Transport Focus Bus Passenger Survey

Methodological overview – Autumn 2018 wave

August 2019

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1 Background

Transport Focus first established the Bus Passenger Survey (BPS) in April 2009 to generate a robust and comprehensive measure of bus passengers' journey experiences within our remit area (England outside of London). The survey is an objective measure of bus passengers' experience on individual journeys and it covers: the bus stop environment, punctuality, 'on bus' comfort, and the standards of the bus driver, together with overall journey satisfaction and value for money ratings.

The Bus Passenger Survey has a well-established methodology, achieved over many waves of this survey. However, following an independent review in late 2014 and further development work through 2015, the Autumn 2015 survey in particular saw some enhancements; these have been carried forward ever since and are detailed in this document. Most notably, the 2015 Autumn wave saw the introduction of a mixed data collection method, in which passengers are given the option to complete the survey either on a paper form or online; this was a change from a paper-only survey previous to that. Then in Autumn 2018, a change was also made to the day-part bands used in sampling and weighting. Both of these more significant changes are described and discussed in their own sections later. Other smaller enhancements which have been made over time are also noted where relevant throughout.

Transport Focus allows local transport authorities and/or bus service operators ("operators") to 'buy into' the survey to achieve boosted response numbers in their territories of interest.

BVA BDRC[1] was appointed by Transport Focus to provide the market research agency services needed to carry out the Autumn 2018 wave of the survey. BVA BDRC conducts research in accordance with the Market Research Society (MRS) Code of Conduct; it is also accredited with the ISO 20252 Quality Assurance and ISO 27001 IT and Data Security Standards. BVA BDRC is also an MRS Company Partner Scheme member.

This document describes the methodology in general and specifics as they relate to the Autumn 2018 BPS wave. If there are any further questions about the methodology deployed in the survey, please call Robert Pain on 0300 123 0835.

[1] *BDRC Continental at time of commissioning; merged to become BVA BDRC from summer 2018.*

2 Survey Overview

The BPS is designed to provide results that are statistically representative of bus passenger journeys made within a Primary Sampling Unit (PSU); a passenger journey is defined as an individual trip made on a local bus service. PSUs are typically local transport authority areas or the divisions of a bus operator. The survey is a measure of individual journey experience. It is designed to provide results that have utility at the PSU level, and in certain circumstances at remit wide level.

The sampling process generates a list of bus routes representative of journeys made in each PSU to be surveyed. Fieldworkers board buses on a representative sample of bus routes; they discuss the survey briefly with individual passengers on these buses and invite them to take part in the survey. Those wishing to take part fill in a self-completion questionnaire after their journey (details of the questionnaire and data collection method are given in sections 4 and 5). The survey is restricted to passengers aged 16 and over. Weighting is applied to correct for differential response rates by age, gender and the day and time of day when travelling. Weighting is also applied to proportionate the individual PSU relative to all the others included in the survey.

2.1 The Primary Sampling Units surveyed in Autumn 2018

PTE Authorities	Unitary authorities	Two tier authorities	Operators not aligned to any authority areas	Scottish PSUs ††	Other special territory areas
Greater Manchester	Bournemouth & Poole	Derbyshire	Blackpool Transport	HiTrans	East Sussex: boost on Hastings & Bexhill routes
Mersey (+ Halton)	Cheshire West & Chester	East Sussex	First South Coast^	Nestrans - Aberdeen City	Kent: boost on non-major operators
South Yorkshire	Cornwall	Essex	GA^^ – Bluestar	Nestrans – Aberdeenshire	Milton Keynes: boost on non-major operators
Tyne and Wear	Durham	Kent	GA - Brighton & Hove	SEStran	Nottingham-shire: boost on non-major operators
West Midlands	Leicester City	Lincolnshire	GA – Carousel	SPT	
West Yorkshire	Milton Keynes	Nottingham-shire	GA – East Yorkshire Motor Services	SWestrans	
	Northumber-land	Oxfordshire	GA – Konectbus	Tactran	
	Swindon	Staffordshire	GA – Metrobus	First Buses Glasgow^	
	Tees Valley Partnership*	Worcestershire	GA - Oxford P&R	First Buses Scotland East^	
	WECA & N.Somerset**		GA - Plymouth Citybus	Lothian Buses	
	York		GA – Salisbury Reds		
			GA - Southern Vectis		
			Warrington's Own Buses		

			Nottingham City Transport (city routes boost)†		
			Reading Buses		
			Stagecoach Cumbria & North Lancashire***		
			Stagecoach East***		
			Stagecoach East (Cambridge Busway)***		
			Stagecoach in Gloucester-shire***		
			Stagecoach Midlands***		
			Stagecoach South***		
			Stagecoach South West***		
			Stagecoach in West of England***		
			Transdev Blazefield – The Blackburn Bus Company		

*Tees Valley Partnership is comprised of Redcar & Cleveland, Middlesbrough, Stockton on Tees, Hartlepool, and Darlington local authority areas

**WECA (West of England Combined Authority) is comprised of: Bath and North East Somerset, Bristol City Council, and South Gloucestershire local authority areas. For the BPS, WECA also partners with North Somerset as a co-funder

***Stagecoach samples were comprised of the operator's routes running in the following local authority areas

- Stagecoach Cumbria & North Lancashire: Cumbria, North Lancashire.
- Stagecoach East: Bedford, Cambridge, Peterborough
- Stagecoach East (Cambridge Busway): Cambridgeshire, specifically services A, B and R

- Stagecoach in Gloucestershire: Cheltenham, Gloucester, Stroud
- Stagecoach Midlands: Northamptonshire, Warwickshire
- Stagecoach South: Hampshire, West Sussex
- Stagecoach South West: Devon, Somerset
- Stagecoach in West of England: Stagecoach routes within the WECA & North Somerset areas; these were not expected to be picked up with a sufficient sample size for reporting at operator level from within the main WECA & North Somerset sample, since Stagecoach is a relatively new entrant in this area at the time of the Autumn 2018 BPS

^First samples were comprised of the operator's routes running in the following local authority areas:

- First South Coast: First Portsmouth, Fareham & Gosport branded services running in Hampshire, Portsmouth, Southampton
- First Glasgow: First Greater Glasgow branded services running in East Dunbartonshire, East Renfrewshire, Glasgow, North Lanarkshire, Renfrewshire, West Dunbartonshire
- First Scotland East: First South East and Central Scotland branded services running in Clackmannanshire, East Lothian, Edinburgh, Falkirk, Midlothian, Scottish Borders, Stirling, West Lothian

^^Go-Ahead has been abbreviated to "GA"

^^^GA-EYMS was specifically sampled as EYMS within the Hull City local authority area (so although operator samples usually cover the whole of each route selected, in this case only the part of each bus route that ran within the City local authority were covered. See more on this in the paragraph on "Travelling on buses in practice " in section 4.1).

† NCT specifically sampled as NCT within the Nottingham City authority area (similar to GA-EYMS above)

††Scottish authority areas have been abbreviated as follows:

- HITRANS – Highlands and Islands Transport Partnership. NB. HITRANS covers the Highlands and Islands including Shetland; however the BPS in Autumn 2018 did not cover any of the Islands, and was for mainland services only – this was the same as in 2016 when this area was previously surveyed.
- Nestrans – North East of Scotland Transport Partnership (for Aberdeen City and Aberdeenshire)
- SPT – Strathclyde Partnership for Transport
- SEStran – South East of Scotland Transport Partnership
- SPT – Strathclyde Partnership for Transport
- SWestrans – South West of Scotland Transport Partnership
- Tactran – Tayside and Central Scotland Transport Partnership

3 Sampling

The sampling process was designed to ensure representative results were achieved for each Primary Sampling Unit (PSU) surveyed.

Sometimes in some PSUs, sample design also accommodated requests to boost specific routes or operators, so that substantive response numbers could be achieved for these groups. Where this occurred, they were suitably weighted back when producing the final PSU results.

In Autumn 2018, the following were sampled as sub-PSUs within their respective areas:

- Services run by non-major operators within Kent
- Services run by non-major operators within Nottinghamshire
- Services run by non-major operators within Milton Keynes
- Routes in Hastings and Bexhill within East Sussex.

3.1 Sample design

3.1.1 Sample universe

A sample was designed for each PSU. The sample universe was sourced from ITO World Ltd (which collects and makes available the bus journey data shown by Traveline, for example). To ensure the research encompassed the totality of routes, the starting point was to use the information from ITO World Ltd to make a list of every bus service and every timetabled occurrence of each service that runs within each PSU. Bus journeys that started outside 06.00 to 21.59 were excluded, as these were outside the fieldwork hours.

This data source had some additional key fields, including: the local transport authority through which the route runs, whether or not it crossed a local transport authority boundary, the journey length in minutes, the start/finish bus stops. To date no superior sample source has been identified, although two minor points are acknowledged following its use in previous waves (neither of which are due to inaccuracies in the sample source nor the way it is compiled):

- In very isolated cases, some routes have been found to have been omitted. This has not affected a noticeable proportion of journeys and has only occurred occasionally in the databases for one or two local authority areas. It has been the result of data being provided to ITO World at a slightly different time for some regions or local authorities

- A small proportion of journeys sampled in advance of the fieldwork have been withdrawn or changed (i.e. timetable changes) by the time of fieldwork itself. The effect

of this has been relatively minor and has usually been due to local changes made in the short period between sampling and fieldwork.

Steps have been taken to mitigate the effect of these: For the Autumn 2017 survey, local authorities and some operators were asked to inform the agency about any routes which were likely to change significantly (e.g. be withdrawn or see major timetable changes) between late summer when the sample was drawn and the fieldwork, or during the fieldwork. For the Autumn 2018 survey, this was taken further and (following the sampling process and review stage described below) all operator co-funders were invited to review the full list of routes which had been selected for the survey, along with an outline of their relative weight – i.e. whether they were planned to be covered with a larger or smaller number of fieldworker shifts.

This resulted in some small changes to the route selection, where operators provided information about:

- Services which had been selected, but which were due to change significantly by the time of or during the fieldwork (e.g. be withdrawn or reduced in frequency, or see a major route change)
- Services which were planned to be covered with a larger number of shifts, but which were actually lower patronage routes – and vice versa
- High-patronage routes which were missing from the selection.

Changes were <u>not</u> made to the route selection, where for example:

- Operators felt that a service had too low a patronage to be "worthwhile". Transport Focus believes that passengers using lower-patronage routes should be given (proportionate) opportunity to feed back about their experiences, in the same way as users of higher-patronage routes are
- Operators were concerned about the impact of recent or upcoming disruption, such as major engineering work or road closures, on passenger experience (and therefore on satisfaction results). Transport Focus wishes to survey the real experiences of passengers, including when they are affected by such disruption, and so all positive and negative factors affecting that experience should be represented fairly.

3.1.2 Sampling process

The sampling process is described below:

1. The journey duration of every timetabled occurrence of every bus service was calculated using the stated start and end times provided by ITO World Ltd. Journeys reaching beyond the Area boundary used the proportion of the journey within the Area boundary (unless this was less than 30% of its total route time, and the portion of the journey within the area was under 15 minutes; such journeys were removed from this initial list). The PSU list (of every timetabled occurrence of every bus route) was then sorted in descending journey lengths.

2. A "Passenger Value" (PV) was then applied to each individual bus journey (this was based on additional research and modelling work which took place during the preceding (Autumn 2017) wave of the survey):

    - The total number of passengers boarding during a single one-way bus journey was counted on a sample of all the bus journeys surveyed during the Autumn 2017 wave

    - This data was used to generate models to predict the number of people travelling on each bus service depending on:

        - Area (or type of area[2] if:

            - That PSU was not surveyed in 2017 and did not therefore have its own counts and model;

            - Or in some cases if that PSU was surveyed in 2017 but with a small sample size, meaning the number of counts was too small to produce a reliable model. Only PSUs with ten or more counts in 2017 had their own model for use in patronage estimates for 2018.)

        - Duration

        - Time of day and day of week when travelling

        - Operator (one of the "big five[3]", another major operator in certain areas, or "other" operators)

[2] Types of areas were: PTEs, Unitary Authorities, Two-tier Authorities and Scottish RTP areas.
[3] The "big five" were: Arriva, First, Go-Ahead, National Express and Stagecoach. Other major operators given their own co-efficient in the modelling work were: Reading Buses and Blackpool Transport in their respective operator samples, Nottingham City Transport and Trent Barton in Nottinghamshire, and Lothian Buses, McGills Bus Services and National Express (Xplore Dundee) in Scottish PSUs.

- Passenger values determined in this way have been found to correlate well with published journey volume statistics when aggregated at total Local Authority level (but are superior to the published figures because they are applicable at the level of individual bus journeys).

- The models used for sampling in Autumn 2018 are provided in Appendix 2, along with an example of the passenger value (PV2) applied to bus services in one of the areas covered in this survey. These models will be updated again in advance of the Autumn 2019 survey, based on new passenger counts undertaken during the Autumn 2018 fieldwork.

- This passenger value, known as "PV2", thus gave a good estimation of how busy each individual bus service was relative to all others. This was an enhancement compared to early waves of the BPS (before Autumn 2015), where a PV was assigned to each bus vehicle journey based on some assumptions (e.g. that longer journeys would carry more passengers). The newer method based the PV2 on evidence about how passenger volumes vary and accounted for more journey variables, not just the duration of the bus route.

- This knowledge was used in the next stage (3) to enable systematic selection of a representative sample of vehicle journeys on which to recruit respondents.

3. Next, the database was sorted by route, day-part[4], journey start time and day of week. In practice, each row of the database (i.e. each journey) showed a cumulative passenger value (PV2). Probability proportional to size was then used to sample the required number of journeys; i.e. probability proportional to PV2. A sampling interval for the PSU was calculated which was the total Passenger Value divided by the number of fieldwork shifts required. For example, a PSU with a total of 30,000 Passenger Value units and 30 shifts required, would have a sampling interval every 1000th fraction of the total value. In practice, to allow for some journeys being infeasible to cover (e.g. non-returning market day services), or if a need was to arise during fieldwork to add supplementary shifts through low return rates, a sample 'overage' was built into calculating the sampling interval. In Autumn 2018, this overage was 75% of the required number of shifts. So in the example for the PSU requiring 30 shifts, in practice 53 journeys would be sampled, and the sampling interval would be 566.

4. The actual sample was struck by choosing a random start point between 0 and the row with the cumulative Passenger Value of the required sampling interval, and then selecting the service corresponding to every sampling interval gap down the list. So, from the example in the previous paragraph, if the random start point was say 326 with 53 shifts

[4] Day-parts are weekday morning peak (07:00-09:29), weekday off-peak (before 07:00, 09:30-15:29, or after 18:30), weekday evening peak (15:30-18:30) and weekends. These precise day-part definitions were reviewed and consequently changed in advance of Autumn 2018; this is covered in detail in section 9.

required and a sampling interval of 566, the selected services would be taken from the rows which contained cumulative passenger values of 892, 1458, 2024, etc.

5. The result of step 4 was a list of bus vehicle journeys, which would form the basis of fieldwork shifts. In early waves of the BPS, fieldworkers had boarded the bus selected during this process and made outward and return journeys from that point onwards, within a three hour period. In the independent consultant's review following the Autumn 2014 BPS, a concern was raised that this approach skewed the overall survey coverage towards later journeys in the day. This is because, for example, passenger journeys happening at 6am could only ever be picked up by fieldwork shifts arranged to start at 6am, whereas journeys starting at 8am could be picked up by shifts starting at 6am, 7am and 8am, and anywhere in between. Therefore from Autumn 2015, a step was added here to correct for this: A programme was written into the sampling database to find the same journey as the one selected, but starting 1.5 hours earlier, for all bus vehicle journeys selected. That is, a journey with the same start and end point, the same operator, the same overall duration, and on the same day of the week. Inevitably, bus timetables do not run with journeys exactly 1.5 hours apart, and so the identical journey which was nearest to 1.5 hours earlier was identified (and in some cases this was actually the same journey, if the original selection was the first of the day or the first for some hours). This newly 'adjusted' journey then became the start point for the fieldworker's shift, meaning that, in practice, the originally selected start time became the mid point of the shift. This meant that the overall profile of fieldwork shifts matched the PV2 profile for each PSU, for different times of the day. As a result this also meant we could expect to see more (and a better representation of) early morning journeys contributing to the survey results, and fewer journeys from the end of the day.

