CÒMHDHAIL ALBA TRANSPORT SCOTLAND

THE EFFECTS OF PARK AND RIDE SUPPLY AND PRICING ON PUBLIC TRANSPORT DEMAND

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Arup, Accent and the Institute for Transport Studies, University of Leeds

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1 Executive summary

Background and study objectives

1.1 Arup, with Accent and the Institute for Transport Studies at the University of Leeds were jointly appointed by Transport Scotland to explore the effect of park and ride parking supply and pricing on public transport demand.

1.2 The study objectives were:

- to investigate the extent to which (if at all) changes to park and ride supply and pricing affect public transport patronage and what alternatives would be used in the absence of formal parking facilities (Objective 1)
- to assess the extent park and ride can influence modal shift to public transport, plus the impact on emissions and congestion (Objective 2)
- to assess the relative importance of the factors which influence the use of park and ride facilities (Objective 3)
- to establish the extent park and ride leads to undesirable outcomes including increased car usage (Objective 4)
- based upon the analysis to support the above aims, to provide metrics to assist the development of guidance for appraising the impact on rail and bus demand and revenue of changes to park and ride parking policy and provision (Objective 5)
- to identify the optimum pricing policy to maximise rail station car parking revenue (Objective 6)

Methods

1.3 The methodology combined a review of secondary data sources and a literature review with the targeted collection of primary data. The primary data were then used to develop forecasting models.

1.4 The study explored parking at railway stations, bus park and ride and Cross Forth journeys using a series of case studies:

- For parking availability at railway stations: Bridge of Allan, East Kilbride, Perth and Kirkcaldy. 'Control' surveys were also conducted at Stirling and Falkirk High since these stations had not benefited from additional parking spaces to isolate these impacts[1]
- For bus park and ride sites: Bridge of Don (Aberdeen) and Ingliston (Edinburgh)

[1] For the secondary analysis a wider range of stations was included.

- For Cross Forth journeys: Inverkeithing and Ferrytoll respectively

Findings on parking at railway stations

1.5 Findings from the model indicate the change in wholly new rail trips resulting from additional parking is modest. The relationship between the number of parking spaces before and after the expansion, and the total number of new trips suggests each additional 100 spaces generates between 4 and 10 extra journeys per day based. The findings from the case study stations could be applied to other stations only with due attention to local circumstances, given that the demand impact will vary according to the specific characteristics of each station.

1.6 The findings from the primary research indicate that the mileage removed from the network from drivers switching to rail would be offset by more existing rail passengers driving to the station.

1.7 Findings from stakeholder feedback, along with the primary research highlight that CCTV, lighting and tarmac roads are an integral part of the overall station design to encourage users.

1.8 The capital cost of extending existing car parks is about £5,000-£10,000 per space, although this could be higher if decking is required. The revenue stream that could be generated from additional rail passengers would be insufficient to provide a financial pay-back in less than 10 years, though there may be instances when this is possible.

1.9 If the price for parking per day was increased by £1 (either from free to £1, or £1 to £2 for example), rail demand would be reduced by 4.9% or just 3.0% if there is ample free local parking. Furthermore, about 55% of the remaining rail passengers would park elsewhere. Regardless of the current pricing structure, any increase to parking charges would mean the revenue loss from rail passengers switching to other modes exceeding the income raised from the higher charge per vehicle.

Findings on bus based park and ride

1.10 Both Ingliston and Bridge of Don park and ride sites have sufficient spare capacity (only 50% of the spaces are occupied, so motorists are confident of getting a space). Therefore the modelling explored the impact on demand if parking spaces were removed. The findings from the modelling framework indicated demand would be reduced by 19% if there was a 10% chance of not finding a space. If the chance of not getting a space was higher (20%), demand would fall by 34%. Over 60% would make their entire journey by car if there was insufficient parking. Therefore, if bus park and ride was not available or constrained there would be a significant switch among users to making their entire journey by car.

1.11 Monitoring data indicated that there are about 1,200 park and ride trips per day using all park and ride sites in Edinburgh. This equates to less than <1%

of the trips into the city centre. The small number of users of park and ride in comparison with all trips means that the impact on wider modal shift and emissions is small.

1.12 The results from the literature review, combined with the findings from the primary research, highlighted a number of essential attributes that are required to encourage usage. These include proximity to the strategic road network, availability of parking throughout the day, bus departures every 10 minutes, competitive journey times, competitive fares that are attractive versus parking in the urban centre and when the buses operate. Other desirable attributes include dedicated buses, availability of facilities, type of vehicle and branding.

1.13 Compared with the rail case studies, the small number of additional car trips from drivers travelling to the park and ride to access more frequent and / or cheaper buses is offset by the mileage removed from the network resulting from mode transfer.

1.14 The costs to operate park and ride with buses departing every 10 minutes range from £800,000 to £1m per site. For a site to break even in financial terms, about 1,200 passengers per day on a typical weekday would be required. This highlights the importance of optimising the site location to achieve a robust financial case. Evidence suggests about 20,000 daily vehicles must pass the site to attract the required demand.

1.15 Although several park and ride schemes in Scotland have been delivered, benchmarking the performance of these sites with examples elsewhere in the UK suggests there is scope to boost patronage.

1.16 Analysis of the impact of changes in fares was inconclusive in terms of being able to specify a revenue maximising fare. The findings suggested that bus park and ride demand is price inelastic, i.e. that there is scope to raise revenue through higher fares. However, this would serve to reduce the associated congestion and carbon benefits.

Findings on Cross Forth travel

1.17 The results from the primary research indicate passengers using Ferrytoll and Inverkeithing park and ride have relatively low values of time, hence implying users are choosing public transport to avoid paying the high parking charges in Edinburgh, even though the overall journey time by bus or rail is longer.

1.18 The opportunities to encourage modal shift to bus or rail appear to be affected by future parking policy and the distribution of new employment in Edinburgh. Passenger behaviour is relatively unresponsive to alternative travel options, so the scope to encourage passengers to switch between rail and bus (or vice versa) following changes is limited.

1.19 The overall journey times by public transport versus car are slower, but two factors mean the former choice remains attractive. The high frequency bus services, combined with the lower overall cost of public transport if free city centre parking is not available have contributed to the high levels of usage.

1.20 The Cross Forth public transport alternatives have limited negative impacts. With short access times to Ferrytoll and Inverkeithing, the number of passengers using park and ride towards Edinburgh has helped to control congestion on busy corridors including the A90. The current delays experienced by car drivers crossing the Forth Bridge limits the number of prospective users crossing from Fife towards Edinburgh. The proposed new crossing could release suppressed demand, with some drivers parking closer to their final destination and increasing the distance travelled, though it should be noted that the plans include a substantial investment in public transport including bus only lanes which will enhance the attractiveness of public transport across the Firth of Forth.

1.21 Potential improvements to the existing Cross Forth park and ride choices need to be considered as part of wider assessment of public transport links between Edinburgh and Fife or destinations further afield, given the characteristics of the rail and bus routes serving the corridor.

Conclusions

1.22 The availability of parking spaces at bus park and ride is fundamental in influencing the travel behaviour. If bus park and ride was not available or constrained there would be a significant switch among users to making their entire journey by car. Several other factors must be addressed including proximity to the strategic road network, and frequency of bus departures.

1.23 In contrast, the relationship between parking and rail demand is less conclusive. If parking availability is increased, the level of new rail demand is relatively small and the subsequent change in car distances is negligible. As a result, the case for delivering improvements must be linked to other objectives and a wider assessment will be needed.

1.24 The requirement to improve bus or rail services for Cross Forth journeys will be influenced by various factors including future parking policy enforced in central Edinburgh, the distribution of employment and the role for any demand management initiatives resulting from the proposed new Forth Crossing.

2 Introduction

Background to the study

2.1 Transport Scotland jointly appointed Arup, with Accent and the Institute for Transport Studies at the University of Leeds to conduct a study that examines the relationship between car parking availability and the resulting levels of public transport demand. The study is intended to fill a research gap in this area, with the outputs used to inform the development of future policy. The conclusions can then help to appraise opportunities for park and ride in other locations. Previous studies for Passenger Focus [2] and the Association of Train Operating Companies [3] have helped to answer this question, but further work is required.

2.2 There are opportunities to develop park and ride to encourage modal shift from car to public transport. Car parks serving major bus and rail services have a role in helping passengers access these journey opportunities and help to increase demand. These overarching objectives are reflected in other policy frameworks, including 'Park and Ride for Buses: A National Framework'[4] and the 'Strategic Transport Projects Review' (STPR) [5]. The STPR includes a commitment to make public transport more competitive by providing highly visible and accessible park and ride. The National Transport Strategy (NTS) [6] was also published in 2006 and the three strategic outcomes have been endorsed by the current Scottish Government.

2.3 The primary objective of this study is to assess the impacts of changes in parking supply, quality and pricing on the demand for public transport and how this varies depending on location and passenger behaviour. The findings will help to identify the optimum locations for new or expanded sites and can be used to inform future rail and bus park and ride strategies. The main research aims are:

- to investigate the extent to which (if at all) changes to park and ride supply and pricing affect public transport patronage and what alternatives would be used in the absence of formal parking facilities **(Objective 1)**

- if a relationship is found for the above, to assess the extent to which park and ride can influence modal shift to public transport, and what the wider impacts are, for example on emissions and congestion **(Objective 2)**

- to assess the relative importance of the factors which influence and drive the use of park and ride facilities (these may differ between rail and bus based sites so each should be considered separately) **(Objective 3)**

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[2] Steer Davies Gleave (2007) Getting to the Station – Research for Passenger Focus
[3] Railway Consultancy (2010) Car Parking at Railway Stations – Research for the Association of Train Operating Companies
[4] Scottish Executive (2006) http://www.scotland.gov.uk/Resource/Doc/157751/0042649.pdf
[5] Scottish Government (2009) http://www.scotland.gov.uk/Resource/Doc/277631/0083349.pdf
[6] Transport Scotland (2008) http://www.transportscotland.gov.uk/stpr

- to establish whether, and to what extent, park and ride leads to undesirable outcomes including an increase in car usage (as more passengers who previously walked, or made a journey entirely by public transport, begin to drive to a park and ride site, or drive further to make use of parking facilities) **(Objective 4)**

- based upon the analysis to support the above aims, to provide metrics to assist the development of guidance for appraising the impact on rail and bus demand and revenue of changes to park and ride parking policy and provision **(Objective 5)**

- to identify the optimum pricing policy to maximise rail station car parking revenue **(Objective 6)**

Structure of the report

2.4 The report describes the methodology, results and recommendations for the three aspects of the study, rail, bus and Cross Forth. The main findings from the secondary research collated from other examples in Scotland and the rest of the UK have been integrated with the primary research to prepare a series of conclusions.

3 Study methodology

3.1 A methodology has been developed to respond to the objectives by combining outputs from secondary research with conclusions from new primary research that has been tailored to fulfil the study objectives. Choosing a railway station or bus based park and ride as part of a journey is influenced by a complex set of variables, including the cost and availability of car parking and the rail or bus journey options available in terms of speed and frequency which help to attract passengers. The car parking availability and the attractiveness of the onward public transport can impact on demand, but there is relatively limited guidance to understand how these variables interact in terms of:

- driving to the station, park and catch a train
- driving to an off-site car park, park and catch a train
- drive to an alternative station and catch a train
- use an alternative access mode (such as public transport, cycling or walking – or obtaining a “kiss & ride” lift) to this or an alternative station, and catch a train
- use a car (or possibly another mode such as bus) for the whole journey

3.2 There is a limited understanding of the overall impact of these variables, so the study methodology combines primary and secondary data for a number of important reasons:

- there was some uncertainty whether analysis of secondary ticket data would be adequate to identify trends, hence the requirement for additional primary data
- results from the interview surveys were used to understand responses to a range of policy choices, and some data was incorporated in the models
- the two datasets offered an independent validation of each other
- the combined datasets helped to generate a statistically robust dataset

Secondary research

3.3 Several existing data sources were reviewed including historic rail journey patterns, parking availability at stations, a range of socio-economic data, plus various monitoring reports relating to bus based park and ride. This was to provide background information and to populate the forecasting model. Further details of the data sources used are given in Chapters 4 to 6.

Primary research

3.4 Econometric modelling has been completed to determine the effects of parking provision, prices and policy directly on the demand for travel. Demand models have been developed that link observed and stated behavioural responses to changes in parking provision, quality and prices. The econometric models use the base number of rail trips, plus other factors to estimate demand impacts. The impact of parking policies is then overlaid, in terms of the number and change in parking availability and charges, plus the quality and security of these facilities to examine a range of user responses. Further details of the modelling approach are presented in the Appendices.

3.5 A case study approach has been adopted for the primary research. This includes rail case studies at Bridge of Allan, East Kilbride, Perth and Kirkcaldy (and control sites at Stirling and Falkirk High) and bus park and ride case studies at Ingliston (Edinburgh) and Bridge of Don (Aberdeen). A further case study – Cross Forth – examines competition between bus based park and ride at Ferrytoll and rail at Inverkeithing. More information is provided on these case studies in Chapters 4 to 6. The primary case studies have been carefully selected, to ensure the results are sufficiently useful and applicable to help evaluate proposals in other parts of Scotland. This transferability is a fundamental aspect, providing a good indicator if other proposals might be successful, subject to fulfilling specified criteria.

3.6 Surveys were carried out with existing users of the case study sites. The face to face interviews were conducted throughout the day on both weekdays and weekends. The initial questionnaire was piloted and amendments completed based on the feedback. Initial screening questions were presented to potential respondents to ensure their travel characteristics were relevant to the survey. The surveys covered topics including gender, age, journey purpose, ticket type, parking costs and attitudinal responses to facilities at the car park. Copies of the survey questionnaires are presented in **Appendix A6**.

3.7 The surveys were conducted in accordance with Market Research Society guidelines and administered using Personal Digital Assistants (PDA) and took a maximum of 15 minutes for the rail and bus surveys, and 15 minutes for the Ferrytoll interviews. A broadly equal number of male and female respondents were interviewed. There was no bias in favour of interviewing either gender, with the sample influenced by who had time to stop and be interviewed. The sample rate of one interview per two or three people was estimated by the interviewers, although a higher sample rate was needed at the less busy stations. Two interviews from the bus surveys were not completed and these were excluded from the overall dataset. The total number of incomplete surveys from the rail and Ferrytoll interviews was 23 and 15 respectively. Table 3.1 confirms the number of interviews for existing users.

Table 3.1: Summary of completed interviews (existing users)

Rail	Status	Number of interviews	Bus	Number of interviews	Cross-Forth	Number of interviews
Kirkcaldy	Case study	101	Ingliston	138	Ferrytoll	87
Bridge of Allan	Case study	115	Bridge of Don	112	Inverkeithing	72
East Kilbride	Case study	107				
Perth	Case study	36				
Falkirk High	Control	64				
Stirling	Control	64				
TOTAL		**487**	**TOTAL**	**250**	**TOTAL**	**159**

Source: Accent

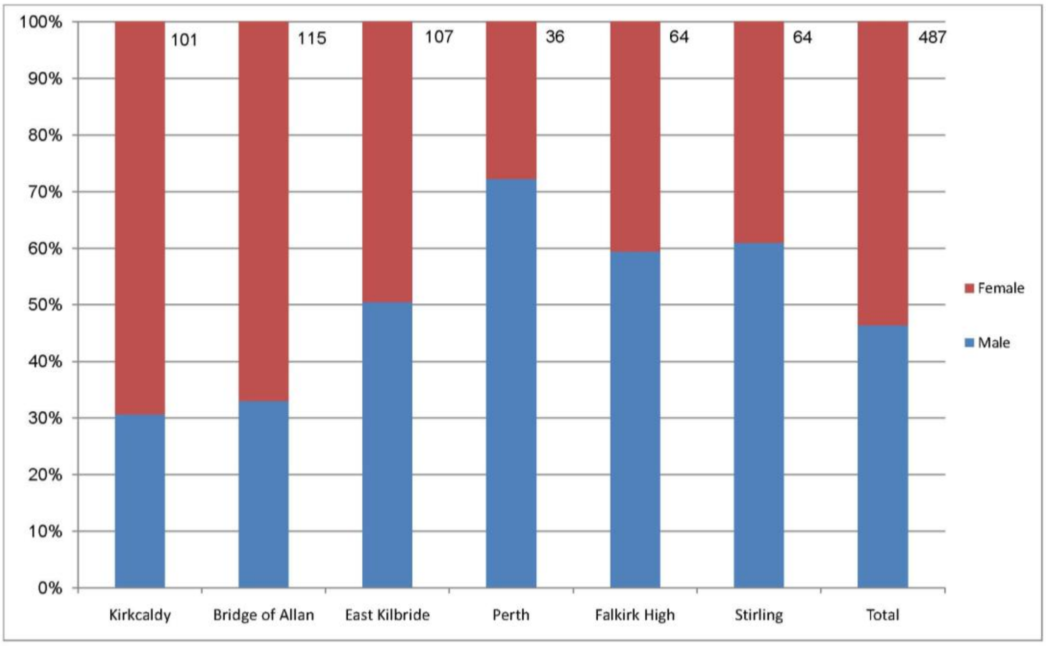
3.8 The responses were collated and used to help populate forecasting models. To supplement the existing user surveys presented above, interviews were also completed for respondents not currently using park and ride who were interviewed in Edinburgh and Aberdeen city centres who could potentially switch from their existing mode. A total of 120 interviews were conducted, 67 in Edinburgh and 53 in Aberdeen with non users to understand the characteristics of their journeys and the factors which may influence the likelihood of switching modes.

3.9 The following summarises the age and gender characteristics of the sample interviewed. More detailed technical description of the methodology is contained in the appendices.

Rail case studies

3.10 The gender of respondents is presented in Figure 3.1. An equal split of men and women were surveyed at East Kilbride, with a significantly higher percentage of women interviewed at Kirkcaldy and Bridge of Allan. At Falkirk High, Stirling and Perth, the proportion of men interviewed was higher. However, very few female respondents were surveyed at Perth, whereas the majority of people interviewed at Kirkcaldy and Bridge of Allan were female. Overall, 52% of the sample was female, with males accounting for 48%.

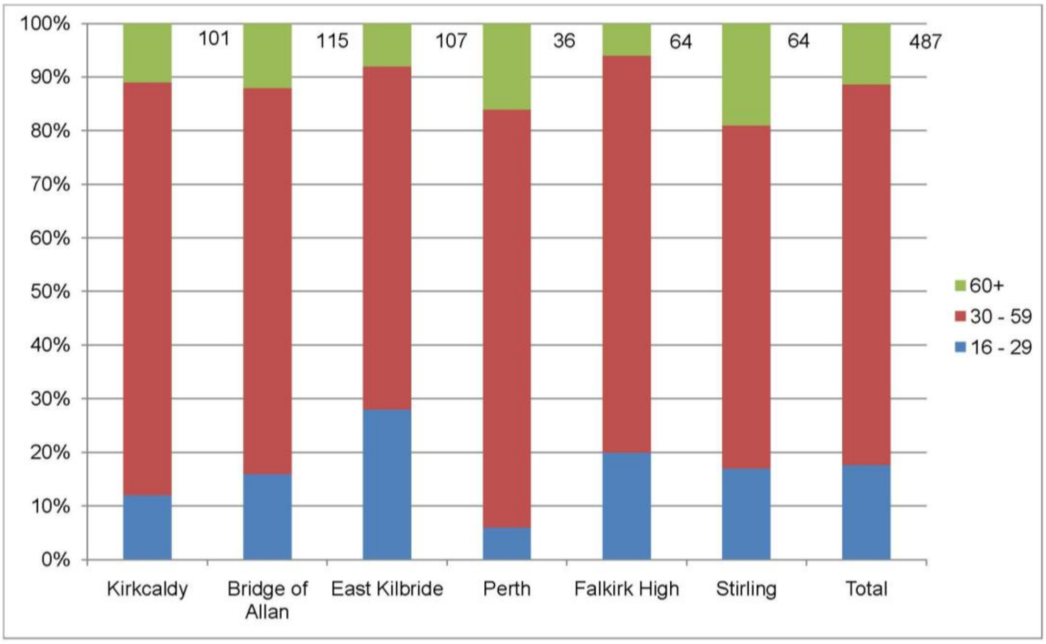
Figure 3.1: Gender of respondents



Source: Arup analysis of Accent data. Sample sizes are shown adjacent to each bar

3.11 The vast majority of respondents were aged between 30 and 59 years old. East Kilbride had the highest proportion aged between 16 and 29 accounting for 28% of respondents, whilst Stirling had the highest proportion of people aged over 60 (19%), as shown in Figure 3.2.

Figure 3.2: Age of respondents



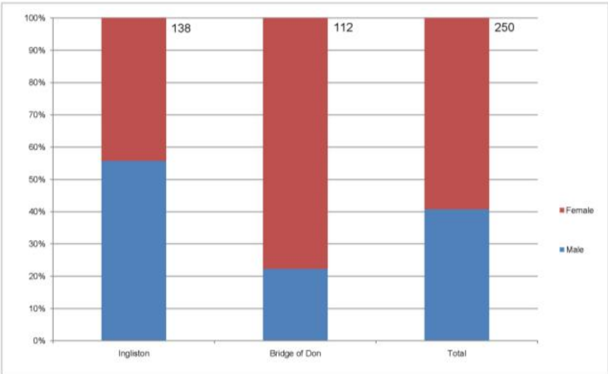
Source: Arup analysis of Accent data, sample size shown

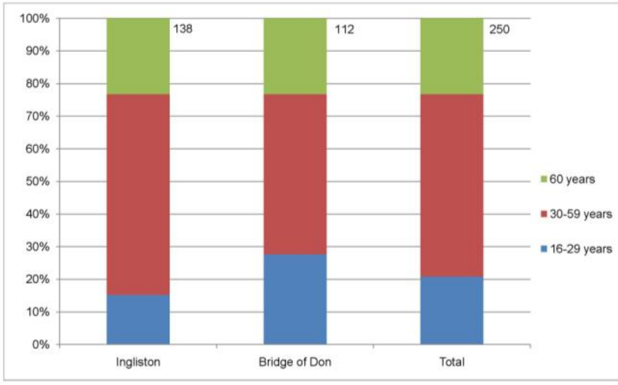
3.12 Rail ticket data, plus other economic information (GDP, employment, population) and the availability of parking information was incorporated into a model. Some of the results from the primary data collection were then used to estimate the demand impacts from the additional parking availability and attitudinal responses to the availability of lighting and security. Further details of the methodology used are included in Chapter 4 and Appendix A1.

Bus case studies

3.13 The majority of male respondents were interviewed at Ingliston, whereas most of the females were surveyed at Bridge of Don. Almost 60% of respondents were aged between 30 and 59 years, as shown in Figure 3.3.

Figure 3.3 Gender and age characteristics





Source: Arup analysis of Accent data, sample size shown

3.14 Similar to the rail model, results from the primary research were incorporated into a forecasting model to understand the impact of parking availability on demand. A Revealed Preference model [7]was created for existing users, with a Stated Intention[8] survey undertaken with non-users. The results from this primary research were incorporated into the model. Further details of the methodology are presented in Chapter 5 and Appendices A2 and A4.

Cross Forth case study

3.15 The purpose of this Stated Preference (SP)[9] exercise was to assess the relative attractiveness of bus and rail based park and ride using Inverkeithing

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[7] Revealed Preference data is obtained from observing what individuals do in real markets and the real choices that they make. By choosing between, say, a quicker but more expensive mode and a slower but cheaper mode, they reveal information on the relative importance they attach to time and cost.

[8] Stated Intention is a special case of Stated Preference. It is essentially a 'what would you do if' question, obtaining individuals' behavioural responses to hypothetical events such as the opening of a new rail station nearby or to a specific increase in fares

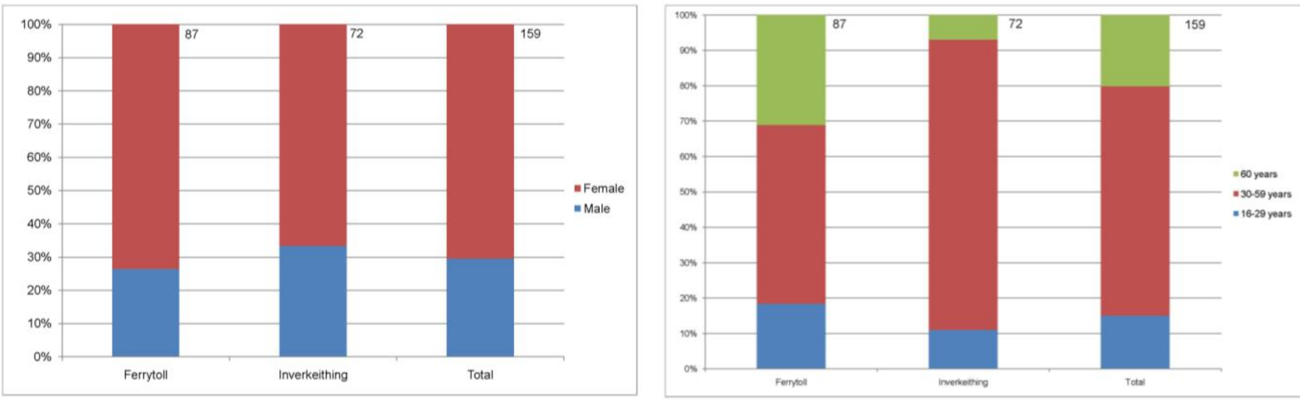
[9] Stated Preference questions offer decision makers choices between hypothetical alternatives characterised by a number of relevant factors, such as time and cost, which influence choices. The

and Ferrytoll. It was beyond the resources of this study to identify and interview a robust sample of current car users for whom Inverkeithing and Ferrytoll would be realistic alternatives for their existing journeys. As a result, the extent of bus or rail improvements needed to attract existing car users has not been quantified. Forecasting models were built for each mode.

3.16 A sample of existing users was approached in the car parks at Ferrytoll and Inverkeithing. A brief interview was conducted about their current journey and followed by a SP exercise describing alternative travel choices. These included changes to the daily return fare, the journey times and service frequencies. Variables were assigned to attempt to induce changes in behaviour in order to reliably estimate the impact of behavioural responses. A range of scenarios were presented, with rail journeys generally assumed to be faster but generally more expensive and less frequent than bus. The actual access and egress times (time spent getting to the final destination from the bus stop or railway station) were also included in the modelling, although these parameters were fixed. A total of 159 interviews were completed, with 72 at Inverkeithing and 87 at Ferrytoll.

3.17 Similar to the bus based surveys discussed above, females accounted for a larger proportion of the overall total (60%) of interviews. Respondents aged between 30 and 59 years accounted for almost two-thirds of the total and this result is comparable to the respondents surveyed as part of the bus sector. Figure 3.4 presents the results.

Figure 3.4: Summary of the age / gender profile



Source: Arup analysis of Accent data, sample size shown

answers provided indicate the relative importance attached to each of those factors in much the same way as for Revealed Preference data.

Consultation with First ScotRail and Regional Transport Partnerships

3.18 To supplement the primary research, discussions with First ScotRail and Regional Transport Partnerships were held as shown paragraph below. The support for expanding car park availability at stations was examined, along with the role of parking to grow demand. The opportunities and issues associated with expanding parking availability were also explored.

3.19 The emerging results from the bus analysis were discussed with some Regional Transport Partnerships. Feedback from was received from TACTRAN and SESTRAN. Many of the RTPs are supportive of park and ride, and this can be demonstrated by the preparation of overarching strategy documents[10]. These discussions helped to supplement some of the emerging analysis from the literature review presented in Chapter 5 to understand the relative performance of existing schemes.

[10] http://www.spt.co.uk/rts/action_plans.php "Park and Ride Action Plan", http://www.sestran.gov.uk/publications/13/strategy-documents--park--ride/ "Strategy Documents Park and Ride", http://www.tactran.gov.uk/strategy_rtsubcats.html "Park and Ride Strategy and Action Plan", http://www.nestrans.org.uk/documents.html, http://www.hitrans.org.uk/Strategy/Strategy.html

4 Parking at railway stations

Background

4.1 Rail passenger numbers continue to increase in Scotland as a result of various timetable changes including the introduction of new or faster services. Coupled with employment growth in the main urban centres[11] and worsening road congestion, this has improved the competitiveness of rail versus other modes.

4.2 As a result, the availability of parking has reduced with many full before the end of the AM peak period. If parking is not available, there is a perception that some may choose to make their entire journey by car rather than use rail. Alternatively, the length of the access leg by car could be extended if there is a lack of parking at some stations. This relationship has not been examined satisfactorily by previous studies.

Supporting wider objectives

4.3 Rail based park and ride can help to support a number of objectives including:

- **economic:** the number of people able to access city centre employment will increase, given the speed and capacity characteristics of rail versus other modes

- **environmental:** rail transport has significant potential to lower CO2 emissions through modal shift from car

- **social:** by encouraging some motorists to switch modes for at least part of their journey, this will reduce congestion levels and deliver other qualitative benefits, including improved quality of life and amenity

Selection of case studies

4.4 The selection of case studies for primary research was carefully reviewed by the client steering group to ensure a representative sample was selected. Primary research was conducted at Bridge of Allan, Kirkcaldy, Perth and East Kilbride stations where the number of car parking spaces had been recently increased. This provided a reasonable cross-section covering geographic location, rural or urban characteristics and different charging structures. Two "control" stations (Stirling and Falkirk High) provided comparisons to understand the impacts if the number of spaces available was unchanged. The controls are located in the same geographic area as the primary case studies, so the specific impacts of car park expansions could be isolated. Table 4.1 summarises details of the specific car parks examined.

[11] Information from TEMPRO dataset version 5.4, National Trip End Model

Table 4.1: Summary of the car parking statistics

Station	Number of Spaces		Date of Expansion	Usage	Operator	Rail Services
	Before the Extension	After the Extension				
Kirkcaldy	274	594	Nov 2006	80%	Local authority	Regular services to Edinburgh, plus trains to Aberdeen / Inverness
Bridge of Allan	114	146	Dec 2005	100%	First ScotRail	Regular trains to Edinburgh and Glasgow Queen Street
East Kilbride	162	287	May 2007	97%	First ScotRail	Regular trains to Glasgow Central
Perth	54	160	N/A	92%	First ScotRail	Regular trains to Glasgow Queen Street, Edinburgh, Aberdeen and Stirling
Falkirk High	215	215	N/A	98%	First ScotRail	Regular trains to Edinburgh and Glasgow Queen Street
Stirling	276	276	N/A	100%	First ScotRail	Regular trains to Glasgow Queen Street, Edinburgh, Aberdeen and Perth

Source: National Rail website, First ScotRail monitoring data illustrating car parking occupancies

4.5 In addition to the above stations, other examples benefiting from car park extensions including Markinch, Dunfermline Town, Rosyth, Musselburgh, Cupar, Carluke, Uddingston, Glengarnock, Johnstone and Prestonpans were included in the forecasting model. Ticket data for other 'control' stations, namely, Leuchars, Motherwell and Falkirk Grahamston, were also included.

