



Forth Valley Bus Alliance STAG Appraisals Case for Change Falkirk Council

29 April 2022

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1. Introduction

The Forth Valley Bus Alliance (FVBA) has been awarded funding from the Bus Partnership Fund (BPF) to develop a package of STAG reports with recommended options for targeted bus priority measures on five identified corridors in the Falkirk, Clackmannanshire and Stirling Council areas. The study is being led by Falkirk Council as the lead local authority on behalf of the FVBA.

The STAG reports are planned to inform subsequent applications to BPF seeking funding to produce business cases as appropriate and continue the design development process.

BPF is intended to complement the powers in the Transport (Scotland) Act 2019, which enables local authorities to leverage bus service improvements by working in partnership with bus operators towards a Bus Service Improvement Partnership (BSIP). In this context, BPF is set to focus on the evidence of how bus services could be improved by addressing congestion and developing bus priority measures that may be part of a BSIP Partnership Scheme.

1.1. Purpose of this Report

The Case for Change is the first stage in the STAG appraisal process and serves as an outline framework around which the appraisal of options will be developed.

1.2. Structure of this Report

This Case for Change report is structured broadly around the following headings and is consistent with the requirements in the STAG guidance:

- Characterisation of the study area including a detailed review of the bus network and operations.
- Analysis of problems and opportunities for each individual corridor.
- Identification of constraints, dependencies, key risks and uncertainties.
- Review of established policy objectives.
- Development of the Transport Planning Objectives (TPOs) including an assessment of how they address the identified problems and opportunities.



Executive Summary

measures in the next stages of the overall STAG process.

development of the next stages of the STAG process.

study area with Edinburgh and Glasgow.

2



The study area for the STAG reports is limited to the five corridors shown in Figure 3.2 and is mainly focused on the urban areas of Alloa, Falkirk and Stirling, as well as the A9 corridor through Camelon and Larbert. This Case for Change report presents the identified key problems and opportunities across the bus network in the study area to then formulate the TPOs. These will then be used to undertake the appraisal of any proposed

At present, bus operations in the study area provide a mix of commuting services for residents, mainly into Stirling and Falkirk, and services dedicated to providing access to key human services for the community – healthcare, education or retail. Key examples of these trip attractors within the study area include the Forth Valley Royal Hospital or the University of Stirling. In addition, there are regular bus services connecting the

The problems and opportunities presented in this report build on the fact that the bus journey is wider than the experience of riding a bus from one point to another (see Figure 2.1 below). It will normally take people a walk or a bike ride to reach the bus stop where they will board the bus. Similarly, people will normally have to cover some distance before they reach their final destination. How users may experience each of these elements of the bus journey has been essential in defining the problems and opportunities and will be central to the

The problems and opportunities identified are summarised below and further expanded in Section 5:

- Traffic delays at junctions and in urban traffic are affecting bus journey times and reliability. This analysis has been expanded by an assessment of the frequency of bus stops per corridor, differentiating between urban and rural areas as per Figure 3.4.
- Other aspects that could affect bus journey times such as how buses are boarded or tickets purchased will be explored in detail at the next stage in the STAG process, options generation.
- There are opportunities within the study area to create a bus offering that is more competitive and attractive than using the private vehicle, which could be enhanced by improving the modal integration with active travel. This could be a key contributing factor to getting people, which otherwise would take their cars for their daily trips, to use the bus.
- In addition, it has been observed that accessibility by public transport to key trip attractors within the study
 area is sometimes limited. For example, access to the University of Stirling campus by bus is limited for the
 residential areas south of Stirling bus station including Bannockburn and the future development at South
 Stirling Gateway.
- Although the condition of bus stops in the study area is generally adequate to the level of service, some areas of improvement have been identified at key trip attractors. These include delays in the approach and exit path for buses, seating and shelter provision, quality of the footways, connectivity with footpaths, provision of lighting and information and, finally, consistency of the location.

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• There are also opportunities to integrate bus services with land-use policies within the study area (South Stirling Gateway and Durieshill developments), as well as other projects and investments currently being delivered or planned for.

Building on these problems and opportunities, a review of relevant national, regional and local policy has been carried out. The review has contributed to identify key policy themes relevant to the problems and opportunities which, in turn, has informed the development of the TPOs. Appendix A.3 details this process and shows how the TPOs have been established building on from the problems and opportunities. The proposed TPOs for the STAG study are outlined below:

<u>Objective 1</u> Tackling the negative impacts of congestion on bus services within the study area, thus improving bus journey times and reliability within the next 5 years.

<u>Objective 2</u> Enhancing bus-based public transport options for everyone within the study area to access key centres for healthcare, employment, education and services within the next 5 years.

<u>Objective 3</u> Removing accessibility barriers to bus-based public transport within the study area, thus improving mobility and inclusion for everyone within the next 5 years.

<u>Objective 4</u> Enhancing the complementary relationship between bus, rail and active travel, increasing travel choice and widening public transport connectivity.

<u>Objective 5</u> Reducing actual and perceived safety issues in the bus network within the study area during the next five years, while aiming to enhance the quality of the urban environment.

These objectives are specific and relevant to the identified problems and opportunities. The potential metrics to evaluate the success of any relevant measures against the TPOs are presented in Table 7.1. There are, however, some uncertainties about future funding availability and the likely timescales for implementation that could deem unrealistic the timescales for achieving these objectives. These are further detailed in 6.4 and will require careful cashflow and financial planning prior to committing for delivery any recommended measures resulting from this STAG report.



3. Characterisation of the Study Area

This section focuses on providing a socio-economic description of the study area including its key transport and environmental characteristics. This analysis builds on the Strategic Transport Projects Review (STPR2) Case for Change for the Forth Valley region and uses pre COVID-19 datasets to reflect the baseline situation.

The Forth Valley region is 1 of the 11 Regional Transport Working Groups that have been established as part of STPR2. The region comprises 3 local authorities: Stirling, Falkirk and Clackmannanshire as shown in Figure 3.1 below.





However, the scope of the study is limited to the five outlined below, which effectively limit the study area to the urban areas of Alloa, Falkirk and Stirling linked by the A9 through Camelon and Larbert as shown in Figure 3.2.

- Corridor 2 follows the A9 from Stirling city centre (St Ninians Rd / Newhouse) to Camelon Roundabout in Falkirk, with an approximate length of 15.7km.
- Corridor 3 provides a key link between the Park and Ride (P&R) at the Three Bridges Roundabout and Falkirk town centre following the A803. The corridor has an approximate length of 4.5km and intersects Corridor 2 at the Camelon Roundabout.
- Corridor 4 follows the Carron Road / Grahams Road corridor (B902) connecting the roundabout with Ronades Road / Carron Road roundabout with Falkirk town centre. The corridor, nearly 2km in length, intersects Corridor 3 in the A803 roundabout Grahams Road, Vicar Street and Park Street.
- Corridor 6 connects the University of Stirling on the A9 following along the A872 until the Bannockburn interchange. The corridor has a length of above 8.5km and intersects Corridor 2 at St Ninians Roundabout.
- Corridor 7 follows the A908 from Fishcross centre to Alloa continuing though to Causewayhead roundabout in Stirling via the B9096, where it intersects Corridor 6. This corridor has a length of about 12.5km and provides a key strategic link between Fishcross, Sauchie, Alloa, Tullibody and Stirling.



Figure 3.2 Study Area and Corridors



3.1. Population

The main settlements across the five corridors and their respective populations as at mid-2020 are listed in Figure 3.3 below.



Figure 3.3 Mid-2020 Population Localities. Source: National Records of Scotland



The study area presents a mix of urban and rural settlements. Figure 3.4 below distinguishes between urban and rural areas as per the Scottish Government's urban / rural classification.



Figure 3.4 Urban / Rural Classification

Approximately between 64% (Tullibody) and 68% (Stirling) of people are of working age, 16 to 64 years of age, as per mid-2020 data. This is consistent with the rest of Scotland with 64% of the population are of working age.

Data from National Records of Scotland shows that Falkirk, Grangemouth, Tullibody and Bannockburn recorded a decline in population between 2012 and 2016 of between 1% and 3%. It is worth noting that Larbert experienced a 10% population growth in this period, which is consistent with a 16% growth in the period between 2012 and 2016.

3.2. Deprivation and Inequality

The Scottish Index of Multiple Deprivation (SIMD) data demonstrates the socio-economic issues experienced in the study area, with 12.0% of all relevant data zones within the 20% most deprived in Scotland as per the 2020 release. It is worth noting that data zones are groups of 2011 Census outputs areas which have populations of around 500 to 1,000 residents.





Figure 3.5 SIMD Distribution in the Study Area

The red areas in Figure 3.5 show the most deprived areas, while the blue areas are the least deprived. Clackmannanshire as a whole has a considerably higher proportion of data zones within the 20% most deprived in Scotland at 25% of data zones compared with 16% in Falkirk and 12% in Stirling.

A key domain of the SIMD is the Geographic Access to Services, intended to capture the issues of financial cost, time and inconvenience of having to travel to access basic services and includes the following travel time indicators:

- Drive times to GP surgery, post office, retail centre, primary school, secondary school and petrol station.
- Public transport times to GP surgery, post office and retail centre. This is the weighted average travel times to selected services using public transport (bus, rail, coach, ferry and tram) and/or walking.
- The broadband subdomain has been added as a new indicator to SIMD 2020.

The maps below show these indicators disaggregated into the drive and public transport subdomains for access to the GP surgery, post office and retail centre.



Figure 3.6 SIMD 2020 Geographic Access to GP Surgery – Drive





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Figure 3.8 SIMD 2020 Geographic Access to Post Office – Drive



Figure 3.9 SIMD 2020 Geographic Access to Post Office – Public Transport





Figure 3.10 SIMD 2020 Geographic Access to Retail Centre – Drive



Figure 3.11 SIMD 2020 Geographic Access to Retail Centre – Public Transport



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Observing the maps above (Figure 3.6 to Figure 3.11) it can be concluded that access times by public transport to the services analysed (GP surgery, post office and retail centre) are not competitive with those of driving across all of the study area. It is worth noting these access times do not include any allowance for getting to the relevant bus stop or station and the waiting time, which are an essential element of the public transport journey.

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3.3. Employment

Data from the Office for National Statistics (ONS) shows that by Q3 2021 unemployment rates in the study area are as shown in Table 3.1 below. While Stirling and Falkirk remain below the national benchmark of 4.2%, Clackmannanshire is above that value.

Table 3.1 Unemployment Data

Council Area	Unemployment Rate
Stirling	3.8%
Falkirk	3.9%
Clackmannanshire	4.4%
Scotland	4.2 %

The key employment centres in the study area along the five corridors are shown in Figure 3.12. In addition, Table 3.2 provides the number of employees by key employment centre with over 1,000 employees.







Table 3.2 Employee Numbers by Key Employment Centre

Employment Centre	Full-time or Part-time employees
Grangemouth Ports and Refineries	12,660
Falkirk Town Centre and Central Retail Park	11,000
Forth Valley Royal Hospital (and surroundings)	9,000
Stirling Enterprise Park and Springkerse Retail Park	8,000
Stirling City Centre and Castlecraig Business Park	7,525
Alloa Town Centre (inc. OI Manufacturing Plant)	6,550
Denny Industrial Estate	1,500
Cambusview and Diageo Works west of Tullibody	1,250
Camelon Industrial Estate	1,250
Bankside Industrial Estate at Falkirk	1,000
Dumyat Business Park	700

3.4. Environment

The map below (Figure 3.13) presents all the environmental designations in the study area. In addition, there are a significant number of historic assets. These include, among others, the Antonine Wall designated World Heritage Site (stretching across the central belt of Scotland and the largest relic of the Roman occupation), as well as the sites for the Battle of Stirling Bridge, the Battle of Bannockburn, the Battle of Sauchieburn and the Battle of Falkirk.





Figure 3.13 Environmental Designations in the Study Area

3.4.1. Air Quality

Air quality is poorest in highly trafficked routes traversing the study area. As per data from STPR2, Stirling recorded higher CO2 emissions from transport per capita relative to other authority areas in the Forth Valley region; whilst Clackmannanshire recorded the lowest per capita in the region.

It is worth noting that the highest proportion of Scotland's total CO2 emissions from transport in the study area were from Falkirk in 2018. Figure 3.13 above includes the Air Quality Management Areas (AQMAs) within the study area.