6. Finally, any journey which had a start time at or later than 19.30 was removed and manually replaced by the instance of that journey which started closest to, but before, 19.00. For example if a journey was selected which started at 19.56, and there was another instance of the same journey at 18:56, it was replaced with the 18.56. This was in order to ensure that a three hour shift could be worked, while still finishing at a reasonable time for the fieldworker (no later than 10:30pm). Similarly, any journey which now had a start time before 6am (as a result of the adjustment in step 5) was replaced by the instance of that journey starting at or closest to, but not before, 6am.

   NB. in isolated circumstances, respondents were included in the final survey dataset who travelled after 10.30pm (the latest time of boarding for a respondent in 2018 was 10.43pm). These were usually when a fieldwork shift had been scheduled for late in the evening and there had also been some kind of delay on the buses covered during that shift meaning the fieldworker finished a little later than normal.

3.2 Sample review

Following the systematic selection of the routes, a further process was undertaken which checked the suitability of each route for a three-hour shift. The guideline was that a shift was feasible where two hours or more of a three hour shift could be spent on board a bus (rather than waiting at a stop which is non-productive time). Some Park-and-Ride services and all obvious school-bus-only routes were excluded during this process and replaced with a randomly selected alternative journey from the sampling 'overage' already provided.

In practice, the timing of bus services meant that some fieldworker shifts were a little shorter or longer than three hours. The general principle used in Autumn 2018 was that a bus journey could be selected and covered by a fieldworker shift if:

a) It would yield a shift of no less than two and a half hours total duration
b) It would yield a shift of no more than four hours total duration (although there were a small number of 4+ hour shifts, where this was necessary to ensure that a reasonable proportion of all routes in a PSU had opportunity to be covered)
c) At least around two hours could be spent on board a bus rather than waiting at a stop
d) At least one full outward and one full return trip could be made on the selected route.

In Autumn 2018, of the 6,140 bus services reviewed for suitability in a fieldworker shift, 3,771 were accepted as possible shifts (including some overage) for the start of fieldwork, and 2,369 were 'rejected'. Bus services were 'rejected' for the following reasons:

a) No return journey available (1,272)
b) Too small proportion of shift to be spent on board a bus (464)
c) Journey and available returns could not fill a 3-hour (or even a 2.5-hour) shift (91)
d) Shift would finish too late (after 10.30pm), and no suitable alternative journey start time was available, as described in point 6 above (11)
e) Journey would be too long for a 3-hour (or even a 4-hour) shift (452)
f) Other (79) – these were all "ineligible" bus services, including obvious park and rides, school buses and Transport for London services in areas close to London.

At this point then, a pool of possible journeys was available, including some overage, as the basis for fieldworker shifts, and from this pool the final selection was made. This was done by listing the possible journeys in a randomised order, and selecting the top n, where n was the number of shifts required.

The profile of the selected shifts was then compared to the universe profile of all bus passenger journeys (using the number of journeys previously estimated in the PV2 process). Their profile was observed in terms of operator mix, day-part and day of week. For operator-only PSUs, or area PSUs with one or more operator co-funder, the profile of routes within these relevant operators was also observed. Where the profile of the fieldwork shifts was not close enough to that of the journey universe (specifically, where the profile differed by more than 5% on one or more of the parameters), different journeys (from the overage) were swapped in to achieve a better profile. Once the profile of fieldwork shifts was acceptably

close, either the selection of bus journeys was deemed final and fieldwork was subsequently booked to take place on these journeys, or in cases where an operator was co-funding, the selection of their routes was also shared with them. As described earlier, this resulted in a small number of further amendments to the selection before being deemed final, and then booking the fieldwork.

In some cases, if the whole pool of "possible" journeys could not yield a set of journeys and therefore fieldwork shifts with a reasonable profile, slight amendments would need to be made to other, previously not "possible" journeys, in order to make them feasible for fieldworker shifts. For instance, cases were included where:

- If a fieldworker stayed on a bus to the end of its journey, there would be no suitable return service to catch; but if they disembarked two or three stops early they would be able to catch a return service. In such cases the journey would be included in the survey and the fieldworker would be instructed to disembark a little before the end of the journey
- A bus journey could be included in the survey if the shift it yielded was allowed to run a little over four hours
- A route was able to be included if it was paired with another run by the same operator; for example where the fieldworker might make the outward journey on the route number 1A, but return on the 1B if in practice both had the same or a very similar route.

Before Autumn 2016, the process for "accepting" bus journeys as the basis of fieldwork shifts was a little different to this. Up to and including Autumn 2015, the profile of "accepted" journeys was not reviewed, but instead there was a target for at least 80% of journeys reviewed for suitability to be accepted as the basis of shifts. Where fewer than 80% of reviewed journeys were accepted, amendments such as those described above were made in order to make a sufficient proportion of journeys feasible as shifts.

Once the pool of possible journeys for use as the basis of fieldwork shifts had been reviewed and refined into a workable fieldwork plan, the result was a set of 3,548 shifts which were planned at the outset of the project. In addition to these shifts scheduled at the outset, a further 375 were scheduled later on, to 'top up' the fieldwork where response was looking lower than needed to generate the required sample sizes. 'Top up' shifts were selected from within the 'overage' provided at initial sample selection stage.)

4 Fieldwork

Fieldwork took place between 10 September and 12 December 2018. (A small number of PSUs started a week later due to delays during the sampling; however the fieldwork for all PSUs was completed by the same date).

There was a pause within the fieldwork period to avoid the school half-term holidays and to allow for a review of progress with the project. In most areas this was between 14 and 29 October, although there were some variations if school half term holidays were at a different time (as in Scotland for example).

4.1 Distribution of questionnaires

Data collection method

Before working their first shift on the project all fieldworkers received a detailed briefing from BDRC via regional supervisors. Fieldworkers joined the bus routes selected from the sampling process on the specified day and start time. They travelled to the final destination of the route and made the first return trip possible on that route, returning to their start point. They repeated this process to make as many trips as possible within their three-hour shift. During this time fieldworkers were required to approach all passengers who boarded the bus and give them the opportunity to participate in the research.

In Autumn 2018, passengers were offered the choice to take a paper questionnaire, along with a post-paid envelope, or to complete the survey online. If they chose the latter, the fieldworker took their email address and a survey invitation was emailed to them as soon after the shift as possible. All those recruited were asked to complete their questionnaire after they had finished their journey.

The online option was first offered in Autumn 2015 after previous pilot work showed it had the potential to improve participation from certain demographic groups (especially younger males) who are typically somewhat under-represented in this type of research, and it has been offered in every wave since. For the Autumn 2018 survey the process for the online survey invitations was fully automated, where between 2015 and 2017 passengers' email addresses would need to be sent back to head office, and then batches of survey invitations were sent out manually each day to all the latest recruits. This enhancement meant that, depending on data connections, the recruited passenger could receive their survey invitation – and therefore complete the survey – as quickly as immediately after they provided their email address (making it comparable with the paper questionnaire in terms of the opportunity to complete it as soon as the passenger wished). It was anticipated that the faster process for delivering survey invitations could increase response rate for the online survey. More on this is given in section 8.

Fieldworkers were issued with between 50 and 80 questionnaires for each shift, driven in part by the estimated number of passengers expected to be encountered during the whole shift (based on the PV2 calculated earlier), but capped with a minimum of 50 and a maximum of 80 (to ensure there would always be enough and to control the sheer weight of questionnaires for fieldworkers to manage).

In total, 165,102 paper questionnaires were distributed (an average of 42.1 per shift), and 14,601 email addresses were collected (an average of 3.7 per shift). In total therefore, 179,703 people were recruited to take part in the survey, an average of 45.8 per shift.

Travelling on buses in practice

If the PSU was a Local Transport Authority, where a route crossed the boundary of that Authority area, the fieldworker treated the route as truncated to the portion within the PSU, i.e. only passengers boarding within the PSU would be approached. To achieve this, fieldworkers themselves would only travel within the boundaries of the Authority area, alighting at the border and boarding the next bus back in the opposite direction from that point. The last stop before the Authority border was identified within the bus timetable information supplied by ITO World.

In advance of each shift, fieldworkers were instructed to double check the journey details they had been given (since, as described above, changes could be made to bus services between the sampling and fieldwork stages). This sometimes resulted in changes to a shift; either:

- if the timetable had been altered, the fieldworker may have needed to start the journey at a different point or at a slightly different time, or
- if a service had been withdrawn it would be replaced with another from the 'overage' in the initial sample.

Further tasks performed during fieldwork

As described in the later section on weighting, fieldworkers also recorded the observed age and gender details of all passengers who were on the bus at a given point in time. For Autumn 2018, this observation was conducted twice within a fieldworker shift: at the mid-point of the first outbound journey, and again at the mid-point of the last inbound journey. These details allowed the creation of a representative passenger demographic profile to be used for weighting purposes.

In addition, during the Autumn 2018 fieldwork (and as in previous waves), a second fieldworker accompanied the first on a sample of 10% of all shifts in each PSU, to count the total number of passengers boarding during one whole outbound and one whole inbound journey. This data will be used to update the models used to estimate passenger values for all bus journeys, for use in sampling for the Autumn 2019 survey.

4.2 Authorisation to work on buses

Regarding permission to conduct interviewing on the bus, Transport Focus provided a letter which the fieldworkers were able to show drivers to vouch for the bona fides of the survey, and Transport Focus communicated to operators that the survey might take place on their services during the intended period. In Autumn 2018 a relatively small number of shifts were disrupted by bus drivers refusing to allow fieldworkers to work.

In 2018, for the first time, fieldworkers also wore high-visibility jackets with Transport Focus' logo and "Passenger survey" printed on them. Anecdotal feedback from the fieldworkers was that this markedly improved the likelihood of drivers allowing them on board, and helped provide an additional perception of credibility to passengers themselves to make them more open to hearing about the survey. The number of reports received about drivers having refused fieldworkers access to their bus also notably reduced compared to previous years,

4.3 Monitoring fieldwork

Throughout fieldwork, fieldworkers reported the number of questionnaires they had handed out, and how many email addresses they had collected (i.e. how many people they had recruited). This was reported by the next working day after each shift, and these metrics were monitored by the team at BDRC.

As paper questionnaires were returned to BDRC's head office, their barcodes were scanned to provide immediate extra confirmation that a fieldwork shift had taken place, and a number of data fields from the questionnaire were recorded manually to enable a first stage of validation checks to take place (see section 6.2). The same information from electronic surveys completed online was recorded automatically. The numbers of completed and validated questionnaires were matched with the reported recruitment figures, to allow the project team to monitor the overall productivity of the fieldwork. Several actions had potential to be triggered by this information, including for example:

- If the sample sizes in certain areas appeared likely to fall below the target, additional 'top up' shifts could be scheduled using the sample overage
- If it was found that all of the available questionnaires were routinely given out in certain areas or on certain routes, this was recorded and more questionnaires may be printed where relevant in future waves
- Steps could be taken to address lower productivity in certain fieldworkers if this was found to be the case.

BDRC carried out all fieldwork in accordance with the MRS Code of Conduct, the IQCS (Interviewer Quality Control Scheme) and ISO 20252. Exceeding normal industry standards, at least 10% of all BPS shifts were subject to unannounced spot-checks by BDRC supervisors and other project team staff. Most shifts to be spot-checked were selected at random, but some were chosen specifically, to monitor new or less productive fieldworkers or areas more closely, and indeed to observe more productive fieldworkers in order to study and pass on best practise techniques. Random unannounced spot-checks were also made by Transport Focus staff.

5 Questionnaire

The paper questionnaire was an 8-page self-completion booklet that was handed out along with a reply-paid envelope to all passengers on the bus who were willing to take part. The online questionnaire was the same in terms of question content and had small modifications in order to work appropriately depending on the type of device (desktop, smartphone, etc.) being used by the respondent.

The questionnaire had a core set of questions to provide consistent measurement of the components of journey experience. A copy of the standard version of the questionnaire is shown in Appendix 1. Transport Focus allocated a space on the questionnaire (part 6) where participating local transport authorities or bus operators were able to place a small number of questions of their choosing.

6 Response rates, and validation of returns

6.1 Response rates achieved

The metric of fieldwork outcome was the product of hand out rates achieved and response rates achieved. The tables below show the metrics achieved from fieldwork across the Primary Sampling Units in this wave.

6a. Fieldwork metrics: PTEs

PTEs *(and boosts)*	No. shifts	Recruits: paper	Respon-ses: paper	Response rate: paper	Recruits: online	Respon-ses: online	Response rate: online	Recruits: total	Respon-ses: total*	Response rate: total	Average respon-ses per shift (total)
Greater Manchester	218	8,101	1,739	21%	1,406	341	24%	9,507	2,080	22%	9.5
Mersey (+ Halton)	155	6,935	1,871	27%	735	169	23%	7,670	2,040	27%	13.2
South Yorkshire	182	7,179	1,528	21%	437	47	11%	7,616	1,575	21%	8.7
Tyne and Wear	140	7,914	1,572	20%	222	41	18%	8,136	1,613	20%	11.5
West Midlands	237	13,102	2,957	23%	395	103	26%	13,497	3,060	23%	12.9
West Yorkshire	205	10,159	1,698	17%	279	53	19%	10,438	1,751	17%	8.5
PTEs total	**1,137**	**53,390**	**11,365**	**21%**	**3,474**	**754**	**22%**	**56,864**	**12,119**	**21%**	**10.7**

6b. Fieldwork metrics: Unitary Authorities (and special territory boosts)

Unitary authorities	No. shifts	Recruits: paper	Respon-ses: paper	Response rate: paper	Recruits: online	Respon-ses: online	Response rate: online	Recruits: total	Respon-ses: total*	Response rate: total	Average respon-ses per shift (total)
Bournemouth & Poole	66	2,937	754	26%	533	155	29%	3,470	909	26%	13.8
Cheshire West & Chester	64	1,959	689	35%	359	100	28%	2,318	789	34%	12.3
Cornwall	62	2,127	941	44%	473	79	17%	2,600	1,020	39%	16.5
Durham	63	3,176	781	25%	38	9	24%	3,214	790	25%	12.5
Leicester City	69	3,060	758	25%	401	153	38%	3,461	911	26%	13.2
Milton Keynes	62	1,981	462	23%	281	57	20%	2,262	519	23%	8.4
Milton Keynes (Non-major operators boost)	27	679	181	27%	67	17	25%	746	198	27%	7.3
Northumberland	46	1,654	526	32%	19	-	0%	1,673	526	31%	11.4
Swindon	96	3,948	942	24%	121	20	17%	4,069	962	24%	10.0
Tees Valley Partnership	160	6,884	1,844	27%	304	58	19%	7,188	1,902	26%	11.9
WECA & N.Somerset	106	4,408	1,391	32%	565	145	26%	4,973	1,536	31%	14.5
York	33	1,490	477	32%	184	47	26%	1,674	524	31%	15.9
Unitaries total	**854**	**34,303**	**9,746**	**28%**	**3,345**	**840**	**25%**	**37,648**	**10,586**	**28%**	**12.4**

6c. Fieldwork metrics: Two tier authorities (and special territory boosts)

Two tier authorities *(and boosts)*	No. shifts	Recruits: paper	Respon-ses: paper	Response rate: paper	Recruits: online	Respon-ses: online	Response rate: online	Recruits: total	Respon-ses: total*	Response rate: total	Average responses per shift (total)
Derbyshire	81	3,023	1,025	34%	192	102	53%	3,215	1,127	35%	13.9
East Sussex	31	1,542	365	24%	55	9	16%	1,597	374	23%	12.1
East Sussex (Hastings & Bexhill boost)	17	767	198	26%	28	10	36%	795	208	26%	12.2
Essex	78	2,702	700	26%	364	120	33%	3,066	820	27%	10.5
Kent	64	2,422	662	27%	122	33	27%	2,544	695	27%	10.9
Kent (Non-major operators boost)	40	1,045	340	33%	34	13	38%	1,079	353	33%	8.8
Lincolnshire	44	1,654	464	28%	137	51	37%	1,791	515	29%	11.7
Nottinghamshire	76	3,069	896	29%	211	80	38%	3,280	976	30%	12.8
Nottinghamshire (Non-major operators boost)	33	937	303	32%	41	22	54%	978	325	33%	9.8
Oxfordshire	126	4,661	1,142	25%	612	79	13%	5,273	1,221	23%	9.7
Staffordshire	64	2,822	955	34%	183	46	25%	3,005	1,001	33%	15.6
Worcestershire	36	1,535	429	28%	136	37	27%	1,671	466	28%	12.9
Two tier total	**690**	**26,179**	**7,479**	**29%**	**2,115**	**602**	**28%**	**28,294**	**8,081**	**29%**	**11.7**