Consultation with First ScotRail

Background

4.6 The impact of car parking extensions on rail demand was discussed with First ScotRail (FSR). This explored the relationship between parking availability, the resulting impact on rail demand and the influence of other factors from the perspective of the operator.

Support for park and ride schemes

4.7 FSR is generally supportive of schemes to increase car parking availability, especially if they help to attract new rail revenue. However, the high capital costs and short duration of the remaining franchise (the current contract expires in November 2014) means the scope for FSR to lead proposals is limited. The fulfilment of a Committed Obligation in the Franchise Agreement would generally necessitate FSR leading the development of a scheme, rather than progressing schemes commercially.

4.8 As a result, Regional Transport Partnerships have taken the lead in delivering extensions, certainly in the SPT (Strathclyde Partnership for Transport) area, with operational and maintenance responsibilities reverting to Local Authorities upon completion. However, proposals need to be aligned with other considerations, for example, capacity constraints at existing sites. Carluke is an example of a Council promoted scheme where the proportion of spaces occupied prior to expansion was very low. With just an hourly service towards Glasgow, the scope to attract additional motorists to this station is limited. This demonstrates the importance of aligning objectives carefully.

Role of parking in influencing wider demand growth

4.9 There are a number of factors influencing rail growth, including the attractiveness of the rail service and the extent of crowding problems. Extending station car parks with a competitive rail service that operate parallel to congested roads can attract new users. This is a particular issue if the rail service is transformed. The route between Edinburgh and Glasgow via Shotts was transformed in December 2009, with the introduction of some services which do not stop at all stations on the line. This has reduced journey times between Edinburgh and Glasgow Central by up to 33 minutes from 96 minutes to 63 minutes. Passenger numbers at selected stations have increased significantly as a result of the improved service, creating capacity problems at a number of station car parks.

Options to expand parking provision

4.10 The potential benefits of decking (providing an additional, second level of car parking at existing car parks) were highlighted by FSR, particularly if the scope for surface level expansions was limited. Bridge of Allan, Johnston and Uddingston stations were suggested as examples that may require decking if additional spaces are required. Rising land costs, particularly for plots close to railway stations were highlighted as a risk, so decking could offer a quicker solution. This approach would minimise the extra land take, although the capital costs would be considerably higher compared with a surface car park. The cost per space for a surface car park is £5,000 - £10,000, whilst the costs for decked spaces are 2-3 times higher[13].

Managing park and ride sites

4.11 The operator has responsibilities for maintaining the extra spaces as specified under the SQUIRE [14] regime, whilst collecting revenue at the stations where charges are enforced. They also actively promote the expansion of station car parks through the local press and leaflets (for non-users) and advertisements at stations for existing users. Station car parks have full CCTV coverage, but FSR does not feel that 'Park Mark' or similar quality assurance deliver good value for money due to poor recognition by passengers.

[13] Source: Arup database of costs from .previous project work based on schemes to expand parking provision at a number of railway stations in South Yorkshire

[14] The Service Quality Regime (SQUIRE) is the mechanism used by Transport Scotland to monitor and measure the quality of customer services provided by First ScotRail

Conclusions

4.12 Whilst FSR are supportive of proposals to expand car parking availability at railway stations, the opportunities are constrained by several factors. The short remaining duration of the operator's franchise term restricts the scope to develop new proposals. The wider interface with the timetable must be considered as part of the overall proposition. Whilst decking existing car parks can reduce implementation timescales, particularly if land needs to be purchased, the resulting capital costs can be prohibitively expensive.

Model development

4.13 A forecasting model was populated using LENNON rail ticket data (which represents single rail trips)[15], plus other parameters, including change in city centre employment, GDP, housing and the availability of parking spaces at the stations. The modelling framework incorporated two main components:

- development of a modelling framework populated with LENNON data
- inclusion of selected parameters using the results from the attitudinal surveys

4.14 Demand models that link observed and stated behavioural responses were examined to understand the relationship between parking availability, quality and prices, along with the change in attitudinal behaviour. The change in rail demand is also dependent on the change in parking spaces, the change in parking charge and changes and the availability of other factors, such as the quality and security of the parking, for example, CCTV.

4.15 Time series LENNON rail ticket data was collated for all passengers (not just park and ride users) by period (4 weekly intervals) for the primary and control stations and incorporated into econometric modelling software. The control stations were selected since they had not benefited from additional parking provision as shown in Table 4.1. Data from these stations was incorporated into the modelling framework to isolate the specific impacts of the extra parking spaces. This would enable the impacts of the case study stations versus the controls to be isolated. The number of trips and revenue generated from the busiest flows were collated, since any changes in car parking availability would have the greatest impact on demand affecting these flows. For example, the highest number of trips originating from Bridge of Allan arrived at Edinburgh, Glasgow Queen Street, Stirling, Dunblane and Falkirk. Journeys and revenue were split by ticket type (season and others).

4.16 The model was segmented to reflect the type of ticket being purchased (season and other) and the length of trip (up to 20 miles or longer). LENNON data was available for about 6 years, and 170 station-to-station flows were included in the model. The inclusion of almost 15,500 records meant the sample size was robust. The model incorporated other variables, including the

[15] It should be noted throughout this report that when reference is made to trip making this is associated with a single journey between an origin and a destination.

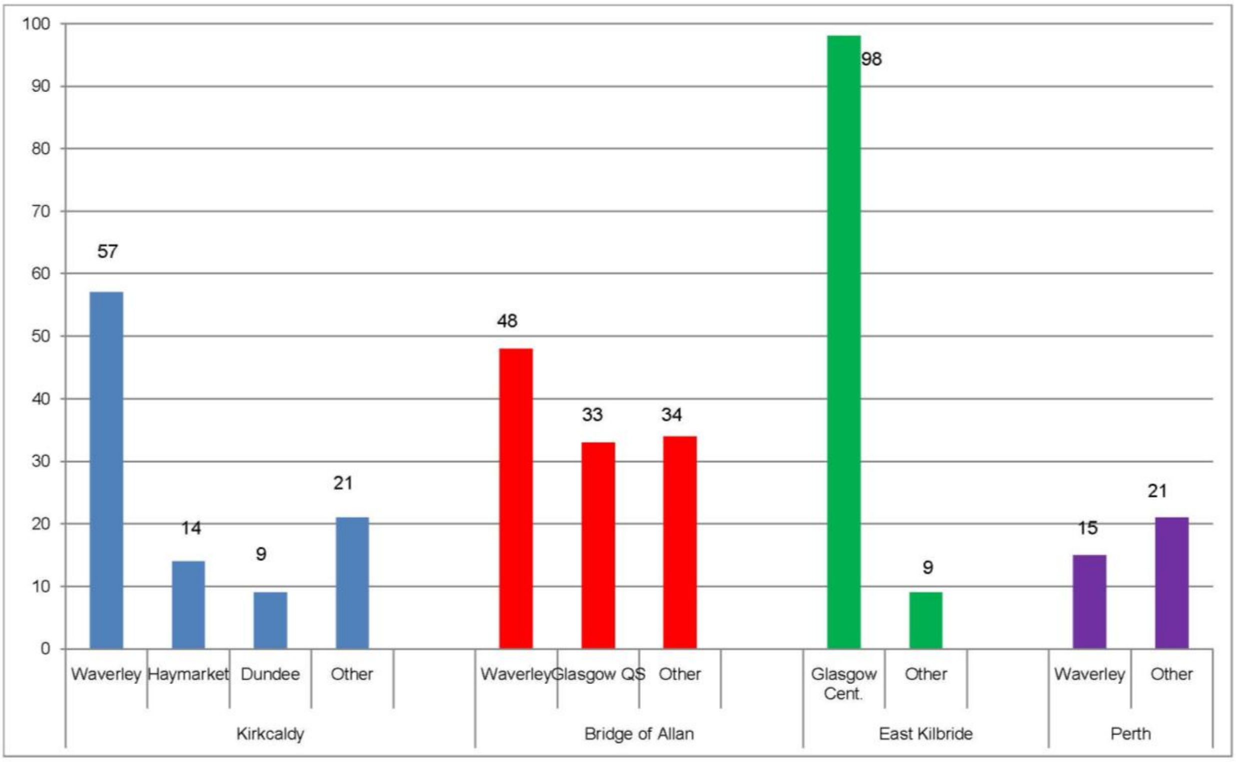
capacity of the railway station car park, or the availability of spaces. A number of variables were also incorporated into the model using results from the primary research. A more detailed description of the modelling methodology is presented in Appendix A1.

Results from the primary data collection

<u>Trip distribution</u>

4.17 To supplement the analysis presented in Chapter 3, further analysis of the primary research has been completed. The most popular destination from Kirkcaldy is Edinburgh Waverley (57 respondents out of 101). With the exception of Haymarket, there were fewer than 10 respondents travelling to other destinations. This reflects the high frequency rail service to Edinburgh from Kirkcaldy with 5-6 services per hour. Over 45 respondents from Bridge of Allan travelled to Edinburgh Waverley, with a further 33 to Glasgow Queen Street. The distribution of passenger journeys is consistent with the train service pattern, with 2 trains per hour to Edinburgh and an hourly service to Queen Street. Fewer than 10 people made journeys to other stations including Falkirk Grahamston. Almost all respondents surveyed at East Kilbride station were travelling to Glasgow Central, with fewer than 10 trips to any other station. The lack of direct services to other major destinations appears consistent with these results, as shown in Figure 4.1.

Figure 4.1: Number of single trips from Kirkcaldy, Bridge of Allan, East Kilbride and Perth

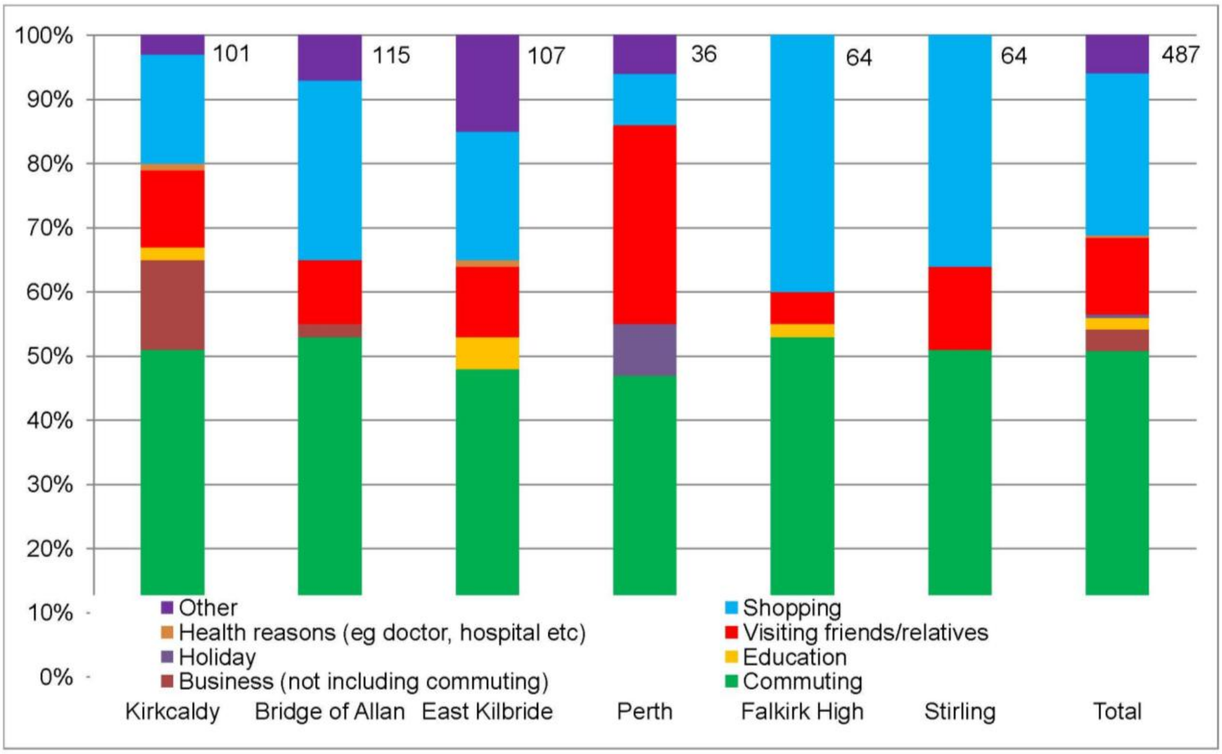


Source: Arup analysis of Accent data

Journey purpose

4.18 Commuting and shopping were the most popular trip purposes as shown in Figure 4.2. Commuting trips accounted for 40-50% of the total, depending on the individual station. The importance of shopping trips differed, ranging from around 10% (Perth) to 35-40% (Falkirk High and Stirling). The relatively low percentage of shopping trips from Perth was offset by the high proportion visiting friends and relatives. The timings of the surveys (afternoon and evening peak) may have influenced the journey purpose.

Figure 4.2: Journey purpose



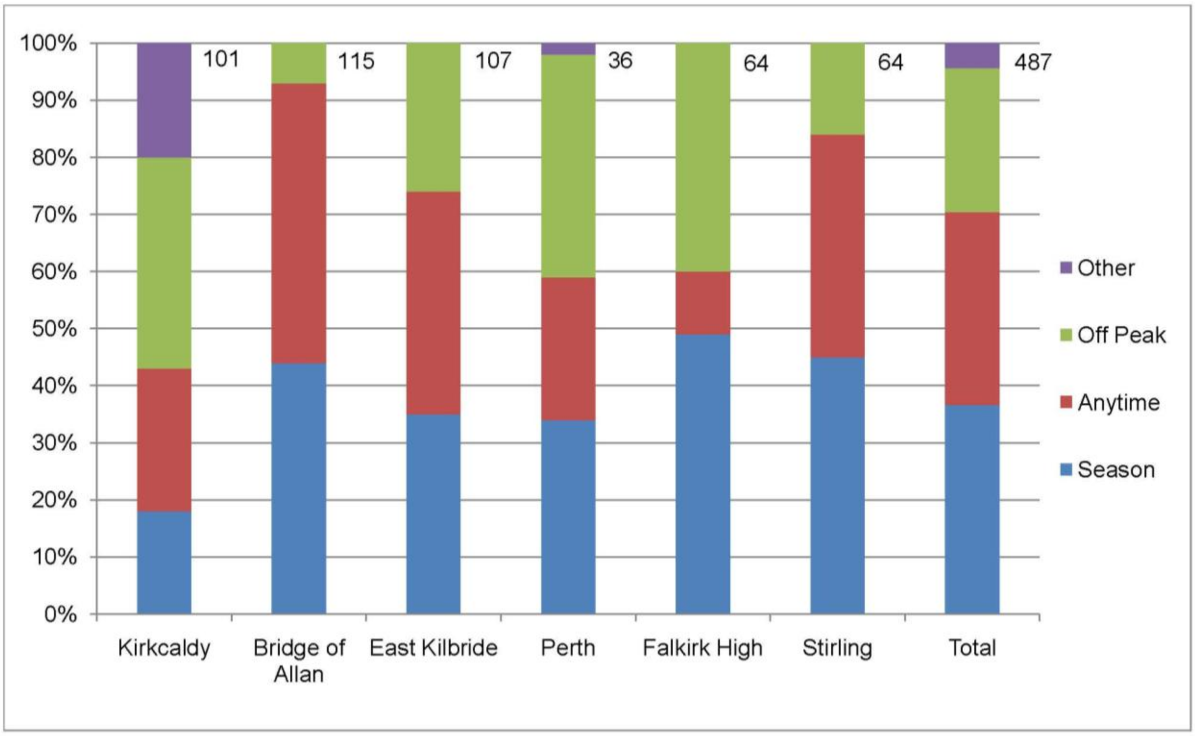
Source: Arup analysis of Accent data, sample size shown

Ticket type

4.19 Figure 4.3 illustrates the type of ticket purchased by the respondents at the six stations. Overall, ‘season’ tickets are the most popular type, especially at Bridge of Allan, Falkirk High and Stirling. In contrast, the percentage from Kirkcaldy using season tickets was relatively small (about 15%). The use of off peak tickets is higher from Kirkcaldy, Falkirk High and Perth, highlighting the role of shopping and other leisure trips from these stations.

4.20 These results illustrate some interesting trends, particularly when examined alongside the journey purpose analysis. In particular, the percentage of respondents purchasing season tickets from Kirkcaldy, Falkirk High and Perth is lower than the proportion of commuters, implying some may be travelling less than 5 days a week and therefore choosing to buy alternative products. The percentage buying off-peak tickets at Bridge of Allan and Stirling is low (less than 20%), highlighting the importance of peak flows.

Figure 4.3: Ticket type based on results of passenger interviews



Source: Arup analysis of Accent data, sample size shown

Parking costs and the availability of spaces

4.21 The stations with extended car parks are generally free, with all respondents at Kirkcaldy and Bridge of Allan benefitting. In Perth, about half of the travellers parked for free. Charges are supposed to be levied, but some travellers do not pay since they perceive the likelihood of checks to be minimal. Over 90% of traveller's park free of charge at East Kilbride. The selected stations without extensions have a higher proportion of chargeable spaces. At Falkirk High and Stirling, only 1% parked for free. Other respondents had paid £2.50 per day (Falkirk High) and £3.00 per day (Stirling). Table 4.2 presents the results.

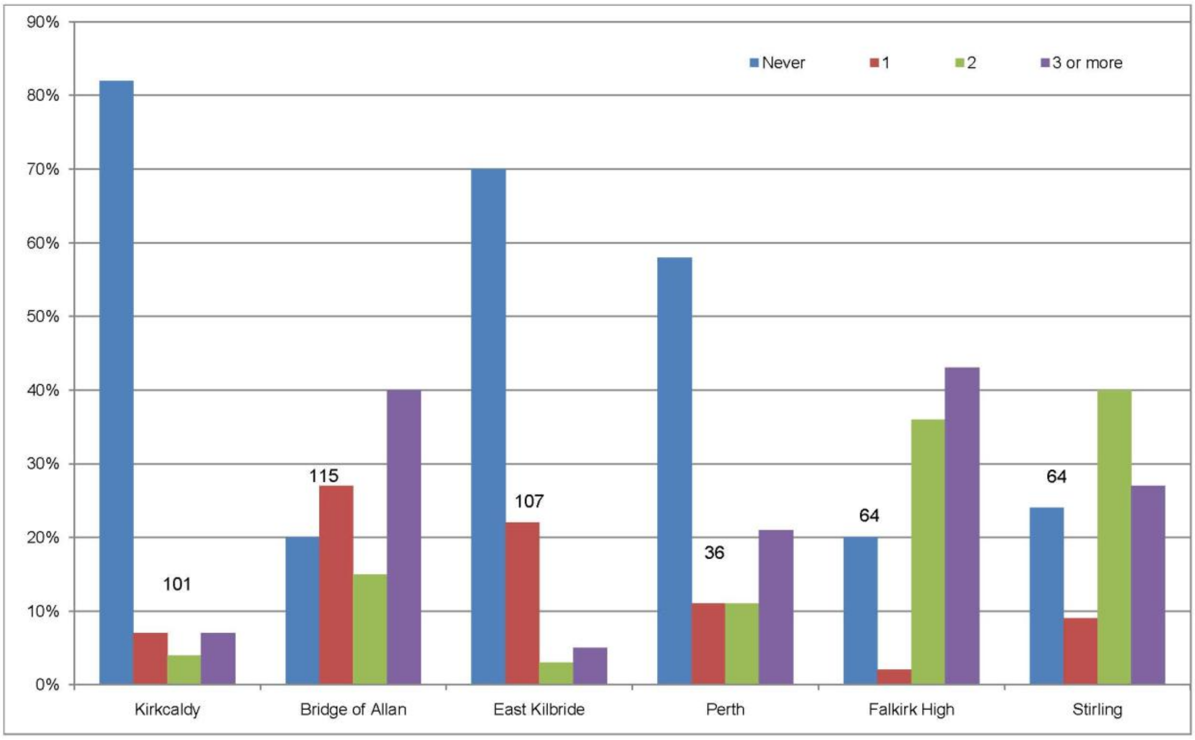
Table 4.2: Daily parking cost

	No charge	Less than 80p	£1.50	£2.50	£3.00	£3.50	No. Of Responses
Kirkcaldy	100%						101
Bridge of Allan	100%						115
East Kilbride	92%		8%				107
Perth	50%	3%			47%		36
Falkirk High				100%			64
Stirling	1%				99%		64

Source: Arup analysis of Accent data

4.22 Respondents were interviewed to explore their perceptions of parking availability. There are noticeable differences between the results, with at least 70% of respondents always finding a space at Kirkcaldy and East Kilbride. This suggests the car park extensions at East Kilbride and Kirkcaldy have alleviated the previous constraints regarding the availability of spaces. Furthermore, nearly 60% of respondents at Perth always found a space. In contrast, only 20% of users at Bridge of Allan, Falkirk High and Stirling could always find a parking space. This highlights the popularity of the car park at Bridge of Allan. The introduction of parking charges at Dunblane may have increased the demand for station parking at Bridge of Allan. About 40% of users at Bridge of Allan and Stirling had problems finding a space on at least 3 occasions every 10 visits. Figure 4.4 presents the results.

Figure 4.4: Likelihood of difficulty in parking (every ten visits)



Source: Arup analysis of Accent data, sample size shown

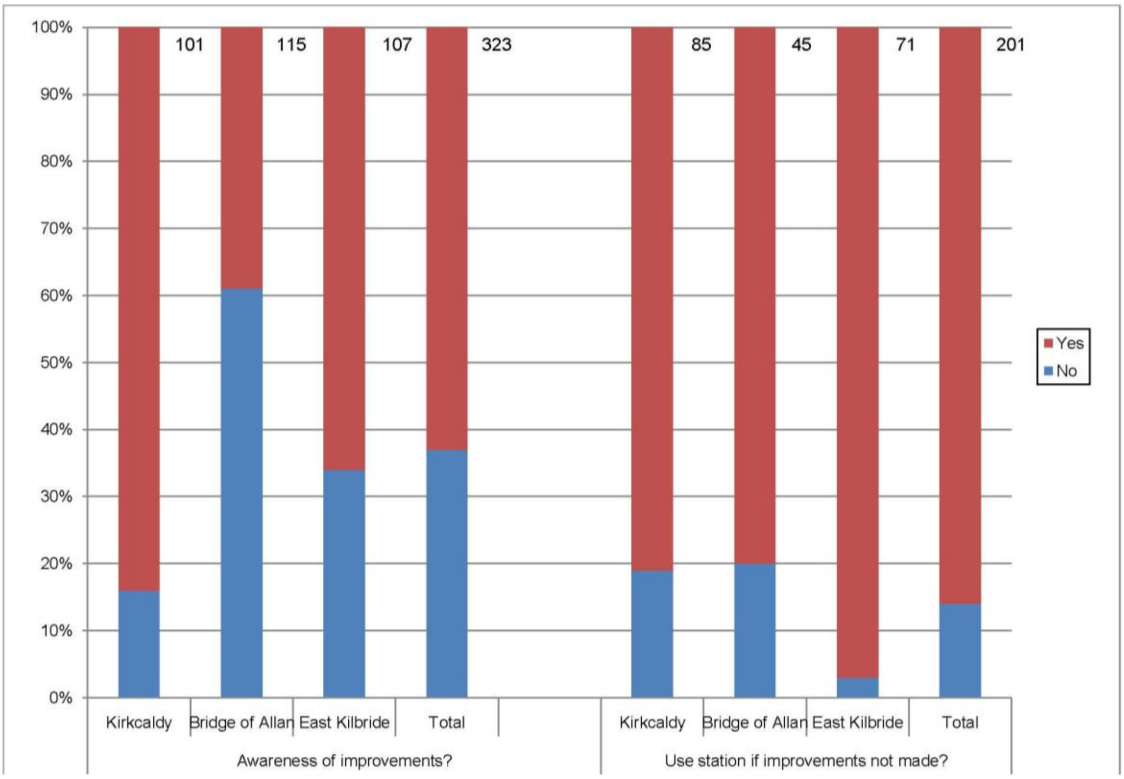
4.23 The occurrence of parking problems affecting peak versus off peak passengers did not highlight any specific problems. Exploring the results in terms of commuting versus leisure travel as a proxy showed no difference in perceived availability of parking spaces. However, anecdotal evidence did highlight some car parks filling up early and this coincided with commuting patterns in the morning peak. Interviews with passengers arriving in the morning peak and who could not park were partially examined as part of the non-user surveys. Larger sample sizes would, however, be required to explore this issue more fully.

Awareness of car park extensions and attitudinal responses

4.24 The awareness of the improvements and the subsequent passenger behaviour in this section was only examined at Kirkcaldy, Bridge of Allan and East Kilbride.

4.25 The majority of respondents surveyed at Kirkcaldy (84%) and East Kilbride (66%) were aware of the improvements to these station car parks. The results for Bridge of Allan indicate an entirely different conclusion, with 61% of respondents not aware of the improvements. At least 80% of respondents stated they would have used their current station, even if additional parking spaces were not available. The results are shown in Figure 4.5.

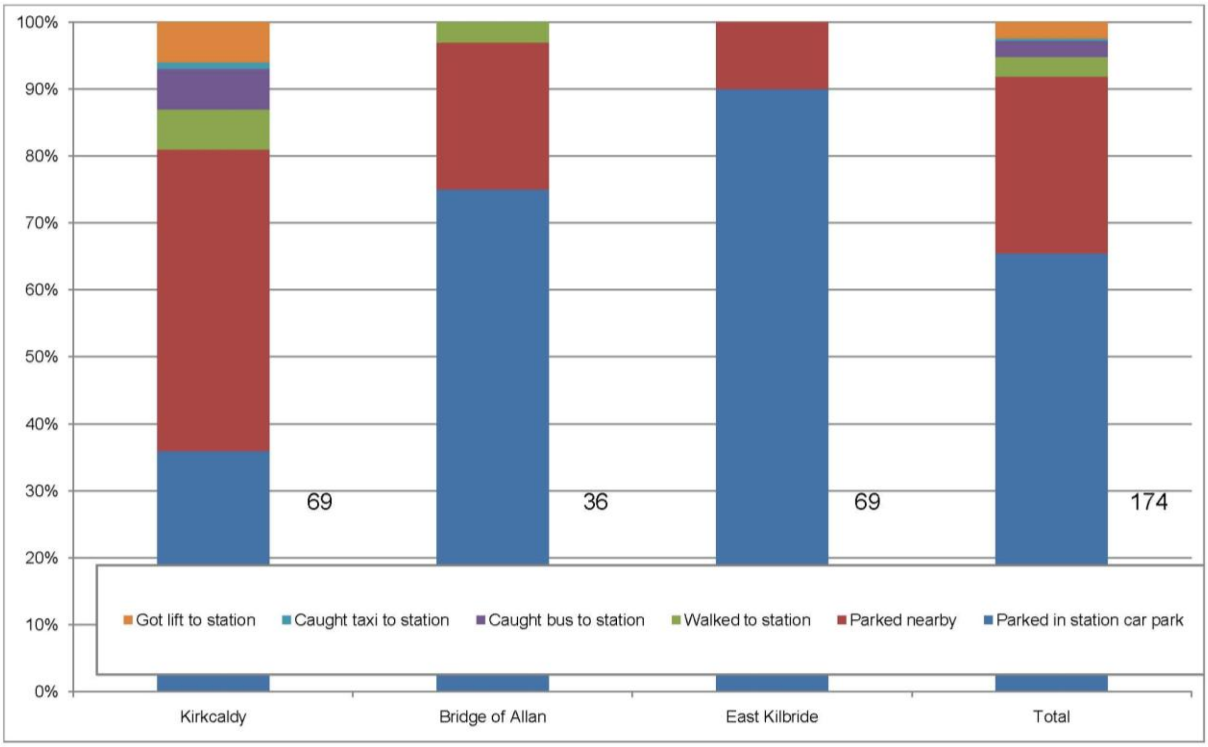
Figure 4.5: Awareness of improvements and changes in user behaviour



Source: Arup analysis of Accent data, sample size shown

4.26 Figure 4.6 illustrates the change in travel behaviour for respondents who used the station prior to the improvements, and their mode of access. Only one-third of respondents interviewed at Kirkcaldy previously used the car park, with about 45% parking elsewhere. The results suggest there are fewer alternative parking choices available for passengers using Bridge of Allan and East Kilbride. With the exception of Kirkcaldy, the number of 'other' responses, including walking to the station or catching a bus or taxi was very small.

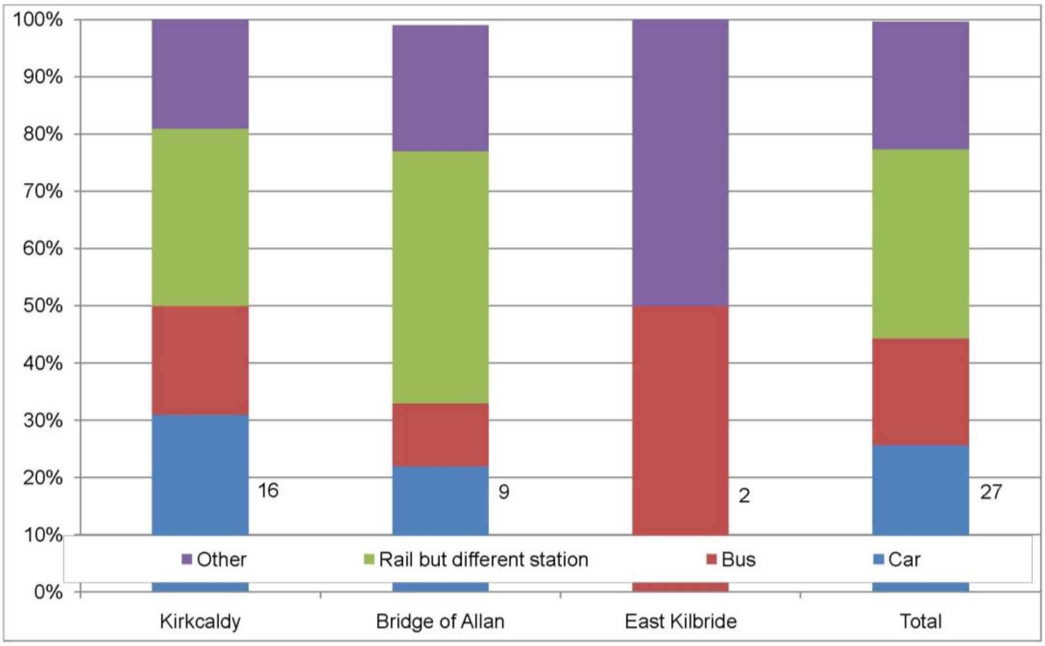
Figure 4.6: Behaviour before car park was extended: existing users



Source: Arup analysis of Accent data, sample size shown

4.27 Figure 4.7 presents the travel behaviour for respondents who are only using rail in response to the car park improvements. In contrast with the results presented in Figure 3.8, it is worth highlighting the relatively small sample size. Around 20-30% of users at Bridge of Allan and Kirkcaldy used to drive, indicating the expanded car parks have removed some trips from the network. Furthermore, 30-40% of users previously drove to a different station, so the extension may have reduced the car distance to reach the station. This result may also have been influenced by the introduction of both on-street parking restrictions and charging at the car park adjacent to Dunblane Station by Stirling Council. (The sample size for East Kilbride is too small to draw any meaningful conclusions.)