3.5. Transport Networks

The bus network is analysed in more detail in 4 and includes an overview of the services operating in each corridor within the scope of this study. This section provides an overview of the rail network and park and ride (P&R) provision in the study area, as well as wider maritime and air connections.

3.5.1. Rail

Figure 3.14 below shows the key railway stations in the study area including all the links and connections from them.





Figure 3.14 Railway Network and Stations in the Study Area

Stirling station is a key commuter station for journeys to Glasgow, Edinburgh and Perth and adjacent to Corridor 2. It is served by 4 trains per hour to Glasgow Queen Street, 3 trains per hour to Edinburgh Waverley and 3 trains per hour to Perth during peak times. Stirling railway station is also adjacent to the main Stirling bus station providing interchange with many core bus services across the study area.

The station is also served by long-distance services to Dundee (hourly), Aberdeen (hourly) and Inverness (8 trains per day) and is the junction for the branch line to Alloa, with 3 trains per hour to Dunblane. Although the majority of services are operated by ScotRail, there are 2 services a day operated by London North Eastern Railway (LNER) to London Kings Cross and Serco Caledonian Sleeper.

Falkirk High is on the main line between Edinburgh and Glasgow and is managed by ScotRail. Services stopping here are operated by ScotRail. Trains to Edinburgh are routed via Polmont and Linlithgow, whilst trains to Glasgow are via Croy. Prior to the pandemic. there were services to Edinburgh and Glasgow 4 times per hour during peak hours Monday to Saturday, with a twice hourly service operating in the evenings and on Sunday. However, since the pandemic these services reverted to 2 trains an hour throughout and the 15 minute frequency has not yet resumed.

Falkirk Grahamston is adjacent to Corridor 4. Managed by Scotrail, the station is on the Edinburgh to Dunblane line, as well as the Glasgow to Edinburgh via Cumbernauld line. The majority of services stopping at the station are operated by ScotRail with regular trains to Edinburgh, Glasgow and Dunblane from Monday to Saturday, and a reduced service operating on Sunday. There is also a daily service to Inverness from Monday to Friday. In addition, the 2 LNER services to London and the Caledonian Sleeper also stop here although the Caledonian Sleeper does not have a return journey.

From December 2018 service levels were improved; to exploit electrification and new trains, a new half hourly electric service between Glasgow and Edinburgh via Cumbernauld was introduced, calling at Falkirk Grahamston.

Larbert station is in the vicinity of Corridor 2 at its southern end and represents an important node in the Forth Valley network. It is worth noting that the station has a large free car park unlike the other stations in Falkirk.



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Other key railway nodes in the study area are Camelon station at the intersection between Corridor 2 and Corridor 3 and Bridge of Allan station just off the top end of Corridor 6.

Finally, Alloa station is the only rail station in Clackmannanshire and is adjacent to Corridor 7. The station provides a direct connection to Glasgow Queen Street via Stirling.

3.5.2. Park and Ride

There are two formalised Park and Ride (P&R) sites within the Forth Valley region that operate services into Stirling city centre. These are funded by Stirling Council and operated by Hunter's Executive Coaches under contract. Both services operate free of charge for both the 'park' and the 'ride'. The free fares are part of a Transport Scotland funded 'Smarter Choices, Smarter Places' project.

The Springkerse Service (P1) operates every fifteen minutes employing two vehicles, taking just ten minutes from Stirling Bus Station and also links the city centre with Morrison's supermarket. First departure from Springkerse is 0730 and last bus from the city is at 1830 Monday to Saturday.

The second Park and Ride service (P2) is more complex and links the city centre with Castle View Car Park usually on a twenty-five minute frequency. Prior to 1130 journeys towards Castle View serve Castle Business Park, while journeys after 1130 from Castle View serve the business park. After 0900 journeys divert to serve St. John Street and Broad Street near Stirling Castle.



Figure 3.15 Park & Ride Services in Stirling

3.5.3. Maritime

There are no passenger ferry routes which operate within the Forth Valley region. The commercial port, Forth Ports Grangemouth, is Scotland's largest container port, handling 9 million tonnes of cargo each year through specialist container, liquid and general cargo terminals.



This cargo flow represents as much as 30% of Scotland's gross domestic product (GDP), highlighting the port's essential role as an economic facilitator for Scotland. A range of liquid bulks, containers and general cargo commodities transit the port using road, rail and sea.

3.5.4. Airports

There are no large airports in the study area, although both Glasgow and Edinburgh airports can be reached by public transport from Alloa, Falkirk and Stirling. However, travelling to any of them involves a trip will over the hour as to Edinburgh it involves taking a train to Haymarket and them the tram to the airport or, alternatively, a lengthy journey by bus which includes at least one change. In the case of Glasgow, the trip would include a train ride to the city and then changing onto a coach to the airport.

It is also worth noting that public transport is not available for the peak air departures between 0600 and 0630. This makes public transport not competitive with the use of the private car in trips to both airports from the study area as these are under the hour at off peak times.



4. Bus Network and Operations

First Scotland East (from now on, First) operates more than 90% of services in Falkirk, whereas Stirling has more services provided by other operators, often on routes from which First has previously withdrawn. However, both Falkirk and Stirling operate effectively as two separate networks served by the depots at Larbert and Bannockburn, respectively.

Although competition in the area is limited, prior to 2020 Mackie's Coaches offered competing services between Stirling and Alloa, but these have been suspended during the pandemic. It is presumed, however, that Mackie's will resume their services in the future as they have not sold their vehicles. To a certain degree, Citylink and First also compete in the connection between Stirling and Glasgow.

First's networks in the study area have contracted and suffered frequency reductions in response to falling ridership, which has resulted in a struggle to maintain viability over many years. This has also led to First's fleet covering these networks being one of their oldest, with the notable exception of the Stirling – Falkirk – Edinburgh corridor. It is worth noting that more recently the Edinburgh to Stirling Link has been split at Falkirk. This has the benefit of improved reliability between Falkirk and Stirling as delays in Edinburgh are not carried through. In addition, this has also allowed the Edinburgh service to extend to serve Falkirk Community Hospital.

Stirling has a bespoke 'UniLink' service operated by First linking the remote campus with Stirling at Goosecroft Road, adjacent to the bus station and Thistles Shopping Centre. The service operates until after midnight and has a high frequency in the daytime.

Falkirk had an inconveniently located bus station on the outskirts of the town centre which closed in 2019. Services are now operating on a bus-only road through the town centre on Newmarket Street (Figure 4.1). However, Falkirk centre has seen a decline as a trip attractor. This is due to shopping moving outward to retail parks and Falkirk Council's staff moving to out of town sites due to the impending closure of the Municipal Buildings.



Figure 4.1 Newmarket Street in Falkirk

Finally, it is worth noting that First Scotland East has not received any funding for upgrading their fleet to zeroemission buses under the Scottish Ultra-Low Emission Buses Scheme (SULEBS). However, they are benefitting from the cascade of young diesel buses from First Glasgow allowing them to upgrade their fleet with vehicles compliant with a Euro VI emissions standard.



4.1. Nature of Bus Services in Corridor 2

Corridor 2 provides access to key employment centres such as Stirling city centre and services along its route. As a result, the nature of bus services operating in this corridor is primarily to provide access to the local community to key services but there are also commuting routes into employment centres at Stirling.

The Forth Valley Royal Hospital on the western edge of Larbert is a major trip generator in its own right and its catchment area includes Falkirk, Stirling and Clackmannanshire. Services in Corridor 2 providing a key access to Forth Valley Royal Hospital First's 38 (Falkirk to Stirling through Bannockburn and St Ninians), 6, 6A and 7 (from Falkirk Wheel and Camelon through Falkirk town centre) and H1 and H2 (from Alva and Dollar through Alloa town centre). These services are fundamental in guaranteeing access from accessible rural areas and small towns to essential healthcare services.

Stirling city centre is a key employment centre at the northern end of Corridor 2 and, as such, a major trip attractor with 7,525 employees. In this case, First's service 38 provides a key connection between Falkirk and Stirling, which are key spots for employment, with mainly residential areas along the route such as Bannockburn or St Ninians. Other service with a similar nature is First's 51 as it provides a route between Stirling city centre, Alloa on the east and Cowie on the south.



Figure 4.2 Bus Services in Corridor 2

Appendix A.1 provides a detailed overview of all services operating in Corridor 2 including operator, origin, destination, hours of operation and frequency.

4.2. Nature of Bus Services in Corridor 3

Corridor 3 provides a key commuting route into Falkirk town centre from the Camelon the west, as well as connecting Camelon Industrial Estate and Camelon train station. In addition, First's service X37 provides a commuting route into Glasgow, also increasing the range of services available to the local community around Corridor 3 and Falkirk.



First's service 38 joins Corridor 3 from Stirling at the Camelon Roundabout towards Falkirk town centre, thus ensuring access to Forth Valley Royal Hospital and providing a commuting route into the town centre from accessible rural areas between Stirling and Falkirk.

Falkirk Community Hospital and Howgate Shopping Centre are the main services in the vicinity of Corridor 3. These are, however, not directly accessible from the corridor, which has a principal function as a commuting route into Falkirk town centre, Camelon Industrial Estate and, beyond the study area, Glasgow.

All the services operating in Corridor 3 are shown in Figure 4.3 below.



Figure 4.3 Bus Services in Corridor 3

Appendix A.1 provides a detailed overview of all services operating in Corridor 3 including operator, origin, destination, hours of operation and frequency.

4.3. Nature of Bus Services in Corridor 4

Similar to Corridor 3, Corridor 4 provides a key commuting route into Falkirk town centre from the mainly residential areas adjacent to Grahams Road and Carron Road. In addition, it provides access to Falkirk's Central Retail Park which is a major trip generator in the study area.

Adjacent to Corridor 4 is Falkirk's Grahamston station, with regular daily services to Edinburgh and Glasgow. However, it is unlikely that regular commuters on the route would reach the station by bus to then continue by train into Edinburgh or Glasgow given the overall journey time and the lack of integrated fares and ticketing.

First's service F16 connects Falkirk and Stirling, providing a key commuting service with stops in Airth, Dunmore, Throsk and Fallin to the north of the corridor. Service 8 provides a commuting service into Falkirk town centre from Denny to the west, also picking trips from Larbert and connecting the Larbert train station in the vicinity of Corridor 2.

Although First's services 6, 6A and 7 operate in Corridor 4, their primary function of serving Forth Valley Royal Hospital is not as relevant as it is for Corridor 2.



All the services operating in Corridor 4 are shown in Figure 4.4 below.



Figure 4.4 Bus Services in Corridor 4

Appendix A.1 provides a detailed overview of all services operating in Corridor 4 including operator, origin, destination, hours of operation and frequency.

4.4. Nature of Bus Services in Corridor 6

Corridor 6 provides a key connection to the University of Stirling, a key trip attractor in the study area, from Bannockburn through Stirling city centre. This means that it is also a key commuting route from the residential areas in Bannockburn and the future development at South Stirling Gateway (see 5.7.4) into Stirling.

There are, however, no bus services operating the whole length of the route which means there is not a direct bus connection between the more residential areas south of the bus station in Stirling and the campus. The only service operating in the corridor that comes closer to providing this overall connection is First's 51 between Clackmannanshire and Cowie although the closest bus stop to the campus is in the proximity to Causewayhead Roundabout. This would still require a 20-minute walk to reach, for example, the admissions office building, adding to the overall journey time.

The best two options to reach the campus from Stirling are First's service UniLink or Stagecoach's 15A, both stopping at the University of Stirling Transport Hub. Although there are plans under the project Walk, Cycle, Live Stirling to improve the route between Stirling station and the campus for people cycling, options to access the university from the south are limited at present.

It is worth noting that the campus provides low-cost parking for visitors at £1 or less per hour Monday to Friday between 9am and 5pm, charging a maximum of £5 for five or more hours. There are also parking permits available for staff and students, which reduces even further the competitiveness of public transport with regards to the use of the private vehicle.

All the services operating in Corridor 6 are shown in Figure 4.5 below.



Figure 4.5 Bus Services in Corridor 6



Appendix A.1 provides a detailed overview of all services operating in Corridor 6 including operator, origin, destination, hours of operation and frequency.