6d. Fieldwork metrics: Operators (1)

Operators	No. shifts	Recruits: paper	Respon-ses: paper	Response rate: paper	Recruits: online	Respon-ses: online	Response rate: online	Recruits: total	Respon-ses: total*	Response rate: total	Average responses per shift (total)
Blackpool Transport	40	1,619	387	24%	328	90	27%	1,947	477	24%	11.9
First South Coast	38	1,638	480	29%	132	66	50%	1,770	546	31%	14.4
GA – Bluestar	33	1,348	293	22%	501	113	23%	1,849	406	22%	12.3
GA – Brighton & Hove	54	3,556	784	22%	134	7	5%	3,690	791	21%	14.6
GA – Carousel	27	669	231	35%	66	10	15%	735	241	33%	8.9
GA – East Yorkshire Motor Services	29	1,354	311	23%	150	33	22%	1,504	344	23%	11.9
GA – Konectbus	25	875	298	34%	159	64	40%	1,034	362	35%	14.5
GA – Metrobus	43	2,156	512	24%	100	9	9%	2,256	521	23%	12.1
GA - Oxford P&R	23	1,038	320	31%	163	17	10%	1,201	337	28%	14.7
GA - Plymouth Citybus	28	1,295	518	40%	259	71	27%	1,554	589	38%	21.0
GA – Salisbury Reds	23	930	276	30%	106	30	28%	1,036	306	30%	13.3
GA - Southern Vectis	25	827	297	36%	62	14	23%	889	311	35%	12.4
Warrington's Own Buses	29	1,017	258	25%	177	45	25%	1,194	303	25%	10.4

6d.Fieldwork metrics: Operators (2)

Operators	No. shifts	Recruits: paper	Respon-ses: paper	Response rate: paper	Recruits: online	Respon-ses: online	Response rate: online	Recruits: total	Respon-ses: total*	Response rate: total	Average responses per shift (total)
Nottingham City Transport (city routes boost)	17	818	177	22%	61	23	38%	879	200	23%	11.8
Reading Buses	77	3,416	738	22%	977	77	8%	4,393	815	19%	10.6
Stagecoach Cumbria & North Lancashire	50	1,670	490	29%	142	45	32%	1,812	535	30%	10.7
Stagecoach East	30	1,388	365	26%	178	57	32%	1,566	422	27%	14.1
Stagecoach East (Cambridge Busway)	16	853	258	30%	127	42	33%	980	300	31%	18.8
Stagecoach in Gloucestershire	44	1,997	474	24%	180	31	17%	2,177	505	23%	11.5
Stagecoach Midlands	37	1,588	440	28%	41	3	7%	1,629	443	27%	12.0
Stagecoach South	41	1,443	443	31%	275	112	41%	1,718	555	32%	13.5
Stagecoach South West	25	1,231	538	44%	78	24	31%	1,309	562	43%	22.5
Stagecoach in West of England	44	761	270	35%	80	18	23%	841	288	34%	6.5
Transdev Blazefield – The Blackburn Bus Company	28	988	298	30%	85	14	16%	1,073	312	29%	11.1
Operators total	**826**	**34,475**	**9,456**	**27%**	**4,561**	**1,015**	**22%**	**39,036**	**10,471**	**27%**	**12.7**

6e. Fieldwork metrics: Scottish samples

Scottish samples	No. shifts	Recruits: paper	Respon-ses: paper	Response rate: paper	Recruits: online	Respon-ses: online	Response rate: online	Recruits: total	Respon-ses: total*	Response rate: total	Average responses per shift (total)
HiTrans	49	1,622	595	37%	140	52	37%	1,762	647	37%	13.2
Nestrans – Aberdeen City	41	1,691	621	37%	25	-	0%	1,716	621	36%	15.1
Nestrans – Aberdeen-shire	47	1,308	634	48%	18	-	0%	1,326	634	48%	13.5
SEStran	47	1,967	1,171	60%	179	15	8%	2,146	1,186	55%	25.2
SPT	43	1,984	897	45%	185	14	8%	2,169	911	42%	21.2
SWestrans	49	1,054	661	63%	17	4	24%	1,071	665	62%	13.6
Tactran	54	3,025	1,362	45%	249	32	13%	3,274	1,394	43%	25.8
First Buses Glasgow	25	1,258	472	38%	63	7	11%	1,321	479	36%	19.2
First Buses Scotland East	31	926	528	57%	183	76	42%	1,109	604	54%	19.5
Lothian Buses	30	1,920	972	51%	47	-	0%	1,967	972	49%	32.4
Scotland total	**416**	**16,755**	**7,913**	**47%**	**1,106**	**200**	**18%**	**17,861**	**8,113**	**45%**	**19.5**

6.2 Validation of completed surveys

Completed questionnaires were subject to two stages of checks and validation; once before they were scanned electronically to pick up the tick-box responses (for paper questionnaires), and once afterwards:

1. Pre-scanning of question responses (for paper questionnaires)

The first stage took place immediately after completed questionnaires were received. Firstly, each paper questionnaire was opened to check that the respondent had answered the questions and not simply returned a blank or mostly-blank form. Sometimes, with self-completion questionnaires, respondents miss some questions, either accidentally or because they choose not to or cannot answer. They may however have provided sufficient, valid answers to most of the questionnaire and so it would be wrong to waste their other answers. Questionnaires were therefore accepted according to these guidelines:

- Providing the respondent had reached the question for "overall journey satisfaction" or beyond (including a small number of cases where the respondent had clearly reached the end of the questionnaire but missed the "overall satisfaction" question itself), the questionnaire was accepted. In other words, if they had left some subsequent questions blank, such as the demographic questions which some people prefer not to answer, they would be accepted on this basis since they would have completed the majority of the questions by this point.

- If the respondent had missed two whole consecutive pages, where this was clearly the result of the pages having been turned over together and the respondent had not realised they were there, the questionnaire would be accepted – providing most of the other questions were completed. If the respondent had missed four whole pages, the questionnaire would be rejected since in this scenario they would have missed at least half of the questions.

- A small number of questionnaires were rejected where the respondent had written nonsense, offensive words or phrases, or expletives (which were unconnected to their feedback on the bus journey), or had defaced part of the questionnaire.

Each questionnaire had a unique ID number; once the above basic checks were completed, for paper questionnaires this was scanned from a barcode on the front page. The answers to certain questions were then manually entered into a database – these were the date (top right on the paper questionnaire and time/date stamped on the electronic questionnaire), the route number of the bus (Q1) and the time the respondent boarded the bus (Q2). (See questionnaire example in the Appendix). These were checked against the original details of the fieldwork shift, to check that the passenger filled in the questionnaire about a verified journey (this also served as a check that fieldwork had been carried out as intended). Questionnaires which did not tally with the expected

journey details were investigated and would be rejected if they could not be verified as corresponding to the correct fieldworker shift.

The same basic checks were made at the equivalent stage for online questionnaires:

- Respondents were counted as "complete" providing that they had reached and answered at least the "overall journey satisfaction" question. Of course, the questions up to this point would also have all been answered in the online questionnaire since unlike the paper version there was no possibility of a respondent accidentally missing any.

- The online questionnaire reminded respondents of the date and approximate time when they were first approached by the fieldworker, and the route number of the bus they were travelling on. However, they were also asked to confirm these details at the beginning of the survey (just in case there had been any unexpected changes on the day, for example due to fieldworker illness or significant disruption to the bus service). These details in the online questionnaire were equivalent to Q1, Q2 and the date information on the paper questionnaire and were checked electronically against sample information for the same reasons as for the paper questionnaire.

It was useful to carry out this stage of the validation immediately (rather than later alongside other DP checks), because it enabled more accurate monitoring of the real number of 'useable' responses which had been collected in each PSU, throughout the fieldwork.

At this stage, for paper questionnaires, the answers to numeric questions were also recorded manually and/or checked. These are all about times (Q15, Q17, Q24 and Q25), and were recorded manually because sometimes respondents' handwriting was difficult to pick up via the electronic scanning data capture system, or passengers incorrectly recorded route numbers or times which used the 24-hour clock. (Checks were built into the manual data entry system to avoid human error, such as a flag to alert the person if they had entered an abnormally long time for waiting for the bus, etc. Also note that the answers to these questions were still scanned electronically, and a sample compared to the manually entered data, as a further check against human error at the data entry stage). Similarly, electronic validation of the equivalent (typed-in) responses in the online questionnaire was built into the cleaning programme.

2. Post-scanning of question responses

Validated paper questionnaires were then scanned electronically to record which answer boxes on the form had been ticked by respondents. (At this stage, the data capture itself was 100% validated, meaning that a person checked, for example, that the electronic process had picked up genuine ticks, rather than instances where a respondent may have ticked one response and then crossed it out in favour of another, or where a mark may have been made accidentally in a box).

Once all the responses to the questionnaire were recorded in a database, other data cleaning could take place. This included, for example, checks for multi-coded answers where a single-code was required, and responses to questions which the respondent should have routed around.

6.3 Data preparation and analysis

After the data was validated, coded and edited, an SPSS data file was provided to Transport Focus. Transport Focus also ran some checks on this file before it was ruled off as final, and then also produced a large number of reports and other outputs.

7 Weighting

7.1 Weighting by age, gender and day-part

The survey weighting was designed to offset the effects of both non-response bias and non-participation bias based on age, gender and day-part.[5]

Age and gender weights

No known source of information exists to detail the demographic of journeys by age and gender consistently for each PSU; therefore this information was collected through the fieldwork. During the Autumn 2018 survey, fieldworkers broke from distributing questionnaires temporarily at points through their shift, to record the age (within 3 bands: 16-25, 26-59 and 60+) and gender of every passenger of the bus (from observation). As described earlier, this age and gender report was made at the mid-point of the first outbound journey, and again at the mid-point of the last inbound journey. The passenger age and gender profiles were aggregated at the PSU level and compared to the profile given by the declared age and gender on the questionnaires returned for that PSU. Rim weights were then applied for each PSU for age and gender (which were not interlocked), based on the observed profiles made during fieldworkers' shifts. In practice, a small proportion of respondents did not declare their age and / or gender in the questionnaire itself. Therefore the observed profiles were adjusted proportionately to allow for this. (The alternative would be to have excluded these respondents on account of the fact that they could not be given a weight, but this would have meant a reduction in the overall sample size and the loss of passenger feedback which was otherwise entirely valid).

(The above age and gender weighting approach was first used in Autumn 2015, and ever since. Previously, up to 2014, factor weights were applied for eight interlocking age-gender cells (4 x age and 2 x gender). Following the independent review of the BPS, the day-part weight (below) was added, and the age-gender weights were simplified at the same time.)

Day-part weights

The proportion of all journeys within each PSU had been estimated via Passenger Value models, during the sampling process. These proportions formed a further set of rim weights applied to each PSU.

Note that for the purpose of weighting, where there were overlaps between a PSU for a local authority, and PSU(s) for operators or other boosts, local authorities were treated as "local authority excluding routes relevant to the operator/boost". For example for East Sussex, where the Autumn 2018 wave surveyed East Sussex as a whole as well as separate samples for Go-Ahead's Metrobus

[5] *Day-parts are weekday morning peak (07:00-09:29), weekday off-peak (before 07:00, 09:30-15:29, or after 18:30), weekday evening peak (15:30-18:30) and weekends. These precise day-part definitions were reviewed and consequently changed in advance of Autumn 2018; this is covered in detail in section 9. .*

and Brighton & Hove Buses, weights were applied to all responses for “East Sussex excluding Metrobus and excluding Brighton & Hove Buses”, and separately for each of the operators. Therefore, responses from within the original ‘main’ East Sussex sample which were for Metrobus or Brighton & Hove Buses, were weighted in the same way as all other responses for that operator. The same was done for Kent, for example, which also had a small overlap with Metrobus.

The following tables show the observed age and gender profile of passengers from the fieldworker observation (adjusted for non-response to age and gender questions in the questionnaire itself), and the estimated day-part profiles generated by the PV2 models. These were therefore the target rim weights applied to each PSU in Autumn 2018.

Target rim weights

7a. Target rim weights applied in PTE Areas

PTE Authorities *(and boosts)*	**Male**	**Female**	**No res-ponse**	**16-25**	**26-59**	**60+**	**No res-ponse**	**AM peak**	**Off-peak**	**PM peak**	**Weekend**
Greater Manchester	43.7%	49.3%	7.0%	33.2%	41.0%	19.5%	6.3%	12.3%	49.2%	20.0%	18.4%
Mersey & Halton	43.0%	50.6%	6.4%	25.3%	38.7%	30.0%	6.0%	13.1%	47.6%	20.7%	18.6%
South Yorks	40.9%	43.0%	16.1%	20.1%	46.3%	17.7%	16.0%	13.8%	49.6%	18.3%	18.3%
Tyne & Wear	41.7%	53.6%	4.6%	22.6%	39.8%	33.3%	4.4%	11.9%	48.6%	18.7%	20.9%
West Midlands	42.4%	50.3%	7.3%	28.5%	40.6%	24.7%	6.2%	13.3%	48.7%	19.1%	18.9%
West Yorks/Metro	44.8%	48.5%	6.7%	29.8%	42.3%	21.8%	6.1%	11.9%	49.6%	21.6%	16.9%

7b. Target rim weights applied in Unitary Authority Areas

Unitary authorities	Male	Fe-male	No res-ponse	16-25	26-59	60+	No res-ponse	AM peak	Off-peak	PM peak	Weekend
Bournemouth & Poole	43.3%	52.5%	4.2%	20.7%	41.8%	33.3%	4.2%	12.2%	48.1%	20.4%	19.4%
Chester West & Chester	36.3%	55.2%	8.5%	20.3%	33.1%	38.4%	8.3%	11.5%	47.9%	23.8%	16.9%
Cornwall (excl. GA Plymouth Citybus)	42.5%	52.3%	5.2%	33.1%	30.0%	31.4%	5.6%	13.9%	47.6%	21.4%	17.1%
County Durham	44.5%	49.5%	6.0%	26.0%	34.3%	33.7%	6.0%	11.6%	50.1%	21.2%	17.1%
Leicester City	38.7%	55.3%	5.9%	27.5%	40.0%	27.6%	4.8%	11.8%	48.6%	22.1%	17.6%
Milton Keynes (excl. non-main operators)	39.8%	53.6%	6.6%	29.2%	45.2%	19.6%	6.1%	11.7%	50.1%	19.5%	18.7%
Milton Keynes (non-main operators)	42.3%	51.7%	6.1%	23.7%	42.2%	30.8%	3.3%	13.9%	47.9%	24.2%	13.9%
Northumberland (excluding Stagecoach Cumbria & North Lancs)	42.0%	51.3%	6.7%	20.2%	35.1%	38.5%	6.3%	11.3%	49.2%	20.6%	18.8%
Swindon	40.0%	53.6%	6.4%	24.9%	43.4%	25.9%	5.9%	11.7%	48.5%	22.0%	17.8%
Tees Valley	42.1%	52.5%	5.4%	25.5%	33.5%	36.5%	4.4%	12.1%	49.0%	20.3%	18.6%
WECA & North Somerset (excl. Stagecoach West of England routes)	38.0%	51.8%	10.1%	33.1%	35.2%	21.8%	9.9%	12.7%	48.7%	19.1%	19.5%
York	36.6%	58.6%	4.8%	24.6%	44.6%	26.9%	3.8%	11.9%	47.1%	22.2%	18.8%