Figure 4.7: Travel behaviour before car park was extended – new users

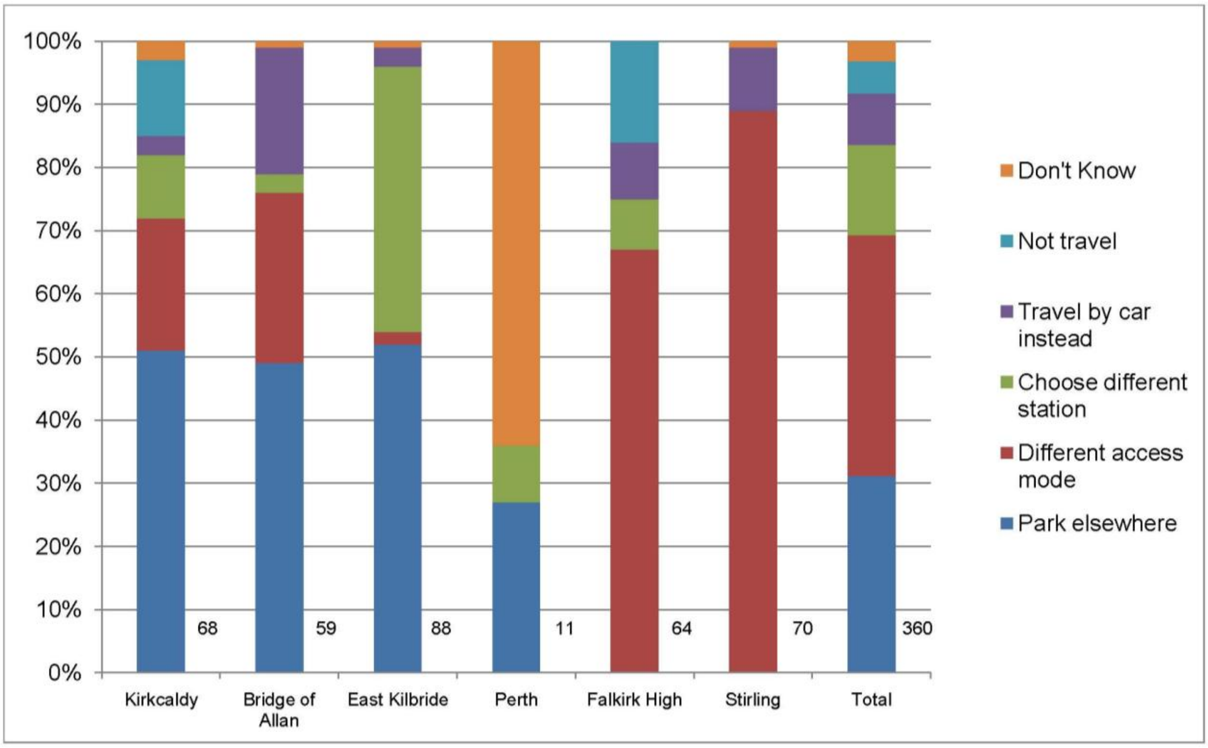


Source: Arup analysis of Accent data, sample size shown

Changes to travel behaviour

4.28 About 50% of respondents at Kirkcaldy, Bridge of Allan and East Kilbride stated they would park elsewhere if the number of spaces was reduced. Over 40% of users at East Kilbride would travel from a different station, and this reflects the close proximity of alternatives. Passengers interviewed at Falkirk High and Stirling indicated they would use a different mode of access to these stations. This reflects the improved journey opportunities available (higher frequencies, faster journey times) compared with adjacent stations. The results are shown in Figure 4.8.

Figure 4.8: Alternative travel behaviour if parking availability is constrained



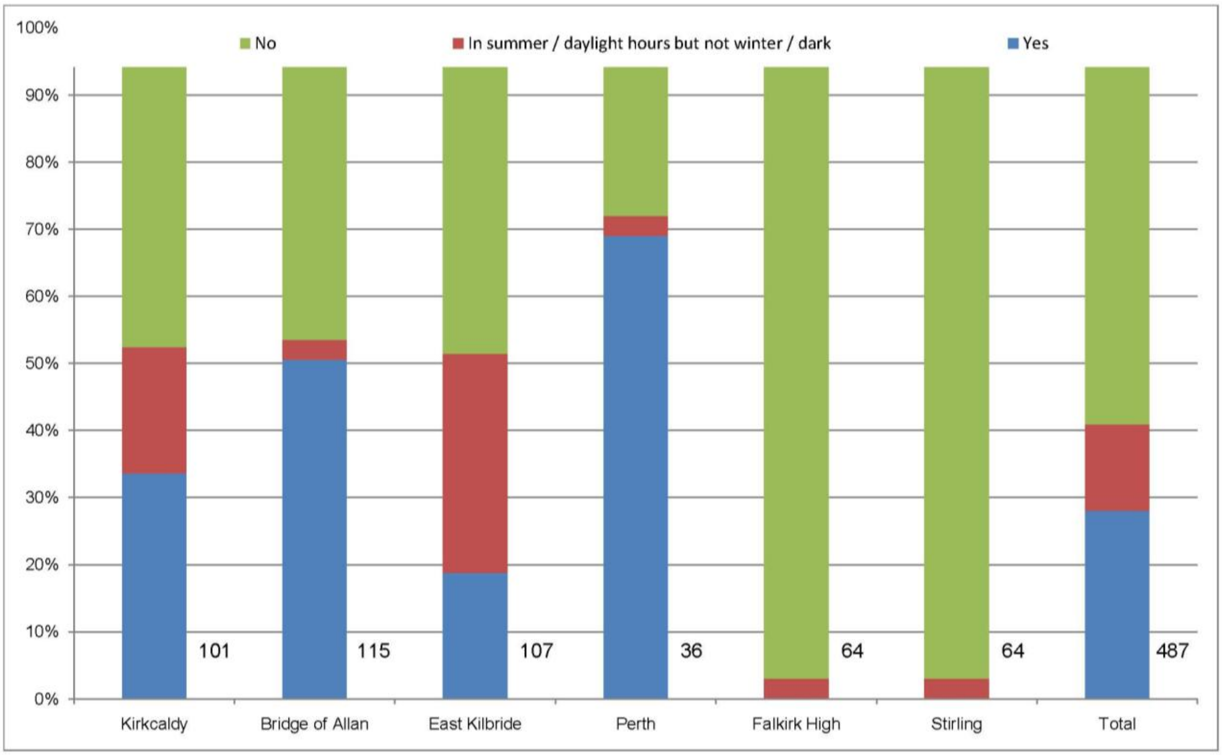
Source: Arup analysis of Accent data, sample size shown

Station facilities

4.29 The importance of CCTV varies at the six stations. In Kirkcaldy, Bridge of Allan, East Kilbride and Perth, the majority of respondents would still use the car park even if CCTV was not available. The availability of lighting is of greater concern when compared with CCTV, particularly at Kirkcaldy and East Kilbride. Whilst the majority of respondents using Bridge of Allan and Perth would continue their current behaviour even if the car park was not lit, they are located close to other pedestrian links, helping to remove some safety concerns. Only one-third of users from Kirkcaldy and East Kilbride would continue to use the station if lighting was removed, although a higher proportion of respondents would use East Kilbride during the summer / daylight conditions. At two of the control stations (Falkirk High and Stirling), over 90% of respondents stated they would not use the car park if there was no lighting.

4.30 The impact on user behaviour was examined if CCTV and lighting were not available, along with no tarmac on the road surface. At Kirkcaldy, Bridge of Allan and East Kilbride about 50% of respondents would not use the car park, although 15-30% would use Kirkcaldy and East Kilbride during daylight hours. Almost 97% stated they would not use Falkirk High and Stirling if these facilities were removed. Figure 4.9 illustrates the results.

Figure 4.9: Willingness to use the car park without CCTV, lighting and an untarmaced road



Source: Arup analysis of Accent data, sample size shown

Results from the modelling outputs

<u>Link between parking availability and demand</u>

4.31 The outputs from the econometric analysis illustrates that a 10% increase in parking spaces would lead to a 0.43% increase in season ticket trips and a 0.35% increase in non-season ticket trips based on the sample of data analysed. The impacts are smaller for local journeys less than 20 miles. The impact for the case study stations is shown in Table 4.3 and is presented in terms of the number of additional rail trips per day when the elasticities are applied. This equates to 12 wholly new trips per day from Kirkcaldy and 3 extra trips per day from Bridge of Allan. The extra demand from Perth and East Kilbride is 11 daily trips. The results from the case studies could be applied to other stations, although scheme promoters need to ensure the characteristics of the stations to be expanded are similar to the above examples, only with due attention to local circumstances, given that the demand impact will vary according to the specific characteristics of each station.

4.32 The modelling methodology estimates the change in demand based on percentage based adjustments. Stakeholders have also requested this impact be expressed in terms of the change in demand which is specifically related to the number of parking spaces provided. The relationship between the number of parking spaces before and after the expansion and the total number of new trips, suggests each additional 100 spaces generates between 4 and 10 extra journeys per day.

Table 4.3: Incremental change in rail demand

Station	Estimated Number of Daily Trips	Change in season ticket trips / day	Change in non-season tickets /day	Total	Number of additional parking spaces	Extra daily trips per 100 parking spaces
Kirkcaldy	3,444	4	8	12	320	3.75
Bridge of Allan	754	1	2	3	32	9.38
East Kilbride	2,743	4	7	11	125	8.80
Perth	2,848	4	7	11	106	10.38

Source: Arup analysis of ITS and Office of Rail Regulation (2009/10 Station Counts). Trip generation based on 30% season tickets and 70% non-season tickets

Likelihood of getting a space

4.33 The econometric modelling estimated the change in demand if the likelihood of finding a space was reduced as shown in Appendix A1. If the likelihood of not finding a space increased from 0% to 20%, this would lead to a 4.3% reduction in rail demand. If the likelihood of not getting a space increased to 10%, demand would be reduced by 2.2%. The model outputs indicate there would be virtually no increase in non-season ticket demand if parking availability was increased and there were ample free alternatives to the station car park.

Impact of parking charges

4.34 A range of scenarios were tested to examine the impact of changes to parking charges. These tests include the introduction of a parking charge to £1 for locations where parking was previously free, or increasing the parking charge to a higher value, for example, from £1 to £2. Responses have been used to assess the percentage using rail which would not alter their travel behaviour, and the proportion parking elsewhere or switching to another mode depending on absolute changes to the parking charges. The relationship shown is non-linear, since each respondent was not presented with every price increase. If the parking charge is increased by £1, park and ride demand would be reduced by 4.9%. A 3.0% reduction in park and ride usage would occur if there is ample free parking available in an alternative location nearby.

Guidance to scheme promoters

4.35 The analysis presented above highlights the main issues emerging from the user surveys and the modelling outputs. The purpose of this section is to consider how these conclusions help to address the overall study objectives and these are set out below.

- **objective 1 (changes to parking supply and pricing affecting public transport usage):** Outputs from the model indicated a 10% increase in parking spaces would lead to a 0.43% increase in season ticket trips and a 0.35% increase in non-season ticket trips. Table 4.3 illustrates the impact on rail demand for the case study stations. Furthermore, if parking charges were increased by £1 (either from free to £1 or £1 to £2), rail demand would be reduced by 4.9%. A 3.0% reduction would occur if there is ample free parking available in an alternative location nearby. In the absence of sufficient parking at a station, the majority of passengers will use alternative solutions to access it

- **objective 2 (scope of parking supply and cost to influence modal shift):** The scope to influence overall mode choice if station parking was increased is relatively small. If additional parking was available, about 1.5% new trips would be generated. However, the wider positive impacts in terms of congestion and emissions will be smaller since the increased availability of parking has encouraged some existing users to drive to the station rather than opting to walk, cycle or catch the bus

  Based on the survey results using Kirkcaldy as a case study (the sample size is larger compared with Bridge of Allan or East Kilbride), the additional car trips travelling to the station as result of the extended car parks rather than using alternative modes is broadly equal to the reduction in car distance. This estimate of car distance removed from the network is based on the level of new rail trips generated from the parking improvements, the proportion switching from car based on the survey results and the assumed trip length from Kirkcaldy. This is similar to the journeys previously travelling to Kirkcaldy by bus, cycle or on foot and an assumed average distance to the station, again based on survey results. As a result, the change in car kilometres removed from the network resulting from the expanded car parks is negligible. However, this conclusion may be different depending on the characteristics of each station

- **objective 3 (relative importance of complementary factors):** Conclusions from stakeholder feedback, along with the survey results from park and ride travellers using the station regarding the impact of ‘softer’ measures, help to illustrate the relative importance of CCTV, lighting and a paved road. Some of these factors were assessed individually or in groups. For example, discussions with FSR highlighted the wider role of employment and other factors generating demand, the impact of timetable changes and the availability of spare capacity. The benefits of CCTV, lighting and other measures to create a safe waiting environment were also highlighted based on results from the primary research. The absence of such measures would reduce the attractiveness of park and ride

- **objective 4 (identification of undesirable outcomes):** The review of evidence to address Objective 2 highlighted the negligible change in car kilometres removed from the network if railway station car parks were expanded using Kirkcaldy as a case study. The mode of access before and after the changes to parking availability indicated around 20% of the sample at Kirkcaldy previously walked, cycled, took the bus, or car shared

- **objective 5 (financial metrics to guide appraisal):** The capital cost to extend existing car parks is about £5,000-£10,000 per space, although this could be higher if decking is required. Based on the estimated levels of trip generation using Kirkcaldy as a case study (about 26 new rail trips per day, based on 260 days per year) and the cost of an average return rail fare (based on MOIRA data for all journey purposes £5.57, 2009/10 data). The revenue stream that could be generated from additional rail passengers would generally be insufficient to provide a financial pay-back in less than 10 years, though there may be instances when this is possible.

- **objective 6 (optimum pricing policy):** the analysis highlighted the change in demand if prices were increased by £1 (for example, either from free to £1, or £1 to £2). Rail demand would be reduced by 4.9% if prices were increased by £1 or 3.0% if there is ample free local parking. Furthermore, about 55% of the remaining rail passengers would park elsewhere. Regardless of whether the car park is free or already charged, the increased parking charges would mean the revenue loss from rail passengers switching to other modes would exceed the income from the newly introduced parking charges. The revenue impacts would be even greater if existing parking charges were raised

5 Bus based park and ride

Background and objectives

5.1 One of the main objectives for bus based park and ride is encouraging car users travelling to large urban centres to transfer onto public transport for part of their journey. Sites have been introduced at various locations across Scotland and the rest of the UK. Similar to the rail based schemes, these examples can also support wider objectives. As well as economic and social benefits, bus travel has significant potential to lower CO2 emissions through modal shift from car.

5.2 Similar to the overarching study methodology described in chapter 2, the bus case study uses a combination of existing secondary data with conclusions from new primary research to address the objectives. Existing literature was summarised, with two case studies carefully selected based on their current usage to ensure the overall sample sizes were sufficient. Outputs were incorporated into the forecasting models, with the combined analysis being used to determine the factors which contribute to a successful scheme.

Secondary research - overview of existing park and ride sites

<u>Background</u>

5.3 In total, there are about 150 sites across the UK, with about 31m passenger journeys per annum in 2005/06 [15]. About 70,000 parking spaces are available. Passenger usage has been used as a proxy to examine the success or otherwise of a scheme. The schemes attracting the highest number of passengers include York (almost 20% of the UK total), Norwich, Cambridge (both sites attract over 3m trips per annum) and Chester (about 2.5m trips). There have been relatively few publications since 2007 which examine the performance of park and ride on a national basis. Some local authorities monitor statistics for individual schemes, but much of the comparative analysis was collated before 2007.

5.4 The performance of other UK sites to identify the factors contributing to the success of park and ride has been examined to highlight any weaknesses that mean individual sites perform less well, so the lessons learned can be avoided when developing other proposals. **Table A5.1 (in Appendix A5)** collates scheme best practice from other sites with the indicators described below, supplemented by other measures. The main conclusions set out below form a subjective assessment of the contributory factors which have contributed to overall best practice:

- **size of potential catchment:** the most successful schemes serve an urban centre with a population of at least 100,000 people. The traffic levels diverting from the strategic road network approaching the urban centre are calculated in the 'Guidance to Scheme Promoters' section

[15] The TAS Consultancy (2007) Park and Ride Industry Monitor

levels diverting from the strategic road network approaching the urban centre are calculated in the ‘Guidance to Scheme Promoters’ section

- **location:** sites need to maximise their proximity to the potential catchment, with minimal delays from congestion. Effective signing is also required. For example, the bus based park and ride site at Falkirk is poorly located in relation to the strategic network and this reduces its attractiveness. Furthermore, one of the main factors contributing to the low usage of Hanley (Stoke-on-Trent) is its location, just 500m from the centre given the surrounding congestion

- **service frequency:** departures every 10 minutes mean passengers do not need a timetable. There are a small number of examples that operate at a lower frequency, but a service every 12-15 minutes is less attractive for short distance journeys. High Wycombe is served by just 4 buses per hour throughout the day and this is not frequent enough, particularly for short distance trips, given the site is located less than 1 mile from the town centre

- **role of Demand Management:** as noted earlier in the case studies, a successful park and ride is an integral component of urban transport policy. The most successful schemes are integrated into an overarching demand management strategy including the cost and availability of parking, especially in historic cities and towns. This is evident from the most successful English schemes which are predominantly located in historic cities

- **costs:** the ratio of bus fare using the park and ride to the typical peak and off-peak charges has been collated. Generally, a lower ratio indicates the cost of the park and ride is more competitive versus urban centre parking. Edinburgh and Norwich have the lowest ratios for charged spaces. The sites in Hanley and Ipswich have the least competitive pricing strategy for park and ride compared with central parking costs

5.5 In addition to the indicators presented in **Table A5.1**, the impact of bus priority measures to deliver reliable, competitive journey times, plus branding of vehicles are highlighted in the TAS report, although it is recognised these can be more difficult to quantify. The purpose of highlighting the other two items is to demonstrate there are some specific tasks which are supplementary to the issues flagged in **Appendix A5**.

5.6 There are a number of attributes which appear to have contributed to the operation of a successful park and ride. The historic characteristics of some cities, including the shortage of central parking, pricing strategy and reductions in road space, has contributed to their wider success. Park and ride sites can help to control congestion levels, particularly in historic centres where the generation of additional traffic could have a detrimental impact on the performance of the road network if it already operates close to capacity.

5.7 Schemes in Scotland generally attract a lower number of trips per annum compared with many English examples. Whilst the number of sites serving the major Scottish cities is generally lower compared with the most popular English examples, the number of trips per site is also less. The four schemes serving Edinburgh generate around 400,000 trips per annum, whereas five sites at York attract about 6m journeys. Although Edinburgh has a larger population versus York (about 450,000 people compared with 180,000 respectively), York receives double the number of tourists each year (7.1m visitors compared with 3.5m for Edinburgh). The higher number of tourists visiting York may have contributed to the increased park and ride use[18].

Case studies

5.8 We have reviewed two cities in England to understand why some English schemes attract a higher number of passengers compared with examples in Scotland. Norwich and York [19] offer a good cross-section of evidence.

Norwich: A strategy was gradually implemented in the early 1990s to address the worsening congestion problems, reduce emissions and improve road safety. Six sites located close to the main strategic routes have been delivered. Although some sites are close to railway stations, buses offer a higher frequency so the scope for competition with other public transport is limited. Norfolk County Council has placed strong emphasis on quality. Sites have good lighting and security and are staffed. NCC provides financial support for the park and ride sites, choosing to prioritise the deployment of a modern, high quality fleet rather than adopt the measures to reduce costs. Bus fares are competitively priced compared with car parking in the centre. Park and ride fares are expressed as a charge per car to encourage family groups. Dedicated bus services operate every 10-12 minutes. Some bus priority measures have been introduced on some corridors. The network of sites has helped to reduce traffic levels crossing a city centre cordon. Cost, convenience and the limited availability of alternatives were identified as contributory factors.

York: The city attracts over 7 million tourists per year and is a prime retail location serving a large catchment in North Yorkshire and beyond. With inadequate space in the city centre to accommodate demand, park and ride sites have been introduced incrementally. As a result, the majority of main radial corridors are now served. The location of sites is adjacent to the outer ring road, minimising delays for car drivers. Dedicated buses depart every 10 minutes. First operates services commercially, with modern low floor vehicles. Articulated vehicles are used on some routes to support high commuting flows. Some priority measures have been introduced, although traffic congestion is becoming a constraint. Free parking is available, with competitively priced fares compared with the cost of city centre parking. Some car parks are full before 10am, despite 3,750 spaces being available. In parallel, the City Council has enforced a number of demand management measures. The City Council also has ambitious plans to further expand its park and ride offer. A funding proposal has been submitted to expand the number of spaces at an existing location and create two new sites.

[18] www.visitscotland.com, www.visityorkshire.com, www.ukcities.co.uk

[19] www.norfolk.gov.uk , www.york.gov.uk , www.firstgroup.com

5.9 These case studies have been compared with Ingliston and Bridge of Don [20].

Ingliston, Edinburgh: Edinburgh is a major trip destination attracting commuters, shoppers and tourists. The city is served by several bus based park and ride sites, mainly located close to the A720 bypass. Monitoring surveys conducted by Edinburgh Council indicate users think services offer good value for money. However, there is limited evidence to demonstrate the impact of park and ride on wider traffic levels. Although Ingliston has over 1,000 parking spaces and served by frequent buses, the occupancy rate is just 50%.

There are several contributory factors including:

- its location on the A8 means some drivers (especially those using the M8 extension) will bypass the site
- lack of bus priority measures mean journey time reliability is poor
- there is limited opportunity to influence service patterns and market the service as buses are operated commercially (this applies to York too)
- there is significant competition with other public transport, especially rail

Bridge of Don, Aberdeen: Dedicated buses operate as a shuttle via Aberdeen city centre to Bridge of Don every 10 minutes during the peak periods (although this drops to every 15 minutes during the off-peak). The site is located close to the A90, about 3 miles from the city centre. Buses benefit from a range of priority measures to achieve reliable journey times.

In contrast with many other UK schemes, passenger numbers have declined sharply during the last five years. For example, the number of trips has declined from 300,000 per annum in 2000 to just 170,000 in 2006. Similar to the Edinburgh example, there are a number of factors that have contributed to this outcome including:

- slight decline in traffic levels using the A90 corridor towards the city centre that would be in-scope for park and ride
- competition with the Ellon park and ride located about 15 miles north of Aberdeen which operates as an inter-urban service. The Ellon site attracts about 80,000 trips per annum and partially overlaps with Bridge of Don
- lower parking charges enforced by the city council in the city has meant city parking is more attractive, based on price, compared to the park and ride site. This makes park and ride at Bridge of Don relatively less competitive
- staff presence at the site has been removed in response to funding cuts

[20] Data received from Edinburgh City Council and Aberdeen City Council

5.10 The results from the secondary analysis highlight some of the main characteristics associated with successful park and ride sites. These conclusions have been used to identify some of the complementary factors and the financial metrics to guide scheme appraisal. We now turn to the primary research which was undertaken to help us understand the characteristics of demand for the Scottish sites and which will be interpreted in the context of the secondary analysis outlined above.

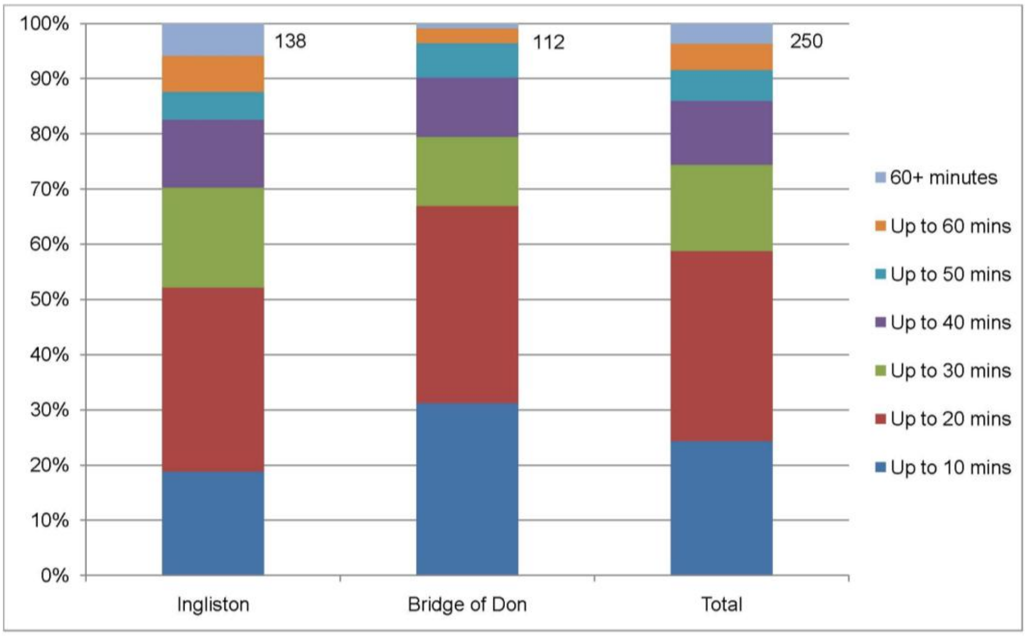
Primary research – overview of findings

5.11 Sites at Bridge of Don near Aberdeen and Ingliston near Edinburgh were chosen to undertake primary research to try and understand the differences in usage. This selection also offered a reasonable geographic coverage, a mixture of catchment sizes and different city centre parking strategies. Both park and ride sites selected for primary research serve eastern Scotland. However, there is a comprehensive rail network serving Glasgow, so the opportunities for complementary bus based park and ride schemes are reduced. Whilst there are several examples serving the Central Belt, their level of usage varies and ensuring a robust sample size formed one of the considerations when assessing the suitability of potential sites.

Journey times to the park and ride

5.12 Figure 5.1 indicates almost 60% of respondents interviewed at Bridge of Don and Ingliston spent less than 20 minutes travelling to the park and ride, whilst a further 15% travel less than 30 minutes. Interestingly, over 20% of respondents travel for more than 40 minutes, including 10% for more than hour. Bridge of Don has a higher number of respondents with a journey time less than 10 minutes, and a shorter travel time to the park and ride (about 20 minutes compared with 25 minutes to Ingliston), implying the catchment to the Bridge of Don is smaller.

Figure 5.1: Journey Times to the Park and Ride

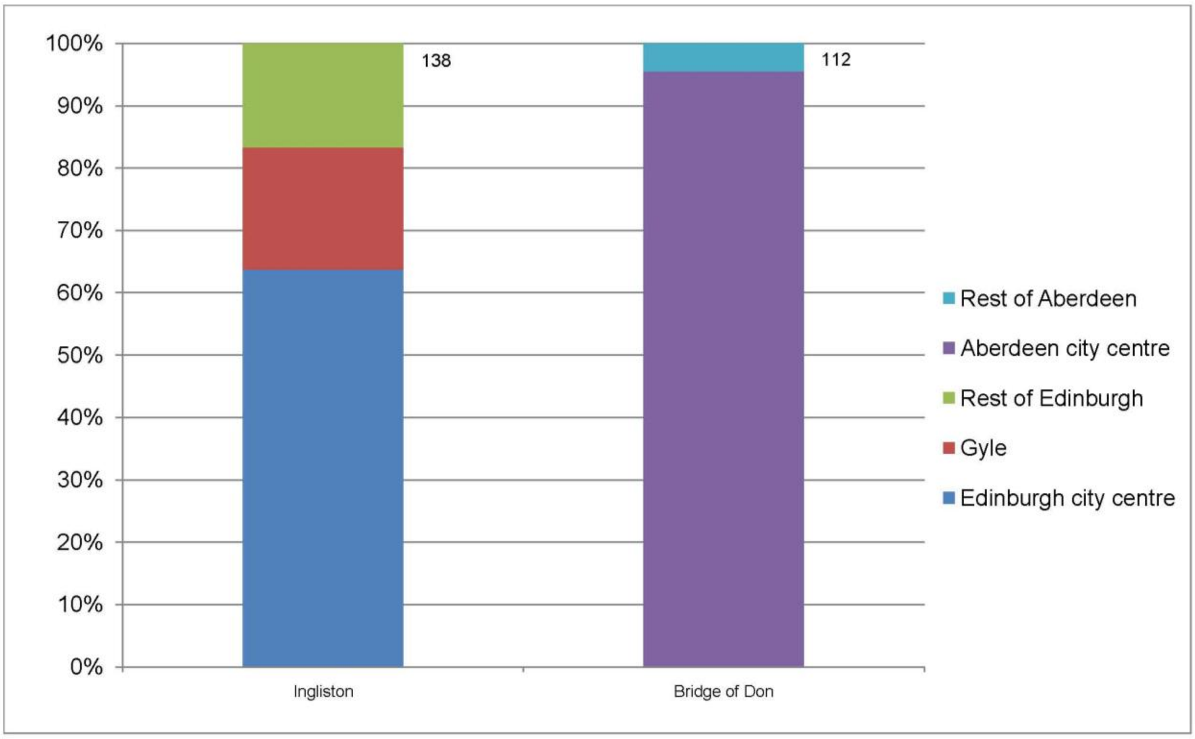


Source: Arup analysis of Accent data, sample size shown

Catchment analysis –trips to the destination

5.13 A significant proportion of trips using the Ingliston park and ride have a destination in Edinburgh city centre with 'The Gyle' also a popular location, as shown in Figure 5.2. Other destinations in Edinburgh are less convenient by park and ride, explaining why less than 15% have a destination in these locations. The concentration of trips to central Aberdeen is even more pronounced compared with Edinburgh, with over 95% to the city centre.