4.5. Nature of Bus Services in Corridor 7

There are two key employment centres along Corridor 7, Alloa town centre including the OI manufacturing plant and the Cambusview and Diageo Works west of Tullibody. Despite this, Corridor 7 represents a clear commuting route from Clackmannanshire into Stirling city centre, also allowing people in Fishcross, Sauchie, Alloa and Tullibody to access a wider range of services in Stirling. The key service meeting this function is First's 51, with a daytime frequency of 15 minutes. Alternatively, service 52 provides a commuting option between Stirling and Alloa with a daytime frequency of 30 minutes.

Corridor 7 also serves Alloa train station, which provides a direct, regular 48-minute railway connection to Glasgow Queen Street via Stirling. However, adding the time of the bus journey to the station from other points within Clackmannanshire, this is not a competitive option for regular commuters with regards to the private vehicle, similar to what was observed for Corridor 4.

It is worth noting that First's hourly services H1 and H2 to Forth Valley Royal Hospital provide an essential access to healthcare services within Clackmannanshire. For example, H2 provides a 43-minute bus connection between Fishcross and Forth Valley Royal Hospital without considering any added time to reach the bus stop. This same trip by car, however, is estimated to take between 20 and 30 minutes.

All the services operating in Corridor 7 are shown in Figure 4.6 below.



Tillicoultry To Callander **Bus Corridors** Corridor 7 **Bus Routes** 257 (Fishers) Stirling 51 (First) 52 (First) Alloa C1 (First) C2 (Hunters) C30 (First) H1 (First) H2 (First) To Kirkcaldy / Dundee Larbert 3 6 km Contains OS data © Crown Copyright and database right 2022

Figure 4.6 Bus Services in Corridor 7

Appendix A.1 provides a detailed overview of all services operating in Corridor 7 including operator, origin, destination, hours of operation and frequency.

5. Analysis of Problems and Opportunities

The analysis below presents the assessment of problems and opportunities across the five corridors around the following key themes:

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- Sections 5.1 to 5.5 provide an assessment of traffic delays at junctions and in urban traffic affecting bus journey time and reliability. These sections also include an assessment of how the location and frequency of bus stops could affect bus journey times. Other aspects that could affect bus journey times such as how buses are boarded or tickets purchased will be explored in detail at the next stage of options generation.
- Section 5.6 focuses on the environment of the bus stop, the wider components of the bus journey as per Figure 2.1 and what the experience of getting to the bus stop and waiting there may look like for different users. These are components of the bus journey likely to have a significant impact on how people perceive the overall bus journey and a blocker to increase ridership of not addressed or planned for adequately.
- An assessment of the suitability and quality of the bus vehicles for different segments of the community will be carried out at the next stage of options generation. This will take account of the nature of the service being provided, as well as the experience of different users within the vehicle.
- Finally, section 5.7 provides an overview of opportunities for integration with operational and developing projects across the study area.

These themes are summarised in the mind map presented in Figure 5.1 below.

Integration Traffic with Other Delays Projects Boarding Nature and Other Problems and Function of Delays Bus **Opportunities** Services Frequency of Bus Stops Quality & Bus Suitability of Stop **Bus Vehicles** Experience of Getting to the Bus Stop Experience of Waiting at the Bus Stop

Figure 5.1 Mind Map of Problems & Opportunities

5.1. Corridor 2 Stirling to Camelon Roundabout

This corridor follows the A9 from Stirling city centre (St Ninians Rd / Newhouse) to Camelon roundabout in Falkirk. The key problems and opportunities across the corridor are presented in Table 5.1 below.

Table J. I Corrigor 2 Froblems and Opportunities
--

Location	Problems, Opportunities and Evidence
Stirling City Centre	There are high volumes of traffic throughout the city centre and congestion hotspots at key junctions. The junction between Wellgreen Rd, St Ninians Rd and Port St

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Location	Problems, Opportunities and Evidence
	represents a convergence point for high-volume routes with weekday average volumes of 16,000 (2019) causing delay and blocking back with no existing bus priority.
Borestone Crescent between Weaver Row and St Ninians Roundabout	Live traffic information from Google Maps shows slow traffic in the northbound section of Borestone Crescent coming out of St Ninians Roundabout at peak times. This could be a consequence of the signalised junction with Weaver Row, which provides access to the Lidl store and St Ninians Primary School, among others. Appendix A.2 provides more detailed information about the delays in this specific section of the corridor.
St Ninians Roundabout	There are minor delays in the access to the roundabout from Borestone Crescent at peak times. More significant delays are observed in the access to the junction from Burghmuir Road (Corridor 6). Similar issues are observed in the approaches to the junction from the A9, both east and westbound. As there is no provision for bus priority in the approaches to the junction these delays could have an impact on overall bus journey times across Corridor 2. Appendix A.2 provides more detailed information about the delays in this specific section of the corridor.
A9 Junction with Station Road	 This is a small roundabout with one lane per direction, as well as parking and loading bays in the approach from the north and no provision for bus priority. Minor delays are observed in the approaches from A9, both from the north and south. There are also minor delays with southbound traffic coming out of the junction. It is worth noting the provision of cycle hire bays (NextBike Stirling) in the corner of East Murrayfield with the A9 (see Figure 5.31 below). As there is no provision for bus priority in the approaches to the junction these delays could have an impact on overall bus journey times across Corridor 2. Appendix A.2 provides more detailed information about the delays in this specific section of the corridor. Figure 5.2 Approach to A9 Junction with Station Road. Street View
Greencornhills Roundabout	This is the junction between the A9 and the A91 (Pirnhall Road), which provides a wider connection to Corridor 6 and the South Stirling Gateway development. Minor delays are observed in the approaches to the roundabout from the A9. These extend to the junction with Stein Square on the north and nearly 350m to the south of the junction. As there is no provision for bus priority in the approaches to the junction these delays
	could have an impact on overall bus journey times across Corridor 2. Appendix A.2 provides more detailed information about the delays in this specific section of the corridor.

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Location	Problems, Opportunities and Evidence
A9 Section between Glen Rd and Glenbervie Roundabout (M876)	The Glenbervie roundabout provides eastbound access to the M876 and picks up westbound traffic coming from the south across the highway. Delays are particularly significant for about 800m southbound from Glen Rd and northbound from Glenbervie roundabout for about 320m. The road provides has multiple points of local access which could be affecting these delays.
	Figure 5.3 A9 Between Glen Rd and Glenbervie Roundabout. Street View
	As there is no provision for bus priority along this section these delays could have an impact on overall bus journey times across Corridor 2. Appendix A.2 provides more detailed information about the delays in this specific section of the corridor.
North Broomage Roundabout and Access to Forth Valley Royal Hospital	The roundabout provides a junction with the approaches to the M876 and Bellsdyke Rd into Larbert. There are only minor delays observed at peak times in the approaches, especially coming from the south and the Forth Valley Royal Hospital.
A9 Junction with Denny Rd	There are minor delays observed in the approaches to the junction at peak times, both from the north and from the south. This is a signalised junction with no provision for bus priority, which could have an impact on overall bus journey times across the Corridor 2. Appendix A.2 provides more detailed information about the delays in this specific section of the corridor.

Location	Problems, Opportunities and Evidence
	Figure 5.4 Denny Rd Junction North Approach. Street View
Camelon Roundabout	This is where Corridor 2 intersects Corridor 3. Although minor delays can be observed in the approach to the junction from the A9 at peak times, these are more significant in Corridor 3 and, therefore, will be analysed in more detail below.
Nature of Bus Services	As discussed in 4.1 the nature of bus services in Corridor 2 is primarily to provide access to the local community to key services and trip generators such as the Forth Valley Royal Hospital. Therefore, the operation of routes connecting accessible rural areas and small towns to these key services must be resilient to guarantee accessibility by public transport.
	Other key services and facilities along corridor 2 include Stirling High School through Beechwood Park, the Lidle store at Weaver Row, Bannockburn Primary School and Library or East Plean Primary School.
	Corridor 2 is also a commuting route into Stirling city centre from the south, which includes all the Thistles Shopping Centre and the Castlecraig Business Park. Guaranteeing a competitive public transport offering for the community along this route could be a key factor in getting commuters, that otherwise would take their cars into Stirling city centre on a daily basis, to use the bus.
Frequency of Bus Stops	The first southbound bus stop in Corridor 2 is located in front of Stirling Council's Old Viewforth building. The average southbound distance between bus stops is 460m, whereas in specific areas classified as Accessible Rural Areas as per Figure 3.4 is 600m.
	The average distance between bus stops for Other Urban Areas is 375m. These include the mainly residential areas south of Stirling, St. Ninians, Bannockburn and Larbert and there is provision for key trip generators such as the Forth Valley Royal Hospital, Bannockburn High School, Bannockburn Primary School or the Police Scotland headquarters at St Ninians Rd.
	The first northbound bus stop in the corridor is located right at the exit of Camelon Roundabout in front of the Forth Valley Sensory Centre. The average northbound distance between bus stops is 500m, which compares to the 460m southbound. In specific areas classified as Accessible Rural Areas this average goes up to 670m. The average distance between bus stops for Other Urban Areas is consistent with the southbound direction at 375m.

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Location	Problems, Opportunities and Evidence
	The provision of bus stops will be revised at the options generation stage to develop a better understanding of how their frequency may have an impact on bus journey times considering the primary nature of bus services in the corridor.

5.2. Corridor 3 Camelon Road and Glasgow Road, Falkirk

This corridor provides a key link between the Three Bridges Roundabout and Falkirk city centre following the A803. The key problems and opportunities across the corridor are presented in Table 5.2 below.

Table 5.2 Corridor 3 Problems and Opportunities



	Canturas ATKINS Member of the SNC-Lavalin Group
Location	Problems, Opportunities and Evidence
Glasgow Road West of Camelon Roundabout	There are delays observed at peak times across this section of Corridor 3, both westbound and eastbound into Falkirk with queuing at the junction with Watling Street. The road provides access to local services and houses as well as having a significant provision of free on-street parking.
	Figure 5.7 Glasgow Road West of Camelon Roundabout. Street View
	As there is no provision for bus priority along this section of the route these delays could have an impact on overall bus journey times across Corridor 3. Appendix A.2
	provides more detailed information about the delays in this specific section of the corridor.
Redbrae Junction, Camelon Roundabout and Camelon Main Street	Redbrae Junction provides access to Camelon station through Redbrae Road. However, the closest bus stop is in Glasgow Road westbound at a 4-min walk as there are no bus services operating directly into the station. This is one of the worst congestion points in Corridor 3 as a result of right turns into Redbrae Road blocking general traffic.
	Figure 5.8 Redbrae Junction into Redbrae Road and Camelon Station
	The Camelon roundabout is the intersection between Corridor 2 and Corridor 3.
	Delays and queuing are observed at peak times in the approaches to Camelon Roundabout, as well as westbound into Glasgow Road coming out of the meeting.



	n emet of the site Earthan oropy
Location	Problems, Opportunities and Evidence
	of the westbound bus lane. Appendix A.2 provides more detailed information about the delays in this specific section of the corridor.
Falkirk Town Centre	City centre routing is inefficient including delays to buses due to general congestion, especially in the approaches to junctions. It must be noted that Newmarket Street is currently used as a bus-only street (see Figure 4.1) with delays to buses entering from the junction in the west and leaving via Vicar St. Traffic is also slow across West Bridge St.
	Figure 5.11 Vicar St Junction with Newmarket St. Street View
	Appendix A.2 provides more detailed information about the delays in this specific section of the corridor.
Nature of Bus Services	Corridor 3 is a key commuting route into Falkirk town centre and, beyond the corridor to the west. Glasgow through First's service X37
	Guaranteeing a competitive and attractive public transport offering for the community along this route could be a key factor in getting commuters, that otherwise would take their cars into Falkirk town centre or Glasgow on a daily basis increasing the volume of traffic in the corridor, to use the bus.
Frequency of Bus Stops	The first eastbound bus stop in Corridor 3 is located at the exit of the Three Bridges Roundabout. The average eastbound distance between bus stops is 305m. The entirety of Corridor 3 goes through Camelon and Falkirk town centre, all of it classified as Other Urban Areas as per Figure 3.4. This average distance is lower than the 375m for Corridor 2. The average distance between bus stops westbound is 295m. The provision of bus stops will be revised at the options generation stage to develop a better understanding of how their frequency may have an impact on bus journey times considering the primary nature of bus services in the corridor.