7c. Target rim weights applied in Two Tier Authority Areas

Two tier authorities *(and boosts)*	**Male**	**Female**	**No res-ponse**	**16-25**	**26-59**	**60+**	**No res-ponse**	**AM peak**	**Off-peak**	**PM peak**	**Weekend**
Derbyshire	41.6%	53.7%	4.7%	23.8%	29.0%	42.3%	4.9%	10.8%	48.4%	23.2%	17.5%
East Sussex - Stagecoach H&B routes	39.6%	52.3%	8.1%	18.5%	38.1%	35.6%	7.8%	11.3%	47.0%	23.3%	18.4%
East Sussex (ex GA B&H, GA Metrobus, Stgc H&B routes)	59.0%	31.0%	10.0%	43.4%		46.6%	10.0%	12.4%	49.2%	22.4%	15.9%
Essex	40.9%	51.2%	7.9%	24.2%	33.6%	35.7%	6.6%	11.3%	48.3%	26.7%	13.6%
Kent (non-major groups – ex GA Metrobus)	37.6%	55.9%	6.5%	15.0%	32.7%	46.6%	5.7%	16.6%	48.9%	26.4%	8.1%
Kent (ex GA Metrobus and ex non-major groups)	38.1%	56.5%	5.4%	20.7%	38.1%	37.2%	4.1%	11.0%	48.2%	23.6%	17.2%
Lincolnshire	43.7%	50.9%	5.5%	22.5%	28.6%	44.2%	4.7%	12.8%	45.2%	26.4%	15.6%
Nottinghamshire (ex non-major groups)	40.0%	56.4%	3.6%	30.0%	43.5%	23.7%	2.7%	10.9%	47.6%	24.0%	17.5%
Nottinghamshire (non-major operators)	37.6%	54.2%	8.1%	22.5%	33.0%	36.9%	7.6%	9.9%	55.0%	22.0%	13.1%
Oxfordshire (excl. GA Oxford Bus P&R)	39.4%	53.6%	7.0%	26.6%	46.7%	21.6%	5.0%	13.5%	50.6%	16.5%	19.5%
Staffordshire	37.4%	54.0%	8.6%	25.4%	30.3%	36.1%	8.3%	12.8%	49.7%	23.6%	13.8%
Worcestershire	39.5%	56.9%	3.7%	17.8%	33.5%	45.0%	3.7%	11.3%	48.4%	24.8%	15.5%

7d. Target rim weights applied to Operator PSUs

Operators	Male	Female	No response	16-25	26-59	60+	No response	AM peak	Off-peak	PM peak	Weekend
Blackpool Transport	42.0%	52.7%	5.2%	27.2%	31.3%	35.4%	6.1%	12.0%	47.6%	20.4%	20.0%
First South Coast	38.8%	55.3%	5.9%	19.0%	45.6%	30.1%	5.4%	12.2%	47.6%	21.5%	18.8%
GA - Bluestar	40.1%	54.7%	5.2%	26.3%	41.6%	26.9%	5.2%	13.0%	49.2%	20.2%	17.6%
GA - Brighton & Hove	37.1%	53.5%	9.4%	23.3%	42.5%	24.9%	9.3%	12.7%	49.3%	17.3%	20.7%
GA - Carousel Buses	39.7%	48.7%	11.6%	17.1%	39.5%	34.2%	9.1%	11.1%	50.6%	21.5%	16.8%
GA - EYMS Hull City routes	40.6%	55.3%	4.1%	26.7%	41.5%	27.9%	3.8%	10.6%	49.1%	22.2%	18.1%
GA - Konectbus	45.5%	51.4%	3.1%	23.0%	31.5%	42.2%	3.3%	13.8%	48.9%	21.9%	15.3%
GA - Metrobus	41.2%	48.0%	10.8%	28.2%	47.2%	13.8%	10.8%	12.4%	49.3%	19.2%	19.1%
GA - Oxford P&R	38.9%	53.4%	7.7%	20.0%	57.1%	15.8%	7.1%	11.5%	44.3%	21.0%	23.2%
GA - Plymouth Citybus	40.9%	54.0%	5.0%	26.2%	36.5%	33.5%	3.9%	14.3%	46.4%	21.3%	18.0%
GA - Salisbury Reds	34.0%	58.8%	7.2%	15.8%	35.0%	42.0%	7.2%	13.1%	47.2%	24.4%	15.3%
GA - Southern Vectis	46.5%	48.0%	5.5%	17.7%	30.7%	45.4%	6.1%	10.3%	46.9%	19.6%	23.2%
Nottingham City Transport - city routes boost	37.3%	56.2%	6.5%	39.4%	40.4%	14.4%	5.7%	10.3%	47.5%	24.3%	17.9%
Reading Buses	40.7%	52.5%	6.8%	20.5%	43.3%	30.2%	6.0%	10.9%	48.8%	23.4%	16.9%
Stagecoach Cumbria & North Lancs	39.9%	55.4%	4.7%	15.8%	30.0%	49.1%	5.1%	11.5%	48.2%	22.0%	18.4%

Stagecoach East - Cambridge Busway	45.1%	49.9%	5.0%	23.5%	36.4%	35.4%	4.7%	13.6%	45.7%	25.1%	15.6%
Stagecoach East (excl. Cambridge Busway)	39.5%	56.9%	3.6%	29.2%	40.5%	26.3%	4.1%	14.5%	48.7%	17.7%	19.1%
Stagecoach Gloucestershire routes	40.8%	52.3%	6.9%	25.7%	35.3%	31.5%	7.5%	12.3%	48.8%	21.8%	17.1%
Stagecoach Midlands	39.9%	54.5%	5.6%	20.2%	35.4%	39.9%	4.5%	12.0%	48.2%	21.6%	18.2%
Stagecoach South	37.7%	53.4%	8.9%	29.1%	38.6%	24.8%	7.5%	13.0%	49.8%	21.3%	15.9%
Stagecoach South West	38.0%	55.1%	6.9%	17.6%	29.7%	46.0%	6.7%	11.8%	47.3%	21.7%	19.2%
Stagecoach West of England routes	33.0%	56.7%	10.3%	23.1%	24.1%	44.0%	8.8%	12.7%	48.7%	19.1%	19.5%
Transdev Blazefield - The Blackburn Bus Company	45.8%	45.2%	9.0%	23.2%	27.5%	40.0%	9.3%	12.1%	49.4%	19.3%	19.2%
Warrington's Own Buses	38.1%	57.6%	4.3%	25.2%	29.9%	41.3%	3.6%	11.9%	49.1%	21.7%	17.0%

7e. Target rim weights applied to Scottish PSUs

Areas in Scotland	Male	Female	No res-ponse	16-25	26-59	60+	No res-ponse	AM peak	Off-peak	PM peak	Weekend
First Glasgow	44.5%	45.7%	9.8%	17.6%	48.0%	26.0%	8.4%	13.3%	48.1%	19.1%	19.4%
First Scotland East	41.1%	53.4%	5.4%	22.9%	40.1%	32.7%	4.4%	12.7%	47.3%	21.9%	18.1%
HITRANS	43.3%	50.0%	6.7%	21.1%	38.0%	34.4%	6.5%	9.8%	39.6%	26.1%	24.4%
Lothian Buses	43.1%	49.6%	7.3%	24.6%	51.5%	17.5%	6.3%	12.6%	48.0%	19.0%	20.4%
NESTRANS - Aberdeen City only	43.1%	47.7%	9.2%	19.8%	48.3%	24.0%	7.9%	10.5%	50.5%	24.6%	14.4%
NESTRANS - Aberdeenshire only	41.7%	49.9%	8.4%	14.6%	40.4%	37.0%	8.0%	6.5%	50.4%	27.1%	16.0%
SESTRANS (ex. First Scotland East and Lothian Buses)	41.5%	39.1%	19.4%	15.3%	32.3%	34.2%	18.3%	8.1%	43.6%	22.9%	25.5%
Strathclyde Passenger Transport (ex. First Glasgow)	40.2%	51.8%	8.1%	14.7%	34.8%	42.4%	8.1%	7.4%	48.6%	27.2%	16.8%
SWESTRANS excluding Stagecoach Cumbria & North Lancs	38.4%	48.8%	12.8%	15.9%	35.2%	36.4%	12.5%	8.8%	46.5%	29.2%	15.6%
TACTRANS (ex. First Scotland East)	34.9%	56.9%	8.1%	15.8%	39.6%	37.9%	6.7%	10.2%	47.9%	23.5%	18.4%

The average weights applied to respondents in each PSU, within each of the weight cells, are given in the tables below. Before settling on these final weights as shown (i.e. the degree to which the final weighted profile matched the target profiles in the tables above), average weights for each of these cells were observed. For a small number of day-part-within-PSU cells, and small number of age-band-within-PSU cells, the average weight for all respondents in that cell was 4 or higher. In these cases, the cell was merged with the most similar other cell (e.g. a weekend cell would be merged with the weekday off-peak cell, a morning peak cell would be merged with an evening peak cell), and the weight for the combined cells applied. The aim was that no individual cell would have respondents with an average weight of above 4, to control the overall level of manipulation on the data.

As a second step, the size of rim weight for individual respondents was also observed, and where there were any very high weights, day-part or age-band cells were also collapsed. In practice for Autumn 2018, all the very high individual weights (defined as 8 or higher) were resolved in the first step, and overall the level of weighting required was an improvement on the 2017 wave: In Autumn 2017, after merging some cells together to reduce the weights, there were 15 respondents with a weight of over 8 (and up to 17). For 2018, only two respondents had a weight of over 8, with the highest at 8.2.

These small improvements to the level of weighting required are likely to have been caused by the changes made to day-part definitions, bringing the sampling and weighting more into line with real passenger flow patterns. More on this is given in section 9.

Actual weights applied

7f. Actual (average) rim weights applied in PTE Areas

PTE Authorities *(and boosts)*	**Female**	**Male**	**No res-ponse**	**16-25**	**26-59**	**60+**	**No res-ponse**	**AM peak**	**Off-peak**	**PM peak**	**Weekend**
Greater Manchester	0.83	1.31	1.00	1.73	1.06	0.54	1.00	0.92	0.96	1.14	1.02
Mersey & Halton	0.84	1.29	0.99	1.69	1.25	0.63	1.00	1.04	0.82	1.16	1.57
South Yorkshire	0.83	1.28	1.00	1.24	1.32	0.54	1.00	1.34	0.91	1.56	0.77
Tyne & Wear	0.85	1.29	1.01	2.37	1.24	0.62	1.00	1.26	0.84	1.13	1.26
West Midlands	0.89	1.17	1.00	1.24	1.13	0.71	1.00	1.00	0.92	1.48	0.92
West Yorkshire	0.79	1.40	1.01	2.80	1.31	0.43	1.00	0.96	0.88	1.05	1.64

7g. Actual (average) rim weights applied in Unitary Authorities

Unitary authorities	Female	Male	No response	16-25	26-59	60+	No response	AM peak	Off-peak	PM peak	Weekend
Bournemouth & Poole	0.83	1.33	1.01	2.19	1.60	0.55	1.00	1.09	0.85	1.32	1.14
Chester West & Chester	0.89	1.23	0.99	1.37	1.24	0.76	1.00	1.13	0.71	1.58	2.37
Cornwall (excl. GA Plymouth Citybus)	0.84	1.29	1.01	1.43	1.34	0.64	1.00	2.12	0.94	1.05	0.77
County Durham	0.84	1.27	1.01	1.57	1.18	0.70	1.00	1.94	0.82	1.03	1.40
Leicester City	0.89	1.21	1.01	1.79	0.95	0.73	1.00	0.96	0.94	1.11	1.07
Milton Keynes (excl. non-main operators)	0.89	1.20	0.99	2.84	1.31	0.40	1.00	0.84	0.73	1.76	2.96
Milton Keynes (non-main operators)	0.85	1.26	1.01	1.83	1.98	0.49	0.96	2.31	0.78	1.87	0.70
Northumberland excluding Stagecoach Cumbria & North Lancs	0.80	1.41	1.05	2.63	1.32	0.64	1.11	1.47	0.68	2.48	1.58
Swindon	0.88	1.22	1.00	2.08	1.21	0.56	1.00	1.16	0.80	1.37	1.37
Tees Valley	0.92	1.12	1.00	1.28	1.27	0.74	1.00	1.01	0.95	1.17	0.98
WECA & North Somerset (excl. Stagecoach West of England routes)	0.89	1.21	0.97	1.82	0.99	0.61	0.98	1.35	0.94	0.91	1.11
York	0.92	1.17	1.03	2.47	1.38	0.50	1.00	0.94	0.93	1.14	1.09

7h. Actual (average) rim weights applied in Two Tier Authorities

Two tier authorities *(and boosts)*	**Female**	**Male**	**No res-ponse**	**16-25**	**26-59**	**60+**	**No res-ponse**	**AM peak**	**Off-peak**	**PM peak**	**Weekend**
Derbyshire	0.94	1.10	1.00	1.83	0.86	0.87	1.00	0.81	0.89	1.48	1.05
East Sussex - Stagecoach H&B routes	0.77	1.66	1.02	1.95	1.67	0.59	1.00	2.17	0.72	2.52	0.91
East Sussex (ex GA B&H, GA Metrobus, Stgc H&B routes)	0.66	1.36	1.00		2.17	0.66	1.00		0.98	0.83	1.19
Essex	0.86	1.27	0.99	2.02	1.17	0.67	1.00	1.01	0.82	1.62	1.02
Kent (non-major groups – ex GA Metrobus)	0.88	1.26	0.99	2.20	1.97	0.66	1.00	1.43	0.90	1.34	1.42
Kent (ex GA Metrobus and non-major groups)	0.83	1.42	1.01	1.25	1.19	0.78	1.00	1.09	0.83	1.79	0.92
Lincolnshire	0.84	1.29	1.02	2.81	1.53	0.64	1.00	1.72	0.78	1.61	1.16
Nottinghamshire (ex non major groups)	0.96	1.18	0.50	2.18	1.31	0.51	0.44	1.45	0.78	1.15	1.65
Nottinghamshire (non-major operators)	0.93	1.10	1.14	2.24	1.32	0.64	1.04	1.98	0.86	1.11	1.16
Oxfordshire (excl. GA Oxford Bus P&R)	0.85	1.31	1.01	2.52	1.28	0.45	1.00	1.27	0.89	0.86	1.46
Staffordshire	0.91	1.18	0.99	1.39	1.35	0.71	1.00	0.78	0.90	1.64	0.99
Worcestershire	0.84	1.38	1.02	1.76	1.04	0.84	1.00	0.92	0.88	1.25	1.22

7i. Actual (average) rim weights applied for Operators

Operators	Female	Male	No response	16-25	26-59	60+	No response	AM peak	Off-peak	PM peak	Weekend
Blackpool Transport	0.88	1.21	1.01	1.78	1.13	0.70	1.00	0.96	0.84	0.98	1.98
First South Coast	0.81	1.50	1.00	2.45	1.86	0.48	1.00	0.86	0.85	1.57	1.18
GA - Bluestar	0.87	1.26	0.99	1.63	1.33	0.57	1.00	1.17	0.82	1.31	1.29
GA - Brighton & Hove	0.89	1.22	1.01	1.56	1.31	0.58	1.00	1.32	0.97	1.15	0.88
GA - Carousel Buses	0.90	1.17	1.00	1.21	1.44	0.69	1.00	1.08	0.75	1.38	2.02
GA - EYMS Hull City routes	0.86	1.28	1.00	2.26	1.56	0.48	1.00	1.00	0.85	1.19	1.43
GA - Konectbus	0.76	1.54	0.99	2.11	1.11	0.74	1.00	0.80	0.87	1.09	2.29
GA - Metrobus	0.86	1.23	1.01	1.87	1.28	0.37	1.00	0.92	0.96	1.87	0.76
GA - Oxford P&R	0.89	1.21	0.98	2.32	1.20	0.43	1.00	0.62	1.00	1.01	1.45
GA - Plymouth Citybus	0.85	1.30	1.00	1.30	1.15	0.76	1.00	1.28	0.80	1.57	1.03
GA - Salisbury Reds	0.83	1.55	1.03	2.84	1.45	0.67	1.00	2.51	0.65	1.70	2.03
GA - Southern Vectis	0.73	1.63	1.01	2.19	1.32	0.73	1.00	1.45	0.79	1.01	1.67
Nottingham City Transport - city routes boost	0.86	1.18	1.89	3.15	0.86	0.38	2.30	0.60	0.90	1.47	1.33
Reading Buses	0.86	1.28	0.99	1.60	1.72	0.54	1.00	1.14	0.78	1.06	2.81
Stagecoach Cumbria & North Lancs	0.86	1.32	0.84	2.05	1.13	0.82	0.84	1.12	0.81	1.46	1.22