Figure 5.2: Distribution of trip destinations

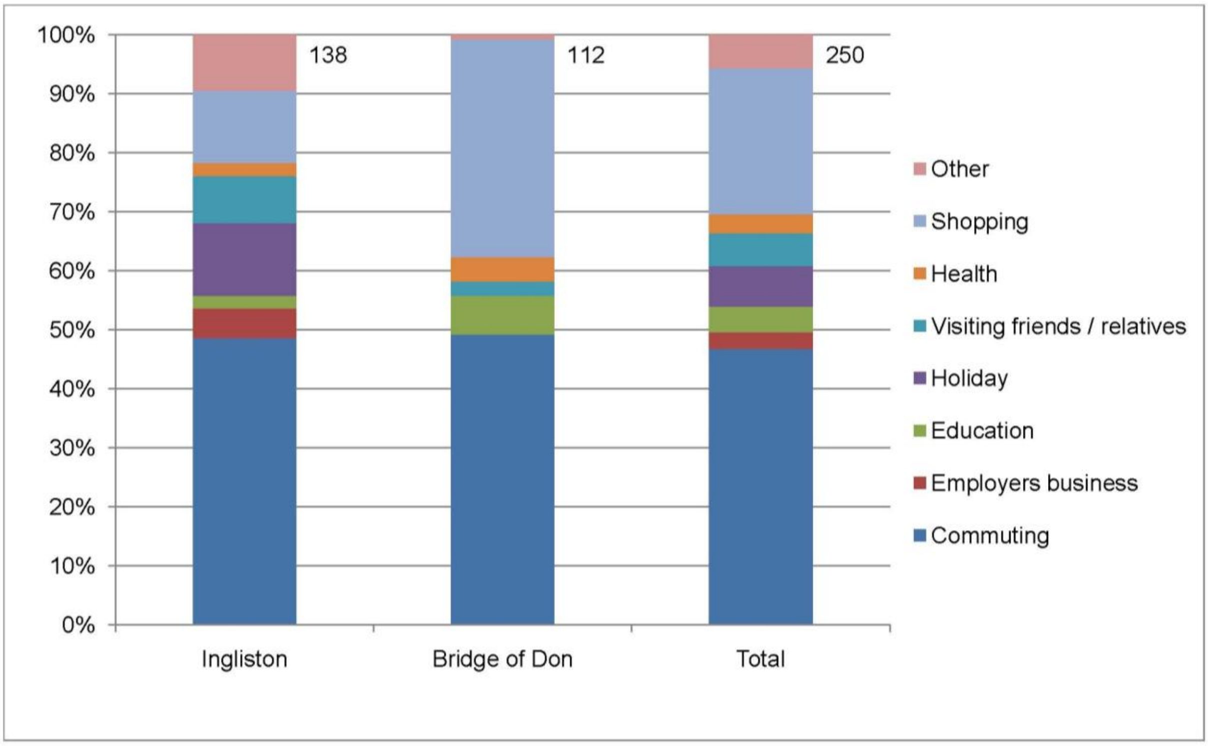


Source: Arup analysis of Accent data. Sample size shown

Journey purpose

5.14 Figure 5.3 indicates the most popular journey purposes are commuting and shopping. For both Ingliston and Bridge of Don, journeys to work account for almost 50% of total trips, with shopping accounting for a further 25%. The ‘other’ journey purposes account for a relatively small proportion of the total.

Figure 5.3: Journey purpose

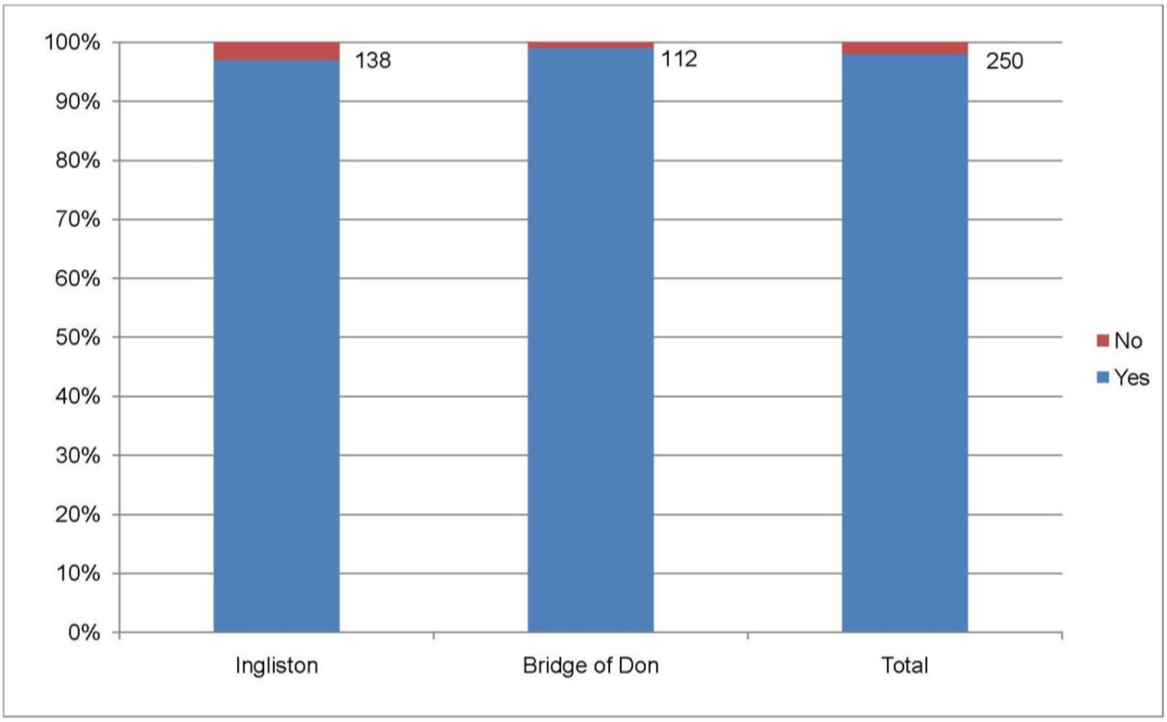


Source: Arup analysis of Accent data, sample size shown

Availability of parking spaces

5.15 In Figure 5.4, over 95% of users had no problems finding a space at both sites. Of the 5% of users that did report problems, these occurred about once a week so the incidence of parking problems is very small. Monitoring data collected by Aberdeen and Edinburgh Councils which illustrates the usage of sites endorse this conclusion[21].

Figure 5.4: Availability of car parking



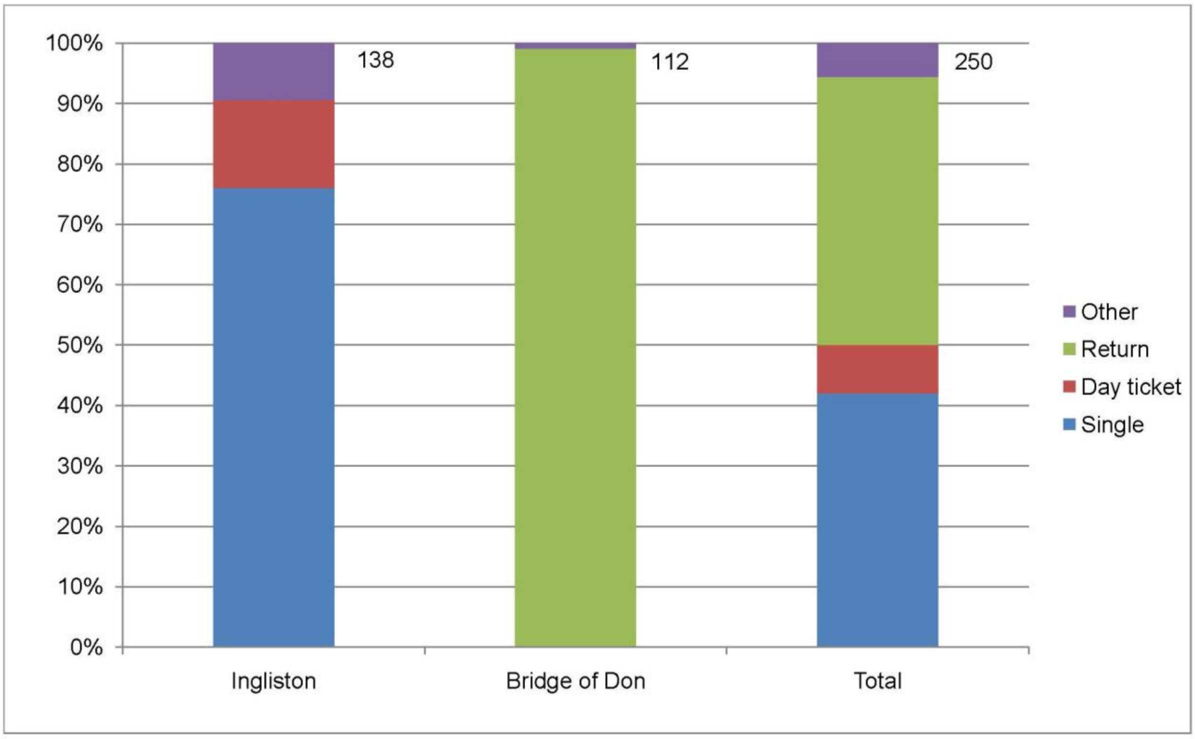
Source: Arup analysis of Accent data, sample size shown

[21] Park and Ride Industry Monitor (TAS), NESTRANS Park & Ride Operations Study Final Report 2008

Ticket type

5.16 The type of ticket purchased is shown in Figure 5.5. In total, about 80% of passengers use single or return tickets. Usage of alternative tickets is relatively small, with less than 15% using day tickets or other (multi-modal) products. Passengers using the Bridge of Don park and ride generally used return tickets, with most people from Ingliston using single tickets.

Figure 5.5: Type of ticket used



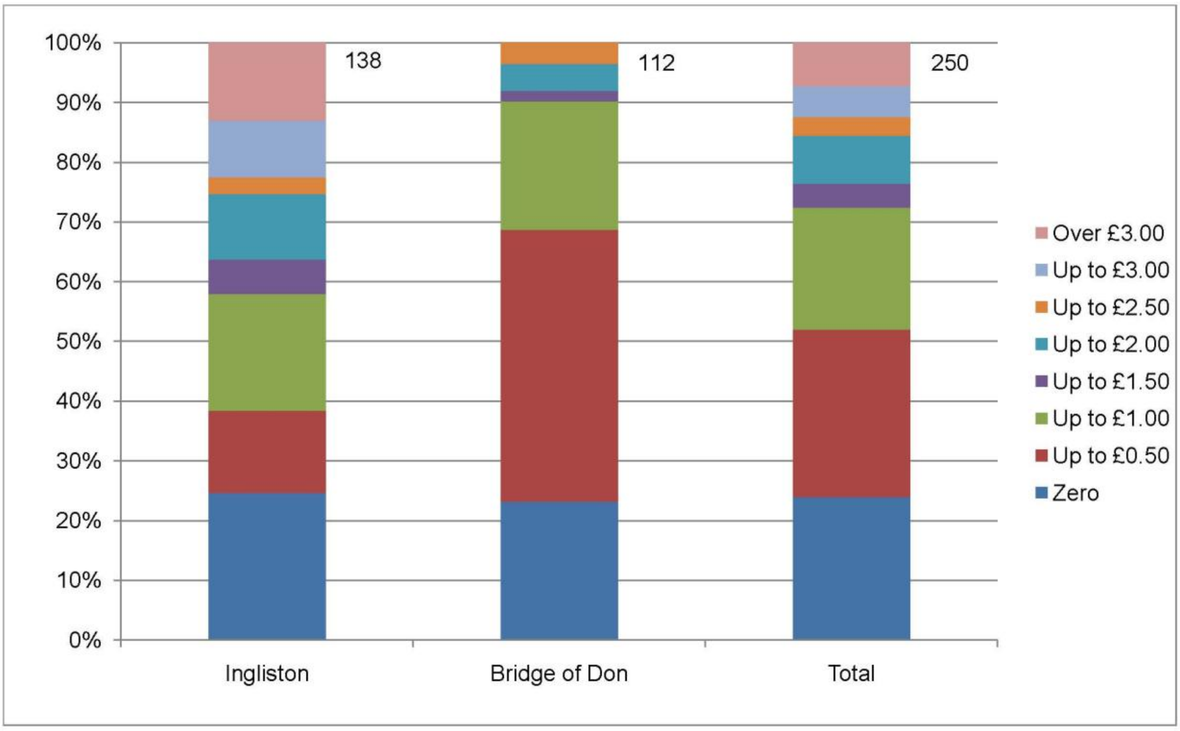
Source: Arup analysis of Accent data, sample size shown

Change in travel behaviour

5.17 The maximum bus fare people are willing to pay is presented in Figure 5.6 and is based on the current fare plus a series of potential fare increases from £0.50 up to £3.50. Across both sites, almost 25% would not be willing to pay anything extra, suggesting some users have available free or low cost parking. About 30% could pay up to £1.00 extra to use the park and ride, implying the cost to park in Aberdeen is relatively cheap. Interestingly, about 12% of users in Edinburgh would be willing to pay over £3.00, indicating the alternative parking choices are very expensive.

5.18 It is useful to consider these alternative costs in relation to the park and ride fares which can range from £2.10 to £2.30 for regular users (infrequent users will pay more). Furthermore, it is important to acknowledge there are other contributory factors influencing travel behaviour including the convenience of using park and ride relative to driving into the city centre and the scope to avoid traffic congestion.

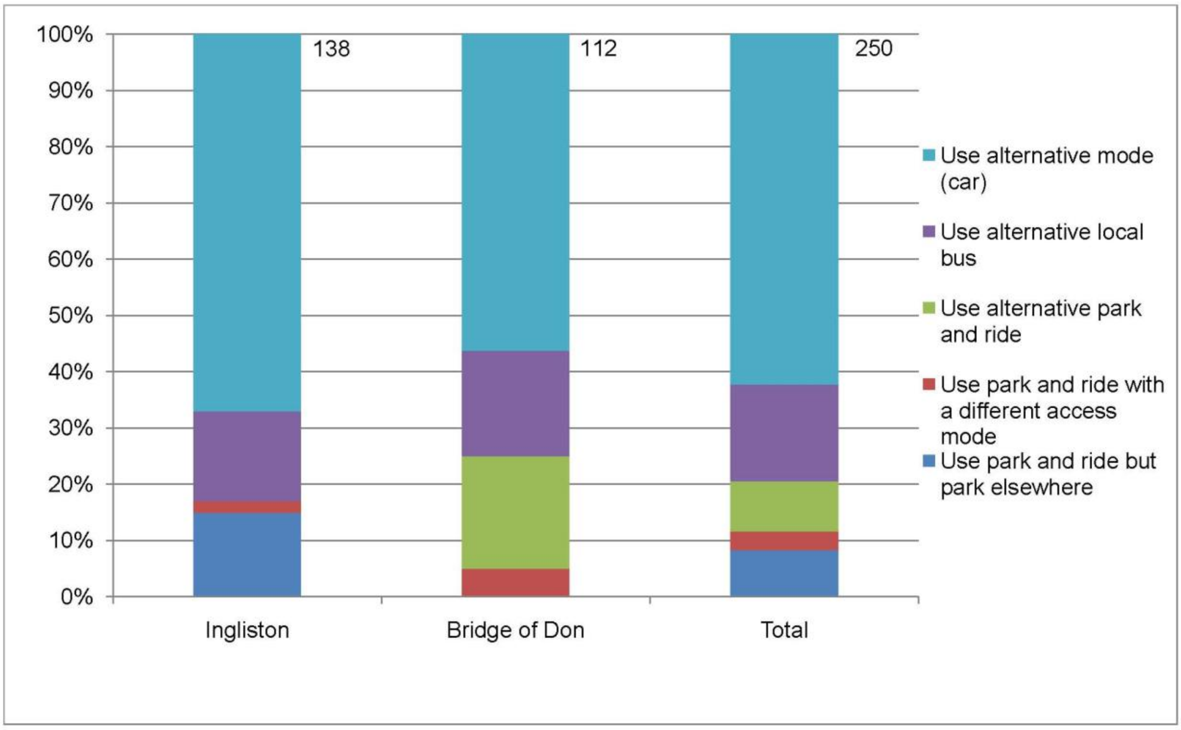
Figure 5.6: Willingness to pay higher bus fares for park and ride



Source: Arup analysis of Accent data, sample size shown

5.19 The impact on travel behaviour if car parking spaces were removed is explored. The results demonstrate the availability of parking is a fundamental factor influencing the attractiveness of park and ride. There is a small number of current park and ride users who could switch to a local bus service for the whole of the journey, but the majority of existing users would choose an alternative mode in the absence of sufficient parking. These results are presented in Figure 5.7

Figure 5.7: Change in travel behaviour if parking was not available

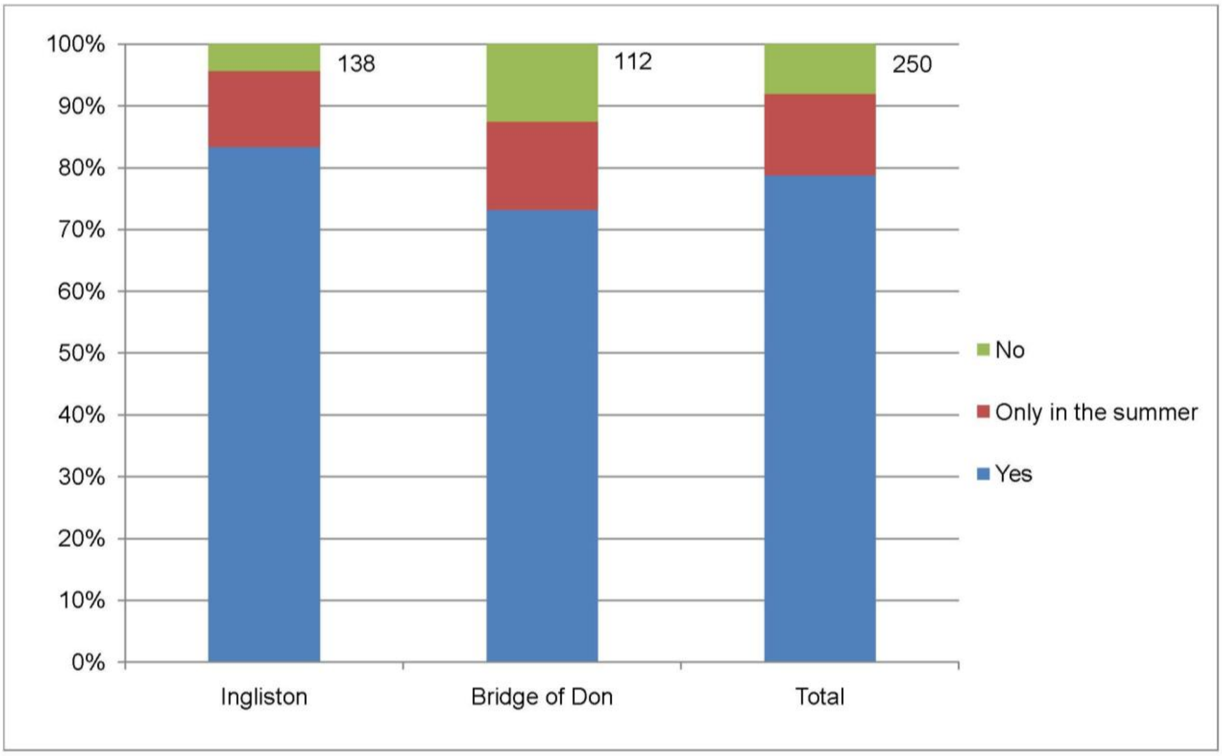


Source: Arup analysis of Accent data, sample size shown

Passenger safety considerations

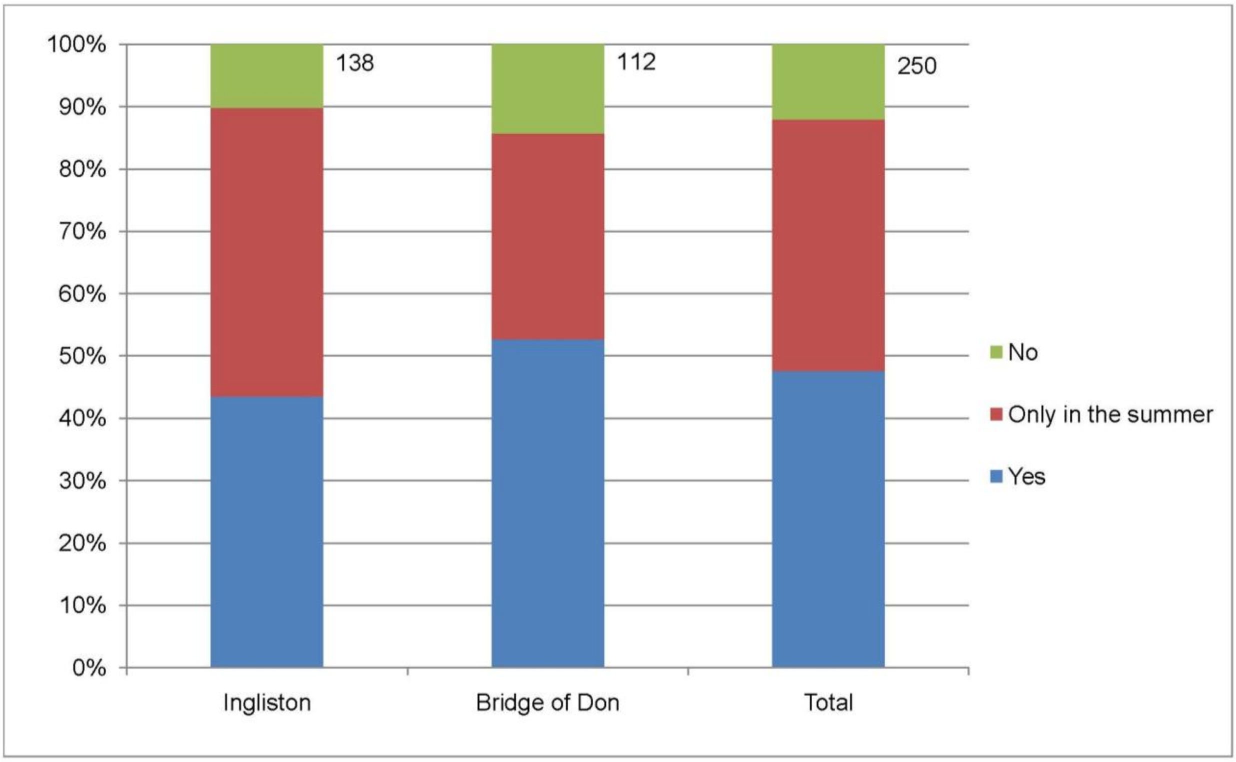
5.20 The attitudinal responses of measures to improve safety or quality at the park and ride site were also considered, with the percentages relating to the total figures. The first topic considers user responses if CCTV was not available. Nearly 80% of respondents at both sites would continue to use the park and ride if CCTV was not available. The availability of lighting appears a more important issue. Less than 50% of respondents at both sites would use the park and ride if the site was poorly lit, although some users would only be willing to use the site during the summer. The combination of no tarmac road to the site, no lighting and no CCTV has a detrimental impact, with just 30% of respondents willing to use the park and ride. A further 40% at both sites would only use the site in the summer, in response to the security issues. Figures 5.8 – 5.10 illustrate the results.

Figure 5.8: No CCTV available – would you continue to use the site?



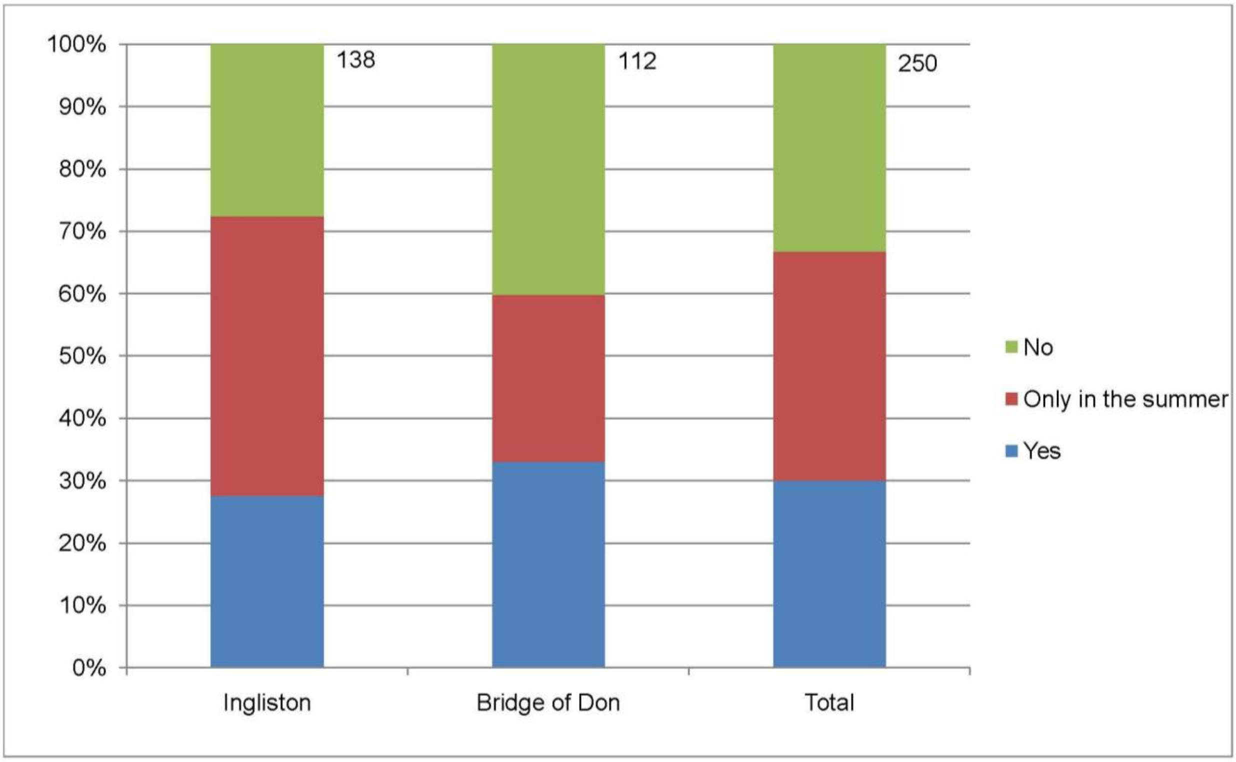
Source: Arup analysis of Accent data, sample size shown

Figure 5.9: No lighting available – would you continue to use the site?



Source: Arup analysis of Accent data, sample size shown

Figure 5.10: No CCTV, lighting and no tarmac road – would you continue to use the site?



Source: Arup analysis of Accent data, sample size shown

Primary research – overview of non user behaviour

5.21 A total of 120 interviews with non-users were completed. These discussions were conducted in Aberdeen and Edinburgh city centres to understand the factors that influenced their travel behaviour. Respondents were carefully screened to ensure the characteristics of their journey meant they could switch to park and ride.

Existing car journey times to the park and ride site

5.22 Respondents were interviewed to understand journey times to central Aberdeen or Edinburgh. The interviewees made relatively long access trips to both sites compared with drivers already using the park and ride, with over 40% travelling over 40 minutes. The percentage of respondents making short trips is small, with no-one interviewed having a travel time to the park and ride of less than 10 minutes to either site.

Competing parking charges

5.23 One of the main factors affecting the choice between driving or park and ride is the cost and availability of car parking in the city centre. About 55% of respondents have free parking available, predominantly in central Edinburgh and this is a major factor influencing their travel choice. Charges for public car parks are set by the individual Councils and these comparisons should help to inform the pricing strategy for park and ride.

Journey purpose

5.24 The most popular journey purposes are commuting and shopping accounting for over 50% of the total trips.

Analysis of the modelling outputs

5.25 The results from the Stated Intention surveys were analysed to understand the proportionate change in demand in response to specific changes in bus fares, frequencies or the likelihood of not getting a parking space. A more detailed overview of the modelling methodology is presented in Appendix A4.

Likelihood of getting a space and impact on demand

5.26 The elasticity relating to the chance of not obtaining a parking space is reported. The impact of not finding a space has been modelled. Therefore, moving from 0-10% chance of not finding a space would lead to a 19% reduction in bus demand, whilst a 20% chance of not finding a space would result in a 34% reduction in bus demand at the park and ride sites. These are considerably higher than the figures produced for rail and probably reflect that the park and ride sites at Ingliston and Bridge of Don currently have a large amount of spare parking capacity at all times, whilst there is a higher number accessing these park and ride sites by car. Consequently, users will be more sensitive to any changes in parking availability.

Impact of higher fares

5.27 The pricing elasticity was tested to see if revenue maximising fares could be identified, since the bus fare elasticity of -0.306 reported in Appendix A2 would indicate that in the short term at least, there is scope to increase fares (a 10% increase in fares would only reduce demand by 3%, resulting in increased revenue). A number of further fare elasticities were calculated to see whether the data allowed for the identification of a revenue maximising price. A range of price increases to the base fare of £3 (return) were considered, ranging from 50p to £5 (i.e. larger than an operator would consider). The corresponding bus fare elasticities were found to range from -0.55 to -0.75 respectively.

5.28 This would suggest a revenue maximising fare cannot be estimated from the data due to the limitations of the survey results. Results were inconclusive from the survey data. In the short term, bus demand is very inelastic, that is to say current passengers find it very difficult to find an alternative mode of transport to make the same journey they currently make in the short term. In the medium to long term we would expect the bus elasticity to become less inelastic as people respond to the bus fare increases by using other modes or changing their destination, so the scope for making large changes to the bus fare is lessened.