5.3. Corridor 4 Graham's Road, Falkirk

This corridor follows the Carron Road / Grahams Road corridor (B902) connecting the Ronades Road / Carron Road roundabout with Falkirk city centre. The key problems and opportunities across the corridor are presented in Table 5.3 below.

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Table 5.3 Corridor 4 Problems and Opportunities

Location	Problems, Opportunities and Evidence
Carron Rd / Ronades Rd Roundabout	There are some minor delays observed in the approach to the roundabout from the south and, more generally, with northbound traffic through the junction. Delays at the roundabout are likely to have some impact on overall bus journey times across Corridor 3 as there is no provision for bus priority. Appendix A.2 provides more detailed information about the delays in this specific section of the corridor.
David's Loan Junction	<text></text>
	detailed information about the delays in this specific section of the corridor.
David's Loan to Dalderse Avenue	This is a heavily congested section in Corridor 4. Issues observed at this section include:
	• Limited opportunities to provide bus priority measures due to space availability.
	• Bus shelters have been observed to be blocked by traffic. It is worth noting that multiple services operate in this corridor sharing bus stops (see Figure 4.4).
	Buses having to stop in traffic immediately after leaving the bus stop.
	Availability of residential street parking.
	These issues are shown in the pictures below.






Figure 5.14 Bus Leaving Stop North of Bankside Av. Junction



Figure 5.15 Shelter Showing Congested Area



	Member of the SNC-Lavalin Group
Location	Problems, Opportunities and Evidence
	As there is no provision for bus priority along this section of the route these delays could have a significant impact on overall bus journey times across Corridor 4, especially given the constraints around road space availability. Appendix A.2 provides more detailed information about the delays in this specific section of the corridor.
Central Retail Park and Falkirk Grahamston	Access to the retail park is through the Grahams Road Roundabout. The roundabout and the approaches present significant congestion during peak shopping hours (morning hours during the weekend).
	In addition, it is worth observing that maximum walking times to the stores in the retail park from the bus shelter are 6 minutes (between the bus shelter and Cineworld).
	Figure 5.16 Service X37 at Central Retail Park (Grahams Rd Roundabout)
	<image/>
	Falkirk Grahamston has 342 parking spaces at a cost of £1.50 per day, as well as electric vehicle (EV) charging facilities. This makes the trip to the station using the private vehicle very attractive when compared to the bus. However, it is worth noting that the bus stop is immediately adjacent to the station at the entrance to Platform 1.
	In general, overall congestion in this section of Corridor 4, especially during peak shopping hours could have a significant impact on overall bus journey times across the corridor. Appendix A.2 provides more detailed information about the delays in this specific section of the corridor.
Nature of Bus Services	As discussed in Section 4.3, Corridor 4 is mainly a route for commuters into Falkirk town centre from Carron, Larbert and Denny, as well as Airth, Dunmore, Throsk and Fallin to the north. In addition, Corridor 4 provides access to Falkirk's Central Retail Park.
	Maintaining an attractive public transport offering along Corridor 4 could be a key factor to increase bus ridership amongst commuters and shoppers, thus reducing the number of people driving their cars into Falkirk, the retail park or even Grahamston station. The availability of free or low-cost parking in Falkirk town centre and in the retail park also needs to be factored in when developing options to address the competitiveness of bus over the private vehicle.

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Location	Problems, Opportunities and Evidence
Frequency of Bus Stops	The first southbound bus stop in Corridor 4 is located at Millflats Street. The average southbound distance between bus stops is 230m. Similar to Corridor 3, all the route passes through an area classified as Other Urban Areas as per Figure 3.4. This average distance is 60m shorter than the average distance for Corridor 3. The northbound average distance is 270m.
	The provision of bus stops will be revised at the options generation stage to develop a better understanding of how their frequency may have an impact on bus journey times considering the primary nature of bus services in the corridor.

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5.4. Corridor 6 University of Stirling – Stirling Centre – Bannockburn Interchange

This corridor connects the University of Stirling on the A9 following along the A872 until the Bannockburn Interchange, intersecting Corridor 2 at St Ninians Roundabout and Corridor 7 at Causewayhead. The key problems and opportunities across the corridor are presented in Table 5.4 below.

Table	5.4	Corridor	6	Problems	and	Opt	oortuni	ties
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Location	Problems, Opportunities and Evidence
Causewayhead Roundabout	The roundabout provides access to Airthrey Rd towards Stirling Uni and is represents the intersection with Corridor 7 through Alloa Rd. Minor delays are observed in the approaches to the roundabout at peak times from all directions. There are also delays coming out of the roundabout towards Stirling due to the right turn into Easter Cornton Rd. Finally, it is worth noting the provision of free residential street parking along Causewayhead Road.
	The National Wallace Monument is a key tourist destination and is adjacent to the roundabout.
	These delays could have an impact on overall bus journey times across Corridor 6 as there is no provision for bus priority. Appendix A.2 provides more detailed information about the delays in this specific section of the corridor.
New Stirling Bridge	Congestion issues observed at the bridge towards Stirling centre are severe. This is the only river crossing in Stirling and is among the most congested points in the network. Space constraints in the bridge are also an issue with limited opportunities to provide bus priority.
	<image/>
	These delays are likely to have a significant impact on overall bus journey times across Corridor 6 and constraints will have to be taken into account as part of any

Location	Problems, Opportunities and Evidence			
	measures proposed for the bridge. Appendix A.2 provides more detailed information about the delays in this specific section of the corridor.			
Customs Roundabout	Minor delays are observed in the approaches to the junction from Union St both westbound and eastbound at peak times. There is also free on-street residential parking available westbound close to the roundabout.			
	These delays could have an impact on overall bus journey times across Corridor 6 as there are no measures for bus priority in place. Appendix A.2 provides more detailed information about the delays in this specific section of the corridor.			
	Figure 5.18 Approach to Customs Roundabout from Union St. Street View			
Stirling City Centre	Similar to Falkirk, it is worth noting that free or low-cost town centre parking is often available in the city centre, which could make private car be perceived as a more convenient mode than bus. City centre parking locations across the corridor include Tesco Superstore, which is free, and Thistles Shopping Centre, with over 1,300 between £1 and £1.50 per hour.			
	The Goosecroft corridor provides access to Stirling Bus Station and the railway station although it often presents delays due to the interface with traffic accessing Thistles Car Park, especially at peak shopping hours. This is a key point of interchange between regional and local bus routes, however hampered by the lack of multi- operator ticketing.			
	These delays could have an impact on overall bus journey times across Corridor 6 as there are no measures for bus priority in place. Appendix A.2 provides more detailed information about the delays in this specific section of the corridor.			
Craigs Roundabout	Minor delays are observed on all accesses to the roundabout at peak times, which get worse during peak shopping hours. There are also delays coming out of the junction southbound through Burghmuir Road.			

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Location	Problems, Opportunities and Evidence
	Figure 5.19 Craigs Roundabout Access from A9. Street View
	These delays anyle have an impact on everall has inverse times agree Carrier 6 as
	there are no measures for bus priority in place. Appendix A.2 provides more detailed information about the delays in this specific section of the corridor.
Burghmuir Rd and Linden Ave Roundabout	The roundabout provides access to the Council-operated Linden Avenue Car Park, which has a daily charge of £2 with a total of 185 parking spaces. The closes bus stop northbound is 2 minutes away walking.
	There are minor delays observed northbound between this roundabout and Craigs Roundabout. As there is no bus priority, these delays are likely to have an impact on overall bus journey time across Corridor 6.
Milton Rd Roundabout	Only minor delays at peak times southbound approaching the roundabout are observed. In addition, there is only an hourly local service south of Milton Road and the Citylink between Glasgow and Edinburgh. Thus, it could be difficult to make the case for any intervention at this specific location.
Bannockburn Interchange	Delays observed at Bannockburn Interchange are minor. However, this is the site of the future South Stirling Gateway development. This could require reconsidering bus priority in this section of Corridor 6 to accommodate demand from the new development (see 5.7.4).
Nature of Bus Services	As detailed in Section 4.4 one of the main function of bus services operating in Corridor 6 is to provide access to the University of Stirling. However, this has been noted to be limited for the residential areas south of Stirling bus station including Bannockburn and the future development at South Stirling Gateway.
	Although future active travel improvements between Stirling city centre and the campus are being planned, there are not clear attractive options to compete with the private vehicle in getting to Stirling University.
	The commuting character of this corridor from the south into Stirling city centre where there are major attractors such as the Thistles Shopping Centre has also been noted. Thus, maintaining an attractive public transport offering along the route could be a decisive factor to increase bus ridership amongst commuters and shoppers.
Frequency of Bus Stops	The first southbound bus stop in Corridor 6 corresponds to the main entrance of the University of Stirling. The average southbound distance between bus stops is 435m, whereas in specific areas classified as Accessible Rural Areas as per Figure 3.4 is 740m.
	The average distance between bus stops for Other Urban Areas is 400m. This is slightly higher than previous distances due to the fact that the distance between bus

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Location	Problems, Opportunities and Evidence
	stops in the northern section from the Causewayhead Roundabout up to the University of Stirling is larger despite being classified as Other Urban Areas.
	The first northbound bus stop in the corridor is located at the junction with Pirnhall Road, right in front of the Pirnhall Inn. The average northbound distance between bus stops is 450m, consistent with the 435m southbound. In specific areas classified as Accessible Rural Areas this average goes up to 565m. The average distance between bus stops for Other Urban Areas is 435m.
	The provision of bus stops will be revised at the options generation stage to develop a better understanding of how their frequency may have an impact on bus journey times considering the primary nature of bus services in the corridor.

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5.5. Corridor 7 Causewayhead – Tullibody – Alloa – Sauchie

This corridor follows the A908 from Fishcross centre to Alloa, providing a key strategic link between Fishcross, Sauchie, Alloa, Tullibody and Stirling. The key problems and opportunities across the corridor are presented in Table 5.5 below.

Location	Problems, Opportunities and Evidence			
Alloa Rd and A91 Roundabout	There are delays observed in the approach to the roundabout from the west, which could have an impact on overall journey times across Corridor 7 as there is no bus priority.			
Alloa Town Centre	There are minor delays in the section of Corridor 7 going through Alloa town centre. However, the potential for bus priority measures may be subject to road space availability.			
Shillinghill Roundabout	This roundabout represents a point of high congestion with issues relating to high speeds favoured by the geometry of the junction – high visibility on roundabout and wide lanes. Figure 5.20 Eastbound Approach to Shillinghill Roundabout. <i>Street View</i> These delays could have an impact on overall bus journey times across Corridor 7 as there are no measures for bus priority in place. Appendix A.2 provides more detailed information about the delays in this specific section of the corridor.			
Whins Road and Hallpark	Minor delays are observed northbound across Whins Rd. This could be due to the presence of on-street residential parking, as well as numerous local access roads with right turns.			

Table 5.5 Corridor 7 Problems and Opportunities



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vidence		

The average distance between bus stops for Alloa, Sauchie and Fishcross, classi as Other Urban Areas is 345m, whereas for Accessible Small Towns (Tullibody) to average distance between bus stops is 440m.
average distance between bus stops is 440m.
The first westbound bus stop in the corridor is south of Fishcross primary school, the opposite side of the road. The average northbound distance between bus stop 540m, whereas in specific areas classified as Accessible Rural Areas this average goes up to 1,020m. The average distance between bus stops for Other Urban Are 470m and for Accessible Small Towns is 380m. This means that there is a better provision of bus stops across Tullibody towards Stirling than towards Alloa.
The provision of bus stops will be revised at the options generation stage to devel better understanding of how their frequency may have an impact on bus journey to considering the primary nature of bus services in the corridor.

Problems, Opportunities and E

5.6. Accessibility to Bus Stops

Location

Bus stop design and location is a crucial element in the overall quality of bus services, as bus passengers are also pedestrians at teach end of the bus trip, thus all aspects of the journey need to be considered. The bus stop environment contains a number of features that need to be accounted for as illustrated in Figure 5.23 below.