Stagecoach East - Cambridge Busway	0.77	1.50	1.05	1.61	1.29	0.68	0.96	0.98	0.91	1.31	1.05
Stagecoach East (excl. Cambridge Busway)	0.83	1.42	0.97	3.12	1.10	0.53	1.04	1.00	1.04	1.00	0.92
Stagecoach Gloucestershire routes	0.82	1.39	1.02	2.07	1.28	0.60	1.00	1.44	0.84	1.63	0.87
Stagecoach Midlands	1.00	1.01	0.99	0.93	1.40	0.82	1.00	0.76	1.08	1.02	0.98
Stagecoach South	0.87	1.26	1.01	2.08	1.85	0.43	1.00	1.93	0.74	3.17	0.81
Stagecoach South West	0.89	1.21	1.01	1.68	1.27	0.77	1.00	2.53	0.94	1.37	0.65
Stagecoach West of England routes	0.96	1.08	0.98	1.42	1.13	0.82	1.00	0.75	0.74	2.17	2.31
Transdev Blazefield - The Blackburn Bus Company	0.85	1.21	1.02	1.29	0.93	0.92	1.00	1.98	0.90	1.26	0.82
Warrington's Own Buses	0.87	1.28	1.01	1.39	1.44	0.72	1.00	2.13	0.77	1.05	1.72

7j. Actual (average) rim weights applied to area and operator samples in Scotland

Areas in Scotland	Female	Male	No res-ponse	16-25	26-59	60+	No res-ponse	AM peak	Off-peak	PM peak	Weekend
First Glasgow	0.83	1.27	0.99	0.94	1.03	1.00	1.00	1.30	0.77	1.04	2.13
First Scotland East	0.86	1.28	0.95	1.32	0.97	0.88	1.00	1.10	0.79	1.73	1.16
HITRANS	0.82	1.33	0.99	2.30	1.02	0.73	1.00	1.81	0.88	1.53	0.75
Lothian Buses	0.93	1.10	1.00	0.94	1.05	0.94	0.99	2.20	0.99	0.64	1.25
Nestrans - Aberdeen City only	0.86	1.21	1.00	1.31	1.13	0.70	1.00	0.75	1.13	0.78	1.49
Nestrans - Aberdeenshire only	0.92	1.11	1.00	1.09	1.29	0.78	1.00	0.66	0.83	1.74	1.18
SESTRANS (ex. First Scotland East and Lothian Buses)	0.79	1.50	0.85	0.77	0.89	1.53	0.84	1.03	1.44	0.71	0.86
Strathclyde Passenger Transport (ex. First Glasgow)	0.84	1.32	1.02	2.90	0.90	0.88	1.00	2.09	0.74	2.64	0.86
SWESTRANS excluding Stagecoach Combria & North Lancs	0.92	1.12	1.01	0.96	0.98	1.03	1.03	0.64	0.81	1.27	2.63
TACTRANS (ex. First Scotland East)	1.00	1.00	1.01	0.80	0.97	1.15	1.00	0.67	0.90	1.42	1.24

The weighting efficiency after rim weights had been applied (and before the second stage of weighting described below) ranged from 55% for GA Salisbury Reds, to 94% for Stagecoach Cumbria & North Lancashire. This compares to a range between 35% (for the Milton Keynes non-major operators boost) and 93% (for Stagecoach West Scotland) in 2017.

7.2 Weighting to proportion Primary Sampling Units within total survey dataset

Weighting was also used to proportion each PSU to the number of passenger journeys it represented within the total set of areas surveyed. Journey numbers for each local authority were sourced from DfT Bus Statistics, and the unweighted sample size for each PSU was 'grossed up' to this number. This meant that, with any analysis where results were aggregated, e.g. for a type of PSU (such as 'all PTEs'), the component PSUs within that aggregate made the appropriate contribution relative to each other.

While journey numbers for local authority areas were available from the DfT, journey numbers for Operator PSUs were derived, and in some cases provided by operators themselves. For operator journey volumes that were derived: from the sample universe supplied by ITO World, it was possible to determine the proportion of all journeys served by an individual operator within the local authorities where it operated, and therefore to estimate the journey volumes for an operator, as a proportion of the journey volumes published at local authority level by the DfT.

For some Operator PSUs in the Autumn 2018 survey, that PSU was the only (or main) coverage of bus services in its area (e.g. the survey of Blackpool Transport was the only coverage in the whole survey of the areas this operator serves). However, some Operator PSUs were effectively sample boosts on local authority PSUs which were also being surveyed already – such as GA Metrobus and GA Brighton & Hove Buses as boosts on the East Sussex and Kent surveys. In these cases, the same process was used to estimate the annual journey volume weights for the operator, but the same volume was also *deducted* from the journey volume weights for the respective local authorities. This was necessary to ensure that the total journey volume weight for these local authorities was still proportionate to other PSUs, e.g. that the total journey volume weight for East Sussex (which was actually made up of the East Sussex survey plus the two GA operator boosts – and this case the additional boost for specified Hastings and Bexhill routes), matched the published figures for the number of journeys in East Sussex. The same principles applied to other types of booster samples, for example the boost on routes run by non-major operators in Milton Keynes, Nottinghamshire and Kent.

The following tables show the journey volume weightings applied to the PSUs selected within this wave's survey. Journey volumes are shown in thousands. The tables show only the weights which were informed by the DfT's published statistics, and / or derived using the methods outlined above. Where the weights were informed by operators themselves, this information has been redacted in the tables below since it is potentially commercially sensitive.

More information can be provided on request following discussion with Transport Focus about how it will be used.

7k. Journey volumes and weights

PTEs	**Journeys** *('000)**	**Sample size** *(valid responses used in reported results)*	**Journey volume weight**
Greater Manchester	194,560	2,074	93.8
Mersey & Halton	106,258	2,031	52.3
South Yorkshire	95,758	1,483	64.6
Tyne & Wear	108,911	1,602	68.0
West Midlands	259,364	3,049	85.1
West Yorkshire	147,818	1,743	84.8

Unitary Authorities (and boosts)	**Journeys** *('000)**	**Sample size** *(valid responses used in reported results)*	**Journey volume weight**
Bournemouth & Poole	28,370	909	31.2
Chester West & Chester	9,650	785	12.3
Cornwall (excl. GA Plymouth Citybus)	8,965	808	11.1
County Durham	21,622	787	27.5
Leicester City	26,635	909	29.3
Milton Keynes (excl. non-main operators)	7,692	380	20.2
Milton Keynes (non-main operators)	2,298	316	7.3
Northumberland (excl. Stagecoach Cumbria & North Lancs)	8,716	494	17.6
Swindon	11,873	954	12.4
Tees Valley	29,965	1,899	15.8
WECA & North Somerset (excl. Stagecoach West of England routes)	68,803	1,455	47.3
York	15,913	522	30.5

Two tier authorities (and boosts)	**Journeys** *('000)**	**Sample size** *(valid responses used in reported results)*	**Journey volume weight**
Derbyshire	25,190	1,209	20.8
East Sussex - Stagecoach H&B routes	4,553	421	10.8
East Sussex (ex GA B&H, GA Metrobus, Stgc H&B routes)	9,215	30	307.2
Essex	44,646	819	54.5
Kent (non-major ops boost - excluding Metrobus)	7,149	368	19.4
Kent main (ex Metrobus and ex non-major groups)	47,846	666	71.8
Lincolnshire	13,505	513	26.3
Nottinghamshire (ex non major groups)	24,456	900	27.2
Nottinghamshire (non-major operators)	4,316	399	10.8
Oxfordshire (excl. GA Oxford Bus P&R)	37,773	1,213	31.1
Staffordshire	16,624	1,000	16.6
Worcestershire	11,070	464	23.9

Operators not assigned to any authority areas	Journeys *('000)***	Sample size *(valid responses used in reported results)*	Journey volume weight
Blackpool Transport		477	
First South Coast		542	
GA – Bluestar		403	
GA - Brighton & Hove		913	
GA - Carousel Buses		241	
GA - EYMS Hull City routes		338	
GA – Konectbus		359	
GA – Metrobus		536	
GA - Oxford P&R		337	
GA - Plymouth Citybus		793	
GA - Salisbury Reds		306	
GA - Southern Vectis		309	
Nottingham City Transport - city routes boost		200	
Reading Buses		814	
Stagecoach Cumbria & North Lancs		584	
Stagecoach East - Cambridge Busway		309	
Stagecoach East (excl. Cambridge Busway)		407	
Stagecoach Gloucestershire routes		492	
Stagecoach Midlands		443	
Stagecoach South		550	
Stagecoach South West		536	
Stagecoach West of England routes		319	
Transdev Blazefield - The Blackburn Bus Company		312	
Warrington's Own Buses		303	

Scotland	Journeys *('000)****	Sample size *(valid responses used in reported results)*	Journey volume weight
First Glasgow		1,132	
First Scotland East		782	
HITRANS	11,200	645	17.4
Lothian Buses		1,943	
Nestrans - Aberdeen City only	16,200	619	26.2
Nestrans - Aberdeenshire only	6,300	628	10.0
SESTRANS (ex. First Scotland East and Lothian Buses)	53,334	152	350.9
Strathclyde Passenger Transport (ex. First Glasgow)	67,176	236	284.6
SWESTRANS (ex. Stagecoach Cumbria & North Lancs)	13,300	625	21.3
TACTRANS (ex. First Scotland East)	31,575	1,144	27.6

** Source: Table BUS0109a - Passenger journeys on local bus services by local authority1,2: England, from 2017/18*

*** Source: information provided directly by operators*

****Source: DfT Bus Statistics data 2017/18 and operator information*

7.3 Weighting total

The final weight was the multiplication of the two component weights as shown below:

Final weight = demographic x journey millions.

7.4 Survey accuracy

This research was designed to ensure robust sample sizes for analysis, at PSU level and in some cases among specific passenger groups within PSUs (e.g. commuters versus leisure travellers). As the survey was conducted with a sample of bus users in each PSU (as opposed to all of them), there could be some differences in results compared to a census of the whole population.

We can be 95% certain that the actual figure (in the universe of all bus journeys) falls within a certain range of the survey figure. The percentages within the tables below represent the typical error variance, for a result of around 80% (results nearer to 0% or 100% are statistically more accurate than results nearer to 50%). This level of accuracy is for analysis run on the Autumn 2018 wave only; where possible, combining waves together for analysis will increase robustness and therefore accuracy.

7l. Typical error variances in Autumn 2018 survey results

PTEs	Typical error variance on a result of around 80%
Greater Manchester	1.9
Mersey & Halton	1.9
South Yorkshire	2.2
Tyne & Wear	2.3
West Midlands	1.5
West Yorkshire	2.4

Unitary Authorities *(and boosts)*	**Typical error variance on a result of around 80%**
Bournemouth & Poole	3.0
Cheshire West & Chester	3.0
Cornwall	2.7
County Durham	3.1
Leicester City	2.8
Milton Keynes	3.8
Milton Keynes (non-main operators)	5.5
Northumberland	4.6
Swindon	2.9
Tees Valley	1.9
West England Partnership	2.2
York	4.0

Two tier authorities *(and boosts)*	**Typical error variance on a result of around 80%**
Derbyshire	2.4
East Sussex	4.1
East Sussex (Hasting & Bexhill boost)	5.0
Essex	2.9
Kent	2.7
Kent (non-major operator boost)	4.7
Lincolnshire	4.0
Nottinghamshire	2.5
Nottinghamshire (non-main operators)	4.6
Oxfordshire	2.8
Staffordshire	2.7
Worcestershire	3.9

Operators	**Typical error variance on a result of around 80%**
Blackpool Transport (OA)	4.0
Bluestar (OA)	4.1
Brighton and Hove (OA)	2.8
Carousel Buses (OA)	5.6
East Yorkshire Motor Services - Hull routes (OA)	5.2
First South Coast (OA)	4.2
Konectbus (OA)	4.9
Metrobus (OA)	4.1
Nottingham City Transport – combined	4.8
Oxford P&R (OA)	5.2
Plymouth Citybus (OA)	2.9
Reading Buses (OA)	3.4
Salisbury Reds (OA)	6.0

Southern Vectis (OA)	5.2
Stagecoach Cumbria & North Lancs (OA)	3.4
Stagecoach East - Cambridge Busway (OA)	4.8
Stagecoach East - excluding Cambridge Busway (OA)	5.1
Stagecoach Gloucestershire routes (OA)	4.1
Stagecoach Midlands	3.9
Stagecoach South (OA)	4.0
Stagecoach South West (OA)	3.8
Stagecoach West of England routes (OA)	5.0
Transdev Blazefield - The Blackburn Bus Company	4.7
Warrington's Own Buses (OA)	4.9

Scotland	**Typical error variance on a result of around 80%**
Aberdeen City	3.4
Aberdeenshire	3.4
First Glasgow (OA)	2.6
First Scotland East (OA)	3.0
HITRANS	3.5
Lothian Buses (OA)	1.9
NESTRANS	2.4
SESTRANS	1.6
Strathclyde Passenger Transport	2.4
SWESTRANS	3.4
TACTRANS	2.2

8 Online methodology: Impact of changes to the survey method

8.1 Impact of changes to survey method on respondent profile

Prior to the Autumn 2015 wave of the BPS, only paper questionnaires were offered to passengers. It was known that younger people (especially males) were under-represented in this method. Linked to this imbalance in respondent profile, commuters and fare-paying passengers were also typically under-represented in favour of more leisure, off-peak travellers. Pilot and other work had indicated that moving to the dual paper / online method could improve the response from these under-represented groups, thus improving the overall quality of the survey sample. Therefore, from Autumn 2015 a dual online and paper method was used.

Table 8d below shows the proportions of respondents from Autumn 2015 onwards who were recruited to the survey and who completed the survey on paper and online. Looking at the columns for 2015-2017, we can see that around one in ten received a questionnaire using an online method and there was a slight decrease to this in 2017 compared to 2016 and 2015; this was also accompanied by a slightly lower online response overall in 2017[6]. It was felt that the online option was not fulfilling all of its potential to improve the representation of younger people (and therefore commuters, fare-payers, etc.), since the overall proportion of online respondents within the survey sample was still minimal. The BDRC team therefore looked at various ways in which there might be potential to increase online response.

One piece of analysis showed that the likelihood for people to respond to the online survey was strongly correlated with how soon after recruitment they received their email invitation with the survey link. In Autumn 2017 it took four days on average[7] for the email invitation to come through, after the passenger had initially been approached by a fieldworker on board a bus (this was a small improvement since 2015). At this time, most recruited passengers' email addresses were recorded on mobile devices by the fieldworkers, and then these were uploaded to a central database at the end of a shift (or when the device was next in wifi / data connection range). Email invitations were then sent out in batches every day except at weekends. This process inevitably meant that there was sometimes a lag between passengers being recruited and receiving their email invitation (especially if recruited on a Friday, meaning in many cases they would not receive the survey link until the following working week).

To address this, from 2018 the process was fully automated: all email addresses were captured on mobile devices which automatically uploaded the details to the central database when in range, and that also automatically triggered the email invitation with the survey link. This meant that many respondents received their survey link immediately or within minutes or hours, rather than a day or multiple days later. This in turn had a notable effect on response rate.

