shopping areas to encourage short stay parking thus increasing the turnover of available parking opportunities for customers.

In addition to questions aimed at ascertaining the progress that had been achieved towards the specific project objectives, the public opinion survey included a number of further general questions regarding *streamline*. The analysis of the responses indicated that on 70% of the corridors over half the respondents felt that there had been an improvement in the overall service since the introduction of *streamline*. Also people using *streamline*TM services

are significantly more positive about key service elements, such as reliability, on bus security, waiting environment at bus stops and bus quality, than passengers using non- *streamline*TM services. This is illustrated in the figure below



As previously stated a sample of non-bus users were included within the public opinion survey. They were asked to indicate the main reasons for not using the bus.



As can be seen from the figure above the main reason respondents gave for not using the bus service was the availability of a parking space at their destination, followed by the perception that the bus takes too long.

Non bus-users were also asked to indicate what measures would encourage them to use the bus service for some or all journeys. Respondents indicated that the most important features would be the availability of more frequent

services, improvements in reliability and more information on the services available.

CONCLUSION

Overall, the results from the initial evaluation are very encouraging. Some key responses from the survey were:

*71% of respondents stated that they were very satisfied or satisfied with the services on **streamline**TM routes compared to 5% who stated they were dissatisfied or very dissatisfied (this is from questionnaire responses).*

*73% of respondents stated that services on **streamline**TM routes have improved over the last few years compared to 15% who feel there has been no improvement.*

*5% of respondents indicated that they had changed from travelling by private car to travelling by bus on **streamline**TM corridors over the last few years and bus patronage has increased on all but the Springburn Road **streamline**TM corridor.*

Indications are that good progress is being made in achieving the **streamline**TM objectives. The vast majority of bus users on **streamline**TM routes feel their service has improved since the introduction of **streamline**TM measures and they are more positive about their service than those using non- **streamline**TM routes. Initial patronage trends are positive and significant road safety benefits have been achieved.

This evaluation and the ongoing initial review process have identified some areas for further improvement which if addressed along with the ongoing traffic signal control improvements will lead to even greater benefits. The amount of data now readily available through the Bus Information and Signalling System has significant potential to assist ongoing monitoring and review of bus and road network operation and a pilot project to make best use of this data has commenced.