Figure 5.23 Features of the Bus Stop Environment. *Transport for London, Accessible Bus Stop Design Guidance*



Although the condition of bus stops in the study area is generally adequate to the level of service, it has been observed that there is room for improvement around some of these elements across the five corridors. General issues include:



- Delays have been observed in the approach and exit path for buses, especially in congested corridors (see Figure 5.14 above).
- Some bus stops do not have any seating provision within the shelter. In addition, the shelter can occasionally be an obstruction to pedestrians using the footway (see Figure 5.24).
- In general, provision of lighting in bus stops is low and does not contribute to create a sense of security within the stop environment.
- Surface markings for buses on the road are not present in some instances. There are also cases where the markings need to be repainted (see Figure 5.25).
- In general, provision of information in some key bus stops along the routes could be enhanced to include live information and waiting times.
- The location for some of the bus stops could be revised to ensure good connectivity with existing and proposed paths and active travel networks.

Figure 5.24 Shelter in Grahams Rd at Bankside Junction



Figure 5.25 Bus Stop in Glasgow Rd, Falkirk



The accessibility aspects of specific bus stops corresponding to key trip generators in the study area is expanded and detailed further in the following sections. This analysis will be further expanded throughout the options generation stage.

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5.6.1. Forth Valley Royal Hospital – Corridor 2

The hospital is a key trip attractor in the study area and essential to understand the nature of bus operations in Corridor 2. The bus stops are located close to the main entrance to the hospital and the pedestrian flow does not present any conflicts with other modes, which is convenient for passengers.

Bus Stops Area Pedestrian Flow trom Bus Stops

Figure 5.26 Pedestrian Flow Between Bus Stops and the Hospital Building

In addition, the access for buses is only shared with drop-off only vehicles and blue-light services, which deems any obstruction to the approach and exit routes for buses unlikely. The bus stop is correctly signposted and the waiting areas are sheltered and have seating available for people waiting.

5.6.2. University of Stirling – Corridor 6

The University of Stirling delivered a new transport hub in 2018 as part of a wider campus masterplan. The hub included bus shelters, footpaths and landscaping improvements.



Figure 5.27 Transport Hub at University of Stirling. Urban Realm

The provision of seating spaces is adequate and the stops are well connected to the footpaths within the campus. There is lighting provision at the bus stops although there may be opportunities to review the provision of lighting and how it may affect the perception of security outwith the transport hub and along the footpaths.

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In addition to this main hub, there are two other bus stop locations as shown in Figure 5.28 below.



Figure 5.28 Bus Route and Stops at University of Stirling. University of Stirling

5.6.3. Stirling High School through Beechwood Park – Corridor 2

Access by bus to Stirling High School from Corridor 2 requires a 6-minute walk through Beechwood Park. This may present a number of issues around the perception of safety by different users, especially during the months of Autumn and Winter when day are significantly shorter.



Figure 5.29 Bus Shelter at Beechwood Park (Southbound). Street View

In addition to the likely issues around insecurity, these bus stops present other issues that could have an impact on people taking the bus to travel to Stirling High School:

• Although the provision of space is enough for people to move around the bus stops, these are not well connected to the footways within the park leading to the high school. This is especially inconvenient for people arriving at the bus stop located southbound, as there are no crossing facilities nearby (see Figure 5.29 above).

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- There is no provision of live bus information at the shelters which could also create accessibility issues for certain segments of the population.
- Finally, the paths within the park, as well as the footways surrounding the bus stops present a rough surface which could present issues for people wheeling or with mobility issues.

These problems have also been identified in the accesses to other education facilities across the study area such as Bannockburn High School, where the bus stops do not have a shelter due to the limited width of the footway. Other educational facilities that will be analysed in detail at the next stage of options generation are Bannockburn Primary School, East Plean Primary School, Wallace High School, Banchory Primary School and Fishcross Primary School.

5.6.4. Retail

Retail and shopping centres are also key trip attractors within the study area and a more detailed assessment of their associated bus stops and the potential opportunities to improve accessibility will be carried out at the next stage of options generation. Key locations include the Thistles Shopping Centre in Stirling, the Asda Superstore or the Central Retail Park in Falkirk, the Asda Superstore in Alloa or the Lidl store at Weaver Row in Stirling.

5.7. Integration with Live and Operational Projects Across the Study Area

Table 5.6 provides a summary of the main opportunities for integration with live and operational projects in the study area, which are expanded further below.

Project	Status	Corridor	Opportunities
Walk, Cycle, Live Stirling	Detailed Design	6	Integration with proposed active travel provision to guarantee competitive journey times over the use of the private vehicle. Relevant trip generators include Stirling Uni and Goosecroft Road (bus and train stations as well as the Thistles Shopping Centre). Constraints around the availability of road space are detailed in 6.1.
City Centre South	Feasibility	2 and 6	Integration with proposed active travel provision to guarantee competitive journey times over the use of the private vehicle, as well as contributing towards the principles and objectives defined within the City Centre South Masterplan. Constraints around the availability of road space are detailed in 6.1.
Pirnhall to City Centre South Active Travel Route	Feasibility	6	Integration with proposed active travel provision to guarantee competitive journey times over the use of the private vehicle. This will become particularly relevant in the context of the South Stirling Gateway and Durieshill developments.

Table 5.6 Live and Operational Projects in the Study Area



Project	Status	Corridor	Opportunities
NextBike Stirling	Operational	2 and 6	Consider bike hire station in the development of any potential measures along corridors 2 and 6 to capture any potential efficiencies around interchange between bus and active travel.
South Stirling Gateway and Durieshill Developments	Planning Application Notice (PAN)	6	Creation of a new entrance gateway into Stirling along Corridor 6 (A872) including addressing the current limitations in terms of public transport links and the provision of P&R.
Denny to Falkirk Active Travel Route	Construction	3	Integration with proposed active travel provision to guarantee competitive journey times over the use of the private vehicle.
Falkirk Growth Deal	Feasibility	3 and 4	The ringfenced investment of £21m represents an opportunity to develop significant improvements around interchange and accessibility to Falkirk Grahamston Station.

5.7.1. Walk, Cycle, Live Stirling

The WCLS programme is made up of the following areas:

- The Raploch Street Design Project. The first phase of the WCLS scheme is a focused street design project covering Raploch Road and the link to Forth Valley College Stirling Campus along Drip Road. This project is being led by Sustrans' Street Design team.
- 2. The city Centre to Forth Valley College Route. The proposals include resurfacing and widening pavements and creating safer crossing points, alongside protected cycle lanes from Upper Craigs, along the A811 and the Forth Valley College Campus.
- 3. The Stirling Station to University Route. The route between Stirling rail station and the University of Stirling will improve the look and feel along key streets including Cowane Street, Causewayhead Road and Airthrey Road. This scheme presents an interface with Corridor 6 at Arthrey Road connecting the University of Stirling with the A9, a section of Causewayhead Road between Dumyat Road and Cornton Road and Cowane Street.

There are opportunities to integrate any proposals resulting from the STAG report with these planned active travel routes to guarantee there is an efficient alternative to driving.

5.7.2. City Centre South

The City Centre South (CCS) programme is intended to expand on Walk, Cycle, Live Stirling creating walking, wheeling and cycling neighbourhoods south of Stirling's city centre. These will link to active travel corridors and proposals from the South Stirling Gateway and Durieshill developments in the long term (see 5.7.4 and 5.7.5 below).

A draft feasibility study has recently been concluded and presents a masterplan for the area, as well as more focused proposals for specific focus areas. The masterplan is shown in Figure 5.30 below and shows primary cycle routes being proposed for Burghmuir Road (Corridor 6) and St Ninians Road (Corridor 2).

Proposals include the provision of pedestrianised spaces and public realm improvements, bi-directional cycleways across the primary cycle routes, improved crossings and other safety improvements, as well as flood mitigation and environmental enhancements.

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Figure 5.30 Stirling City Centre South Masterplan. *City Centre South Feasibility Report (Stirling Council, March 2022)*



5.7.3. NextBike Stirling

The NextBike scheme provides people with the opportunity to rent a bike using a subscription model. The locations for the NextBike stations are shown in Figure 5.31 below.



Figure 5.31 NextBike Stirling Stations. NextBike



5.7.4. South Stirling Gateway and Durieshill Developments

It is worth noting that although the corridors represent critical routes overall minor rerouting could be beneficial to provide better connections with destinations of growing importance adjacent to the corridors. The South Stirling Gateway and Durieshill developments at the southern end of Corridor 6 are a clear example of this situation. It is worth noting that overall journey times could increase once the walking time from different points of the development to the bus stops is included.

South Stirling Gateway is a large development area allocated within Stirling's Local Development Plan (LDP) for a mixed-use development across two sites, as illustrated in Figure 5.32 below. The primary use of the larger site has been allocated for housing, up to 800 units. Other uses such as retail and business have been allocated in conjunction with housing over the two sites.

As part of Stirling's LDP Action Programme (2020) key site requirements include provision for P&R and improvements to the M9 Junction 9 Pirnhall, as well as upgrading the A91 between Pirnhall to Greencornhills and A872.

As part of the development there may be an opportunity to create a new entrance gateway into Stirling along Corridor 6 (A872) including addressing the current limitations in terms of public transport links (see Figure 4.5) and the provision of P&R to connect with wider regional bus services to Edinburgh and Glasgow. In addition, an integrated active travel route could be developed to connect with existing routes towards the centre of Stirling.

The Durieshill site is located to the southeast of the Bannockburn Interchange (A9), thus beyond the southern end of Corridor 6. As with South Stirling Gateway there are limited local bus services currently operating in the site and there is no integration into local or national cycle routes. There are, however, opportunities to extend any proposals for Corridor 6 to the south addressing Durieshill.



Figure 5.32 South Stirling Gateway & Durieshill. *Developments Accessibility Report (2016), Stirling Council*



5.7.5. Pirnhall to City Centre South Active Travel Route

In supporting the development of both sites – South Stirling Gateway and Durieshill – Stirling Council commissioned in 2020 a desktop study aimed at identifying the opportunity to provide a safe, coherent walking, wheeling and cycling route between the Bannockburn Interchange and St Ninians Roundabout. Effectively, this would overlap Corridor 6 of this study.

The outcomes of the feasibility study will help inform the development of options for Corridor 6 and will likely translate into opportunities for better integration between public transport and active travel across Corridor 6.

Proposals coming forward for the southern section of the corridor between Bannockburn Interchange and Milton Roundabout include the allocation of the active travel provision on the west side of the carriageway which could require the relocation of the bus stop as shown in Figure 5.33 below. This will be further expanded at the next stage of this STAG report when developing the potential measures for Corridor 6.



Figure 5.33 Section 1 (Bannockburn to Milton Roundabout) Recommended Active Travel Measures. *Glasgow Road Corridor Active Travel Feasibility Study (Stirling Council)*



Proposals coming forward for the section north of Milton Roundabout include the designation of some of the suburban areas adjacent to the A802 as 'Quiet Routes' to provide a low traffic alternative for cyclists between Milton Road and Bruce View. Proposals also include a signalised junction at the Home Bargains depot to safeguard bus journey times. These proposals are shown in Figure 5.34 below.



Figure 5.34 Section 2 North of Milton Roundabout Recommended Active Travel Measures. *Glasgow Road Corridor Active Travel Feasibility Study (Stirling Council)*



Proposals for the northern section up to St Ninians Roundabout include further 'Quiet Routes' and several geometry reconfigurations as shown in Figure 5.35 and Figure 5.36 below.

Figure 5.35 Section 3 Milton Road up to St Ninians Roundabout Recommended Active Travel Measures, Part 1 of 2. Glasgow Road Corridor Active Travel Feasibility Study (Stirling Council)



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Figure 5.36 Section 3 Milton Road up to St Ninians Roundabout Recommended Active Travel Measures, Part 2 of 2. Glasgow Road Corridor Active Travel Feasibility Study (Stirling Council)



5.7.6. Denny to Falkirk Active Travel Route

The project involves the creation of 4km of new path linking Denny to Falkirk, the construction of a new bridge over the M876 and carrying out repair works to the existing Roughmute Bridge and Bonny Water Viaduct structures. Current proposals aim to repurpose a section of disused railway line for a shared-use path to



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5.7.7. Falkirk Growth Deal

The Heads of Terms agreement for the Falkirk Growth Deal was signed in December 2021 by the UK Government, Scottish Governments and Falkirk Council. The agreement enables a total of £80 million investment from UK and Scottish Governments, £45 million from Falkirk Council, and £5.8 million from Scottish Canals to create an Investment Zone for Falkirk and Grangemouth.