The results of this change are shown in the following graphs and tables:

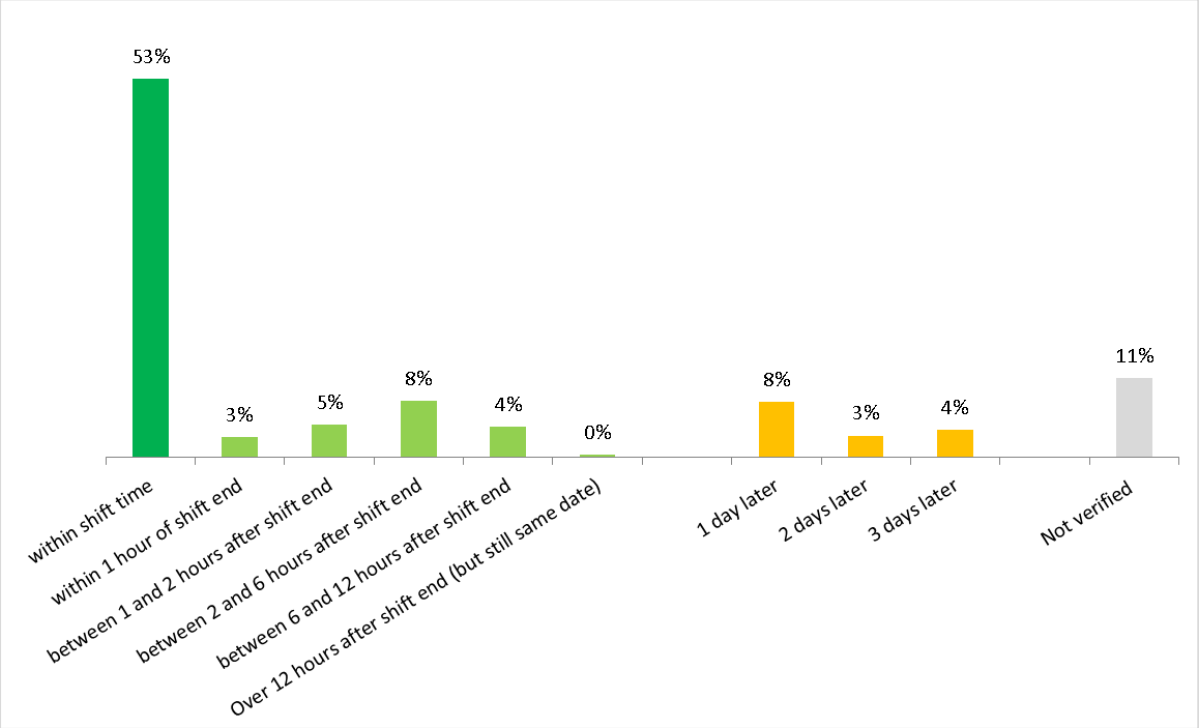
[6] These are partly real decreases, and partly driven by variances in the PSUs covered: in particular, Wales and Scotland, both covered in 2017, generally had lower online take-up than many English PSUs.
[7] 4.2 days was the mean average, which is partly inflated by some outliers. 63% of recruited passengers in 2017 received their email invitation within 3 days.

1. Graph 8a shows the time lag between recruitment and receiving the online survey link in 2018, and table 8b shows how this time lag changed between 2015-17 and 2018. Where the lag was an average of 4-5 days in 2015-17, it was less than one day on average in 2018. (This does not include a small number of cases where it appeared that the passenger received their survey invitation 4+ days after the shift took place during which they were recruited. These were among a number of cases where the shift took place on a different date from that originally scheduled, but details could not be verified. This was due to some technical issues with the database in this first wave of the new automated invitation system, and is expected to be reduced in subsequent years.)

2. Table 8c shows the average response rate to the online survey in each year. Here we can see that the declines in response rate that had been seen up to 2017 were arrested in 2018.

3. Table 8d shows the proportion of all recruits that chose the online survey option versus paper, followed by the proportion of all respondents in the online and paper versions. These show that while around the same proportion chose to take up the online option as in 2017 (we would have no reason to expect any different finding to this), the recovery in response rate noted above also resulted in a recovery in the contribution that online respondents made to the final survey sample. (Note that, as seen in 2017, these figures are also dampened somewhat by Scotland, where both the proportion of recruits, and especially the proportion of respondents, were lower from the online survey compared to the paper).

8a. Time difference between recruitment and receipt of email invitation to survey: detailed 2018



8b. Time difference between recruitment and receipt of survey link: average 2015-2018

2015	4.9 days (60% within 3 days)
2016	4.1 days (67% within 3 days)
2017	4.2 days (63% within 3 days)
2018	Most within shift time (as shown in bar graph above); for those not, an average of 0.9 days after shift

8c. Response rate to online survey

	2015	***2016***	***2017***	***2018***
Response rate: all entering survey	*33%*	*26%*	*23%*	*32%*
Response rate: all completing survey (to Q31)	*25%*	*18%*	*18%*	*24%*

8d. Proportion of recruits and respondents in online vs paper versions of the survey

Method of questionnaire distribution	***2015***	***2016***	***2017***	***2018***
Paper questionnaires handed out	90%	89%	92%	92%
Email addresses collected	11%	11%	8%	8%

Method of survey completion	***2015***	***2016***	***2017***	***2018***
Respondents completing survey on paper	92%	93%	95%	93%
Respondents completing survey online	8%	7%	5%	7%

The tables below demonstrate the (unweighted) profile of respondents completing a questionnaire using each method. In summary this shows a slightly greater proportion of younger people (16-25 year olds), males, fare-payers and commuters completing online. That is, as expected, the online option appears to be encouraging response from under-represented and harder to reach groups. (Over time there is also a slight flattening out of the age, journey purpose and fare-paying profile of online respondents, which is to be expected as the wider use of smartphones and tablets in particular continues to increase among all ages.)

This overall pattern has continued in 2018, confirming that it is worthwhile to take steps, such as the automation of survey invitations, to maximise the role that an online element can make to the BPS.

8e. Unweighted respondent profile by method

	2015		2016		2017		2018	
	Paper	**Online**	**Paper**	**Online**	**Paper**	**Online**	**Paper**	**Online**
16-25	14%	34%	13%	36%	12%	31%	14%	32%
26-59	34%	49%	34%	46%	31%	46%	32%	47%
60+	48%	16%	48%	16%	51%	22%	47%	21%
Not stated	5%	2%	5%	1%	5%	1%	7%	1%
Male	32%	37%	32%	38%	32%	37%	33%	36%
Female	62%	61%	63%	60%	62%	61%	60%	62%
Not stated	6%	2%	5%	1%	6%	2%	8%	2%
Free pass holder	51%	17%	50%	19%	54%	22%	48%	22%
Fare payer	47%	83%	47%	81%	44%	77%	49%	78%
Not stated	2%	0%	3%	0%	2%	1%	3%	0%
Commuter	33%	57%	32%	57%	31%	54%	32%	54%
Non-commuter	62%	43%	63%	43%	69%	46%	63%	46%

8.2 Increasing the contribution of online surveys

The above analysis shows that there have been some improvements (at least a recovery) in the level of contribution that online respondents make to the survey sample.

However, it is worth considering how the online survey might contribute more in future waves, to further encourage younger people (and therefore commuters and fare-payers) into the survey. We would expect this to lead to an overall reduction in the level of weighting required. There are three main areas which have been looked at:

1. There were some technical difficulties with the automation system at the outset of the 2018 survey (which were resolved but may have brought down the averages in the analyses above), and in the central database linked to the automation process. Resolving these in future waves is likely to cause marginal improvements in the effectiveness – i.e. the speed – of the whole process. Since we know that faster receipt of the survey link correlates with response rate, this could lead to small improvements in response rate to maximise the number of recruits.

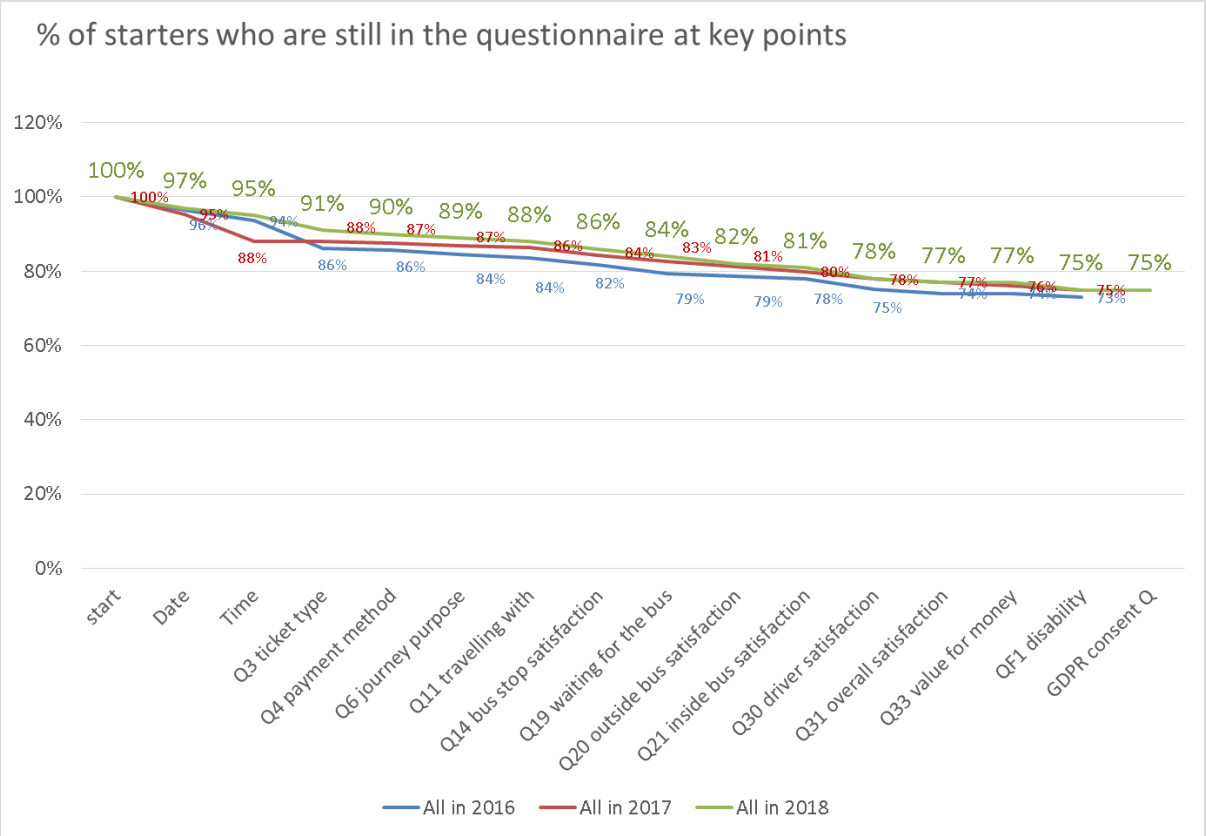
2. We have reviewed the level of drop out from the online survey, and the places where people typically drop out, to see if there are potential hotspots within the survey itself that could affect overall response. Graph 8f below shows those who completed key questions as a proportion of those who began the online survey, effectively showing where drop-out was most prevalent. This compares data for the last three years[8]. Small additional changes in 2017 and then 2018 had a very small impact overall, probably indicating that the survey is becoming as effective as possible in this respect (some level of drop out is to be expected in all online questionnaires).

   (See the questionnaire in Appendix 1 to view full question wording[9].)

[8] A previous comparison of 2016 to 2015 showed that efforts to improve drop outs at key drop out questions in 2015 had been successful to some extent, with the drop-out rate more gradual over the whole survey

[9] The questionnaire shown in the Appendix is an example of the paper version. This does not include a question on the date of the passenger's journey, because this information can be confirmed by the fieldworker at the point of recruitment (they write the date in the top right hand corner of the questionnaire). The question about the date of the journey is included on the online questionnaire only. The survey programme gives the date the respondent is expected to have been recruited (from sample information), but the respondent is asked to verify and amend this, in case of last-minute changes to fieldwork which, in isolated cases, may not have been accounted for in the survey programme by the time of completion.

8f. % of online starters who are still in the survey at key points in the questionnaire:



Two other points are encouraging:

- Questions were added in 2018 for compliance with the new GDPR which came into effect in advance of the survey; this included some additional consent questions around the classification details that are requested from respondents. There was some concern that the presence of the consent question might put some respondents off from answering the final questions. However graph 8f shows that there was no further drop-out from this question, indicating that it did not have this potential negative effect.

- The fact that the level of drop out at key questions has not changed much from 2017 to 2018 is a positive in light of the fact that the proportion of people completing the survey on a smartphone markedly increased in 2018 (likely a result of many people receiving their survey link while still on the bus, and / or while still out and about). This is shown in table 8g below: overall, the increase in smartphone responses did not cause a decrease in the average effectiveness of the online questionnaire. This is a positive since it is known that people completing surveys (across all market research) on smartphones are more likely to drop out than those completing on larger or at-home/work devices.

8g: proportion of online respondents starting the survey on…

	2016	2017	2018
Smartphone	53%	57%	67%
Tablet	35%	32%	24%
Desktop	11%	11%	9%

3. Thirdly, while the point immediately above – that increased smartphone usage did not in itself lead to an average greater drop out from the survey than in previous years – it is still the case that smartphone users are less likely to continue all the way through the survey, than tablet or desktop users. This may be due to the way the questions appear on screen (though significant work has been done to ensure the mobile experience is good, while also balancing this with a need for consistency in the way questions are presented to different respondents), or to the different type of respondent that typically completes the survey on a mobile, or simply to the length of the survey (intuitively we would expect that people will have more tolerance for a relatively long set of questions when they are in front of a desktop screen in particular, compared to when using a mobile when they are more likely to be out or on the move). Since little (more) can be done in response to the first two possible causes, and in anticipation that smartphone usage may also continue to rise further (among the older age groups in particular), it would seem sensible to consider again whether a shortened version of the survey could be served to those entering it on a smartphone. This would mean further investigation and pilot work to understand what effect this has on results overall, and weighing this up against the potential gains to be made from retaining more smartphone users through to the end of the survey.

9 Day-part definitions: the change for 2018 and its impact

When the BPS method was reviewed by the independent consultant after the 2014 Autumn wave, one of the adopted recommendations was to introduce a day-part weight. The same review also recommended using a model to predict patronage on board buses which would enable more effective sampling, and the day-part of a bus journey is one of the significant factors used in this modelled prediction.

From Autumn 2015 the day-parts used in both the weighting and patronage predictions, and therefore sampling, were:

- Weekday morning peak (06:00 – 08:59)
- Weekday off-peak (before 06:00, 09:00 – 16:29, or after 18:59)
- Weekday evening peak (16:30 – 18:59)
- Weekend.

These definitions were based on common sense, but some stakeholders felt that the weekday definitions did not tally closely with peak and off-peak passenger flows in their area. Transport Focus also used a slightly different variation of the day-parts in reporting, and sometimes found that the sample sizes for the weekday evening peak period in particular were too low for robust reporting at day-part level.

Therefore, in advance of the Autumn 2018 wave, a review of the weekday day-part definitions was carried out, with a view to amending them if needed to meet the needs and expectations of as many survey users as possible. The definitions were reviewed in three ways:

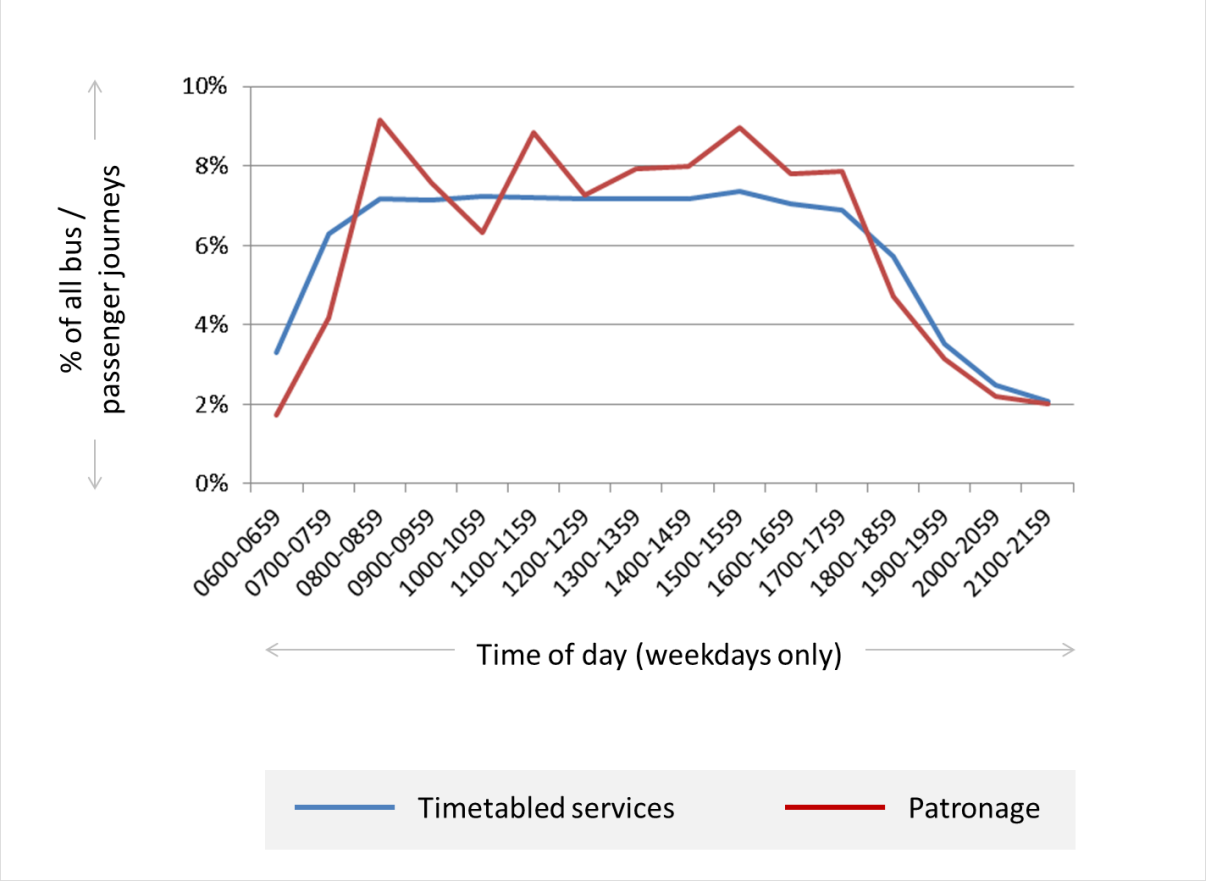
1. The BDRC team looked at the profile of all timetabled bus journeys[10], across a selection of thirty different PSUs that had been surveyed in 2017 (including a mix of regularly covered PSUs and "one-offs", different types of areas and operators, and a wide geographical mix). These are summarised in the blue line in Graph 9a below.