Guidance to scheme promoters

5.29 The analysis presented in Chapter 5 highlights the main issues affecting the viability of bus based park and ride. The detailed review of the case studies, plus the other secondary data collated and the conclusions emerging from the primary research, has highlighted some important issues to be cognisant of when developing future bus based park and ride policies:

- **objective 1 (changes to parking supply and pricing affecting public transport usage):** since there is sufficient parking space at the existing car parks, this objective is evaluated in terms of the impact on demand if spaces were removed. There are two datasets collated as part of this study that explores the relationship between these variables. The outputs from the modelling work suggested a 10% chance of not finding a space would lead to a 19% reduction in bus demand, whilst a 20% chance of not finding a space would lead to a 34% reduction. Furthermore, the results from the primary research indicated over 60% of respondents would make their entire journey by car if there was insufficient parking available. Both datasets clearly demonstrate the importance of ensuring adequate parking is available throughout the day. Car users will continue their journey if sufficient parking facilities are not available

- **objective 2 (changes to parking supply and pricing influencing modal shift):** the monitoring data from City of Edinburgh Council indicates there are about 1,200 park and ride trips per day using all park and ride sites (Hermiston, Ingliston and Straiton) and this equates to less than 1% of the trips crossing the A720 for journeys towards the city centre. As a result, the impact of park and ride on wider modal shift is relatively small. The scale of congestion relief benefits is dependent on wider network performance, since any traffic diverting from roads that are operating close to capacity will have a greater impact compared with uncongested routes. Based on the current usage of most park and ride sites in Scotland, the impact on congestion and emissions will be relatively small

- **objective 3 (relative importance of complementary factors):** there are a range of criteria that determine the level of use associated with individual sites. Using the results from the primary research, combined with the case study analysis, these attributes include accessibility to the strategic road network, availability of parking spaces, opening times and the frequency of bus services, plus the relative competitiveness of park and ride in terms of journey time and cost versus the alternative journey made by car

- **objective 4 (identification of undesirable outcomes):** compared with the rail market, there is very limited evidence of undesirable outcomes generated from bus based park and ride. The results from the primary research indicate some respondents chose to drive to Ingliston to catch the park and ride rather than using their local bus service. A combination of higher bus frequencies and cheaper fares compared with their local service contributed to this decision making. However, these disbenefits are offset by the number of car kilometres removed from the network. The number of car trips removed from the network is 2.5 to 3 times higher than the additional mileage generated from respondents driving to the park and ride to take advantage of the bus services available there

- **objective 5 (financial metrics to guide scheme appraisal):** using outputs from a number of existing schemes, the operating costs for services departing every 10 minutes range from £800,000 to £1m per annum for each site depending on the operating period. Site operating costs vary depending on the specification offered and could range from £75,000 to £100,000 per annum. Depending on the overall commercial position, these costs would be attributable to the operator and / or Council. It is assumed the capital costs will be funded through Local Transport Plan investment. The value of removing car trips from the network in terms of decongestion benefits, accident savings and emissions should be quantified to make the case for the investment

- for a site to break even in financial terms, about 1,200 passengers per weekday would be required based on the operating costs described above. This is a high number of trips, and highlights the importance of locating park and ride in the optimum position to achieve a robust financial case. Based on previous consultancy studies[22], the percentage of drivers passing the site with a city centre destination ranges from 20-40%. It is estimated park and ride attracts between 10-40% of motorists depending on the characteristics of the schemes and the parking structure enforced in the urban centre. Car occupancies of about 1.45 persons could be assumed based on STAG guidance for AM peak trips[23]. This

[22] TAS (2007) Park and Ride Industry Monitor, Arup (2009) Park and Ride Scoping Study for South Yorkshire PTE
[23] Transport Scotland (2008) Scottish Transport Appraisal Guidance Section 9.5.14

equates to about 20,000[24] vehicles per day using roads adjacent to the site (total cars * in-scope trips * mode share / car occupancies

- **objective 6 (optimum pricing policy):** analysis of the price elasticity to identify the optimum price structure was inconclusive. Incremental bus fare increases were considered, and the corresponding elasticities were found to range from -0.55 to -0.75. The revenue maximising fare cannot be estimated from the data since the results from the survey data are inconclusive. Whilst passengers may find it difficult in the short term to find an alternative mode, bus elasticity would become less inelastic in the longer term as people respond to the bus fare increases by using other modes or changing their destination. Consequently the scope to make changes to fares is lessened, though not in the short term

[24] Arup (2009) Park and Ride Scoping Study for South Yorkshire PTE

6 Cross Forth case study

Background

6.1 The strong competition between bus and rail based park and ride between Fife and Edinburgh is examined. There is a large existing travel market for Cross Forth trips between Fife and Edinburgh, whilst the future public transport strategy for this corridor could be affected by the proposed new crossing. The park and ride sites at Ferrytoll and Inverkeithing help to tackle congestion, particularly as the number of daily vehicles using the Forth Road Bridge exceeds 60,000. The diversion of some drivers onto public transport helps to support employment levels in Edinburgh city centre, and 'control' congestion levels for other motorists. Two case studies were examined:

- **Ferrytoll:** the site is located at Inverkeithing near the Forth Road Bridge. The site is open daily from early morning until after midnight. There is a high frequency bus service, with departures every 5 minutes towards Edinburgh at peak times, with other services to Edinburgh Airport, Gyle and Edinburgh Park. There is free parking with 1,040 spaces. Journey times to Edinburgh during the peak periods are about 40 minutes, with return daily fares of £4.70

- **Inverkeithing:** there is rail based park and ride to Edinburgh in the town. Access from the strategic road network is less convenient compared with Ferrytoll. There are at least 5 trains per hour towards Edinburgh, with journey times of about 25-30 minutes. Although the rail service is less frequent, journey times are faster, especially in the peak periods when buses are more readily affected by congestion. However, rail fares are more expensive (£7.50 for a return journey). There are 425 parking spaces and 943,000 single trips per annum[25]

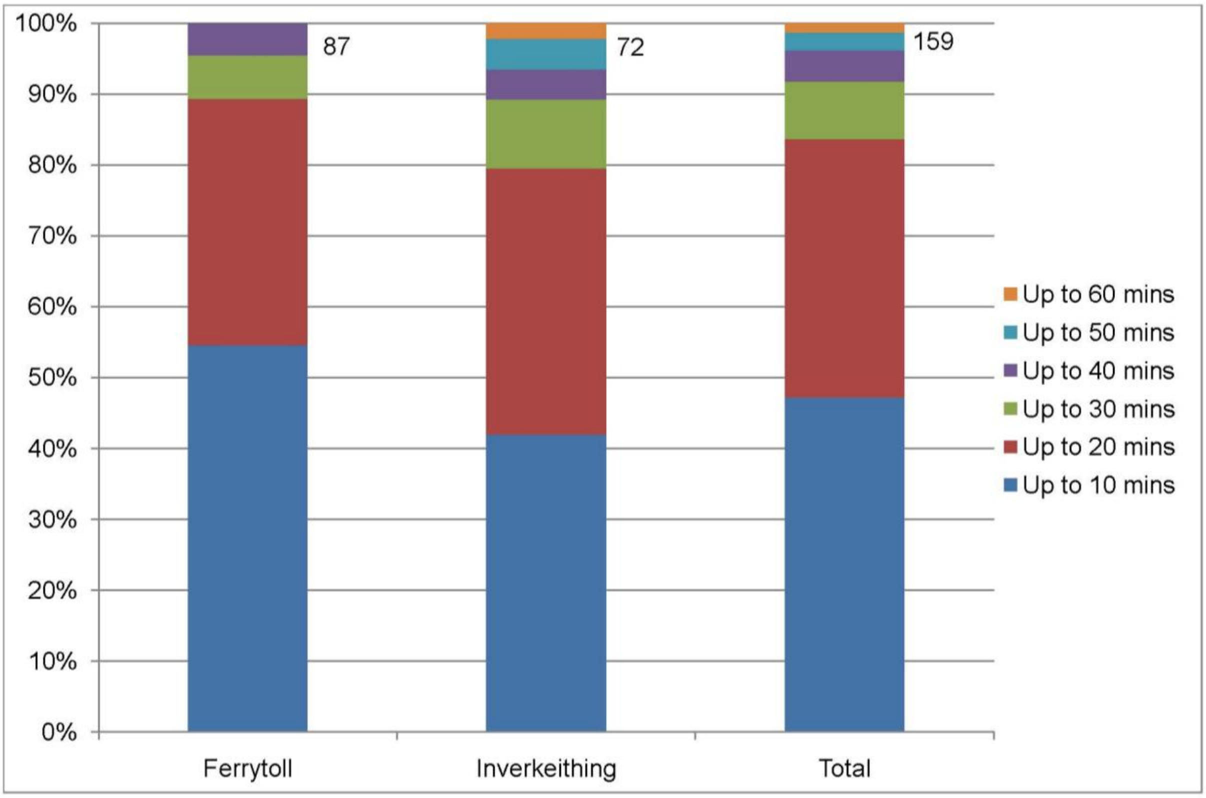
6.2 The generalised journey time for rail and bus has been incorporated into the modelling framework to compare journey choices on a consistent basis.

Primary research – overview of the findings

6.3 Passengers surveyed have relatively short access times to Ferrytoll and Inverkeithing, as shown in Figure 6.1. Almost 50% have a journey time less than 10 minutes, with a further 35% with a journey time between 10 and 20 minutes, illustrating the concentration of trips originating close to these places.

[25] www.Nationalrail.co.uk and Office of Rail Regulation statistics for 2009/10

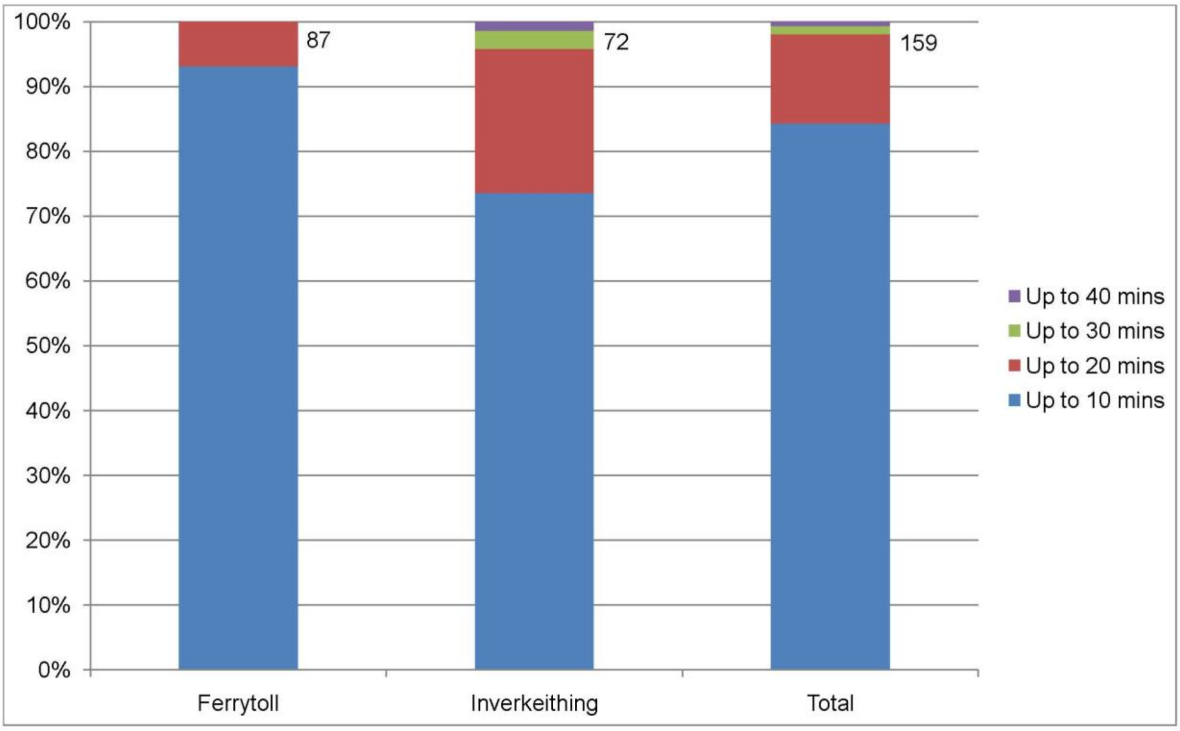
Figure 6.1: Journey times from trip origins to Ferrytoll / Inverkeithing



Source: Arup analysis of Accent data, sample size shown

6.4 The length of journey times to the final destination from the railway station or the bus stop in central Edinburgh as shown in Figure 6.2 is even more concentrated compared with the data presented in Figure 6.1. For example, nearly 85% of respondents have a journey time of less than 10 minutes to their final destination, whilst a further 14% have timing between 10 and 20 minutes.

Figure 6.2: Journey times to final destinations from Central Edinburgh



Source: Arup analysis of Accent data, sample size shown

6.5 Similar to the results from the bus based park and ride surveys, there is a high proportion of trips with a destination in central Edinburgh. The destination for around 85% of rail respondents is Edinburgh city centre, with 11% of people surveyed travelling to Haymarket. Table 6.1 presents the results.

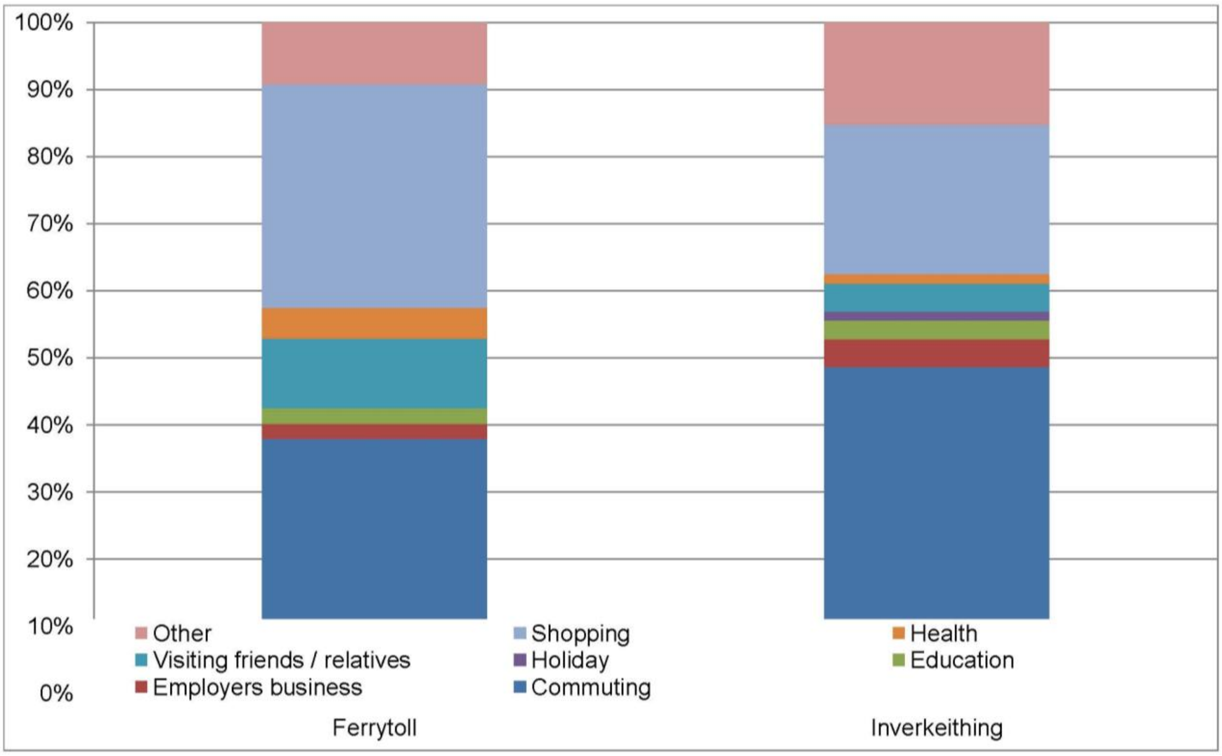
Table 6.1: Trip destinations for passengers boarding at Ferrytoll and Inverkeithing

Trip Destination	Ferrytoll	Inverkeithing	Total
Edinburgh	82	53	135
Gyle	2	2	4
Haymarket	3	14	17
Leith	1	0	1
Rest of Edinburgh	2	0	2

Source: Arup analysis of Accent data

6.6 Commuting and shopping account for the highest proportion of trips presented in Figure 6.3. Commuting accounts for about 45% of the total, with about 28% of passengers making a shopping trip. The percentage of passengers making other types of trip was relatively small.

Figure 6.3: Journey purpose



Source: Arup analysis of Accent data, sample size shown

Results from the stated preference research

6.7 More detailed results of the analysis of the SP data is presented in Appendix A3. The models produce a good statistical correlation, although some individual coefficients are not statistically significant. Separate models have been developed for commuting and non-commuting markets for each mode.

6.8 There are several important conclusions to draw from these results:

- **frequency:** the impact of service frequency is very low and appears relatively unimportant, given there are regular departures
- **out of vehicle time (OVT):** this has a strong influence on modal choice, given its relationship relative to in-vehicle (IVT). The OVT is higher compared with IVT, so the time spent getting to the final destination comprises a larger component of the overall journey
- **mode constant:** the mode constant indicates the preference for one mode compared with the other. The size of this parameter indicates the choice between rail and bus is relatively fixed. This conclusion is also reinforced by the outcome from the sensitivity tests which indicating there

was relatively few passengers switching modes in response to the alternative travel choices presented

- **values of time:** The implied values of time vary between about 2 and 4 pence per minute, somewhat lower than other guidance, for example, Department for Transport WebTAG guidance[26]. This implies park and ride users are choosing to use park and ride even though the journey times are slower to avoid paying to park in central Edinburgh
- **bus journey times:** times from Ferrytoll appear less important compared with other examples reviewed in Chapter 5, although the unique characteristics of Ferrytoll need to be acknowledged accordingly

Guidance for scheme promoters

6.9 The analysis presented in Chapter 6 highlights the main issues affecting the viability of rail and bus based park and ride serving the Cross Forth corridor. Primary research has been collected from a range of existing users at Ferrytoll and Inverkeithing and the following outlines some important issues to shape the development of the future public transport strategy for the corridor.

- **objective 1 (changes to parking supply and pricing affecting public transport usage):** the results from the primary research indicate passengers using Ferrytoll and Inverkeithing park and ride have a relatively low value of time. This implies users are choosing to switch to public transport before the Forth Crossing to avoid paying the high parking charges in Edinburgh, even though the overall journey time by bus or rail is longer compared with driving. As a result, changes to parking availability will have a limited impact on travel behaviour

- **objective 2 (changes to parking supply and pricing influencing modal shift):** the scope to encourage future modal shift to public transport appears to be influenced by future parking policy and the distribution of new employment in Edinburgh. This is an important consideration, since the modelling analysis highlighted the relatively unresponsive choices by passengers to alternative travel options, given the time spent travelling to the final destination is fixed. As a result, the scope to encourage passengers to switch between rail and bus (or vice versa) in response to service improvements appears limited. Therefore, the opportunities to grow the Cross Forth public transport market will be influenced by the distribution of future employment and its accessibility to public transport nodes in terms of egress times and the cost of parking

- **objective 3 (relative importance of complementary factors):** although the overall journey times by public transport are slower compared with driving, the cheaper overall cost helps to offset these impacts. Two factors have emerged from the primary research which influences the overall success of Ferrytoll and Inverkeithing. The importance of high frequency services is reflected in the modelling outputs, whilst the relative cost of the rail and bus services versus the alternative parking choices has clearly contributed to the number of passengers using the park and ride

[26] www.webtag.org.uk, module 3.5.6. Department for Transport

- **objective 4 (identification of undesirable outcomes):** results from the primary research indicate Cross Forth public transport has generated limited negative impacts. The access times to Ferrytoll and Inverkeithing are typically relatively short, indicating the car distances using the network are relatively short. The number of passengers using the bus and rail park and ride towards Edinburgh has helped to control congestion levels on busy corridors including the A90. Whilst the current capacity constraints affecting the Forth Bridge effectively limit the number of car drivers crossing from Fife, the proposed new crossing could release some suppressed demand, though it should be noted that the plans include a substantial investment in public transport including bus only lanes which will enhance the attractiveness of public transport across the Firth of Forth. Some existing car drivers parking on the Fife side of the bridge may drive closer to their final destination, particularly if these capacity constraints are alleviated. As noted earlier, there are also a number of other public transport options serving the travel market west of Edinburgh. This may also influence the overall decision making process. This does represent a risk that some motorists could drive further towards their ultimate destination, hence increasing total car kilometres

- **objective 5 (financial metrics to guide appraisal):** most of the existing bus services calling at Ferrytoll operate as part of a longer distance route. Analysis of the load factors using these services was outside this commission, so further work is needed to determine whether there is a business case to provide additional seats on these bus routes, or whether future growth can be accommodated using the existing vehicles. Similarly, the business case for rail service improvements needs to be linked to other proposals. The procurement of additional rolling stock needed to support future growth from Inverkeithing, especially during the peak period may need to be linked to service improvements elsewhere in Fife to produce a robust business case

- **objective 6 (optimum pricing policy):** Park and ride users appear to have a lower value of time compared with typical values. This would imply time savings are not the main factor that encourages park and ride, and indeed it is doubtful the rail and bus alternatives offer a quicker door-to-door journey time. However, these results are consistent with relatively high cost sensitivities, implying park and ride is used to avoid high parking charges. The results indicate frequency is not an important factor in the choice of whether to use park and ride, although this conclusion is dependent on a reasonable service frequency being available. Optimal fare calculations are not relevant to this section

7 Conclusions

Rail

7.1 The modelling outputs indicated that additional car parking availability would only generate a small increase in demand, with an increase of 0.35-0.43% trips. The case study examples demonstrated the overall change in demand would be relatively modest assuming there are no significant timetable changes. The relatively modest results that emerge from the modelling framework, in conjunction with stakeholder comments, highlights the importance of linking car park extensions with timetable changes to maximise the potential impacts. The benefits from additional car parking could be significantly larger, if the proposal is aligned with timetable improvements.

7.2 Although the additional parking has encouraged some users to switch from car to rail, these benefits are offset by the extra car distance generated by other changes in travel behaviour. With survey results indicating the extra parking has encouraged some users to drive to the station rather than making more sustainable travel choices. This has offset the benefits from the new passengers that have switched modes. As a result, the net change in car distance travelled using the network related to the change in parking provision at stations is negligible.

7.3 The responses from the primary research highlight the importance of 'softer' measures. For example, CCTV, lighting and a tarmac road should be an integral part of the overall station design to encourage users. Station security is also an important aspect to consider.

7.4 The analysis presented earlier highlights the limitations to achieve a robust financial appraisal that offers a payback within the typical duration of rail franchises. Assuming a cost per space of up to £10,000 (the costs for additional spaces will be higher if decking is required) means a payback period of more than 10 years would be required based on the current fare yield and income from parking charges, though this may reduce in certain circumstances. Therefore, the business case for additional spaces needs to be assessed in terms of the specific circumstances of the location. It is important to note that there are additional reasons for providing parking, e.g. to ease the burden of parking in local streets from residents.

7.5 The implications resulting from changes to the existing parking structure require careful consideration. If the parking charge is increased by £1 (either as the introduction of a charge, or a change from £1 to £2), the number of users switching from rail is 4.9%. Furthermore, about 55% of users would choose to park in an alternative location. The percentage switching modes would reduce to 3.0% if there is ample free parking available. The loss of rail revenue from passengers switching mode could exceed the income from car park charges. The reduction in revenue would be even more apparent if parking charges are already enforced and users switch to an alternative site.

Bus

7.6 In contrast with the rail data, the conclusions emerging from the bus case studies highlighted that the availability of parking was absolutely fundamental in influencing the travel behaviour. Both Ingliston and Bridge of Don park and ride sites have sufficient spare capacity (only 50% of the spaces are occupied, so motorists are confident of getting a space). However, if the parking availability was insufficient, over 60% would choose to complete their entire journey by car. Therefore, if bus park and ride was not available or constrained there would be a significant switch among users to making their entire journey by car.

7.7 The small number of users of park and ride in comparison with all trips means that the impact of park and ride on wider modal shift and emissions is small.

7.8 The review of existing park and ride sites highlighted several influential criteria to help attract motorists and these are set out below.

- **proximity to the strategic road network** (with adequate signing to inform drivers)
- **service frequency with departures every 10 minutes** to offer a turn-up-and-go bus service
- **availability of parking throughout the day** to ensure spaces are free for daytime users
- **competitive journey times by bus**, possibly supported by priority measures
- **operating period** consistent with the timing of commuting and leisure patterns
- **competitive fares** covering both bus fares and parking compared with the cost of parking in the town or city centre

7.9 Although several park and ride schemes in Scotland have been delivered, benchmarking the performance of these sites with examples elsewhere in the UK suggests there is scope to boost patronage.

7.10 Analysis of the impact of changes in fares was inconclusive in terms of being able to specify a revenue maximising fare. The findings suggested that bus park and ride demand is price inelastic, i.e. that there is scope to raise revenue through higher fares. However, this would serve to reduce the associated congestion and carbon benefits.

Cross Forth

7.11 The movement corridor between Fife and Edinburgh is served by bus and rail-based park and ride. Surveys were conducted at Ferrytoll and Inverkeithing to understand the characteristics of the current users. This analysis highlighted that existing users are choosing to use these park and ride sites to avoid paying the relatively expensive parking charges in Edinburgh city centre. The results from the primary research indicate the choice between bus and rail is relatively inelastic, since the location of the final destination is an influential factor.

7.12 The need to enhance cross-Forth park and ride capacity will be dependent on wider considerations. These include the future parking charging strategy in Edinburgh, the likely distribution of new employment in Edinburgh and the additional capacity created by the proposed new Forth Crossing. The current rail and bus services operate as part of longer distance routes between Edinburgh and other parts of Fife or beyond, so the value for money case for delivering other public transport improvements needs to be considered. In developing proposals, the cost advantages for park and ride compared with city centre parking and the high frequency service characteristics need to be maintained.

7.13 The Ferrytoll and Inverkeithing park and ride sites offer some capacity relief benefits for congested routes in Edinburgh, particularly the A90 corridor.

8 Appendix A1: Rail modelling methodology for revealed preference

Background

8.1 The aim of this aspect of the study is to determine the effects of parking provision, prices and policy directly on the demand for rail travel, rather than simply to estimate, say, the valuation of improved facilities. For this reason, we have developed demand models that link observed and stated behavioural responses to, amongst other things, changes in parking provision, quality and prices. The method of rail demand forecasting set out in the Passenger Demand Forecasting Handbook (PDFH), which is widely used in the railway industry in Great Britain, is an incremental approach of the form:

$$\frac{V_{new}}{V_{base}} = \left(\frac{P_{new}}{P_{base}}\right)^{p} \left(\frac{GJT_{new}}{GJT_{base}}\right)^{g} \left(\frac{E_{new}}{E_{base}}\right)^{e} \qquad (1)$$

8.2 Where V is the volume of rail demand in the new (forecast) and base period. This proportionate change in demand is driven by proportionate changes in price (P), generalised journey time (GJT) and a range of external factors (E). The terms p, g and e denote the respective elasticities of these variables. We enhance this framework to include station parking policy as follows:

$$\frac{V_{new}}{V_{base}} = \left(\frac{P_{new}}{P_{base}}\right)^{p} \left(\frac{GJT_{new}}{GJT_{base}}\right)^{g} \left(\frac{E_{new}}{E_{base}}\right)^{e} \left(\frac{S_{new}}{S_{base}}\right)^{s} \left(\frac{C_{new}}{C_{base}}\right)^{c} e^{(O_{new}-O_{base})} \qquad (2)$$

8.3 Thus the change in rail demand is now additionally dependent on the change in parking spaces (S), the change in parking charge (C) and changes in other factors (O), such as the quality and security of the parking provision. The latter enters in this form since O is likely to be a dummy variable denoting discrete changes reflecting, say, a change in CCTV provision. The parameter s is the elasticity to parking space provision. It is informative to establish how this varies with:

- the extent to which the station car park was previously at capacity
- the extent to which there is other car parking provision near the station
- the extent to which there are competing stations with differing levels of parking provision
- whether the rail journeys are for commuting or other purposes
- whether the rail journeys are short or long distance, with 20 miles typically being used in the rail industry to distinguish the two

8.4 The parameter ‘c’ is the elasticity to parking charge and ideally the sensitivity of this elasticity to a range of factors would be explored, including:

- the level of the parking charge
- charges at alternative parking locations
- the presence of competing stations with parking provision

8.5 The parameter o denotes the proportionate change in demand after other changes, such as the quality and security of parking.

Overview of the datasets

8.6 Two forms of data are used in estimating the model:

- tickets sales (LENNON) data denoting actual changes in demand
- survey data denoting the diversion factors consequent upon changes in parking policy

8.7 In addition, we can combine the two forms of data, in a jointly estimated model, which would be unique since we are not aware of previous studies which have analysed both ticket sales data and survey based data in a single model. The reason for using two forms of data is not only because this provides more data, and hence more precise estimates, but the two forms of data are highly complementary to each other:

- the ticket sales data has the advantage in that it is based on what people actually do and indeed their perceptions of actual changes. However, as with all revealed preference data, it is limited to the changes that have occurred in the real world, in this case in the context of parking policy
- survey data can provide more detail and cover changes that we would like to model that do not occur in the real world. For example, we can offer respondents changes in parking charges and parking quality, as well as parking spaces, and we can offer these in different contexts where, for example, there are different degrees of competition from other parking spaces, different likelihoods of getting a parking space, and for the flows and ticket types that are of greatest interest to us. In addition, there is no possibility of confounding effects, such as demand varying for other reasons

LENNON ticket sales data

8.8 The changes in rail demand have been analysed and form a useful starting point to understand the impact of car park extensions on changes to rail demand. We have used a number of data sources to assess how demand has changed. Since period-by-period LENNON data, split by ticket type is only available for the last five years, this duration may not fully represent the before /after period when each car park was extended.

8.9 This yields 91 observations per flow. We have obtained revenue and volume for each flow and time period for season tickets and non-season tickets. The ratio of revenue and volume provides a measure of price. The most popular demand flows were identified using LENNON data, since any changes to parking availability will have the greatest impact on these movements.

8.10 As a result, we have used trip data from MOIRA to enable the time period the LENNON dataset represents to be extended. The following describes the process adopted:

- review annual MOIRA data for individual flows, for example, Bridge of Allan to Edinburgh or Glasgow
- examine LENNON data representing total footfall from each station to understand the proportion of journeys made during each four week period throughout the year
- review overall ticket types, and aggregate for season and non-season tickets to estimate the number of trips for commuting or other journeys
- use the MOIRA and LENNON datasets to estimate the number of journeys by period, split by ticket type for individual flows for up to 10 years

8.11 Four weekly ticket sales data was derived between 2003/4 Period 1 through to 2009/10 Period 13. In total we have 170 station-to-station flows in the data set. Given 91 time periods per flow, this yields a total of 15,470 flows for modelling purposes.

8.12 Employment data at the destination has been included, to help to explain variations in season ticket demand, and Gross Value Added (GVA) at the origin, to help explain variations in trips on non-season tickets. It was beyond the scope of this study to source historic journey time data but we have included distance between the origin and destination.

8.13 Estimates of the changes in parking spaces were overlaid onto this dataset, with utilisation rates before and after the change in parking spaces and a variable denoting whether there is any local car parking other than the station, ample free local parking or ample local parking at a charge.

Survey data

8.14 This data takes two forms:

- at Kirkcaldy, Bridge of Allan and East Kilbride where improvements have occurred, car park users were asked what they did prior to the improvement

- at these improved or indeed any other stations, selected to cover a wide range of parking situations, car park users would be asked what they would do in the event that car parking became less available, became more expensive, or was of reduced quality

8.15 In both cases, the effects of changes in parking policy are not confounded with changes in other factors, such as fares or GDP/employment, which can occur with ticket sales data.

Impact of parking improvements

8.16 At Kirkcaldy, Bridge of Allan and East Kilbride, users were asked how they had changed their behaviour as a result. They were first asked if they were aware of the improvements to the car parking facilities that had been implemented and were told when these were improved. For those who were aware of the improvements, they were asked whether they would have still made the journey by train in the absence of such improvements. If the answer was yes, they were further asked if they would have parked at the station, parked somewhere else nearby or else access the station by some other means.

8.17 Current train users were asked what they would do in response to a series of parking charge increases, a series of reductions in the chances of finding a parking space, the removal of CCTV and of lighting, the removal of both CCTV and lighting and the absence of tarmac road surface, and finally a 10% and a 25% increase in rail fares. Permissible responses were:

- as now
- use rail but park elsewhere
- use rail but use a different access mode
- use rail but from a different station
- use another mode of transport
- not travel

8.18 With the exception of the rail fare increases, permissible responses were to continue with train, use another mode of travel or else not to make the journey.

8.19 If appropriate, a series of questions are presented for multiple observations per respondent, similar to standard Stated Preference methods. This generates a much larger data set compared with the presentation of a single Stated Intention question and helps to make the overall results more robust. Iterative scenarios were presented, comprising increasing parking charges and / or reduced chances of getting a space.

Non user surveys

8.20 There is scope to ask non users whether they would make a train journey if parking provision at a station was improved, but the level of uncertainty surrounding such questions is high. In addition, the cost of contacting a sufficient number of non-users who might possibly make a train journey if the parking at a station was improved was beyond the resources of this study. Furthermore, trying to estimate the proportional increase in rail demand that would result would also be very difficult. Instead, a more straightforward approach was adopted, by discussing possible deteriorations to existing rail users compared with the current train service. Whilst this assumes symmetry between equivalent improvements and deteriorations in travel attributes, this is the default assumption used by most conventional travel demand models.