Funding is anticipated to be spread across the 11 projects that make up the Investment Zone, with projects sitting under two broad themes – Innovative Industry and Creating Great Places.

Investment in Creating Great Places includes £21 million for a Central Sustainable Transport Hub to be known as 'Falkirk Central' at the current Falkirk Grahamston Station and an associated 'Green Corridor' that will connect local communities.

Grahamston Station is a key node for where corridors 3 and 4 intersect and this investment represents an opportunity to develop significant improvements around interchange and accessibility to the station.



6. Constraints, Dependencies, Risk and Uncertainty

This section outlines the key constraints, dependencies, risks and uncertainties identified at this stage of the study and that could have an impact on the delivery of the TPOs. These will be further detailed in subsequent stages, together with the development of potential mitigation measures, when possible.

6.1. Road Space Availability

Given the nature of this study, it is very likely that some of the best performing options will involve the implementation of bus priority infrastructure. There are, however, key pinch points across the study area that may represent a challenge for this and could impact the case for this type of measures at certain locations. This is particularly relevant at Stirling city centre, as well as both Falkirk and Alloa town centres.

Therefore, there could be a requirement to prioritise the movement for more sustainable modes at these pinch pints. These could include limiting the access to private vehicles through certain sections. However, the impact on surrounding areas that this may have should be considered in the appraisal of any proposed measures.

6.2. Interface with Active Travel Provision and Live Projects

Some of the projects identified in Section 5.7 are still in the early development stages and detailed design proposals are not yet available. Therefore, there is a level of uncertainty around the interface with these projects. This may require prioritising decisions around the proposals resulting from this study or setting out a coordinated plan integrating all these projects.

In any case, there will be a requirement to put in place a strong governance structure to enable an effective decision-making process to guarantee delivery is not halted due to conflicts between concurrent projects.

6.3. Bus Patronage and Post-COVID Recovery

The Covid-19 pandemic has had a significant impact on the levels of patronage for public transport all around the world. Future bus ridership remains uncertain at this point although recovery is already underway. Given that these are critical elements in building the economic case, uncertainty around post-Covid recovery will likely have to be defined through the development of assumptions and scenarios in any models used to inform the development of the economic case.

These scenarios and assumptions will be correctly recorded and decision makers will be briefed of their potential impact on the results of any economic assessment as part of the detailed appraisal of the proposed measures.

6.4. Future Funding Availability and Timescales for Implementation

The TPOs presented in Section 7.4 are time bound and assume any outputs are delivered over a period of five years. This will require careful financial planning to ensure the required funding to deliver the outputs is available on time. Any future funding sources, however, are still uncertain and will require the development of financial and cashflow modelling during the next stages of this work.

It is worth noting that any proposals resulting from this work will be appraised against their effectiveness to deliver against the objectives and their potential to deliver Value for Money.



7. Transport Planning Objectives

This section provides an overview of the process put in place to develop the Transport Planning Objectives (TPOs) for the study. The TPOs have been informed by a review of relevant policy at national, regional and local levels and respond to the problems and opportunities identified in the previous section as shown in Appendix A.3.

7.1. Review of National Policy

7.1.1. The Fourth National Planning Framework (NPF4)

The draft document of the fourth National Planning Framework is now under consultation. Once approved by the Scottish Parliament and adopted by Scottish Ministers, the plan will become part of the statutory development plan and will directly influence planning decisions.

The amended Town and Country Planning (Scotland) Act 1997 directs that the NPF must contribute to a series of 6 outcomes:

- a. Meeting the housing needs of people living in Scotland including, in particular, the housing needs for older people and disabled people.
- b. Improving the health and wellbeing of people living in Scotland.
- c. Increasing the population of rural areas of Scotland.
- d. Improving equality and eliminating discrimination.
- e. Meeting any targets relating to the reduction of emissions of greenhouse gases, within the meaning of the Climate Change (Scotland) Act 2009.
- f. Securing positive effects for biodiversity.

7.1.2. The Second National Transport Strategy (NTS2)

The strategy presents the Vision for Scotland's transport system over the next 20 years. This is to have a sustainable, inclusive, safe and accessible transport system, helping delivery a healthier, fairer and more prosperous Scotland for communities, businesses and visitors. The Vision is articulated around four priorities, each with three associated outcomes. The policies to realise these outcomes are outlined below.

Priority 1 Reduces inequalities

- Will provide fair access to required services
- Will be easy to use for all
- Will be affordable for all

The policies to realise this priority are:

- Minimise the connectivity and cost disadvantages faced by island communities and those in remote rural and rural areas, including safeguarding of lifeline services.
- Ensure transport in Scotland is accessible for all by supporting the implementation and development of Scotland's Accessible Travel Framework.
- Remove barriers to public transport connectivity and accessibility within Scotland.
- Improve sustainable access to healthcare facilities for staff, patients and visitors.
- Ensure sustainable, public and active travel access to employment, education and training locations.

Priority 2 Takes climate action

- Will help deliver Scotland's net-zero target
- Will adapt to the effects of climate change
- Will promote greener, cleaner choices



The policies to realise this priority are:

- Reduce emissions generated by the transport system to mitigate climate change.
- Reduce emissions generated by the transport system to improve air quality.
- Ensure the transport system adapts to the projected climate change impacts.
- Support management of demand to encourage more sustainable transport choices.
- Facilitate a shift to more sustainable and space-efficient modes of transport for people and goods.
- Improve the quality and availability of information to enable all to make more sustainable transport choices.

Priority 3 Helps deliver inclusive economic growth

- Will get people and goods where they need to get to
- Will be reliable, efficient and high quality
- Will use beneficial innovation

The policies to realise this priority are:

- Increase resilience of Scotland's transport system from disruption and promote a culture of shared responsibility.
- Increase the use of asset management across the transport system.
- Provide a transport system which enables businesses to be competitive domestically, within the UK and internationally.
- Ensure gateways to and from international markets are resilient and integrated into the wider transport networks to encourage people to live, study, visit and invest in Scotland.
- Support Scotland to become a market leader in the development and early adoption of beneficial transport innovations.
- Meet the changing employment and skills demands of the transport industry and upskill workers.
- Integrate transport and wider infrastructure policies and investments, including digital and energy, to unlock greater benefits.

Priority 4 Improves our health and wellbeing

- Will be safe and secure for all
- Will enable us to make healthy travel choices
- Will help make our communities great places to live

The policies to realise this priority are:

- Increase safety of the transport system and meet casualty reduction targets.
- Implement measures that will improve perceived and actual security of Scotland's transport system.
- Ensure that transport assets and services adopt the Place Principle .
- Reduce the negative impacts which transport has on the safety, health and wellbeing of people.
- Provide a transport system that promotes and facilitates active travel choices which help to improve people's health and wellbeing across mainland Scotland and the Islands.
- Embed the implications for transport in spatial planning and land use decision making.

7.1.3. STPR2 Case for Change

STPR2 will help inform transport investment in Scotland for the next 20 years. The output from STPR2 will help to deliver the vision, priorities and outcomes for transport set out in NTS2, aligning with other national plans such as the Climate Change Plan and NPF4.

TPOs for STPR2 have been developed to sit at a national level, supported by regional sub-objectives with a focus on the specific evidence-based problems and opportunities for the Forth Valley Region. These are closely

aligned with the vision, 4 priorities contained within NTS2. The national TPOs and regional sub-objectives are presented below.

National Objective 1 A <u>sustainable</u> strategic transport system that contributes significantly to the Scottish Government's net zero emissions target

Regional sub-objectives:

- Reduce the consumption of fossil fuels through managing travel demand and enable a shift to more sustainable modes of transport.
- Increase the share of active travel for everyday journeys, particularly in the main population centres of Alloa, Falkirk and Stirling.
- Increase the share of public transport, including travel outwith the main population centres of Alloa, Falkirk and Stirling.
- Reduce emissions generated by the transport system.

National Objective 2 An <u>inclusive</u> strategic transport system that improves the affordability and accessibility of public transport

Regional sub-objectives:

- Increase public transport share by connecting sustainable modes of transport, with a focus on key interchanges in the region.
- Improve mobility and inclusion, with a particular focus on interventions that improve mobility for all, including outwith the urban centres of Alloa, Falkirk and Stirling.
- Reduce transport poverty by increasing travel choice, particularly outwith the urban centres of Alloa, Falkirk and Stirling.
- Reduce the reliance on private car by enhancing public transport options to access key centres for healthcare, employment and education, within the region and key destinations.

National Objective 3 A <u>cohesive</u> strategic transport system that enhances communities as places, supporting health and wellbeing

Regional sub-objectives:

- Reduce demand for unsustainable travel by supporting and embedding place-making principles in the strategic transport system.
- Increase the share of active travel for shorter everyday journeys, particularly in the main population centres
 of Alloa, Falkirk and Stirling.
- Reduce demand for unsustainable travel arising from nationally significant growth areas, taking cognisance of the Local Development Plans and emerging NPF4 network.
- Reduce emissions from the strategic transport system that are harmful to people's health by alleviating pressure on and improving air quality at 'pinch points' and AQMAs.

National Objective 4 An <u>integrated</u> strategic transport system that contributes towards sustainable inclusive growth in Scotland

Regional sub-objectives:

- Increase sustainable access to labour markets and key centres for employment, education and training both within Forth Valley and other key destinations in the Central Belt.
- Increase competitive transport access by all modes to key domestic and international markets, by reducing
 costs and improving journey time reliability for commercial transport, within Forth Valley, to key destinations
 in the Central Belt and to Forth Ports.
- Increase resilience of accesses to key domestic and international markets to encourage people to live, study, visit and invest in Forth Valley.



- Make better use of existing transport infrastructure through the adoption of beneficial transport innovations.
- Increase the mode share of freight by sustainable modes.

National Objective 5 A <u>reliable and resilient</u> strategic transport system that is safe and secure for users

Regional sub-objectives:

- Increase resilience from disruption on Forth Valley's strategic road and rail infrastructure.
- Reduce transport related casualties in line with reduction targets, with a particular focus on reduction of the number and severity of cycling collisions in Forth Valley.
- Improve resilience through climate change adaptation within the management and maintenance of Forth Valley's strategic road and rail infrastructure.
- Improve perceived and actual security on Forth Valley's strategic road and rail infrastructure.

7.1.4. Bus Partnership Fund

The key objective under BPF is to develop and deliver bus priority schemes to tackle the negative impacts of congestion on bus services. However, BPF is also expected to leverage other bus service improvements making bus a more attractive travel option supporting modal shift and reducing the use of the private car.

Under BPF, national and local strategic objectives remain relevant and local transport authorities awarded with funds have a remit to demonstrate how these will be achieved through the proposed measures.

7.2. Review of Regional Policy

7.2.1. The Vision of the Forth Valley Bus Alliance

The is a partnership between First Scotland East, Stagecoach East Scotland, Falkirk Council, Clackmannanshire Council, Stirling Council, SEStran, Tactran, Citylink and Bus Users and serves the geographic region of the Forth Valley in central Scotland. The FVBA was established in 2019 so partners and stakeholders could work together to:

- Improve bus-based public transport within the Forth Valley region.
- Increase customer growth.
- Increase satisfaction and advocacy levels.
- Deliver modal shift from car by improving journey times and reliability.
- Enhance the complementary relationship between bus and active travel.
- Support economic development.

7.2.2. SEStran Draft Regional Transport Strategy

The draft Regional Transport Strategy (RTS) for the South-East of Scotland has been prepared by the South-East of Scotland Regional Transport Partnership(SEStran) which was set up under the Transport (Scotland) Act 2005. It covers eight constituent local authorities as shown in Figure 7.1 below, including Falkirk and Clackmannanshire



Figure 7.1 SEStran Location Plan. SEStran RTS - Case for Change



The four key objectives identified by the strategy are outlined below:

- Strategy Objective 1: Transitioning to a sustainable, post-carbon transport system
- Strategy Objective 2: Facilitating healthier travel options
- Strategy Objective 3: Widening public transport connectivity and access across the region
- Strategy Objective 4: Supporting safe, sustainable and efficient movement of people and freight across the region

7.2.3. Tactran Regional Transport Strategy (RTS) 2015 – 2036 Refresh

The first Tactran's RTS was published in October 2008 and adopted for the 15-year period up to 2023. A delivery plan was then approved in 2009 and is regularly updated to reflect regional and local priorities. This RTS refresh extends the scope of the strategy to 2036 and includes Angus Council, Dundee City Council, Perth & Kinross Council and Stirling Council.