2. The team looked at the profile of patronage across the same thirty PSUs. This used the patronage counts made during the fieldwork for these PSUs, to create an average number of passengers per bus per day-part, in each PSU. This average was then multiplied by the number of actual timetabled bus services per day-part, in each PSU. This is also summarised, in the red graph line, below.

[10] *On weekdays between 06:00 and 21:59, which is the usual time during which fieldwork takes place.*

9a. Profile of timetabled bus journeys and passenger journeys

(Based on a sample of PSUs surveyed during Autumn 2017)



The data here show that, typically, bus timetables run at near or full frequency from 7-8am until 6-7pm. However, passenger journeys are at their peak from between 8am and 9am, and drop in volume after around 5-6pm.

3. Transport Focus also consulted with key stakeholders including several local authorities and operators, to establish any patterns in when these different stakeholders considered the peaks to be. Although there was no consistent approach, the greatest common ground was for:

- Weekday morning peak: starting 07:00 or 07:30 and ending 09:00 or 09:30 (although some were simply pre-09:00 or 09:30)
- Weekday evening peak: starting 15:00 or 15:30 and ending 18:00 or 18:30 (although some stretched to 19:00).

Based on all of this, the decision was taken to re-define the day-parts for sampling and weighting as:

- Weekday morning peak (07:00 – 09:29)
- Weekday off-peak (before 07:00, 09:30 – 15:29, or after 18:30)

- Weekday evening peak (15:30 – 18:30)
- Plus weekends, which were unchanged.

9.1 The impact on sample profiles

As a result of this change, a larger proportion of shifts was typically assigned to the evening peak compared to previous waves. This was partly because the evening peak band had been widened (it was now half an hour longer), and partly because it was now better aligned with the peak of passenger flow, meaning bus services during this day-part were given a higher weight during the sample selection than previously. A lower proportion of shifts was therefore assigned to the new off-peak definition, and in most cases to the morning peak (which was now half an hour shorter).

The universe and shift profile for the West Midlands in the Autumn 2017 and 2018 surveys is shown below as an example[11]:

9b. Universe and shift plan profiles by day-part: West Midlands

	2017		**2018**	
	Universe *(all passenger journeys)*	**Shifts in BPS**	**Universe** *(all passenger journeys)*	**Shifts in BPS**
Morning peak	17%	15%	13%	14%
Off-peak	53%	51%	49%	50%
Evening peak	11%	11%	19%	16%
Weekend	19%	23%	19%	20%

9.2 The impact on unweighted respondent profile

Table 9c shows how these changes in the sample selection affected the profile of respondents in the final survey – again using West Midlands as an example. Although weighting is still

[11] Note that the shift profile does not match the universe profile exactly, in either year. This is normal for all PSUs in each wave, and comes as a result of putting together a set of shifts which are practical in terms of undertaking fieldwork, and have a profile which is as close as possible to the universe in terms of day-part but also operator mix, day of week, and in many cases, route number within operator.

required, by starting with a larger target for the evening peak period in particular, a larger proportion of the overall West Midlands sample was picked up during the evening peak, providing more robust sample sizes for this day-part.

9c. Unweighted day-part profiles: West Midlands

	2017			2018		
	Universe and target profile	**Actual unweighted profile**	**Average rim weight required to achieve target**	**Universe and target profile**	**Actual unweighted profile**	**Average rim weight required to achieve target**
Morning peak	17%	12%	1.31	13%	13%	1.00
Off-peak	53%	63%	0.89	49%	53%	0.92
Evening peak	11%	8%	1.36	19%	13%	1.48
Weekend	19%	17%	1.03	19%	21%	0.92

The data in table 9d below is more significant because it shows the impact that the change in definition (and size) of the day-parts had on other aspects of respondent profile, in particular around the typically harder-to-engage groups: younger people, males, commuters and fare-payers.

This table shows that, overall, a higher proportion of the final unweighted sample were younger people, which also correlates with higher proportions of commuters and fare-payers. The reasons for this are:

- Younger people have always been most prevalent in the peaks – and now particularly the evening peak (as it has moved earlier, better capturing school / college finish times). So altering the time of the evening peak seems to have improved representation of younger people

- Commuters (and therefore fare-payers) have always been most prevalent in the peaks. The slight drop in the proportion of commuters in the morning peak (and corresponding uplift in off-peak) may be due to the loss of one hour between 6am and 7am – previously counted as morning peak and now counted as off-peak. However, with commuters making up over half of the evening peak sample, and this part of the day having been significantly increased in the sample selection (sometimes doubled, as in West Midlands for example, increasing from 11% to 23%), this is the overall reason for

there being more commuters, and therefore fare-payers, in the overall unweighted sample.

9d. Unweighted sample profiles within day-part: (all areas)
Notable increases in proportions of sample groups between 2017 and 2018 are highlighted green

	2017					2018				
	Total	**Morn-ing peak**	**Off-peak**	**Even-ing peak**	**Week end**	**Total**	**Morn-ing peak**	**Off-peak**	**Even-ing peak**	**Week end**
16-24	**13%**	21%	11%	19%	13%	**23%**	26%	21%	32%	21%
25-59	**32%**	55%	26%	47%	32%	**36%**	46%	32%	39%	38%
60+	**50%**	20%	57%	30%	50%	**35%**	21%	41%	23%	36%
Male	**32%**	31%	32%	35%	34%	**36%**	31%	35%	42%	40%
Female	**62%**	64%	62%	60%	60%	**56%**	60%	57%	53%	54%
Comm-uter	**31%**	77%	24%	54%	16%	**41%**	70%	37%	58%	22%
Non-comm-uter	**63%**	19%	69%	41%	78%	**55%**	28%	59%	37%	75%
Fare-payer	**45%**	80%	37%	66%	44%	**62%**	77%	57%	68%	60%
Free pass holder	**52%**	17%	61%	31%	53%	**35%**	19%	41%	29%	36%

These increases in the overall proportions of younger people, commuters and fare-payers (and to a lesser degree males) are important because they have helped to contribute to the lower levels of weighting needed overall in the 2018 survey compared to previous waves. Table 9e illustrates this, where the average rim weights on younger people, males, commuters and fare-payers have all been reduced.

9e. Average rim weights applied by key sample parameters

Notable improvements in size of rim weights between 2017 and 2018 are highlighted green

	2017	2018
16 to 25	1.83	1.59
26 to 59	1.26	1.20
Over 60	0.65	0.66
Male	1.37	1.24
Female	0.84	0.87
Commuting	1.36	1.24
Non-commuting	0.86	0.87
Fare-payer	1.34	1.22
Free pass	0.74	0.75
Morning peak	1.57 *(06:00 - 08:59)*	1.11 *(07:00-09:29)*
Off peak	0.85	0.87
Evening peak	1.18 *(16:30 - 18:59)*	1.23 *(15:30-18:29)*
Weekend	1.25	1.15

With the changes to the unweighted sample profile outlined above, it is important to understand whether or not this has had any impact on the weighted sample profile, and therefore on the results from the survey, over time. The following analysis and commentary examine these points.

9.3 Impact on the weighted sample profile

Overall, the weighted profile by day-part has changed – though this is largely limited to the day-part profile:

- As shown in the two tables below, the morning peaks and off-peaks are now contributing less to the final weighted results than in 2017, and the evening peak is contributing much more. The analysis is shown at overall sample level (table 9f), and for the West Midlands separately (table 9g) to give an idea of the change seen at PSU level as well as overall. To some degree the changes here align with the fact that the

morning peak is now half an hour shorter and the evening peak is half an hour longer (the off-peak time still covers 10.5 hours in total, but this is across slightly different times of the day and includes 6-7am). But this is not the only reason, because the increase and decrease in morning peak and evening peak are not simply a result of each other. Rather, we are also seeing that the higher volume of journeys taking place in the "evening peak" (perhaps more accurately the "afternoon" peak), are now also being represented more fully – and more accurately. Weekend contribution is relatively unchanged.

- Beyond this, although there are variations for some individual PSUs, the weighted profile by age, gender and journey circumstances is relatively unchanged since 2017. This is to be expected, since weights are applied for age and gender which have controlled this aspect, and this will also have helped to create some stability in the proportion of fare-payers versus free-pass holders (which is linked to age in particular) and in journey purpose (which is linked to time of day but also to age).

9f. Weighted profiles: Total sample

	2017 weighted profile	**2018 weighted profile**
Morning peak	17% *(06:00-08:59)*	12% *(07:00-09:29)*
Off-peak	54% *(09:00-16:29, and 19:00 to late)*	49% *(06:00-06:59, 09:30-15:29, and 18:30 to late)*
Evening peak	10% *(16:30-18:59)*	21% *(15:30-18:29)*
Weekend	19%	18%
16-24	25%	25%
25-59	41%	40%
60+	29%	28%
Male	42%	41%
Female	53%	51%
Commuter	43%	44%
Non-commuter	51%	52%
Fare-payer	63%	65%
Free pass holder	34%	33%

9g. Weighted profiles: West Midlands

	2017 weighted profile	2018 weighted profile
Morning peak	17% *(06:00-08:59)*	13% *(07:00-09:29)*
Off-peak	53% *(09:00-16:29)*	49% *(09:30-15:29)*
Evening peak	11% *(16:30-18:59)*	19% *(15:30-18:29)*
Weekend	19%	19%

16-24	28%	28%
25-59	45%	41%
60+	22%	25%

Male	44%	42%
Female	49%	50%

Commuter	48%	47%
Non-commuter	45%	49%

Fare-payer	71%	69%
Free pass holder	25%	28%

9.4 Impact on survey results

It is the case that satisfaction varies by day-part – as shown in table 9h below, where higher levels of satisfaction with the overall journey are seen in the off-peaks and weekends.

9h. Overall journey satisfaction by day-part (total survey, weighted, 2018)

	Total	Morning peak	Off-peak	Evening peak	Weekend
Very satisfied	44%	37%	48%	38%	46%
Fairly satisfied	38%	43%	36%	42%	36%
Neither/nor	7%	9%	6%	9%	6%
Fairly dissatisfied	2%	3%	2%	4%	1%
Very dissatisfied	1%	2%	1%	2%	1%
NET: satisfaction	82%	80%	84%	79%	82%

It would therefore follow that we might expect to see lower levels of satisfaction overall in 2018 compared to 2017, because together the peak periods contribute more than before (33% in 2018 compared to 27% in 2017). The next table below, 9i, provides this comparison, showing the same analysis as above, for 2017:

9i. Overall journey satisfaction by day-part (total survey, weighted, 2017)

	Total	Morning peak	Off-peak	Evening peak	Weekend
Very satisfied	44%	38%	47%	35%	47%
Fairly satisfied	38%	43%	37%	44%	37%
Neither/nor	7%	10%	6%	10%	7%
Fairly dissatisfied	3%	4%	2%	4%	2%
Very dissatisfied	1%	1%	1%	2%	1%
NET: satisfaction	83%	81%	84%	79%	84%

As can be seen here, the change from 2017 to 2018 is very minimal, at the overall survey level – there is an overall decrease in satisfaction (by less than 1%), but this looks to be driven as

much by a drop in satisfaction at the weekend, than because of the change in day-part definitions.

Of course, changes in satisfaction may also be driven by the different mix of PSUs surveyed from one year to the next, or by real changes to service provision. To control for this to some degree, the following table (9j) repeats the same analysis, but based on the group of PTE areas[12] which was consistent between 2017 and 2018. (Analysis at individual PSU level is unlikely to be helpful because changes in satisfaction are very likely to be real rather than research-effect changes.)

This information demonstrates again that there appears to be little change from one year to the next, in overall satisfaction, as a direct result of the change to the day-part definitions. This is because, although there are small decreases in satisfaction within the morning and off-peaks (where we might expect a decrease for morning peak but an increase for off-peak, given their re-definition), there is no change within the evening peak (where we might have expected a drop, if there was a research-effect at play), and an increase within the weekends. **The overall small drop in satisfaction is not being driven by the larger contribution made in 2018 by the evening peak period, which is where we would have expected to see a research effect if there was one.**

9j. Overall journey satisfaction by day-part (all PTEs, weighted, 2017 vs 2018)

	2017					2018				
	Total	AM peak	Off-peak	PM peak	Week-end	Total	AM peak	Off-peak	PM peak	Week-end
Very satisfied	43%	37%	45%	33%	45%	42%	36%	44%	34%	47%
Fairly satisfied	40%	43%	39%	46%	38%	40%	43%	39%	44%	37%
Neither/nor	8%	12%	7%	9%	7%	8%	11%	7%	11%	7%
Fairly dissatisfied	3%	4%	2%	5%	3%	3%	3%	3%	4%	2%
Very dissatisfied	2%	1%	2%	4%	1%	2%	2%	1%	2%	1%
NET: satisfaction	83%	80%	84%	79%	83%	82%	78%	83%	79%	85%

To further verify this finding, the following table shows the net “satisfied” (or “good”) score on a number of other key measures, across the same set of PSUs.

[12] *PTE areas covered consistently on the survey are: Greater Manchester, Merseyside (+ Halton), South Yorkshire, Tyne & Wear, West Midlands, West Yorkshire. Where boosts were included in 2017 and not in 2018, these have been included within the relevant results shown here, though are weighted appropriately meaning that the set of PSUs is comparable from 2017 to 2018.*

9k. Key satisfaction measures (all PTEs, weighted, 2017 vs 2018)
(Net: satisfaction / good)

	2017	2018
Overall journey satisfaction	83%	82%
Value for money (fare payers only)	43%	44%
Bus driver: helpfulness/attitude	64%	67% ^
On bus journey time	80%	80%
Interior cleanliness/condition	75%	74%
Punctuality	64%	66% ^

^ *indicates statistically significant change vs. 2017*

Again this analysis does not indicate that the increase in the contribution of evening peak has caused a decrease in satisfaction, which would be the expected effect, if anything. In fact, despite the increased contribution of (typically more negative) day-parts, there have been some significant uplifts on some measures.

In conclusion, overall, the effect of redefining the day-parts has been to better reflect real passenger flows and thereby reduce the amount of weighting required, without notably affecting the satisfaction levels which transport authorities and operators will use to evaluate their service and help plan future business and operational decisions.