Modelling approach

8.21 We can estimate three types of model

- demand model based solely on ticket sales data
- demand model based on the Stated Intentions survey data where the parking situation is made worse
- a combined model covering both the ticket sales and the Stated Intentions data, and additionally also the behavioural response data relating to the actual improvements

8.22 Whilst the behavioural response to improvements can be included in the joint model, unlike the Stated Intentions data, there is not enough data to estimate a freestanding model. In order to facilitate pooling of the ticket sales data and the survey data, since the former covers the population whilst the latter is a survey, the model has been specified using ratios, as presented in equation 2. Taking a logarithmic transformation, where 'ln' denotes natural logarithm, for estimation by ordinary least squares regression, yields:

$$\frac{\ln V_{new}}{V_{base}} = a + pln\frac{P_{new}}{P_{base}} + eln\frac{E_{new}}{E_{base}} + sln\frac{S_{new}}{S_{base}} + cln\frac{C_{new}}{C_{base}} + o(O_{new} - O_{base}) \qquad (3)$$

8.23 This differs from equation 2 in terms of the exact variables included since historic journey time data is not readily available. Parameters 'C' and 'O' are only included in the Stated Intentions data since these terms do not vary in the ticket sales data.

Analysis of ticket sales data

8.24 The model is specified in ratio form, so 91 observations per flow yields 90 ratios of demand that are independent observations. There are various ways to specify the ratios. If we specified them as 'first differences', reflecting period on period changes, then there would only be one ratio out of the 90 where the car parking variable would change. Alternatively, the ratio could be specified as demand after the change relative to demand before the change, ensuring each period is used at least once.

8.25 The approach adopted compares each period after the additional car parking was introduced with the situation immediately preceding it, and then to compare the situation immediately prior to the change with all previous periods. This gives us a mixture of different scenarios. The actual period when the change occurred was removed, thereby eliminating a small amount of data. After reducing the number of observations from 91 to 89 per flow, and taking account of missing data, 15,120 observations for season tickets and 14,230 observations for non-season tickets remained. These are robust samples for modelling purposes.

8.26 The estimated models for season and non-season tickets are reported in Table A1.1. The goodness of fit achieved by each is reasonable given that the employment data covers a relatively large geographic area. The absence of reliable local income variations, which drive sales of other tickets are further limitations. Data on historic journey times, changes in inter-modal competition or local one-off events are also excluded.

8.27 The employment elasticity calculated produced a non-typical result due to some of the inherent inaccuracies affecting the data. As a result, we have specified dummy variables to represent the impacts relative to the 2003/04 base data. The absence of local income effects meant some dummy parameters were also used in the non-season data model to reduce the reliance on regional GVA statistics.

8.28 Period effects are similarly accounted for by the specification of 12 dummy variables, with period 1 serving as the arbitrary base. The remaining variables relate to fare, represented as revenue per trip, and car parking spaces. The fare elasticity has a ‘base’ term and incremental variations, denoted by ‘+’. The incremental effects relate to whether the fare is a reduction (FareRed) and whether the journey was inter-urban, defined as more than 20 miles (FareInter). As a result, the fare term relates to fare increases on urban journeys.

Results from the RP models

8.29 The base fare elasticity for commuting rail trips is -0.641, implicitly relating to fare increases, whereas it falls to -0.144 (-0.641+0.497) for fare reductions. These figures seem reasonable. The corresponding figures for non-season tickets are -1.242 and -0.663. We also observe that inter-urban journeys have lower fare elasticities, by 0.072 for season tickets and 0.177 for non-season tickets. Thus reductions in the price of season tickets for inter-urban travel would generate few extra trips.

8.30 The reason we distinguish between increases and losses in price is that the Stated Intention data relates explicitly to price increases. For comparability purposes, it therefore makes sense to be able to isolate the effect of price increases in the ticket sales data since this is how we assess the quality of the Stated Intentions responses to price increases.

8.31 With regard to spaces, we have a significant incremental effect relating to inter-urban trips for season tickets (SpacesInter) of -0.078. This would imply a wrong sign effect and we are inclined to ignore this, particularly given that inter-urban commuting trips from the origin stations in question will be comparatively rare. There was no significant effect from whether there is ample free local parking (SpacesLocal); perhaps commuters are less inclined to leave their cars 'off-site', although there will be more spaces available earlier in a morning and hence free parking elsewhere is less of an attraction. However, the base effect (Spaces) indicates that increasing provision increases rail demand overall.

8.32 For non-season tickets, increasing spaces does have a significant effect on demand, although neither of the incremental effects were significant. We might expect the impact of increased parking spaces to depend upon occupancy levels prior to improvements. We could not detect any effect from occupancy levels on the demand for either season or non-season tickets.

8.33 It is encouraging that we can recover right sign coefficients estimated with a reasonable degree of confidence for the effect of changes in parking spaces. As far as we are aware, this is the first study to have recovered such effects.

8.34 The base spaces coefficient indicates that a 10% increase in parking spaces would be forecast to lead to:

- a 0.43% increase in season ticket trips
- a 0.35% increase in non-season ticket trips

Results from the RP models

Table A1.1: Results of the demand models

	Seasons	**Non-Seasons**
Intercept	-0.047 (7.8)	-0.019 (3.7)
Fare +FareRed +FareInter	-0.641 (25.6) 0.497 (14.5) 0.072 (3.3)	-1.242 (47.3) 0.579 (12.0) 0.177 (5.4)
Spaces +SpacesInter +SpacesLocal	0.043 (4.0) -0.078 (6.2) n.s.	0.035 (4.6) n.s. n.s.
Year0304	Base	Base
Year0405	0.130 (17.2)	0.110 (16.1)
Year0506	0.184 (27.2)	0.241 (37.8)
Year0607	0.322 (40.1)	0.300 (40.8)
Year0708	0.359 (43.7)	0.331 (44.1)
Year0809	0.451 (48.9)	0.391 (45.2)
Year0910	0.481 (52.8)	0.464 (54.5)
Period1	Base	Base
Period2	0.108 (13.1)	-0.033 (4.5)
Period3	0.081 (9.8)	-0.036 (4.9)
Period4	-0.002 (0.2)	-0.071 (8.7)
Period5	-0.066 (8.5)	0.073 (10.8)
Period6	0.126 (18.9)	0.120 (18.2)
Period7	0.234 (28.8)	0.045 (6.2)
Period8	0.284 (36.7)	0.061 (8.8)
Period9	0.231 (24.6)	0.079 (9.5)
Period10	-0.189 (18.2)	-0.035 (3.9)
Period11	0.273 (25.1)	-0.057 (5.8)
Period12	0.314 934.5)	0.111 (13.7)
Period13	0.207 (19.0)	0.001 (0.1)
Adj R^2	0.47	0.40
Obs	15120	14230

Source: Analysis by ITS

Behavioural responses

8.35 The travel market has been differentiated into the following segments:

- season tickets and urban journeys
- season ticket and inter-urban journeys
- other tickets and urban journeys
- other tickets and inter-urban journeys

8.36 Of the 323 respondents who answered the question about awareness of car parking improvements, 201 (62%) were aware, although this total does not include respondents from Perth. Those who were not aware of the improvement might still have been influenced by the enhanced level of improvement but the question is not relevant to them and hence they have been excluded. There would be others who were not aware since they were not making rail trips at the time of the improvements and thus again the question is irrelevant.

8.37 Table A1.2 shows the different possible behavioural responses. Not using the train is a minor response, as would be expected. Splitting the sample by train station as well as ticket type and distance would mean the sample sizes would be too small.

8.38 With the exception of inter-urban journeys, the impact of car parking improvements has had little impact on demand. The largest impact is for inter-urban other, indicating a 14% demand effect. The effect would still exceed 10%, even if it is assumed all those unaware were not bothered about car parking.

Table A1.2: Response to the retention of existing car park facilities

	Urban Seasons	Urban Other	Inter-Urban Seasons	Inter-Urban Other
Total	39	99	58	127
Aware	28 (72%)	55 (56%)	28 (48%)	90 (71%)
Not Use Train				
Bus	1 (4%)	1 (2%)		3 (3%)
Car			1 (4%)	6 (7%)
Other	1 (4%)			4 (4%)
Use Train				
Park at Station	21 (75%)	44 (80%)	21 (75%)	28 (31%)
Park Nearby	5 (18%)	9 (16%)	2 (7%)	30 (33%)
Use Another Station		1 (2%)	2 (7%)	6 (7%)
Walked to Station			2 (7%)	4 (4%)
Bus to Station				4 (4%)
Taxi/Lift to Station				5 (5%)
Generation	2 (7%)	1 (2%)	1 (4%)	13 (14%)

Source: Analysis by ITS

Table A1.3 provides predicted demand effects based on the ticket sales analysis. There would seem to be a high degree of correspondence between the two sets of results for urban other and inter-urban seasons. For inter-urban other, the behavioural response data seems high whilst for urban seasons the behavioural response data is based on a small sample.

Table A1.3: Predicted response based on ticket sales model

	Urban Seasons	Urban Other	Inter-Urban Seasons	Inter-Urban Other
Bridge of Allan	0.9%	2.2%	1.5%	2.2%
Kirkcaldy	2.4%	5.5%	3.9%	5.5%
East Kilbride	2.2%	1.3%	3.6%	1.3%

Note: Kirkcaldy and Bridge of Allan were defined as having no local parking whereas East Kilbride was defined as having ample local parking. Before and after spaces for each station were 114:146 for Bridge of Allan, 162:287 for East Kilbride and 274:594 for Kirkcaldy. Results for Perth were not collected.

Results from the modelling outputs

Link between parking availability and demand

8.39 The secondary data was examined to understand the relationship between parking availability and resulting demand in accordance with the modelling methodology described. The data indicates a 10% increase in parking spaces would lead to a 0.43% increase in season ticket trips and a 0.35% increase in non-season ticket trips based on the sample of data analysed.

Likelihood of getting a space

8.40 The proportionate change in demand if either the car parking charges or the likelihood of getting a parking space was altered was also assessed. The model results are presented in Table A1.4. The demand parameters included ticket type, inter-urban or local journeys and whether the origin station had no local parking, ample free local parking or ample paid local parking. Ticket type was used as a proxy for differentiating between peak (using seasons and full tickets as a proxy) and off-peak (using reduced as the proxy) results.

8.41 With regard to the availability of spaces, an incremental (add-on) effect relating to inter-urban trips for season tickets was identified, although this was not significant for non-season tickets. However, there is an incremental effect where there is ample local free parking for non-season tickets, although this was not significant for season tickets. This implies commuters are less inclined to leave their cars ‘off-site’, although there will be more spaces available earlier in a morning and hence free parking elsewhere is less of an attraction. Thus moving from a 0 to 20% chance of not finding a space would lead to a 4.3% reduction in rail demand. If the likelihood of not getting a space increased to 10%, demand would be reduced by 2.2%.

Table A1.4: Results from the stated intention model

Attribute	Value
Rail Fare	-6.3230 (12.8)
+Season	1.9401 (3.4)
+Inter	2.2078 (3.9)
Chance	-0.0022 (4.0)
Park Charge	-0.0005 (7.5)
+AmpleFree	0.0002 (1.3)
Adj R^2	0.46
Obs	246

Source: ITS calculation. Note: Adj R^2 is for model with constant included. A % chance of not getting a parking space is specified as 10 whilst parking charge is specified in pence. The numbers shown in brackets are the t ratios, whilst the other numbers are model coefficients. The results are elasticity values, where an elasticity is defined as a proportional change in demand after an absolute change in fare, expressed in pence

<u>Impact of parking charges</u>

8.42 A range of scenarios were tested to examine the impact of changes to parking charges. These tests include the introduction of a parking charge to £1 for locations where parking was previously free, or increasing the parking charge to a higher value from £1 to £2. Table A1.5 illustrates the change in travel behaviour if parking costs changed. Responses have been used to assess the percentage using rail who would not alter their travel behaviour, and the proportion parking elsewhere or switching to another mode depending on absolute changes to the parking charges. Different ratios are calculated for individual changes in price. The relationship shown is non-linear, since every respondent was not presented with every price increase.

8.43 If the parking charge is increased by £1, park and ride demand would be reduced by 4.9%. A 3.0% reduction in park and ride usage would occur if there is ample free parking available in an alternative location nearby.

Table A1.5: Change in user behaviour in response to pricing changes

Change in Car Parking Costs – Pence	Rail Park and Ride Users	Rail Users who Park Elsewhere	Transfer from Rail
20	33.9%	65.1%	1.0%
40	30.2%	67.9%	2.0%
60	22.7%	74.4%	3.0%
80	47.3%	48.8%	3.9%
100	41.3%	53.8%	4.9%
120	30.8%	63.4%	5.8%
140	24.8%	68.5%	6.8%
160	29.4%	62.9%	7.7%
180	19.3%	72.1%	8.6%
200	30.2%	60.3%	9.5%
220	21.1%	68.5%	10.4%
240	21.6%	67.1%	11.3%
260	14.0%	73.8%	12.2%
280	20.9%	66.1%	13.1%
300	9.3%	76.8%	13.9%
400	19.2%	62.6%	18.1%

Source: ITS calculation

9 Appendix A2: Analysis of stated intention data

9.1 The Stated Intention data was combined to denote the proportionate changes in demand after some particular increase in rail fare, car parking charge or likelihood of not getting a parking space. The modelling methodology then distinguished, to the extent that the sample size in any cell allowed, by ticket type (season or non-season for consistency with the ticket sales analysis), origin station, since the local parking conditions vary across these, and whether the journey was inter-urban or not. This process yield 246 demand changes for modelling purpose, and the same form of model was estimated, as set out in equation 3 (in appendix A1 above), for the change in demand.

9.2 The estimated model contains three primary variables. These are:

- the rail fare, specified in constant elasticity form
- the chance of not getting a parking space, specified in difference form (as with variable O in equation 3), since the chance of not getting a space is often zero in the base case
- the parking charge at the station, which is also specified in difference form since it too can often be zero

9.3 The models are contained in Table A2.1. The demand parameters was then tested for the above three terms, depending on ticket type, whether the journey was inter-urban and whether the origin station had no local parking, ample free local parking or ample paid local parking. The only statistically significant effects we were able to discern were that the parking charge had a lesser impact (-0.0005+0.0002) when there was ample free local parking and that the rail fare elasticity varied by ticket type and distance.

9.4 The rail fare elasticities obtained from the Stated Intention data are clearly unreasonable. The base elasticity, for non-seasons and urban trips, exceeds 6! The elasticities for seasons and inter-urban travel would similarly be far too high. This is the potential problem of the Stated Intention approach. If respondents perceive that fares might be in line to increase, they have every incentive to state that they would no longer use train if the fares were increased. This clearly seems to have occurred here.

9.5 With regard to the chance of not finding a parking space, this demand parameter was invariant with respect to local parking conditions, ticket type and distance. Taking the exponential of the product of the demand parameter (-0.0022) and the change in the chance of not finding a parking space (10=20-10) indicates the proportionate change in demand after that change in the chance of finding a space.

9.6 Thus moving from a 0 to 20 percent chance of not finding a space would lead to a 4.3% reduction in rail demand. A change from 0 to 10 percent would reduce demand by 2.2%.

The calculations for the parking charge work in exactly the same fashion. If the parking charge is increased by £1 (100p) then demand would be reduced by 4.9%. This value would reduce to 3.0% if there is ample free local parking.

Table A2.1: Result of the demand models

Parameter	Output
Rail Fare	-6.3230 12.8)
+Season	1.9401 (3.4)
+Inter	2.2078 (3.9)
Chance	-0.0022 (4.0)
Park Charge	-0.0005 (7.5)
+AmpleFree	0.0002 (1.3)
Adj R^2	0.46
Obs	246

Note: Adj R^2 is for model with constant included. A % chance of not getting a parking space is specified as 10 whilst parking charge is specified in pence.

10 Appendix A3: Stated preference modelling methodology for cross Forth market

Modelling approach

10.1 By far the most common method used to explain discrete data in transport research is some form of logit model. The SP exercises used here are of the conventional form involving choices between just two alternatives.

10.2 The logit model which is used to analyse choices at the disaggregate (individual) level is based on the assumption that each individual chooses that alternative from the n on offer which yields maximum utility (U) or satisfaction. Thus individual i chooses alternative 1 if:

$$U_{i1} > U_{in} \quad for\ all\ n, n \neq 1 \quad (1)$$

10.3 In turn, the overall utility for each alternative is made up of the part-worth utilities associated with a range of explanatory variables. However, the demand analyst cannot possibly observe all the influences on each individual's choices, whilst others are difficult to measure or too minor to merit inclusion. An error term (εi) is therefore introduced to represent the net effect of the unobserved influences on an individual's choices. Hence as far as we are concerned, individual i bases decision making on what might be termed random utility which for alternative k (Uik) is made up as:

$$U_{ik} = V_{ik} + \varepsilon_{ik} \quad (2)$$

10.4 Vik is the observable part of utility, termed deterministic utility. In the case of the choice between n options with, say, different costs (C) and levels of travel time (T), the deterministic utility associated with option 1 for individual i could be represented as:

$$V_{i1} = \alpha T_{i1} + \beta C_{i1} \quad (3)$$

10.5 The utility for other options are specified in an entirely analogous fashion. As analysts, by definition we can proceed only by observation of Vik, yet this ignores the influence of what is to us unobservable. We cannot be sure that alternative 1 is preferred if Vi1 is the highest, yet the analysis must proceed on the basis of this observable component of utility alone.

10.6 The way forward is to specify the problem as one of explaining the probability of an individual choosing a particular alternative. We would expect the likelihood of choosing alternative 1 to increase as its overall random utility increases. The probability that an individual chooses alternative 1 (Pi1) from the n on offer can be represented as:

$$P_{i1} = \Pr\left[\left(V_{i1} + \varepsilon_{i1}\right) > \left(V_{in} + \varepsilon_{in}\right)\right] \quad for\ all\ n, n \neq 1 \quad (4)$$

10.7 By assuming some probability distribution for the εin, the probability of choosing alternative 1 can be specified solely as a function of the observable component of utility. Assuming that the errors associated with each alternative have a type I extreme value distribution and are independently and identically distributed yields the familiar multinomial logit model (MNL):

$$P_{i1} = \frac{e^{V_{i1}}}{\sum_{k=1}^{n} e^{V_{ik}}} \quad (5)$$

10.8 Where choices are made amongst just two alternatives, as is the case here, the logit model simplifies to:

$$P_{i1} = \frac{1}{1 + e^{(V_{i2} - V_{i1})}} \quad (6)$$

10.9 The coefficients in the disaggregate logit model's utility function (equation 3) are estimated by the technique of maximum likelihood to provide the best explanation of individuals' discrete choices.

10.10 More sophisticated estimation techniques allow the parameters in the utility function to have a distribution across the sample rather than assuming them to be fixed across all individuals, and allow more flexible forms of utility function to be directly estimated. However, in the vast majority of studies the linear-additive function of equation 3 is adopted by default.

10.11 The estimated coefficient weights (α and β of equation 3) denote the relative importance of the variables. We will have expectations as to the sign of the coefficient estimates. A variable which as it becomes larger is disliked more, such as both fare and travel time, will have a negative coefficient weight.

10.12 The logit model produces standard errors for each of its coefficient estimates, allowing t ratios and confidence intervals to be derived. These are interpreted in the same manner as for the more familiar multiple regression analysis and indicate the degree of confidence that can be placed in the coefficient estimates. A 95% confidence interval indicates the range in which we can be 95% confident the parameter value actually lies, and it is two standard errors either side of the central estimate. The t ratio is derived as the ratio of the coefficient estimate and its standard error. The critical value is commonly taken to be two, given that then the 95% confidence interval covers a coefficient value of zero. However, we are prepared to retain variables whose coefficients have t ratios of less than two if the estimates are expected to influence choice and are plausible even though not precisely estimated.

10.13 The $\rho 2$ statistic is a measure of goodness of fit, analogous to the more familiar R2 measure of regression analysis. However, the interpretation of what is a reasonable figure is somewhat different. Louviere et al. (2000) state that, "Values of $\rho 2$ between 0.2 and 0.4 are considered to be indicative of extremely good model fits. Simulations by Domencich and McFadden (1975) equivalenced this range to 0.7 to 0.9 for a linear function". $\rho 2$'s of around 0.1

are typical of the goodness of fit obtained in standard SP travel choice models.

10.14 What is termed the value of an attribute denotes the monetary equivalence of the change in utility brought about by a change in that attribute. For example, the value of time is the monetary equivalent of a reduction or improvement in travel time and cost to reflect the entire journey. It therefore represents the most that an individual is prepared to pay for a time saving or the minimum compensation that would be required in the event of a time loss.

10.15 The marginal value of a variable is defined as the ratio of the marginal utility of that variable and the marginal utility of money. In the case of the linear-additive utility functions of the form of equation 3, the marginal value of time is simply the ratio of the travel time coefficient and the cost coefficient (α/β). In this case, the monetary value is constant, and the average and marginal values are the same. Other monetary valuations are derived as the ratio of their coefficients to the cost coefficient.

10.16 Table A3.1 reports the results of the analysis of the SP data. The units used in the models are shown in terms of minutes or pence for a one-way journey (these are standard formats to represent data for the purposes of SP modelling). The models produce a good statistical correlation, in terms of the adjusted $\rho 2$ statistics, although some of the individual coefficients are not statistically significant. Separate models have been developed for the commuting and non-commuting markets for rail and bus.

10.17 It is noticeable that the impact of the service frequency is very low, whilst the associated coefficient is not statistically significant for any models. This outcome occurs despite the large range of scenarios presented to respondents. It might be argued that frequency is relatively unimportant, assuming there is a departure at the required time. However, access times are relatively short, with bus and rail services departing at frequent intervals. The combination of these characteristics helps to explain the relatively low importance of the frequency. The relationship between the in-vehicle time and the out of vehicle time variables is broadly consistent with the other guidance, for example, STAG.

Table A3.1: Park and ride SP mode choice models

	Rail Commute	Rail Other	Bus Commute	Bus Other
Coefficients:				
ASC-Train	2.2941 (3.7)	1.2960 (3.0)	-0.0562 (0.1)	-1.0500 (2.5)
Out-of-Vehicle Time	-0.0764 (2.9)	-0.0522 (2.4)	-0.0460 (1.8)	-0.0506 (1.8)
In-Vehicle Time	-0.0423 (1.7)	-0.0218 (1.1)	-0.0281 (1.3)	-0.0213 (1.2)
Frequency	-0.0035 (0.1)	-0.0095 (0.4)	-0.0078 (0.3)	-0.0243 (1.3)
Cost	-0.0114 (5.9)	-0.0092 (6.6)	-0.0151 (7.0)	-0.0067 (5.2)
Money Values (pence):				
ASC-Train	201.23	140.87	-3.72	-156.71
Out-of-Vehicle Time	6.70	5.67	3.04	7.55
In-Vehicle Time	3.71	2.37	1.86	3.18
Frequency	0.30	1.03	0.52	3.62
Descriptives:				
Observations	278	263	264	415
Train	240	190	90	84
Bus	38	73	174	331
Missing	2	9	0	1
Adj ρ^2 constants	0.30	0.20	0.28	0.09

Source: ITS calculation. Note: Adj R^2 is for model with constant included and represents the statistical significance. The numbers shown in brackets are the t ratios, whilst the other numbers are model coefficients.

10.18 Out-of-vehicle time (OVT) has a strong influence on modal choice, given its relationship relative to in-vehicle (IVT). The OVT has a higher ratio compared with the IVT, indicating the time spent getting to the final destination comprises a large component of the overall journey. In many models, walk and wait time are typically valued at twice in-vehicle time. However, the access time to Ferrytoll and Inverkeithing is by car, so it would be reasonable to assume this parameter would have a lower value.

10.19 The additional journey time for parking and the time spent walking from the car to the train or bus is also included. In addition, the time spent travelling to the final destination will involve wait time and some walking. Overall, it would be reasonable to expect the out of vehicle time to be valued at around twice the time spent on the train or bus based on other empirical evidence.

10.20 Whilst the time coefficient is correct in terms of its sign, it is only significant in one of the four models, albeit at a lower (10%) confidence level. This result is achieved, despite large variations in the journey times presented as part of the SP experiments. The implied values of time vary between about 2 and 4 pence per minute, somewhat lower than other guidance, for example, Department for Transport WebTAG guidance[27]. This implies park and ride users may have relatively low values of time compared with other motorists.

10.21 It is worth commenting on the alternative specific constant (ASC). This indicates the preference for one mode compared with the other, if other factors are equal. The ASC is specified relative to train, so a positive ASC indicates a preference for train over bus. The ASC favours train amongst train users, with a similar result for bus amongst bus users. Both offer a strong preference.

10.22 Bus commuters are essentially indifferent between the modes. This is reflected in the 'bi-modal' distribution of the market shares. For current rail users, the vast majority of the SP responses are for rail. In contrast, the vast majority of bus users' SP responses are for bus. The relatively low VoT indicates respondents are choosing to park and ride, rather than paying to park in Edinburgh city centre. Furthermore, the choice between rail and bus appears relatively fixed, given the differences in egress time.

10.23 The bus journey times from Ferrytoll appear less important compared with other bus based park and ride sites. However, the characteristics of Ferrytoll are different to most other bus based park and ride sites, so the conclusions of the benchmarking analysis in Chapter 4 from other UK examples need to be acknowledged accordingly.

[27] www.webtag.org.uk, module 3.5.6. Department for Transport

11 Appendix A4: Modelling methodology for the bus market

Modelling approach

11.1 Two surveys were undertaken with regards to bus demand and parking provision at Ingliston (Edinburgh) and Bridge of Don (Aberdeen) with a total of 250 respondents. The first set were current users of bus based park and ride, whilst the second were non users but did not reject park and ride. For current users the questionnaire established:

- what they did prior to the improvement at the car park (Point 1)
- what they would do in response to a series of bus fare increases (Point 2)
- what they would do in response to a series of bus frequency increases (Point 3)
- what they would do in response to a series of increases in the chance of not being able to find a parking space (Point 4)
- what they would do in response to a series of changes in the quality of the car parking. These were presented as (1) the removal of CCTV; (2) the removal of lighting; and (3) the removal of both CCTV and lighting and the absence of a tarmac road surface (Point 5)

11.2 The main analysis was related to 2, 3 and 4 above and the permitted responses to these questions were:

- as now
- use bus but from a different park and ride site
- use another bus service
- use another mode
- not travel
- other

11.3 Adaptive stated intentions questions were asked of every respondent with the aim being to 'hone in' on the change of bus fare, bus frequency and chance of not parking that would result in the current user choosing an option other than 'as now'.

11.4 A process of doubling changes was adopted if a respondent answered As Now (i.e. if they answered As Now when faced with a £1 increase in bus fare they were then asked what they would do if the bus fare increased to £2) and halving the difference if they answered anything other than As Now (i.e. taking the same example if the respondent did not answer As Now at £2 they were then asked what they would do if the bus fare increased to £1.50). This would continue for a maximum of 4 iterations or until a value that was, for bus fares, within 10 pence of the starting price.

11.5 The processes were very similar for both ‘chance of finding a parking space’ and ‘bus frequency’. For the former a starting value set at the respondent’s current chance of not finding a parking space (note for this sample of respondents this was primarily 0%) plus 20%. If the respondent answered As Now then the chance increased by 20% or if they did not answer As Now it was reduced by 10%. This process was iterative until a chance within 10% of the starting value was found.

11.6 For bus frequency the starting point was the respondent’s current departure pattern plus 10 minutes. If the respondent answered ‘as now’, then the increase was doubled to 20 minutes but if they did not answer ‘as now’ it was reduced to 5 minutes. Again the process was iterative until a value for frequency was found that was within 5 minutes of the starting frequency.

11.7 Where suitable, as with price and occupancy changes, the series of questions asks allow for multiple observations per respondent, much as in standard Stated Preference methods, and makes for a much larger data set than if, as is sometimes the case, only a single Stated Intention question is asked.

Analysis of stated intention data

11.8 The Stated Intention data was combined to denote the proportionate changes in demand after some particular increase in bus fare, bus frequency and the likelihood of not getting a parking space. The estimated model contains three primary variables. These are:

- bus fare, specified in constant elasticity form
- bus frequency, specified in constant elasticity form
- the chance of not getting a parking space, specified in difference form (as with variable O in equation 3), since the chance of not getting a space is often zero in the base case

11.9 The models are contained in Table A7.1 and are presented for the base cases (i.e. without disaggregation by purpose or ticket type), relating solely to the bus park and ride market (i.e. the demand affects upon demand for bus services leaving from the Ingliston and Bridge of Don bus park and ride sites). The bus fare elasticity is very high at -1.605 suggesting that for a 10% increase in fare, demand would fall by 16%. Clearly this is too high and is reflective of the nature of Stated Intentions type questioning in that if respondents perceive that fares might be in line to increase, they have every incentive to state that they would no longer park and ride bus if the fares were increased.

11.10 Another factor to consider is that this elasticity relates to demand for the two specific park and ride sites at Ingliston and Bridge of Don, not to the bus market as a whole. A high elasticity is therefore expected since whilst a number of respondents may no longer use a specific park and ride site that doesn't mean to say they will not stop using bus (either a local but slower local service or another park and ride service).

11.11 A further look at the data revealed that a large number of respondents had been offered increases well in excess of 100% of the current fare, with a number of these still choosing the As Now option. This will contribute to the high elasticity estimate and as such a restricted version of the model was estimated which capped the fare increased offered to respondents at £3.40, equivalent to around a 110% increase on the highest fare. The result was a much lower and more plausible fare elasticity of -0.927.

11.12 Two elasticities are presented for bus frequency in Table A4.1, an unrestricted one based upon the whole data set and a restricted one. Again we see that the elasticity for the unrestricted case is considerably higher that one would expect at -1.468 suggested that a 10% increase in bus frequency would result in a 15% reduction in passenger numbers. As with the fare elasticity part of the explanation for such a high number can be attributed to the nature of SI questioning and partly to the fact that the elasticity relates to the specific park and ride market and not the general bus market. Again a number of incremental models (purpose and ticket type) were estimated but the findings were not significant and/or counter intuitive.

11.13 A closer inspection of the data found that the a number of respondents had been offered 'odd' increases in frequency which they might have found hard to translate into actual frequencies, i.e. a bus every 40 minutes is more difficult to conceptualise than a bus every 30 minutes. A restricted model was estimated that only considered those respondents who had been offered the following levels of bus frequency – every 15 minutes, 20 minutes, 30 minutes and 60 minutes. This reduced the sample size by over half but improved the frequency elasticity, although still high, to -0.982.

Table A4.1: Park and ride specific elasticities

	Unrestricted Constant	**Restricted Constant**	**Unrestricted Constant**	**Restricted Constant**	**Unrestricted Exponential**
Bus Fare	-1.605 (27.6)	-0.927 (9.1)			
Frequency			-1.468 (25.0)	-0.982 (10.2)	
Park Chance					-0.021 (6.8)
Adj R^2	0.60	0.59	0.58	0.50	0.20
Obs	161	30	172	68	53

Note: Adj R^2 is for model with constant included whilst the elasticities reported are from models with no constants.