The objectives have been revised as part of the refresh following consultation with stakeholders. These have been developed under six broad themes, with an overarching objective for each theme and related supporting sub-objectives. These are outlined below.

Economy - To ensure transport helps to deliver regional prosperity

- Ensuring that transport infrastructure and services in the region help deliver economic growth, particularly in key business and employment sectors, and in supporting town centres.
- Improving the efficiency, reliability and integration of the movement of goods and people.
- Addressing issues of peripherality associated with the Tactran region.
- Ensuring good connectivity between Tactran's cities and those in the rest of the UK, and with major airports.

Accessibility, Equity & Social Inclusion – To improve accessibility for all, particularly for those suffering from social exclusion



- Improving access to employment.
- Improving access to public services, including health and education.
- Improving access to retail, recreation, leisure and tourist facilities.
- Reducing severance and social and economic isolation caused by transport, or by a lack of it.
- Improving the accessibility and inclusivity of the transport system.

Environment – To ensure that the transport system contributes to safeguarding the environment and promotes opportunities for improvement

- Contributing to the achievement of the Scottish national targets and obligations on greenhouse gas emissions.
- Promoting a transport system that respects both the natural and the built environment.
- Promoting a shift towards more sustainable modes.

Health & Wellbeing - To promote the health and wellbeing of communities

- Helping to meet or better all statutory air quality requirements in the Tactran region.
- Helping to reduce noise generated on the Tactran transport network.
- Promoting a culture of active and healthy lifestyles.

Safety & Security – To improve the real and perceived safety and security of the transport network

- Improving transport-related safety.
- Improving real or perceived levels of personal security related to the transport network.

Integration – To improve integration, both within transport and between transport and other policy areas

- Improving integration of all transport modes.
- Ensuring integration with land-use planning.
- Ensuring a fit with other relevant national, regional and local strategies and policies.

7.3. Review of Local Policy

7.3.1. Stirling Local Transport Strategy 2017 – 2027

This Local Transport Strategy (LTS) will shape how people and goods will move around Stirling safely and sustainably to support the economic, social and environmental objectives the Council has set. This vision is articulated around the six objectives outlined below.

A safer Stirling

- Reduce the numbers of both accidents and casualties.
- Ensure that the transport network and streets feel safe and secure for all users.

A connected Stirling

- Maintain and improve strategic road and rail transport links between Stirling and Scotland's other cities, and beyond.
- Maintain and improve transport links into Stirling and its key employment areas.
- Maintain and improve transport links between Stirling and its rural towns and villages.

An active and sustainable Stirling

- Encourage and enable more trips to be made by walking, cycling and public transport
- Ensure sustainable travel choices are at the heart of an integrated transport network
- Minimise carbon emissions from transport

An inclusive Stirling

- Ensure that jobs, services and opportunities can be accessed by a choice of means of travel.
- Transport networks, including our streets, that are usable by all, including people with mobility difficulties.

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A quality place

- Enhance the quality of Stirling's urban and rural environments, as well as the street environments as the principal public space in settlements.
- Ensure the street environments are safe, pleasant, easily navigable and connected for all users.
- Continually seek to improve air quality and reduce noise pollution arising from traffic.

A quality transport network

- Maximise the efficiency of the existing transport networks to support the other objectives of the LTS.
- Maintain the safety, maximise the utility and minimise the whole-life costs of the transport networks through maintenance programmes.

7.3.2. Falkirk Local Transport Strategy 2014

This LTS sets out how the transport vision for the Falkirk Council area will be achieved and the work to be implemented. The LTS details the policies that will help combat the effects of traffic growth whilst promoting sustainable active travel choices.

The Council's vision is to provide a transport network both within the Council area and linking to surrounding areas, which allows people a reasonable choice of travel options as part of a safe, reliable, convenient, accessible and sustainable transport system. To achieve this, the Council has developed five key objectives.

- Objective 1 To support the growth of the local economy in a sustainable way.
- Objective 2 To contribute to community regeneration through promoting social inclusion.
- Objective 3 To protect the environment by minimising the impact that transport can have on it and to improve health by promoting more active travel.
- Objective 4 To improve safety for all those using the transport network.
- Objective 5 To improve integration between different forms of transport.

7.3.3. Clackmannanshire Local Transport Strategy 2010 – 2014

The overarching aims of this LTS are:

- Support and enhance the local economy.
- Manage travel to reduce its environmental impact.
- Improve the transport environment to reduce actual and perceived safety issues.
- Work towards a seamless transport system to increase social inclusion.
- Remove barriers to accessibility by enhancing healthy and alternative modes of travel.
- Integrate land use and transport planning.
- Maintain and improve the existing infrastructure.

7.4. Transport Planning Objectives

Building on the analysis of problems and opportunities presented in Section 5, as well as the review of policy objectives, the TPOs for the STAG reports are set out below. Appendix A.3 provides a more detailed overview of how these objectives respond to the identified problems and opportunities, as well as relevant policy objectives.

Building on the vision of the FVBA, the key adopted outcome of this study and any future interventions is to improve bus-based public transport within the study area, increasing the number of trips made by bus, customer growth, satisfaction and advocacy levels by:

<u>Objective 1</u> Tackling the negative impacts of congestion on bus services within the study area, thus improving bus journey times and reliability within the next 5 years.

<u>Objective 2</u> Enhancing bus-based public transport options for everyone within the study area to access key centres for healthcare, employment, education and services within the next 5 years.

<u>Objective 3</u> Removing accessibility barriers to bus-based public transport within the study area, thus improving mobility and inclusion for everyone within the next 5 years.

<u>Objective 4</u> Enhancing the complementary relationship between bus, rail and active travel, increasing travel choice and widening public transport connectivity.

<u>Objective 5</u> Reducing actual and perceived safety issues in the bus network within the study area during the next five years, while aiming to enhance the quality of the urban environment.

Delivering on these objectives will likely support a reduction int the emissions generated by the transport system in the study area, thus contributing to mitigate climate change and improving air quality.

To ensure these objectives remain measurable, the table below proposes a series of metrics to evaluate the effectiveness of any proposed measure in delivering the desired outcomes. These will be further developed as part of a more detailed Monitoring and Evaluation Plan at a later stage of this study.

Table 7.1 Proposed Metrics to Evaluate the Performance of Relevant	Measures	
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Objective	Components	Key Metrics	Evaluation Methodology			
Tackling the negative impacts of congestion on bus services	Pupiourpov	Vehicle Speeds	Comparison of vehicle speeds before and after delivery of any relevant measures.			
	times	Bus journey time surveys	Comparison of bus journey time between key locations within the study area before and after delivery of any relevant measures.			
	Bus journey reliability	Bus journey time surveys	Comparison of bus journey time between key locations within the study area before and after delivery of any relevant measures, paying special attention to any peak-hour variations.			
Enhancing bus- based public transport options for everyone	Healthcare SIMD		Annual comparison of the geographic access to GP/Health services by public transport before and after delivery of any relevant measures. This could be carried out annually and extend to accessibility by car to identify any negative impacts as a consequence of changes within the study area.			
	General	Route coverage	Bus service options available by area to key trip generators before and after delivery of any relevant measures. In addition, any changes to the bus network should be recorded.			
Removing accessibility barriers to bus- based public transport	N/A	Bus user and community surveys	Qualitative user and community surveys to understand the perception of the community around the accessibility to key destinations by bus before and after delivery of any relevant measures.			
		Passenger numbers	Comparison of bus users for selected services operating within the study area before and after delivery of any relevant measures.			

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Objective	Components	Key Metrics	Evaluation Methodology				
		Bus journey	Qualitative user and community surveys to understand perceptions about the overall quality of the bus journey experience before and after delivery of any relevant measures.				
		quality surveys	These surveys could also include visual professional inspections to check the status and quality of the infrastructure, identifying any potential barriers of different types of users.				
Enhancing the complementary relationship between bus, rail and active travel		Sustrans' Walking and Cycling Index	The Walking and Cycling Index is delivered by Sustrans in collaboration with 18 cities and urban areas across UK and Ireland, including Stirling. The report includes progress made towards making walking, wheeling and cycling more attractive as an everyday way to travel.				
	N/A	for Stiming	Bi-annual comparison of the outputs of Sustrans' Walking and Cycling Index for Stirling before and after delivery of any relevant measures.				
		Cycle hire and parking	Comparison of utilisation of cycle parking facilities and cycle hire schemes at key interchange locations across the study area before and after delivery of any relevant measures.				
			This could be supported by cycle surveys at key locations to improve the understanding of how modal connectivity may or may not have improved.				
		Bus user and community surveys	Qualitative user and community surveys to understand the perception of the community around the bus services with other modes of transport within the study area before and after delivery of any relevant measures, including the provision of P&R.				
Reducing actual and perceived safety issues in the bus network	N/A	Bus user and community surveys	Qualitative user and community surveys to understand the perception of the community around safety and security issues at key locations within the bus network before and after delivery of any relevan measures.				



A.1. Bus Routes Origin / Destination Matrix

Bus	Operator	Origin	Destination	First	Last	Frequency			Corridor		
Service				Service	Service		2	3	4	6	7
1	First	Dunipace	Bridgend	06:09	21:20	30 mins					
2	First	Limerigg	Bo'ness	04:50	21:57	30 mins					
5	First	Hallglen	Langlees	06:34	22:25	30 mins					
6	First	Falkirk Wheel	Forth Valley Royal Hospital	05:40	23:21	30 mins					
6A	First	Camelon	Forth Valley Royal Hospital	07:20	17:59	60 mins					
7	First	Camelon	Forth Valley Royal Hospital	06:37	18:33	30 mins					
8	First	Camelon	Fankerton	06:13	19:03	60 mins					
15A	Stagecoach	Perth	Stirling	06:03	21:30	60 mins					
19	Stagecoach	Stirling	Perth	18:36	22:04	120 mins					
20	Dochertys	Auchterarder	Stirling	08:41	15:42	120 mins					
29	First	Falkirk	Bathgate	05:49	21:56	60 mins					
35	First	Falkirk	Cumbernauld	05:54	17:49	60 mins					



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Bus	Operator	Origin	Destination	First	Last	Frequency	Corridor					
Service				Service	Service		2	3	4	6	7	
C48	First	Bannockburn	Kinbuck	07:19	17:42	120 mins						
F14	First	Falkirk High	The Kelpies	06:49	18:03	60 mins						
F16	First	Stirling	Falkirk	05:40	20:37	60 mins						
F25	First	Falkirk	Standburn	07:45	20:00	120 mins						
H1	First	Alva	Forth Valley Royal Hospital	06:33	18:34	120 mins						
H2	First	Dollar	Forth Valley Royal Hospital	05:29	21:33	120 mins						
M8	Megabus	Dundee	Glasgow	06:45	18:15	120 mins						
P1	Hunters	Springkerse P+R	Stirling	07:30	18:15	15 mins						
P2	Hunters	Springkerse P+R	Stirling	07:25	17:35	25 mins						
UL	First	Stirling	University of Stirling	07:07	00:20	12 mins						
W1	Bryans	Denny	Stirling	07:30	16:30	60 mins						
X10	First	Stirling	Glasgow	05:27	23:00	60 mins						
X10A	First	Stirling	Glasgow	08:35	17:35	120 mins						
X36	First	Stirling	Glasgow	05:58	21:51	60 mins						

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Bus	Operator	Origin	Destination	First	Last Service	Last	Frequency		Corridor			
Dervice				Gervice			2	3	4	6	7	
X37	First	Falkirk	Glasgow	05:23	21:51	60 mins						
X38	First	Camelon	Edinburgh	05:03	22:09	30 mins						
X53	First	Stirling	Kinross	06:25	17:40	120 mins						



A.2. Observed Delays per Corridor
A.3. Development of the Transport Planning Objectives