11.14 The final elasticity reported in Table A4.1 relates to the chance of not obtaining a parking space. The exponential of the produce of the demand parameter (-0.021) and the change in the chance of not finding a parking space (i.e. 10=10-0) indicates the proportionate change in demand after that change in the chance of finding a space.

11.15 Thus moving from a 0 to a 10 percent chance of not finding a space would lead to a 19% reduction in bus demand, whilst a move from a 0 to 20 percent chance of not finding a space would result in a 34% reduction in bus demand at the park and ride sites. These are considerably higher than the figures produced for rail and probably reflect that the current park and ride sites currently have a large amount of spare parking capacity at all times so users will be much more sensitive to any move away from 0%.

11.16 The point has already been made that the demand elasticities reported above are relevant to the specific bus park and ride markets examined and that this is likely to lead to exaggerated elasticities vis a vis those normally associated with general bus use. To investigate whether this is the case a further set of models are presented in Table A4.2 below which look at the general bus market, i.e. do people remain in the bus market (use a slower local bus service or another park and ride service) when faced with changes to their current bus park and ride services.

Table A4.2: General bus market elasticities

	Unrestricted Constant	Unrestricted Constant[1]	Unrestricted Exponential	Unrestricted Exponential
Bus Fare	-0.306 (4.8)			
Frequency		-0.285 (4.1)	-0.007 (3.6)	
Park Chance				-0.008 (2.0)
Adj R^2	0.024	-0.069	-0.080	-0.146
Obs	32	14	14	7

Note: Adj R^2 is for model with constant included whilst the elasticities reported are from models with no constants. [1] This assumes a current frequency of 15 minutes.

11.17 As expected the elasticities reported in Table A4.2 are much lower than those for the park and ride specific market (Table A4.1). The bus fare elasticity reduces from -1.605 to a much more plausible -0.306, suggesting that a 10% rise in bus fares reduces bus demand by 3%. For frequency, a similar picture emerges with a reduction in the constant elasticity from -1.468 to -0.285, suggest that a 10% increase in frequency reduces demand by just under 3%. This elasticity was based on an assumed current frequency of 15 minutes (based on the median average of the sample).

11.18 A further frequency model is reported based upon differences between the current frequency and proposed increases. The exponential of the produce of the demand parameter (-0.007) and the change in frequency (i.e. 10=20-10) indicates the proportionate change in demand after that change. So for example, moving from a 10 to a 20 minute frequency would lead to around a 7% reduction in bus demand.

11.19 A similar exponential model is reported for the impact of parking. Again a reduced impact can be seen from that reported in Table A4.1. A 10% increase in the chance of not being able to park would see demand reduced by 8% as compared to 19% with the model reported in Table A4.1.

12 Appendix A5: Bus park and ride overview of main indicators

Table A5.1: Overview of the main performance indicators

Site	Location description	Population (Urban Centre)	Daily Two-way link flow using adjacent corridors	No. of parking spaces	Type of Service	Service Frequency (buses per hour)	Cost per passenger (£)	Cost of town centre parking (all day, £)	Cost of town centre parking (off-peak, £)	Ratio: Cost versus peak parking	Ratio: Cost versus off-peak parking	Annual usage
Bridge of Don, Aberdeen	3 miles north of city centre off A90	212,000	A90 North: 15,788	600	Dedicated	4-6	£2	£8.00	£4.50	25%	44%	170,000
Broxden, Perth	2.4 miles west of city centre adjacent to A9, M90 interchange	43,450	A9 West: 24,352 M90: 30,436 A94 Scone: 5,677	244	Dedicated	4-6	£1	£3.00	£3.00	33%	33%	140,000
Falkirk	2.5 miles west of town centre near A883 / A803	34,000	A883: 14,445 A803: 8,487	350	Conventional	6	£2.30	Free	Free	N/A	N/A	5-10,000
Ingliston, Edinburgh	8m west of Edinburgh nr A80	448,600	A8 West: 43,465	1,085	Dedicated	6	£1.20	£15.00	£15.00	8%	8%	140,000
Kingswells, Aberdeen	5 miles west of city centre nr A944	212,000	A944: 28,010	950	Dedicated	4-6	£2	£8.00	£4.50	25%	44%	75,000

Table A5.1 (cont): Overview of the main performance indicators

Site	Location description	Population (Urban Centre)	Daily Two-way link flow using adjacent corridors	No. of parking spaces	Type of Service	Service Frequency (buses per hour)	Cost per passenger (£)	Cost of town centre parking (peak, £)	Cost of town centre parking (off-peak, £)	Ratio: Cost versus peak parking	Ratio: Cost versus off-peak parking	Annual usage
Stirling	One site 2 miles west of city nr M9 Site 1.5 miles east of city nr A91	41,200	A9: 13,198 A905: 25,013	216	Conventional	5	£1	£2.50	£2.50	40%	40%	46,000 76,000
Durham (Belmont)	2.5 miles north east of city near A1(M)	87,700	A690: 28,350	424	Dedicated	6	£1.70	£6.00	£4.00	28%	43%	500,000
Exeter	One site off the M5 3.3 miles from the city centre plus three other sites.	118,800	A30 West: 39,100 M5 South: 78,998 A30 East: 32,264	650	Dedicated	5	£2	£5.80	£2.50	34%	80%	1,281,000
Hanley	0.5 miles south of city centre	239,700	A5006: 21,600	560	Diversion	6-15	£3.50/ Car	£5.00	£5.00	70%	70%	30,000
High Wycombe	2 miles west of town centre	92,300	A464: 33,796	400	Dedicated	4	£1.80-£2.30	£8.50	£8.50	21-27%	21-27%	50,000

Table A5.1 (cont): Overview of the main performance indicators

Site	Location description	Population (Urban Centre)	Daily Two-way link flow using adjacent corridors	No. of parking spaces	Type of Service	Service Frequency (buses per hour)	Cost per passenger (£)	Cost of town centre parking (peak, £)	Cost of town centre parking (off-peak, £)	Ratio: Cost versus peak parking	Ratio: Cost versus off-peak parking	Annual usage
Ipswich	London Road (3.1 miles west of city)	128,000	A12 South West:	590	Dedicated	6	£3	£4.40	£4.40	70%	70%	855,000
	Bury Road (2.5 miles north of city)		A14 North West: 5,513	600		5	£3	£4.40	£4.40	70%	70%	
	Martlesham (5 miles east of city)		A12 East: 39,337	550		5	£3	£4.40	£4.40	70%	70%	
Norwich	Thickthorn (4 miles west of city centre)	376,500	A11 West: 40,539	736	Dedicated	6	£1.70-£2.00	£15	£15	13%	13%	3,671,500
	Costessey (5.5 miles north west of city)		A47 West: 33,910	1100		6	£1.70-£2.00	£15	£15	13%	13%	
	Postwick (4 miles east of city centre)		A47 East: 31,997	525		6	£1.70-£2.00	£15	£15	13%	13%	
	Sprowston (2.5 miles north of city)		A1151 North East: 18,198	788		6	£1.70-£2.00	£15	£15	13%	13%	
	Harford (4 miles south of city centre)		A140 South: 22,602	1088		6	£1.70-£2.00	£15	£15	13%	13%	
	Airport (3.5 miles north of city centre)		A140 North: 24,390	620		6	£1.70-£2.00	£15	£15	13%	13%	

Table A5.1 (cont): Overview of the main performance indicators

Site	Location description	Population (Urban Centre)	Daily Two-way link flow using adjacent corridors	No. of parking spaces	Type of Service	Service Frequency (buses per hour)	Cost per passenger (£)	Cost of town centre parking (peak, £)	Cost of town centre parking (off-peak, £)	Ratio: Cost versus peak parking	Ratio: Cost versus off-peak parking	Annual usage
Worcester	2 miles north of city centre off the A38	94,100	A38: North 13,975	540	Dedicated	6	£2.20	£10	£10	22%	22%	815,000
York	Askham Bar (2 miles south of city centre)	180,000	A64 West: 44,297	920	Dedicated	6	£2.30	£10	£10	23%	23%	6,076,000
	Grimston Bar (3.7 miles east of city centre)		A1079 South East: 19,261	1000		6	£2.30	£10	£10	23%	23%	
	Rawcliffe Bar (3 miles north west of city centre)		A19 North: 9,621	400		6	£2.30	£10	£10	23%	23%	
	Designer Outlet (2.5 miles south east of city centre)		A19 South: 17,019	750		6	£2.30	£10	£10	23%	23%	
	Monks Cross (3 miles north east of city centre)		A64 East: 22,298	540		6	£2.30	£10	£10	23%	23%	

Source: The TAS Consultancy (2007) Park and Ride Industry Monitor, various internet searches, DfT annual daily traffic counts from DfT website

13 Appendix A6: Sample questionnaires

- Rail users
- Bus users
- Non-bus users
- Inverkeithing/Ferrytoll stated preference questionnaire

2171
Effects of P & R Parking on Demand for Public Transport – Final Main Rail User Questionnaire

Interviewer no: | | | | | **Interviewer name:** | |

Date: | | | / | | | **Time interviewer started:** | | | : | | |

Recruitment

INTERVIEWER PLEASE CODE:

Day of week:
Mon
Tue
Wed
Thurs
Fri
Sat
Sun

LOCATION: INTERVIEWER PLEASE SELECT STATION LOCATION

1. Kirkcaldy
2. Bridge of Allan
3. East Kilbride
4. Falkirk High
5. Stirling
6. Perth

INTRODUCTION
Good morning/afternoon/evening. My name is .... from Accent and I am carrying out research for Transport Scotland, the transport agency of the Scottish Government, into station parking. Could you spare me 10 minutes now to answer a few questions to help with this research? Any answer you give will be treated in confidence in accordance with the Code of Conduct of the Market Research Society. You do not have to answer questions you do not wish to and you can terminate the interview at any point.

RQ1. Can I just confirm that you drove to the station today and have parked in the station car park or in an adjacent council car park **(INTERVIEWER: IF THEY HAVE PARKED IN A COUNCIL CAR PARK IT MUST BE NEXT DOOR TO THE STATION FOR THE RESPONDENT TO BE IN SCOPE FOR THE SURVEY)**?

1. yes
2. no **THANK & CLOSE**

Section 1: General Questions

Q1. Can you please tell me which station you will be travelling to, or which station you have travelled from, today by train? **SINGLE RESPONSE**

IF LOCATION = 1:
Edinburgh Waverley
Edinburgh Haymarket
Aberdeen
Aberdour
Arbroath
Burntisland
Cardenden
Cowdenbeath
Cupar

Dalgety BayDalmeny
Dundee
Dunfermline Queen Margaret
Dunfermline Town
Dyce
Glenrothes with Thornton
Inverkeithing
Inverurie
Kinghorn
Ladybank
Lochgelly
Leuchars
Markinch
Montrose
North Queensferry
Rosyth South
Gyle
Stonehaven
Other **specify**

IF LOCATION = 2:
Edinburgh Waverley
Edinburgh Park
Edinburgh Haymarket
Glasgow Queen Street
Bishopbriggs
Camelon
Croy
Dunblane
Falkirk Grahamston
Falkirk High
Gleneagles
Larbert
Lenzie
Linlithgow
Perth
Polmont
Stirling
Other **specify**

IF LOCATION = 3:
Glasgow Central
Busby
Clarkston
Crossmyloof
Giffnock
Hairmyres
Pollockshaws West
Thornliebank
Thornton Hall
Other **specify**

IF LOCATION = 4:
Edinburgh Waverley
Edinburgh Park
Edinburgh Haymarket
Glasgow Queen Street
Bishopbriggs
Croy
Lenzie
Linlithgow
Polmont
Other **Specify**

IF LOCATION = 5:
Aberdeen
Edinburgh Haymarket
Edinburgh Waverley
Glasgow Queen Street
Inverness
Perth
Arbroath
Aviemore
Blair Atholl
Carnoustie
Carrbridge
Dunblane
Dunkeld & Birnam
Dundee
Falkirk Grahamston
Gleneagles
Kingussie
Larbert
Laurencekirk
Montrose
Newtonmore
Pitlochry
Portlethen
Stonehaven
Other **specify**

IF LOCATION = 6
Aberdeen
Dundee
Edinburgh Haymarket
Edinburgh Waverley
Glasgow Queen Street
Inverness
Stirling
Arbroath
Aviemore
Blair Atholl
Carnoustie
Dunkeld & Birnam
Gleneagles
Inverkeithing
Kingussie
Kirkcaldy
Ladybank
Laurencekirk
Markinch
Montrose
Newtonmore
Pitlochry
Stonehaven
Other **specify**

Q2. Can you please tell me what the main purpose of your journey today is: **SINGLE RESPONSE**

1. Commuting
2. Business (not including commuting)
3. Education
4. Holiday
5. Visiting friends/relatives
6. Health reasons (eg doctor, hospital etc)
7. Shopping
8. Other

Q3. Can you please tell me what type of ticket you will be travelling on today: **SINGLE RESPONSE**

1. Operator season ticket
2. Travel Card (PTE)
3. Open (travel any time)
4. Off peak
5. Other

Q4. Can you please tell me how much, if anything, you pay per day for parking in this car park?

£________ Pence_________

Q5. In your experience what is the likelihood of you turning up and not being able to find a parking space in this station car park, ie how many times of out of ten is this likely to happen? **INTERVIEWER RECORD HOW MANY TIMES OUT OF 10 BELOW (DP: L=0, H=10)**

________ out of 10

Section 2: Railway Users at Improved Station

Q6. **IF LOCATION GE4 GO TO SECTION 3.** Are you aware of the improvements to the car parking facilities that took place here in <**INSERT "2005" IF LOCATION = 2 AND "2007" IF LOCATION = 1 OR 3**>?

1. No **GO TO Q10**
2. Yes **GO TO Q7**

Q7. **ASK IF Q6 = YES, ELSE GO TO Q10:** If the improvements had not been made, would you have used this station to make your journey today?

1. Yes **GO TO Q8**
2. No **GO TO Q9**

Q8. **ASK IF Q7 = YES, ELSE GO TO Q9:** Would you have parked in the station car park or nearby, or would you have accessed the train station in a different way?

1. Parked in station car park
2. Parked nearby
3. Walked to station
4. Cycled to station
5. Caught bus to station
6. Caught taxi to station
7. Got lift to station
8. Other

Q9. **ASK IF Q7=NO, ELSE GO TO Q10.** Please can you tell me how you would have made your journey today instead?

1. Car
2. Bus
3. Cycled
4. Rail but different station
5. Would not have made the journey
6. Other

Q10. **IF Q7=NO GO TO SECTION 3** Did you make any rail trips from this station prior to the improvements to the car parking facilities in < **INSERT "2005" IF LOCATION = 2 AND "2007" IF LOCATION = 1 OR 3**>?

1. Yes
2. No

Section 3 – Stated Intentions Questions

Q11. What would you do if the station car parking charge went up by <insert random starting price from table below> per day? **INTERVIEWER PLEASE NOTE: IF THEY PREVIOUSLY PAID NOTHING, THEY WOULD NOW PAY THE AMOUNT SHOWN; IF THE PREVIOUSLY PAID SOMETHING, THEY WOULD PAY THAT AMOUNT PLUS THE AMOUNT SHOWN**

20 pence
40 pence
60 pence
80 pence
100 pence
120 pence
140 pence
160 pence
180 pence
200 pence
220 pence
240 pence
260 pence
280 pence
300 pence

1. As now
2. Use rail but park elsewhere
3. Use rail but use a different access mode
4. Use rail but from a different station
5. Use another mode of transport
6. Not travel

Q12. **IF Q11 GE 2 ASK, ELSE GO TO Q13:** What would you do if the station car parking charge went up by **<REDUCE THE STARTING PRICE BY HALF (TO NEAREST 5P)>** per day?

CODES AS FOR Q11

Q13. **IF Q11 EQ 1 ASK, ELSE GO TO Q14:** What would you do if the station car parking charge went up by **<DOUBLE THE STARTING PRICE (TO NEAREST 5P)**> per day?

CODES AS FOR Q11

Q14. **IF Q12 GE 2 ASK, ELSE GO TO Q15; GO TO Q26 IF NEXT REDUCTION WOULD MOVE COST TO WITHIN 20P OF STARTING PRICE:** What would you do if the station car parking charge went up by **<REDUCE THE PRICE GIVEN AT Q12 BY HALF (TO NEAREST 5P)>** per day?

CODES AS FOR Q11

Q15. **IF Q12 EQ 1 ASK, ELSE GO TO Q16; GO TO Q26 IF NEXT INCREASE WOULD MOVE COST TO WITHIN 20P OF STARTING PRICE:** What would you do if the station car parking charge went up by **<INCREASE THE PRICE GIVEN AT Q12 BY 50% (TO NEAREST 5P)**> per day?

CODES AS FOR Q11

Q16. **IF Q13 GE 2 ASK, ELSE GO TO Q17; GO TO Q26 IF NEXT REDUCTION WOULD MOVE COST TO WITHIN 20P OF STARTING PRICE:** What would you do if the station car parking charge went up by **<REDUCE THE PRICE GIVEN AT Q13 BY 50% OF THE DIFFERENCE BETWEEN PRICE STATED AT Q11 AND PRICE STATED AT Q13 (TO NEAREST 5P)>** per day?

CODES AS FOR Q11

Q17. **IF Q13 EQ 1 ASK, ELSE GO TO Q18; GO TO Q26 IF NEXT INCREASE WOULD MOVE COST TO WITHIN 20P OF STARTING PRICE:** What would you do if the station car parking charge went up by **<DOUBLE THE PRICE GIVEN AT Q13 (TO NEAREST 5P)>** per day?

CODES AS FOR Q11

Q18. **IF Q14 GE 2 ASK, ELSE GO TO Q19; GO TO Q26 IF NEXT REDUCTION WOULD MOVE COST TO WITHIN 20P OF STARTING PRICE:** What would you do if the station car parking charge went up by **<REDUCE THE PRICE GIVEN AT Q14 BY HALF (TO NEAREST 5P)>** per day?

1. As now
2. Use rail but park elsewhere
3. Use rail but use a different access mode
4. Use rail but from a different station
5. Use another mode of transport
6. Not travel

Q19. **IF Q14 EQ 1 ASK, ELSE GO TO Q20; GO TO Q26 IF NEXT INCREASE WOULD MOVE COST TO WITHIN 20P OF STARTING PRICE:** What would you do if the station car parking charge went up by **<INCREASE THE PRICE GIVEN AT Q14 BY 50% OF THE DIFFERENCE BETWEEN PRICE STATED AT Q12 AND PRICE STATED AT Q14 (TO NEAREST 5P)>** per day?

CODES AS FOR Q11

Q20. **IF Q15 GE 2 ASK, ELSE GO TO Q21; GO TO Q26 IF NEXT REDUCTION WOULD MOVE COST TO WITHIN 20P OF STARTING PRICE:** What would you do if the station car parking charge went up by **<REDUCE THE PRICE GIVEN AT Q15 BY 50% OF THE DIFFERENCE BETWEEN PRICE STATED AT Q12 AND PRICE STATED AT Q15 (TO NEAREST 5P)>** per day?

CODES AS FOR Q11

Q21. **IF Q15 EQ 1 ASK, ELSE GO TO Q26; GO TO Q26 IF NEXT INCREASE WOULD MOVE COST TO WITHIN 20P OF STARTING PRICE:** What would you do if the station car parking charge went up by **<INCREASE THE PRICE GIVEN AT Q15 BY 50% OF THE DIFFERENCE BETWEEN PRICE STATED AT Q12 AND PRICE STATED AT Q15 (TO NEAREST 5P)>** per day?

CODES AS FOR Q11

Q22. **IF Q16 GE 2 ASK, ELSE GO TO Q22; GO TO Q26 IF NEXT REDUCTION WOULD MOVE COST TO WITHIN 20P OF STARTING PRICE:** What would you do if the station car parking charge went up by **<REDUCE THE PRICE GIVEN AT Q16 BY 50% OF THE DIFFERENCE BETWEEN PRICE STATED AT Q13 AND PRICE STATED AT Q16 (TO NEAREST 5P)>** per day?

Q23. **IF Q16 EQ 1 ASK, ELSE GO TO Q26; GO TO Q26 IF NEXT INCREASE WOULD MOVE COST TO WITHIN 20P OF STARTING PRICE:** What would you do if the station car parking charge went up by **<INCREASE THE PRICE GIVEN AT Q16 BY 50% OF THE DIFFERENCE BETWEEN PRICE STATED AT Q13 AND PRICE STATED AT Q16 (TO NEAREST 5P)>** per day?

CODES AS FOR Q11

Q24. **IF Q17 GE 2 ASK, ELSE GO TO Q25; GO TO Q26 IF NEXT REDUCTION WOULD MOVE COST TO WITHIN 20P OF STARTING PRICE:** What would you do if the station car parking charge went up by **<REDUCE THE PRICE GIVEN AT Q17 BY 50% OF THE DIFFERENCE BETWEEN PRICE STATED AT Q13 AND PRICE STATED AT Q17 (TO NEAREST 5P)>** per day?

Q25. **IF Q17 EQ 1 ASK, ELSE GO TO Q26; GO TO Q26 IF NEXT INCREASE WOULD MOVE COST TO WITHIN 20P OF STARTING PRICE:** What would you do if the station car parking charge went up by **<DOUBLE THE PRICE GIVEN AT Q17 (TO NEAREST 5P)>** per day?

CODES AS FOR Q11

Q26. What is the maximum increase in the daily car parking cost that you would accept? **(DP: L=0 IF GE2 TO ALL QUESTIONS SO FAR ANSWERED, OTHERWISE L=LOWEST VALUE SO FAR ACCEPTED; H=LOWEST VALUE SO FAR DECLINED)**

£_____ Pence ________

Q27. What would you do if the chance of not finding a parking space increased from <**INSERT RESPONSE TO Q5 CONVERTED TO % (IE 0 = 0%, 1 = 10%, 2 = 20% ETC)**> to < **INSERT RESPONSE TO Q5 CONVERTED TO % PLUS 20%**>?

1. As now
2. Use rail but park elsewhere
3. Use rail but use a different access mode
4. Use rail but from a different station
5. Use another mode of transport
6. Not travel

Q28. **IF Q27 GE2 ASK, ELSE GO TO Q29:** What would you do if the chance of not finding a parking space increased from <**INSERT RESPONSE TO Q5 CONVERTED TO %>** to **<INSERT FIGURE GIVEN AT Q27 MINUS 10%**>?

CODES AS FOR Q27

Q29. **IF Q27 = 1 AND Q5 LE 7 ASK, ELSE GO TO GO TO Q34:** What would you do if the chance of not finding a parking space increased from <**INSERT RESPONSE TO Q5 CONVERTED TO %>** to <**INSERT FIGURE GIVEN AT Q27 PLUS 20%, CAP AT 100%; AFTER 100% REACHED GO TO Q34**>?

1. As now
2. Use rail but park elsewhere
3. Use rail but use a different access mode
4. Use rail but from a different station
5. Use another mode of transport
6. Not travel

Q30. **IF Q29 GE2 ASK, ELSE GO TO Q31:** What would you do if the chance of not finding a parking space increased from <**INSERT RESPONSE TO Q5 CONVERTED TO %>** to **<INSERT FIGURE GIVEN AT Q29 MINUS 10%**>?

CODES AS FOR Q27

Q31. **IF Q29 = 1 ASK, ELSE GO TO Q34:** What would you do if the chance of not finding a parking space increased from <**INSERT RESPONSE TO Q5 CONVERTED TO %>** to <**INSERT FIGURE GIVEN AT Q29 PLUS 20%, CAP AT 100%; AFTER 100% REACHED GO TO Q34**>?

1. As now
2. Use rail but park elsewhere
3. Use rail but use a different access mode
4. Use rail but from a different station
5. Use another mode of transport
6. Not travel

Q32. **IF Q31 GE2 ASK, ELSE GO TO Q33:** What would you do if the chance of not finding a parking space increased from <**INSERT RESPONSE TO Q5 CONVERTED TO %>** to **<INSERT FIGURE GIVEN AT Q31 MINUS 10%**>?

CODES AS FOR Q27

Q33. **IF Q31 = 1 ASK, ELSE GO TO Q34:** What would you do if the chance of not finding a parking space increased from <**INSERT RESPONSE TO Q5 CONVERTED TO %>** to <**INSERT FIGURE GIVEN AT Q31 PLUS 20%, CAP AT 100%; AFTER 100% REACHED GO TO Q34**>?

1. As now
2. Use rail but park elsewhere
3. Use rail but use a different access mode
4. Use rail but from a different station
5. Use another mode of transport
6. Not travel

Q34. If there was no CCTV at this car park would you continue to use it?

1. Yes
2. Yes, in the summer/daylight hours but not in the winter/dark
3. No

Q35. If there was no lighting at this car park would you continue to use it?

1. Yes
2. Yes, in the summer/daylight hours but not in the winter/dark
3. No

Q36. What would you do if there was no CCTV at this car park, no lighting and the road surface was not tarmacked, would you continue to use the car park?

1. Yes
2. Yes, in the summer/daylight hours but not in winter/dark
3. No

Q37. **IF RESPONSE CODES 2 OR 3 SELECTED AT Q34 OR Q35 OR Q36 ASK, ELSE GO TO** ERROR! REFERENCE SOURCE NOT FOUND.**:** If you weren't parking in the car park, what would you do?

1. Use rail but park elsewhere
2. Use rail but use a different access mode
3. Use rail but from a different station
4. Use another mode of transport
5. Not travel
6. Other

Q38. What would you do if the train fare for your journey today was 10% higher?

1. Travel by train
2. Travel by another mode **GO TO Q40**
3. Not make the journey **GO TO Q40**
4. Don't know/unsure **GO TO Q40**

Q39. **ONLY AS IF Q38 = 1, ELSE GO TO Q40.** Finally, can I please ask you what would you do if the train fare for your journey today was 25% higher?

1. Travel by train
2. Travel by another mode
3. Not make the journey
4. Don't know/unsure

Section 6: Socio Economics

Q40. DO NOT ASK, RECORD GENDER

1. male
2. female

Q41. Which of the following age bands are you in? **READ OUT**

1. 16 – 29
2. 30 – 59
3. 60+
4. refused

THANK YOU FOR YOUR HELP IN THIS RESEARCH

This research was conducted under the terms of the MRS code of conduct and is completely confidential. If you would like to confirm my credentials or those of Accent please call the MRS free on 0500 396999. **HAND OVER THE THANK YOU SLIP.**

Please can I take a note of your name and where we can contact you for quality control purposes?

Respondent name: ....

Telephone: home:...work:...

Thank you
I confirm that this interview was conducted under the terms of the MRS code of conduct and is completely confidential

Interviewer's signature: ....
Time Interview completed:

2171: **Effects of P & R Parking on Demand for Public Transport**
Final Main Bus User Questionnaire

Interviewer no: ____ **Interviewer name:** ____

Date: __ / __ **Time interview started:** __ : __

Recruitment

INTERVIEWER PLEASE CODE:

Day of week:

Mon
Tue
Wed
Thurs
Fri
Sat
Sun

LOCATION: INTERVIEWER PLEASE SELECT BUS PARK & RIDE LOCATION

1. Ingliston
2. Bridge of Don, Aberdeen

INTRODUCTION

Good morning/afternoon/evening. My name is .... from Accent and I am carrying out research for Transport Scotland, the transport agency of the Scottish Government, into bus Park & Ride. Could you spare me 10 minutes now to answer a few questions to help with this research? Any answer you give will be treated in confidence in accordance with the Code of Conduct of the Market Research Society. You do not have to answer questions you do not wish to and you can terminate the interview at any point.

RQ1. Can I just confirm that you drove to this bus Park & Ride facility today and have parked in the bus Park & Ride car park?

1. yes
2. no **THANK & CLOSE**

Section 1: General Questions

Q1. Can you please tell me how far you have travelled today (in minutes) to reach this Bus Park and Ride site? **RECORD IN MINUTES; EG IF ONE AND A HALF HOURS RECORD 90**

Q2. Can you please tell me where you will be travelling to (or have travelled to) today by bus Park & Ride? **SHOW SHOWCARD A_EDINBURGH IF LOCATION = 1; SHOW SHOWCARD B_ABERDEEN IF LOCATION = 2 AND RECORD RELEVANT RESPONSE BELOW. SINGLE RESPONSE**

IF LOCATION= 1
Edinburgh City Centre
Edinburgh Park
Gyle
Haymarket
Leith
Rest of Edinburgh

IF LOCATION = 2
Aberdeen City Centre

Old Aberdeen
Aberdeen Outer
Aberdeen South
Rest of Aberdeen

Q3. Can you please tell me what the main purpose of your journey today is: **SINGLE RESPONSE**

1. Commuting
2. Employer's business (not including commuting)
3. Education
4. Holiday
5. Visiting friends/relatives
6. Health reasons (eg doctor, hospital etc)
7. Shopping
8. Other

Q4. Can you please tell me what type of ticket you will be travelling on today: **SINGLE RESPONSE**

IF LOCATION = 1
Single
Day ticket
RIDACARD
Carnet of 20 tickets

IF LOCATION = 2
Return
First Day
First Week
First 4 week
First 12 Week

Q5. Can you please tell me how frequent the Bus Park and Ride services are at this time of day, in terms of how many minutes between services? **INTERVIEWER PLEASE RECORD FREQUENCY; IE, IF 4 AN HOUR RECORD 15.**

Every ________mins

Q6. In your experience, what is the likelihood of you turning up and not being able to find a parking space in this Bus Park and Ride car park, ie how many times of out of ten is this likely to happen? **INTERVIEWER RECORD HOW MANY TIMES OUT OF 10 BELOW (DP: L=0, H=10)**

________ out of 10

If location = 2 go to section 3: Section 2: Bus Users at Improved Bus Park and Ride Sites

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Q7. Are you aware of the improvements to the car parking facilities that took place here in May 2008?

1. No **GO TO Q11**
2. Yes **GO TO Q8**

Q8. **ASK IF Q7 = YES, ELSE GO TO Q11:** If the improvements had not been made, would you have used this station to make your journey today?

1. Yes **GO TO Q9**
2. No **GO TO Q10**

Q9. **ASK IF Q8 = YES, ELSE GO TO Q10:** Would you have parked in the Bus Park and Ride car park or nearby, or accessed the Bus Park and Ride in a different way? **SINGLE REPONSE**

1. Parked in Park & Ride car park
2. Parked nearby
3. Walked to Park & Ride
4. Cycled to Park & Ride
5. Caught bus to Park & Ride
6. Caught taxi to Park & Ride
7. Got lift to Park & Ride
8. Other

Q10. **ASK IF Q8 = NO, ELSE GO TO Q11.** Please can you tell me how you would have made your journey today instead?

1. Car
2. Bus
3. Cycled
4. Rail
5. Taxi
6. Would not have made the journey
7. Other

Q11. **IF Q8 = NO GO TO SECTION 3** Did you make any bus trips from this Bus Park and Ride prior to the improvements to the car parking facilities in May 2008?