Identified Problems & Opportunities	Key Policy Theme	Relevant National Objectives	Regional Objectives	Local Objectives
Key to the development of the study is addressing all the issues identified across each of the five corridors affecting bus	ss Increase mode share towards sustainable modes of transport	Facilitate a shift to more sustainable and space-efficient modes of transport for people and goods [NTS2]. Increasing the share of public transport, including travel outwith the main population centres of Alloa, Falkirk and Stirling [STPR2 Case for Change].	Improve bus-based public transport within the Forth Valley region, increase customer growth, satisfaction and advocacy levels [FVBA Vision]. Promoting a shift towards more sustainable modes [Tactran's RTS].	Encourage and enable more be made by walking, cycling a public transport [Stirling's LTS
delays at junctions and urban traffic, the potential impact the frequency and location of bus stops could have on overall journey time and other aspects such as how buses are boarded or tickets purchased.		Develop and deliver bus priority schemes to tackle the negative impacts of congestion on bus services [BPF].	Deliver modal shift from car by improving bus journey times and reliability [FVBA Vision].	
 Some of the most severe examples of delays at junctions and urban traffic include: New Stirling Bridge (Corridor 6). Goosecroft corridor at Stirling (Corridor 6). 	Policy and land-use integration	Integrate transport and wider infrastructure policies and investments, including digital and energy, to unlock greater benefits [NTS2].		
 Port St in Stirling approaching the junction with St Ninians Road and Wellgreen Rd (Corridor 2), Specific sections of Glasgow Road at Falkirk and Falkirk town centre (Corridor 3). 		Reduce demand for unsustainable travel arising from nationally significant growth areas, taking cognisance of the Local Development Plans and emerging NPF4 network [STPR2 Case for Change].	Ensuring integration with land-use planning and a fit with other relevant national, regional and local strategies and policies [Tactran's RTS].	Integrate land use and transp planning [Clackmannanshire
 Carron Rd section between David's Loan and Dalderse Avenue at Falkirk (Corridor 4). In the context of the South Stirling Gateway and Durieshill developments, there is an opportunity to create a new entrance gateway into Stirling along Corridor 6 (A872) including addressing the current limitations in the area in terms of public transport links and the provision of P&R. This could also tie in with proposals under the Pirnhall to City Centre South Active Travel Route. 	Reduce emissions and minimise environmental impact	Reduce emissions generated by the transport system [STPR2 Case for Change] to mitigate climate change and improve air quality, ensuring the transport system adapts to the projected climate change impacts [NTS2].	Transitioning to a sustainable, post- carbon transport system [SEStran's draft RTS]. Contributing to the achievement of the Scottish national targets and obligations on greenhouse gas emissions, promoting a transport system that respects both the natural and the built environment [Tactran's RTS].	Minimise carbon emissions fr transport [Stirling's LTS]. To protect the environment by minimising the impact that tra can have on it [Falkirk's LTS]
		Reduce emissions from the strategic transport system that are harmful to people's health by alleviating pressure on and improving air quality at 'pinch points' and AQMAs [STPR2 Case for Change].	Helping to meet or better all statutory air quality requirements in the Tactran region [Tactran's RTS]. Helping to reduce noise generated on the Tactran transport network [Tactran's RTS].	Continually seek to improve a and reduce noise pollution ar from traffic [Stirling's LTS].



	TPOs
ore trips to ng and LTS].	The key adopted outcome of this study and any future interventions is to improve bus-based public transport within the study area, increasing the number of trips made by bus, customer growth, satisfaction and advocacy levels by:
nsport iire's LTS].	Tackling the negative impacts of congestion on bus services within the study area, thus improving bus journey times and reliability within the next 5 years.
ns from ht by t transport TS] ve air quality h arising l.	See the conclusion to Section 7.4

Identified Problems & Opportunities	Key Policy Theme	Relevant National Objectives	Regional Objectives	Local Objectives	TPOs
		Reduce the negative impacts which transport has on the safety, health and wellbeing of people [NTS2].			
It has been observed that the function of bus services in the study area is a mix between commuting trips, mainly into Stirling and Falkirk, and the provision of access to key services such as the Forth Valley Royal Hospital. However, the services providing these functions need to be resilient to ensure accessibility by public transport to key human services. In addition, guaranteeing a competitive bus offering for the community in the study area could be a key factor to getting people, which otherwise would take their cars for their daily trips, to use the bus.	Sustainable access to healthcare, employment, education and services	Improve sustainable access to healthcare facilities for staff, patients and visitors [NTS2]. Ensure sustainable, public and active travel access to employment, education and training locations [NTS2]. Reduce the reliance on private car by enhancing public transport options to access key centres for healthcare, employment and education, within the region and key destinations [STPR2 Case for Change]. Increase sustainable access to labour markets and key centres for employment, education and training both within Forth Valley and other key destinations in the Central Belt [STPR2 Case for Change].	Widening public transport connectivity and access across the region [SEStran's draft RTS]. Supporting safe, sustainable and efficient movement of people and goods across the region [SEStran's draft RTS]. Improving access to employment, public services including health and education, retail, recreation, leisure and tourist facilities [Tactran's RTS].	Ensure that jobs, services and opportunities can be accessed by a choice of means of travel [Stirling's LTS].	Enhancing bus-based public transport options for everyone within the study area to access key centres for healthcare, employment, education and services within the next 5 years.
In general, information available in bus stops is limited to timetables and no live information or waiting times are provided to passengers in bus stops.	Quality and availability of information	Improve the quality and availability of information to enable all to make more sustainable transport choices [NTS2].			
There have been some accessibility issues identified at key bus stops and their environments. These relate to the availability of seating within shelters, street clutter, lack of lighting or poor connectivity with existing and proposed paths, active travel routes or the final destination for bus journeys. Any future proposals will need to recognise that the experience and time that people take to get to the bus stop is an essential component of the bus journey, In addition, there could be accessibility issues within the bus vehicles related to their suitability and quality for different segments of the community and their	Remove barriers to accessibility, improving mobility and inclusion	Remove barriers to public transport connectivity and accessibility within Scotland [NTS2]. Improve mobility and inclusion, with a particular focus on interventions that improve mobility for all, including outwith the urban centres of Alloa, Falkirk and Stirling [STPR2 Case for Change].	Reducing severance and social and economic isolation caused by transport, or by a lack of it [Tactran's RTS]. Improving the accessibility and inclusivity of the transport system [Tactran's RTS].	Transport networks, including our streets, that are usable by all, including people with mobility difficulties [Stirling's LTS]. To contribute to community regeneration through promoting social inclusion [Falkirk's LTS]. Work towards a seamless transport system to increase social inclusion [Clackmannanshire's LTS]. Remove barriers to accessibility by enhancing healthy and alternative modes of travel [Clackmannanshire's LTS].	Removing accessibility barriers to bus-based public transport within the study area, thus improving mobility and inclusion for everyone within the next 5 years.



Identified Problems & Opportunities	Key Policy Theme	Relevant National Objectives	Regional Objectives	Local Objectives
experience, as well as the nature of the service being provided.			Addressing issues of peripherality associated with the Tactran region [Tactran's RTS].	Maintain and improve transp between Stirling and its rural and villages [Stirling's LTS].
There are opportunities to integrate any potential measures with existing and proposed active travel provision in the study area (Walk, Cycle, Live Stirling; City Centre South; Pirnhall to City Centre South Active Travel Route; Denny to Falkirk Active Travel Route), as well as operating cycle hire schemes (NextBike Stirling). This could significantly contribute to guarantee competitive journey times over the use of the private vehicle.	Modal integration	Provide a transport system that promotes and facilitates active travel choices which help to improve people's health and wellbeing across mainland Scotland and the Islands [NTS2]. Increase public transport share by connecting sustainable modes of transport, with a focus on key interchanges in the region [STPR2 Case for Change].	Enhance the complementary relationship between bus and active travel [FVBA Vision]. Improving integration of all transport modes [Tactran's RTS].	Ensure sustainable travel ch at the heart of an integrated network [Stirling's LTS]. To improve integration betwe different forms of transport [F LTS].
	Increase active travel share for shorter everyday journeys	Reduce transport poverty by increasing travel choice, particularly outwith the urban centres of Alloa, Falkirk and Stirling [STPR2 Case for Change]. Increase the share of active travel for shorter everyday journeys, particularly in the main population centres of Alloa, Falkirk and Stirling [STPR2 Case for Change].	Facilitating healthier travel options [SEStran's draft RTS]. Promoting a culture of active and healthy lifestyles [Tactran's RTS].	To improve health by promot active travel [Falkirk's LTS].
There is a ringfenced investment of £21m under the Falkirk Growth Deal to develop improvements around interchange and accessibility to Falkirk Grahamston Station. There are regular trains to Edinburgh and Glasgow from the station, as well as 2 LNER services to London and the Caledonian Sleeper. There are also opportunities to improve accessibility to the CityLink services which provide a link into Edinburgh Airport. This could require, however, coordination with BPF work being carried out for Edinburgh.	Access to key domestic and international markets	Provide a transport system which enables businesses to be competitive domestically, within the UK and internationally [NTS2]. Increase competitive transport access by all modes to key domestic and international markets, by reducing costs and improving journey time reliability for commercial transport, within Forth Valley, to key destinations in the Central Belt and to Forth Ports [STPR2 Case for Change]. Ensure gateways to and from international markets are resilient and integrated into the wider transport networks to encourage people to live, study, visit and invest in Scotland [NTS2].	Support economic development [FVBA Vision]. Supporting safe, sustainable and efficient movement of people and goods across the region [SEStran's draft RTS]. Ensuring that transport infrastructure and services in the region help deliver economic growth, particularly in key business and employment sectors, and in supporting town centres [Tactran's RTS]. Improving the efficiency, reliability and integration of the movement of goods and people [Tactran's RTS]. Ensuring good connectivity between Tactran's cities and those in the rest	Maintain and improve transp into Stirling and its key emplo- areas [Stirling's LTS]. Maximise the efficiency of th transport networks [Stirling's To support the growth of the economy in a sustainable wa [Falkirk's LTS]. Support and enhance the loo economy [Clackmannanshire Maintain and improve strateg and rail transport links betwee Stirling and Scotland's other beyond [Stirling's LTS].



	TPOs
sport links ral towns].	
choices are ed transport ween : [Falkirk's	
noting more].	Enhancing the complementary relationship between bus, rail and active travel, increasing travel choice, widening public transport connectivity and supporting
sport links ployment	economic development and growth.
the existing J's LTS]. ne local way	
local iire's LTS].	
tegic road ween er cities, an	

Identified Problems & Opportunities	Key Policy Theme	Relevant National Objectives	Regional Objectives	Local Objectives
		Increase resilience of accesses to key domestic and international markets to encourage people to live, study, visit and invest in Forth Valley [STPR2 Case for Change].	of the UK, and with major airports [Tactran's RTS].	
In general, provision of lighting in bus stops is low and does not contribute to create a sense of security within the stop environment. This has been observed for some of the key trip attractors within the study area such as the Stirling High School.	Safety and security	Increase safety of the transport system and meet casualty reduction targets, implementing measures that will improve perceived and actual security of Scotland's transport system [NTS2]. Reduce transport related casualties in line with reduction targets, with a particular focus on reduction of the number and severity of cycling collisions in Forth Valley [STPR2 Case for Change]. Improve perceived and actual security on Forth Valley's strategic road and rail infrastructure [STPR2 Case for Change].	Supporting safe, sustainable and efficient movement of people and goods across the region [SEStran's draft RTS]. Improving transport-related safety and improving real or perceived levels of personal security related to the transport network [Tactran's RTS].	Reduce the numbers of both accidents and casualties an that the transport network an feel safe and secure for all u [Stirling's LTS]. To improve safety for all tho the transport network [Falkin Improve the transport enviro reduce actual and perceived issues [Clackmannanshire's
	Place Principle	Ensure the transport assets and services adopt the Place Principle [NTS2]. Reduce demand for unsustainable travel by supporting and embedding place-making principles in the strategic transport system [STPR2 Case for Change].		Enhance the quality of Stirlin and rural environments, as a street environments as the p public space in settlements ensure the street environme safe, pleasant, easily naviga connected for all users [Stirl



	TPOs
th nd ensure and streets users ose using irk's LTS]. ronment to ed safety 's LTS].	Reducing actual and perceived safety issues in the bus network within the study area during the next five years, while aiming to enhance the quality of the urban environment.
ling's urban well as the principal s and ents are gable and rling's LTS].	