1. Yes
2. No

Section 3 – Stated Intentions Questions

Q12. What would you do if the cost of the return Bus Park and Ride service went up by **<INSERT RANDOM STARTING PRICE FROM TABLE BELOW>**?

20 pence
40 pence
60 pence
80 pence
100 pence
120 pence
140 pence
160 pence
180 pence
200 pence
220 pence
240 pence
260 pence
280 pence
300 pence

1. As now
2. Use bus but from a different Park and Ride site
3. Use another bus service
4. Use other mode
5. Not travel
6. Other

Q13. **IF Q12 GE 2 ASK, ELSE GO TO Q14:** What would you do if the cost of the return Bus Park and Ride service went up by **<REDUCE THE STARTING PRICE BY HALF (TO NEAREST 5P)>**?

CODES AS FOR Q12

Q14. **IF Q12 EQ 1 ASK, ELSE GO TO Q15:** What would you do if the cost of the return Bus Park and Ride service went up by **<DOUBLE THE STARTING PRICE (TO NEAREST 5P)**>?

CODES AS FOR Q12

Q15. **IF Q13 GE 2 ASK, ELSE GO TO Q16; GO TO Q16 IF NEXT REDUCTION WOULD MOVE COST TO WITHIN 10P OF STARTING PRICE:** What would you do if the cost of the return Bus Park and Ride service went up by **<REDUCE THE PRICE GIVEN AT Q13 BY HALF (TO NEAREST 5P)**>?

CODES AS FOR Q12

Q16. **IF Q13 EQ 1 ASK, ELSE GO TO Q17; GO TO Q27 IF NEXT INCREASE WOULD MOVE COST TO WITHIN 10P OF STARTING PRICE:** What would you do if the cost of the return Bus Park and Ride service went up by **<INCREASE THE PRICE GIVEN AT Q13 BY 50% (TO NEAREST 5P)**>?

CODES AS FOR Q12

Q17. **IF Q14 GE 2 ASK, ELSE GO TO Q18; GO TO Q27 IF NEXT REDUCTION WOULD MOVE COST TO WITHIN 10P OF STARTING PRICE:** What would you do if the cost of the return Bus Park and Ride service went up by **<REDUCE THE PRICE GIVEN AT Q14 BY 50% OF THE DIFFERENCE BETWEEN PRICE STATED AT Q12 AND PRICE STATED AT Q14 (TO NEAREST 5P)>**

CODES AS FOR Q12

Q18. **IF Q14 EQ 1 ASK, ELSE GO TO Q19; GO TO Q27 IF NEXT INCREASE WOULD MOVE COST TO WITHIN 10P OF STARTING PRICE:** What would you do if the cost of the return Bus Park and Ride service went up by **<DOUBLE THE PRICE GIVEN AT Q14 (TO NEAREST 5P)>**?

CODES AS FOR Q12

Q19. **IF Q15 GE 2 ASK, ELSE GO TO Q20; GO TO Q27 IF NEXT REDUCTION WOULD MOVE COST TO WITHIN 10P OF STARTING PRICE:** What would you do if the cost of the return Bus Park and Ride service went up by **<REDUCE THE PRICE GIVEN AT Q15 BY HALF (TO NEAREST 5P)>**?

1. As now
2. Use rail but park elsewhere
3. Use rail but use a different access mode
4. Use rail but from a different station
5. Use another mode of transport
6. Not travel

Q20. **IF Q15 EQ 1 ASK, ELSE GO TO Q27; GO TO Q27 IF NEXT INCREASE WOULD MOVE COST TO WITHIN 10P OF STARTING PRICE:** What would you do if the cost of the return Bus Park and Ride service went up by **<INCREASE THE PRICE GIVEN AT Q15 BY 50% OF THE DIFFERENCE BETWEEN PRICE STATED AT Q13 AND PRICE STATED AT Q15 (TO NEAREST 5P)>**?

CODES AS FOR Q12

Q21. **IF Q16 GE 2 ASK, ELSE GO TO Q22; GO TO Q27 IF NEXT REDUCTION WOULD MOVE COST TO WITHIN 10P OF STARTING PRICE:** What would you do if the cost of the return Bus Park and Ride service went up by **<REDUCE THE PRICE GIVEN AT Q16 BY 50% OF THE DIFFERENCE BETWEEN PRICE STATED AT Q13 AND PRICE STATED AT Q16 (TO NEAREST 5P)>**

CODES AS FOR Q12

Q22. **IF Q16 EQ 1 ASK, ELSE GO TO Q27; GO TO Q27 IF NEXT INCREASE WOULD MOVE COST TO WITHIN 10P OF STARTING PRICE:** What would you do if the cost of the return Bus Park and Ride service went up by **<INCREASE THE PRICE GIVEN AT Q16 BY 50% OF THE DIFFERENCE BETWEEN PRICE STATED AT Q13 AND PRICE STATED AT Q16 (TO NEAREST 5P)>**?

CODES AS FOR Q12

Q23. **IF Q17 GE 2 ASK, ELSE GO TO Q24; GO TO Q27 IF NEXT REDUCTION WOULD MOVE COST TO WITHIN 10P OF STARTING PRICE:** What would you do if the cost of the return Bus Park and Ride service went up by **<REDUCE THE PRICE GIVEN AT Q17 BY 50% OF THE DIFFERENCE BETWEEN PRICE STATED AT Q14 AND PRICE STATED AT Q17 (TO NEAREST 5P)>**

Q24. **IF Q17 EQ 1 ASK, ELSE GO TO Q27; GO TO Q27 IF NEXT INCREASE WOULD MOVE COST TO WITHIN 10P OF STARTING PRICE:** What would you do if the cost of the return Bus Park and Ride service went up by **<INCREASE THE PRICE GIVEN AT Q17 BY 50% OF THE DIFFERENCE BETWEEN PRICE STATED AT Q14 AND PRICE STATED AT Q17 (TO NEAREST 5P)>**?

CODES AS FOR Q12

Q25. **IF Q18 GE 2 ASK, ELSE GO TO Q26; GO TO Q27 IF NEXT REDUCTION WOULD MOVE COST TO WITHIN 10P OF STARTING PRICE:** What would you do if the cost of the return Bus Park and Ride service went up by **<REDUCE THE PRICE GIVEN AT Q18 BY 50% OF THE DIFFERENCE BETWEEN PRICE STATED AT Q14 AND PRICE STATED AT Q18 (TO NEAREST 5P)>**

Q26. **IF Q18 EQ 1 ASK, ELSE GO TO Q27; GO TO Q27 IF NEXT INCREASE WOULD MOVE COST TO WITHIN 10P OF STARTING PRICE:** What would you do if the cost of the return Bus Park and Ride service went up by **<DOUBLE THE PRICE GIVEN AT Q18 (TO NEAREST 5P)>**?

CODES AS FOR Q12

Q27. What is the maximum increase in the daily return Park and Ride bus fare that you would accept?

£_____ Pence ________

Q28. What would you do if the chance of not finding a parking space increased from <**INSERT RESPONSE TO Q6 CONVERTED TO % (IE 0 = 0%, 1 = 10%, 2 = 20% ETC)**> to < **INSERT RESPONSE TO Q6 CONVERTED TO % PLUS 20%**>?

1. As now
2. Use Park & Ride service but park elsewhere
3. Use Park & Ride service but use a different access mode
4. Use Park & Ride but from a different station
5. Use bus but not Park & Ride
6. Use other mode
7. Other

Q29. **IF Q28 GE2 ASK, ELSE GO TO Q30:** What would you do if the chance of not finding a parking space increased from <**INSERT RESPONSE TO Q6 CONVERTED TO %>** to **<INSERT FIGURE GIVEN AT Q28 MINUS 10%**>?

CODES AS FOR Q28

Q30. **IF Q28 = 1 AND Q6 LE 7 ASK, ELSE GO TO GO TO Q35:** What would you do if the chance of not finding a parking space increased from <**INSERT RESPONSE TO Q6 CONVERTED TO %>** to <**INSERT FIGURE GIVEN AT Q28 PLUS 20%, CAP AT 100%; AFTER 100% REACHED GO TO Q35**>?

1. As now
2. Use rail but park elsewhere
3. Use rail but use a different access mode
4. Use rail but from a different station
5. Use another mode of transport
6. Not travel

Q31. **IF Q30 GE2 ASK, ELSE GO TO Q32:** What would you do if the chance of not finding a parking space increased from <**INSERT RESPONSE TO Q6 CONVERTED TO %>** to **<INSERT FIGURE GIVEN AT Q30 MINUS 10%**>?

CODES AS FOR Q28

Q32. **IF Q30 = 1 ASK, ELSE GO TO Q35:** What would you do if the chance of not finding a parking space increased from <**INSERT RESPONSE TO Q6 CONVERTED TO %>** to <**INSERT FIGURE GIVEN AT Q30 PLUS 20%, CAP AT 100%; AFTER 100% REACHED GO TO Q35**>?

1. As now
2. Use rail but park elsewhere
3. Use rail but use a different access mode
4. Use rail but from a different station
5. Use another mode of transport
6. Not travel

Q33. **IF Q32 GE2 ASK, ELSE GO TO Q34:** What would you do if the chance of not finding a parking space increased from <**INSERT RESPONSE TO Q6 CONVERTED TO %>** to **<INSERT FIGURE GIVEN AT Q32 MINUS 10%**>?

CODES AS FOR Q28

Q34. **IF Q32 = 1 ASK, ELSE GO TO Q35:** What would you do if the chance of not finding a parking space increased from <**INSERT RESPONSE TO Q6 CONVERTED TO %>** to <**INSERT FIGURE GIVEN AT Q32 PLUS 20%, CAP AT 100%; AFTER 100% REACHED GO TO Q35**>?

1. As now
2. Use rail but park elsewhere
3. Use rail but use a different access mode
4. Use rail but from a different station
5. Use another mode of transport
6. Not travel

Q35. What would you do if the frequency of the Bus Park and Ride service reduced from a bus every **<INSERT RESPONSE 0 ROUNDED TO THE NEAREST 5 MINUTES>** minutes to every **<RESPONSE TO 0 PLUS 10 MINS>**?

1. As now
2. Use bus but from a different Park & Ride station
3. Use another bus service
4. Use other mode
5. Not travel
6. Other

Q36. **IF Q35 GE2 ASK, ELSE GO TO Q37:** What would you do if the frequency of the Bus Park and Ride service was reduced from a bus every **<INSERT RESPONSE 0 ROUNDED TO THE NEAREST 5 MINUTES>** minutes to a bus every **<INSERT FIGURE GIVEN AT Q35 MINUS 5 MINUTES**>?

CODES AS FOR Q35

Q37. **IF Q35 = 1 ASK, ELSE GO TO GO TO Q42:** What would you do if the frequency of the Bus Park and Ride service reduced from a bus every **<INSERT RESPONSE 0 ROUNDED TO THE NEAREST 5 MINUTES>** minutes to a bus every <**INSERT FIGURE GIVEN AT Q35 PLUS 10 MINUTES**>?

CODES AS FOR Q35

Q38. **IF Q37 GE2 ASK, ELSE GO TO Q39:** What would you do if the frequency of the Bus Park and Ride service was reduced from a bus every **<INSERT RESPONSE 0 ROUNDED TO THE NEAREST 5 MINUTES>** minutes to a bus every **<INSERT FIGURE GIVEN AT Q37 MINUS 5 MINUTES**>?

CODES AS FOR Q35

Q39. **IF Q37 = 1 ASK, ELSE GO TO Q42:** What would you do if the frequency of the Bus Park and Ride service reduced from a bus every **<INSERT RESPONSE 0 ROUNDED TO THE NEAREST 5 MINUTES>** minutes to a bus every <**INSERT FIGURE GIVEN AT Q37 PLUS 10 MINUTES**>?

CODES AS FOR Q35

Q40. **IF Q39 GE2 ASK, ELSE GO TO Q41:** What would you do if the frequency of the Bus Park and Ride service was reduced from a bus every **<INSERT RESPONSE 0 ROUNDED TO THE NEAREST 5 MINUTES>** minutes to a bus every to **<INSERT FIGURE GIVEN AT Q39 MINUS 5 MINUTES**>?

CODES AS FOR Q35

Q41. **IF Q39 = 1 ASK, ELSE GO TO Q42:** What would you do if the frequency of the Bus Park and Ride service reduced from a bus every **<INSERT RESPONSE 0 ROUNDED TO THE NEAREST 5 MINUTES>** minutes to a bus every <**INSERT FIGURE GIVEN AT Q39 PLUS 10 MINUTES**>?

CODES AS FOR Q35

Q42. If there was no CCTV at this car park would you continue to use it?

1. Yes
2. Yes, in the summer/daylight hours but not in the winter/dark
3. No

Q43. If there was no lighting at this car park would you continue to use it?

1. Yes
2. Yes, in the summer/daylight hours but not in the winter/dark
3. No

Q44. If there was no CCTV at this car park, no lighting and the road surface was not tarmacked, would you continue to use the car park?

1. Yes
2. Yes, in the summer/daylight hours but not in the winter/dark
3. No

Q45. **IF RESPONSE CODES 2 OR 3 SELECTED AT Q42 OR Q43 OR Q44 ASK, ELSE GO TO Q46:** If you weren't parking in the car park, what would you do?

1. Use Park & Ride service but park elsewhere
2. Use Park & Ride service but use a different access mode
3. Use Park & Ride but from a different station
4. Use bus but not Park & Ride
5. Use other mode
6. Other

Section 6: Socio Economics

Q46. DO NOT ASK, RECORD GENDER

1. male
2. female

Q47. Which of the following age bands are you in? **READ OUT**

1. 16 – 29
2. 30 – 59
3. 60+
4. refused

THANK YOU FOR YOUR HELP IN THIS RESEARCH

This research was conducted under the terms of the MRS code of conduct and is completely confidential. If you would like to confirm my credentials or those of Accent please call the MRS free on 0500 396999. **HAND OVER THE THANK YOU SLIP.**

Please can I take a note of your name and where we can contact you for quality control purposes?
Respondent name: ....
Telephone: home:.. work:..

Thank you
I confirm that this interview was conducted under the terms of the MRS code of conduct and is completely confidential

Interviewer's signature: ....
Time Interview completed:

2171: **Effects of P & R Parking on Demand for Public Transport**
Final Non Bus User Mainstage Questionnaire

Interviewer no: | | | | | **Interviewer name:**

Date: | | / | | **Time interview started:** | | : | |

Recruitment

INTERVIEWER PLEASE CODE:

Day of week:

Mon
Tue
Wed
Thurs
Fri
Sat
Sun

LOCATION: INTERVIEWER PLEASE SELECT AREA YOU ARE WORKING IN

1. Lasswade, Bonnyrigg or Penicuik
2, Currie or Balerno
3. Kintore or Inverurie
4. Portlethen or Newton Hill

INTRODUCTION

Good morning/afternoon/evening. My name is .... from Accent and I am carrying out research for Transport Scotland, the transport agency of the Scottish Government, into bus Park & Ride schemes. Could you spare me a couple of minutes to see if you are in scope for the survey?

1. yes **GO TO RQ1**
2. no **REASSURE & PERSUADE, ELSE THANK & CLOSE**

RQ1. Can I just confirm that you have driven into [**INSERT "**Edinburgh**" IF LOCATION LE 2 OR "**Aberdeen**" IF LOCATION GE 3**] in the last 6 months by car?

1. yes **GO TO RQ2**
2. no **THANK & CLOSE**

RQ2. And have you made the journey into [**INSERT "**Edinburgh**" IF LOCATION LE 2 OR "**Aberdeen**" IF LOCATION GE 3]** using the [**INSERT** "Ingliston" **IF LOCATION LE 2 OR "**Bridge of Don**" IF LOCATION GE 3]** Park & Ride in the past 12 months?

1. yes **THANK & CLOSE**
2. no **GO TO RQ3**

RQ3. If travelling into [**INSERT "**Edinburgh" **IF LOCATION LE 2 OR** "Aberdeen" **IF LOCATION GE 3]** would you ever consider using bus Park & Ride in the future if there was a new Park & Ride site here near [insert "the A702 **SHOW ON SHOWCARD C**" **IF LOCATION = 1;** insert "the A70 **SHOW ON SHOWCARD C**" **IF LOCATION = 2;** insert "the A96 **SHOW ON SHOWCARD D" IF LOCATION = 3; INSERT "**the A90 **SHOW ON SHOWCARD D" IF LOCATION = 4]** for any of the trips that you currently make into [**INSERT "**Edinburgh**" IF LOCATION LE2 OR** "Aberdeen**" IF LOCATION GE3]** by car?

1. yes **GO TO INTRODUCTION**
2. no **THANK & CLOSE**

Introduction

Thank you, you are in scope for the study. Could you spare a further 8-10 minutes to answer a few questions to help with this research? Any answer you give will be treated in confidence in accordance with the Code of Conduct of the Market Research Society. You do not have to answer questions you do not wish to and you can terminate the interview at any point.

1. yes **GO TO Q1**
2. no **REASSURE & PERSUADE, ELSE THANK & CLOSE**

Section 1: General Questions

Q1. Thank you. I'd like you to think about the most recent journey that you have made into [**INSERT** "Edinburgh" **IF LOCATION LE 2 OR** "Aberdeen" **IF LOCATION GE 3]** by car and please tell me what the main purpose of the journey was: **SINGLE RESPONSE**

1. Commuting
2. Employer's business (not including commuting)
3. Education
4. Holiday
5. Visiting friends/relatives
6. Health reasons (eg doctor, hospital etc)
7. Shopping
8. Other

Q2. How long did it take you to drive into [**INSERT** "Edinburgh" **IF LOCATION LE 2 OR** "Aberdeen" **IF LOCATION GE 3]** on that occasion? **RECORD IN MINUTES; EG IF ONE AND A HALF HOURS RECORD 90**

Q3. And how much did you have to pay for parking in [**INSERT** "Edinburgh" **IF LOCATION LE 2 OR** "Aberdeen" **IF LOCATION GE 3]**?

£______:______

Section 2 – Stated Intentions Questions

INTRODUCTION

I would now like you to imagine that a new bus based park and ride services was built near [insert "the A702 **SHOW ON SHOWCARD C**" **IF LOCATION = 1;** insert "the A70 **SHOW ON SHOWCARD C**" **IF LOCATION = 2;** insert "the A96 **SHOW ON SHOWCARD D" IF LOCATION = 3; INSERT** "the A90 **SHOW ON SHOWCARD D" IF LOCATION = 4]** and you had to make the same journey as the one you have just answered questions about into [**INSERT** "Edinburgh" **IF LOCATION LE 2 OR** "Aberdeen" **IF LOCATION GE 3]**. You would now be faced with a choice between making that same journey totally by car or by a combination of car and a park and ride bus service.

Assuming that you have this choice, I will now ask you to look at 8 scenarios which offer different park and ride bus services as characterised by:

- Bus fare
- Frequency of bus services
- Chances of finding a parking spot
- And the quality of the car park.

For each of the scenarios please assume that there is no charge for car parking at the bus park and ride site and that the journey time by bus from the park and ride site to the city centre is [insert "15" **IF LOCATION = 1;** insert "20" **IF LOCATION = 2;** insert "20" **IF LOCATION = 3; INSERT** "15" **IF LOCATION = 4**] minutes. In addition please assume that the car journey time to the city and the parking cost for your car in the city is as you remember it for your most recent journey.

Q4. Here is the 1st scenario and the characteristics of the bus based park and ride scheme. Can you please tell me, when faced with a choice of making the same journey to [**INSERT** "Edinburgh" **IF LOCATION LE 2 OR** "Aberdeen" **IF LOCATION GE 3]** as previously described for this scenario, whether you would make it by car or by bus based park and ride? You will also have to consider how long it would take you to drive to the new location near [insert "the A702 **SHOW ON SHOWCARD C**" **IF LOCATION = 1;** insert "the A70 **SHOW ON SHOWCARD C**" **IF LOCATION = 2;** insert "the A96 **SHOW ON SHOWCARD D" IF LOCATION = 3; INSERT** "the A90 **SHOW ON SHOWCARD D" IF LOCATION = 4]**, so before you make your choice of how to make the journey, can you please tell me how long you think it will take you to drive from your home to this location. **RECORD IN MINUTES; EG IF ONE AND A HALF HOURS RECORD 90.**

__________Minutes

Q5. Now looking at the first scenario, when faced with a choice of making the same journey to [**INSERT** "Edinburgh" **IF LOCATION LE 2 OR** "Aberdeen" **IF LOCATION GE 3]** as previously described for this scenario, would you would make the journey by car or by bus based park and ride?

Bus Park and Ride Characteristics	
Return Bus Fare	£3.00 if LOCATION LE 2 and £2.20 if LOCATION GE 3
Bus service frequency	"every 6 minutes" if LOCATION LE 2 AND Q1 = 1 (ie commuting) "every 8 minutes" if LOCATION LE 2 AND Q1 GE2 "every 10 minutes" if LOCATION GE 3 AND Q1 = 1 (ie commuting) "every 15 minutes" if LOCATION GE 3 AND Q1 GE2
Chances of not finding a parking space	0%
Quality of car park: CCTV installed, good lighting & tarmaced surface	Yes

1. Car
2. Bus based Park & Ride

Q6. And in this second scenario, when faced with a choice of making the same journey to [**INSERT** "Edinburgh" **IF LOCATION LE 2 OR** "Aberdeen" **IF LOCATION GE 3]** as previously described for this scenario, would you would make the journey by car or by bus based park and ride? (**DP: PLEASE POPULATE SCENARIO 2 WITH A RANDOM CHOICE FROM CARDS 1-25 IN NEW FILE** edinburghbusnonusers10910.xls **IF LOCATION LE2 OR** AberdeenSIcard.xls **IF LOCATION GE 3**).

Bus Park and Ride Characteristics	
Return Bus Fare	£_.__ <insert from column A edinburghbusnonusers10910.xls or AberdeenSIcard.xls, as applicable, converted to £s>
Bus service frequency	Every __ minutes < insert from column B edinburghbusnonusers10910.xls or AberdeenSIcard.xls, as applicable >
Chances of not finding a parking space	--% < insert from column D edinburghbusnonusers10910.xls or AberdeenSIcard.xls, as applicable; for "0" insert "0, ie spaces always available">
Quality of car park: CCTV installed, good lighting & tarmaced surface	< insert either yes or no from column C edinburghbusnonusers10910.xls or AberdeenSIcard.xls, as applicable>

1. Car
2. Bus based Park & Ride

Q7. And what would you do in the following scenarios?

Scenario 3

(DP, PLEASE INSERT 7 MORE SCENARIOS RANDOMLY SELECTED FROM CARDS 1-25 IN EITHER EDINBURGHBUSNONUSERS10910.XLS IF LOCATION LE 2 OR ABERDEENSICARD.XLS IF LOCATION GE 3 USING THE ABOVE TABULAR FORMAT)

Q8. Scenario 4

Q9. Scenario 5

Q10. Scenario 6

Q11. Scenario 7

Q12. Scenario 8

Q13. Scenario 9

Section 6: Socio Economics

Q14. DO NOT ASK, RECORD GENDER

1. male
2. female

Q15. Thank you, I just have one final question. Can you please tell me which of the following age bands you are in? **READ OUT**

1. 16 – 29
2. 30 – 59
3. 60+
4. refused

THANK YOU FOR YOUR HELP IN THIS RESEARCH

This research was conducted under the terms of the MRS code of conduct and is completely confidential. If you would like to confirm my credentials or those of Accent please call the MRS free on 0500 396999. **HAND OVER THE THANK YOU SLIP.**

Please can I take a note of your name and where we can contact you for quality control purposes?

Respondent name: ....

Telephone: home:.. work:..

Thank you

I confirm that this interview was conducted under the terms of the MRS code of conduct and is completely confidential

Interviewer's signature: ....

Time Interview completed: | | | : | |

2171: Effects of P & R Parking on Demand for Public Transport
Final Main Inverkeithing/Ferrytoll SP Questionnaire

Interviewer no: | | | | | **Interviewer name:**

Date: | | | / | | | **Time interview started:** | | | : | | |

Recruitment

RQ1 INTERVIEWER: RECORD WHETHER STANDING IN THE INVERKEITHING OR FERRYTOLL CAR PARK

1. Inverkeithing
2. Ferrytoll

INTRODUCTION

Good morning/afternoon/evening. My name is .... from Accent and I am carrying out research for Transport Scotland, the transport agency of the Scottish Government, into bus and rail station parking. Could you spare me 10 minutes now to answer a few questions to help with this research? Any answer you give will be treated in confidence in accordance with the Code of Conduct of the Market Research Society. You do not have to answer questions you do not wish to and you can terminate the interview at any point.

RQ2. Can I just confirm that you drove here today and have parked in this car park?

1. yes
2. no **THANK & CLOSE**

Section 1: General Questions

Q1. Can you please tell me where you will be travelling to (or **have** travelled to) today by [**INSERT** "train" **IF RQ1= 1 AND** "bus Park & Ride" **IF RQ1=2**]? **SHOW SHOWCARD A_EDINBURGH AND RECORD RELEVANT ZONE BELOW. SINGLE RESPONSE**

Edinburgh City Centre
Edinburgh Park
Gyle
Haymarket
Leith
Rest of Edinburgh

Q2. Can you please tell me what the main purpose of your journey is today: **SINGLE RESPONSE**

1. Commuting
2. Employer's business (not including commuting)
3. Education
4. Holiday
5. Visiting friends/relatives
6. Health reasons (eg doctor, hospital etc)
7. Shopping
8. Other

Q3. How long does it take you to get to the [**INSERT RESPONSE TO RQ1**] car park from where you live? **RECORD IN MINUTES; EG IF ONE AND A HALF HOURS RECORD 90**

Q4. How long does it take to get to your final destination from where you exit the [**INSERT** "train" **IF RQ1=1 AND** "park and ride bus" **IF RQ1=2**] in Edinburgh? **RECORD IN MINUTES; EG IF ONE AND A HALF HOURS RECORD 90**

Q5. There is a [**INSERT** "bus park and ride facility at Ferrytoll" **IF RQ1=1 AND** "train park and ride facility at Inverkeithing" **IF RQ1=2**]. If you were to use that [**INSERT** "bus" **IF RQ1=1 AND** "train" **IF RQ1=2**] park and ride, how long would it take you to get there from where you live? **RECORD IN MINUTES; EG IF ONE AND A HALF HOURS RECORD 90. IF DON'T KNOW PROBE FOR ESTIMATE**

Q6. And how long would it take to get to your final destination from where you would exit the [**INSERT** "park and ride bus" **IF RQ1=1 AND** "train" **IF RQ1=2**] in Edinburgh? **IF DON'T KNOW PROBE FOR ESTIMATE**

SP Intro

Now we would like you to consider some situations where you have the choice of train park and ride from Inverkeithing and bus park and ride from Ferrytoll for the journey you have just told me about. In each case, the time spent getting to and from the park and ride is as you have just reported to me. Please assume that there would never be a problem getting a parking space and that parking is free at both the train park & ride car park and the bus park & ride car park…

Q7. So, if you had the choice between the following two options, what would you do?

DP: RANDOMLY SELECT 8 CHOICES FROM 2171_SP_CHOICES.XLS; COLUMNS A, C & E FOR TRAIN AND B, D & F FOR BUS.

OR

Bus Park & Ride from Ferrytoll	
Bus frequency	Every 2 minutes
Bus journey time	50 minutes
Bus return cost	£5.00

1. Take the train   2. Take the bus   3. Neither

Q8. 2nd selection
Q9. 3rd selection
Q10. 4th selection
Q11. 5th selection
Q12. 6th selection
Q13. 7th selection
Q14. 8th selection

Q15. **IF THEY SAY NEITHER AT ANY OF Q7 TO Q14 ASK, ELSE GO TO Q16:** For one or more of the choices you said that you would take neither the train nor the bus. In those instances, would you have taken your car or not made the journey at all?

1. taken car
2. used another mode of transport
3. not made the journey
4. don't know/unsure

Section 6: Socio Economics

Q16. DO NOT ASK, RECORD GENDER

1. male
2. female

Q17. Which of the following age bands are you in? **READ OUT**

1. 16 – 29
2. 30 – 59
3. 60+
4. refused

THANK YOU FOR YOUR HELP IN THIS RESEARCH

This research was conducted under the terms of the MRS code of conduct and is completely confidential. If you would like to confirm my credentials or those of Accent please call the MRS free on 0500 396999. **HAND OVER THE THANK YOU SLIP.**

Please can I take a note of your name and where we can contact you for quality control

purposes? Respondent name:

.... Telephone:

home:... work:... **Thank you**

I confirm that this interview was conducted under the terms of the MRS code of conduct and is completely confidential

Interviewer's signature: ....

Time Interview completed: | | | : | | |

Further copies of this document are available, on request, in audio and large print formats and in community languages (Urdu; Bengali; Gaelic; Hindi; Punjabi; Cantonese; Arabic; Polish).

اس دستاویز کی مزید کاپیاں آڈیو کیسیٹ پر اور بڑے حروف کی چھپائی میں اور کمیونٹی کی
زبانوں میں طلب کیے جانے پر دستیاب ہیں، برائے مہربانی اس پتہ پر رابطہ کریں:

এই ডকুমেন্ট-এর (দলিল) অতিরিক্ত কপি, অডিও এবং বড়ো ছাপার অক্ষর আকারে এবং
সম্প্রদায়গুলোর ভাষায় অনুরোধের মাধ্যমে পাওয়া যাবে, অনুগ্রহ করে যোগাযোগ করুন:

Gheibhear lethbhreacan a bharrachd ann an cruth ris an èistear, ann an clò mòr agus ann an cànain coimhearsnachd. Cuir fios gu:

इस दस्तावेज़/कागज़ात की और प्रतियाँ, माँगे जाने पर, ऑडियो टैप पर और बड़े अक्षरों में तथा कम्यूनिटी भाषाओं में मिल सकती हैं, कृपया संपर्क करें:

ਇਸ ਦਸਤਾਵੇਜ਼/ਕਾਗ਼ਜ਼ਾਤ ਦੀਆਂ ਹੋਰ ਕਾਪੀਆਂ, ਮੰਗੇ ਜਾਣ ’ਤੇ, ਔਡਿਓ ਟੇਪ ਉੱਪਰ ਅਤੇ ਵੱਡੇ ਅੱਖਰਾਂ ਵਿਚ ਅਤੇ ਕੰਮਿਊਨਿਟੀ ਭਾਸ਼ਾਵਾਂ ਦੇ ਵਿਚ ਮਿਲ ਸਕਦੀਆਂ ਹਨ, ਕ੍ਰਿਪਾ ਕਰਕੇ ਸੰਪਰਕ ਕਰੋ:

此文件有更多備份，如果需要，語音版本和大字體版本及少數種族語言版本也可提供，請聯絡：

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ونسخ بلغات أخرى، يرجى الإتصال على:

Aby otrzymać niniejszy dokument w innej wersji językowej, na kasecie lub w wersji z powiększonym drukiem, prosimy o kontakt:

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