10 Other analysis: key drivers of satisfaction

The purpose of Key Driver Analysis

The headline measure on the Bus Passenger Survey is the level of passenger satisfaction with the overall journey, which provides a simple summary for the journey as a whole. Transport authorities and operators are, of course, also interested to understand how they might improve overall satisfaction, and where they should focus attention and resources to achieve this. Key Driver Analysis assists with this, by identifying elements of the journey experience which have the greatest impact upon the overall journey satisfaction rating that passengers give, using the other question ratings from the survey.

Questions included in the Key Driver Analysis

The headline measure is passenger satisfaction with the overall journey, taken from the core survey question:

Q31. Overall, taking everything into account from the start to the end of the bus journey, how satisfied were you with your bus journey?

The questions that were then tested for the impact they have on this overall satisfaction were taken from the core survey questions (see more detail in the questionnaire provided in Appendix 1):

- Q13 and Q14 (bus stop ratings)
- Q19 (waiting time and punctuality)
- Q20 (boarding the bus)
- Q21 and Q26 (on the bus)
- Q29 (the driver and quality of driving)
- Q32 (value for money).

How the Key Driver Analysis was conducted

A series of statistical techniques were used, with three stages:

Stage 1: Selecting fare paying passengers (filtering the data)

Transport Focus believes that value for money is important to passengers and so it was important to test it as one of the potential influencers of overall journey satisfaction. This meant that the analysis could only be conducted using the survey responses from fare-paying

passengers. Responses for non-fare paying passengers were therefore removed from the data before carrying out the Key Driver Analysis.

Stage 2: Categorising the main survey questions into themes (factor analysis)

This stage was first introduced for the Autumn 2016 survey and has been used since. The aim of this stage was to use a statistical technique (factor analysis) to group together individual questions from the survey into themes, based upon the way in which passengers respond to the questions. In previous waves (and in Transport Focus' other Passenger Surveys) there had usually been some degree of overlap between the responses that passengers give to the different satisfaction questions in the survey. For example, the survey asked about waiting time and punctuality in two separate questions, and while these questions have a slightly different meaning, there have often been similarities between the responses that passengers give to each. In such an example, we might regard this as being responded to by passengers as one theme, even though we have asked them two questions.

This is a common phenomenon when it comes to market research data, partly because of genuine overlap in topics covered and partly due to questionnaire effects, where responders to a survey might respond in a similar way across multiple questions or topics.

All the responses from fare payers in the Autumn 2018 Bus Passenger Survey were taken together, and used to identify the different themes, using the factor analysis technique. From this analysis we identified ten themes, which are shown in the table below; we then used these themes, rather than the individual questions, in the next stage of the analysis.

Theme (factor)	**Questions**
Bus driver	Nearness to kerb
	Appearance
	Greeting/welcome
	Helpfulness/attitude
	Time given to get to seat
	Smoothness/freedom from jolting
	Safety of driving
On bus environment and comfort	Availability of seating or space to stand
	Comfort of the seats
	Amount of personal space
	Provision of grab rails to stand/move within the bus

	Temperature inside the bus
	Personal security
	Ease of getting off bus
Bus stop condition	General condition/standard of maintenance
	Freedom from graffiti/vandalism
	Freedom from litter
Boarding the bus	Route/destination information on outside of bus
	Ease of getting onto bus
	Time taken to board
Timeliness	Waiting time
	Punctuality
Bus cleanliness and information on-board	Exterior cleanliness/condition
	Interior cleanliness/condition
	Information provided inside bus
Access to the bus stop	Distance from journey start
	Convenience/accessibility
Bus stop safety and information	Information provided at stop
	Personal safety at stop
Journey time	On-bus journey time
Value for money	Value for money (asked of fare payers only)

Stage 3: Identifying how much of an impact each of these themes had on the overall journey satisfaction question (regression analysis)

We used a second statistical technique (Multiple Linear Regression) to identify how much of an impact each of the themes had on the overall journey satisfaction question. While the generation of the themes was based upon all the responses from fare-payers in the Autumn 2018 surveys, the impact scores for each of the themes was calculated from the responses of passengers in each PSU only.

The analysis was performed in two stages:

- First, the drivers of satisfaction were identified. 'Satisfied' passengers were defined as those who were either very or fairly satisfied with their journey. Dissatisfied customers were classified as those saying either very or fairly dissatisfied, or those saying

neither/nor (thus this latter group are perhaps more accurately described as 'not satisfied'). The regression took into account all five points of the satisfaction scale, and was run using scalar driver variables (sometimes called independent variables) – this meant that moving any one point up the five point scale was assumed to have the same impact.

- Once the drivers of satisfaction had been determined, the 'non-satisfied' (very dissatisfied, fairly dissatisfied and neither/nor respondents) were removed, and a new regression analysis was run to determine which factors drove people to be very satisfied (rather than either fairly or very satisfied), again using scalar driver variables.

The two parts of the analysis therefore indicated, firstly, which service aspects should be improved in order to provide an adequate overall journey experience (i.e. one which is at least satisfactory) and secondly, which service aspects should be improved in order to provide a genuinely good experience.

For Autumn 2018, the key driver analysis typically explained around a third of the variance in overall journey satisfaction, with a small amount of variation for individual PSUs. (The R^2 value was, on average, 0.36 for the drivers of satisfaction, and 0.33 for the drivers of very satisfied).

Why did we change the way we conduct the Key Driver Analysis from Autumn 2016?

Each year we review all elements of the survey and see what lessons we can learn from the previous year. Our latest review identified this opportunity to improve the way in which we conduct the Key Driver Analysis; partly, as being a better approach in its own right (with such a large number of questions being included in the analysis, reducing this into a smaller number of themes is more robust), and partly to respond to queries from stakeholders as to why a question could be identified as having a large impact upon overall journey satisfaction in one year, but not in the next (and the effect of this upon investment decisions).

The theming process (using factor analysis) removed the degree of overlap that could exist between individual questions, as each theme was independent of the others, i.e. they were responded to in different ways. The outputs from this new approach to the Key Driver Analysis were therefore likely to be more stable year on year, making it easier to identify where to focus attention or the resources required to improve, or maintain, overall journey satisfaction. Furthermore, in reality, it may well be simpler to address a theme rather than an individual measure, for example, fixing/cleaning bus stops could cover a range of the individual aspects related to the 'bus stop condition' theme.

Appendix 1: Questionnaire used in BPS Autumn 2018

Core version shown as example

905010 001

transportfocus

DATE (DD/MM/YY)
Sep-Nov 2018

Bus Passenger Survey

Thank you for agreeing to take part in our survey about **the bus journey you made when given this questionnaire.**

There are also questions about your general experiences at the end.

All the information you give will be treated in the strictest confidence.

Your views as a passenger are important.

Transport Focus is the offical, independent consumer watchdog that promotes the interests of transport users.

Bus companies, local authorities and governments act on the survey results. They are the evidence we use to seek improvements on behalf of passengers.

Completing the questionnaire

- Please fill in the questionnaire after completing your journey.
- Please tick only one box per question, unless directed otherwise.
- Return it to us in the reply paid envelope provided.

When answering: consider only the journey you made when given this questionnaire

1 About your journey

Q1 Please write in the route number or letter of the bus you boarded

Q2 Please fill in the time that you boarded the bus:
Please use the 24 hour clock e.g. 5.25pm is 17:25.
Fill in your time of boarding in the boxes as shown

1 7 : 2 5

Q3 What type of ticket did you use for that journey?

A free pass or free journey
Elderly person's pass ☐
Disabled person's pass ☐
Complimentary/free ticket ☐

Single/return/multi tickets
Standard single ticket ☐
Standard return ticket ☐
From a multi-ticket/carnet ☐
Other ☐

A day pass - valid for
That bus company only ☐
Across bus companies ☐
Buses and other modes of transport ☐

A pass/season ticket for a longer period (e.g. weekly, monthly) - valid for
That bus company only ☐
Across bus companies ☐
Buses and other modes of transport ☐

For office use only:
#26 WS02886

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Your opinion counts!
transportfocus

Q4 On boarding the bus, did you?

- Use cash to buy a ticket or pass ☐
- Use a contactless payment method (e.g. credit or debit card, Apple Pay or Android Pay) to buy a ticket or pass ☐
- Show the driver a paper ticket or pass ☐
- Place your smartcard onto the fare machine ☐
- Show the driver or scan a ticket displayed on your smart phone ☐

Q5 If you bought your ticket or pass <u>before</u> getting on the bus, how did you do this?

- From a bus driver before that day ☐
- Direct from the bus company using their app ☐
- Direct from the bus company via website, phone call, or some other way ☐
- From another website or app ☐
- From a travel centre/bus station/booking office ☐
- From a local shop or post office ☐
- Arrangement through work/college ☐
- Other ☐
- Did not buy your ticket before boarding the bus ☐

Q6 What was the main purpose of your bus journey?

- Travelling to/from work ☐
- Travelling to/from education (e.g. college, school) ☐
- Travelling to/from medical/other appointment ☐
- Shopping trip ☐
- Visiting friends or relatives ☐
- Leisure trip (e.g. day out) ☐
- Other ☐

Q7 What was the main reason you chose to take the bus for that journey?

- Cheaper than the car ☐
- More convenient than car (e.g. parking) ☐
- Cheaper than other transport ☐
- More convenient than other transport ☐
- Preferred bus to walking/cycling ☐
- Other reason ☐
- Didn't have the option of travelling by another means ☐

Q8 Did you use any other form of transport as part of your journey?
(Please do not count walking as a form of transport)

- Yes ☐
- No ☐

Q9 What was the weather like when you made your journey, was it?

- Dry ☐
- Light rain ☐
- Heavy rain ☐
- Snow ☐

Q10 Please tell us whether your bus journey was …

- On a single-decker bus ☐
- Downstairs on a double-decker bus ☐
- Upstairs on a double-decker bus ☐

Q11 Were you travelling with …
(Please tick all that apply)

- Heavy/bulky luggage ☐
- Shopping bags ☐
- A shopping trolley ☐
- A pushchair, buggy or pram ☐
- A folding bicycle ☐
- A dog ☐
- A helper ☐
- A mobility scooter ☐
- A wheelchair ☐
- None of the above ☐

2 About the bus stop where you boarded the bus

Q12 Which of the following were provided at the stop where you caught the bus?
(Please tick all that apply)

- A shelter ☐
- Seating ☐
- Electronic display showing bus arrival times ☐
- A timetable ☐
- Information on fares ☐
- Information on types of tickets available ☐
- A route map ☐
- Lighting ☐
- A mobile text code for bus arrival times ☐

Q13 Thinking about the bus stop itself, how satisfied were you with the following?

	Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know/no opinion
Its distance from your journey start e.g. home/shops	☐	☐	☐	☐	☐	☐
The convenience/accessibility of its location within that road/street	☐	☐	☐	☐	☐	☐
Its general condition/standard of maintenance	☐	☐	☐	☐	☐	☐
Its freedom from graffiti/vandalism	☐	☐	☐	☐	☐	☐
Its freedom from litter	☐	☐	☐	☐	☐	☐
The information provided at the bus stop	☐	☐	☐	☐	☐	☐
Your personal safety whilst at the bus stop	☐	☐	☐	☐	☐	☐

Q14 Overall, how satisfied were you with the bus stop?

Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know/no opinion
☐	☐	☐	☐	☐	☐

3 Waiting for the bus

Q15 How long did you wait for your bus?
(Please write the time in minutes)

Q16 Did you check any of the following to find out when the bus was meant to arrive?
(Please tick all that apply)

	Before you left for the bus stop	At the bus stop
Paper timetable	☐	☐
Online timetable	☐	☐
Live bus locator/timings (e.g. via mobile app/web)	☐	☐
Disruption updates (e.g. on Twitter/Facebook)	☐	☐
Electronic display at the bus stop		☐
Other	☐	☐

If you did not check before leaving, or at the bus stop, why was this?

- Knew service was frequent ☐
- Already knew arrival times ☐
- Could not find the information ☐
- Didn't have time ☐
- Other ☐

Q17 How long did you expect to wait for your bus?
(Please write the time in minutes)

Q18 Thinking about the time you waited for the bus, was it …?

Much longer than you expected	A little longer than you expected	About the length of time you expected	A little less than you expected	Much less than you expected
☐	☐	☐	☐	☐

Q19 How satisfied were you with each of the following at the bus stop?

	Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know/no opinion
The length of time you had to wait for the bus	☐	☐	☐	☐	☐	☐
The punctuality of the bus (arriving on time)	☐	☐	☐	☐	☐	☐

4 On the bus

Q20 Thinking about when the bus arrived, please indicate how satisfied you were with the following?

	Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know/no opinion
Route/destination information on the outside of the bus	☐	☐	☐	☐	☐	☐
The cleanliness & condition of the outside of the bus	☐	☐	☐	☐	☐	☐
The ease of getting onto the bus	☐	☐	☐	☐	☐	☐
The length of time it took to board the bus	☐	☐	☐	☐	☐	☐

Q21 Thinking about whilst you were on the bus, please indicate how satisfied you were with the following?

	Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know/no opinion
The cleanliness and condition of the inside of the bus	☐	☐	☐	☐	☐	☐
The information provided inside the bus	☐	☐	☐	☐	☐	☐
The availability of seating or space to stand	☐	☐	☐	☐	☐	☐
The comfort of the seats	☐	☐	☐	☐	☐	☐
The amount of personal space you had around you	☐	☐	☐	☐	☐	☐
Provision of grab rails to stand/move within the bus	☐	☐	☐	☐	☐	☐
The temperature inside the bus	☐	☐	☐	☐	☐	☐
Your personal security whilst on the bus	☐	☐	☐	☐	☐	☐
The ease of getting off the bus	☐	☐	☐	☐	☐	☐

Q22 Did you get a seat on the bus?

Yes - for all of the journey ☐	No - but you were happy to stand ☐
Yes - for part of the journey ☐	No - but you would have liked a seat ☐

Q23 Did other passengers' behaviour give you cause to worry or make you feel uncomfortable during your journey?

Yes ☐ No ☐

If yes: **Which of the following were the reason(s) for this?** *(Please tick all that apply)*

Passengers drinking/under influence of alcohol ☐	Music being played loudly ☐
Passengers taking/under influence of drugs ☐	Smoking ☐
Abusive or threatening behaviour ☐	Graffiti or vandalism ☐
Rowdy behaviour ☐	Other ☐
Feet on seats ☐	

Q24 How long was your journey on the bus?
(Please write the time in minutes)

Q25 How long did you expect your journey on the bus to take?
(Please write the time in minutes)

Q26 How satisfied were you with the length of time your journey on the bus took?

Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know/no opinion
☐	☐	☐	☐	☐	☐

Q27 Was the length of time your journey took affected by any of the following?
(Please tick all that apply)

- Congestion/traffic jams ☐
- Road works ☐
- Bus driver driving too slowly ☐
- Poor weather conditions ☐
- The bus waiting too long at stops ☐
- Time it took passengers to board/pay for tickets ☐

Q28 Were any of these present on the bus?

	Yes	No	Don't know
A map of the bus route/journey times	☐	☐	☐
Audio announcements e.g. saying the next bus stop	☐	☐	☐
An electronic display e.g. showing the next bus stop	☐	☐	☐
Information about tickets/fares	☐	☐	☐
A timetable	☐	☐	☐
Details of how to contact the bus company, for example, to make a complaint or find out information	☐	☐	☐
Free Wi-Fi	☐	☐	☐
USB charging points	☐	☐	☐
Leather seats	☐	☐	☐

Q29 Thinking about the driver, please indicate how satisfied you were with the following?

	Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know/no opinion
How near to the kerb/stop the bus stopped	☐	☐	☐	☐	☐	☐
The driver's appearance	☐	☐	☐	☐	☐	☐
The greeting/welcome you got from the driver	☐	☐	☐	☐	☐	☐
The helpfulness and attitude of the driver	☐	☐	☐	☐	☐	☐
The time the driver gave you to get to your seat	☐	☐	☐	☐	☐	☐
Smoothness/freedom from jolting during the journey	☐	☐	☐	☐	☐	☐
The safety of the driving (i.e. appropriateness of speed, driver concentrating)	☐	☐	☐	☐	☐	☐

5 Your overall opinion of the journey you made when given this

Q30 Overall, taking everything into account from start to end of the bus journey, how satisfied were you with your bus journey?

Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know/no opinion
☐	☐	☐	☐	☐	☐

Q31 If something could have been improved on your journey, what would it have been?

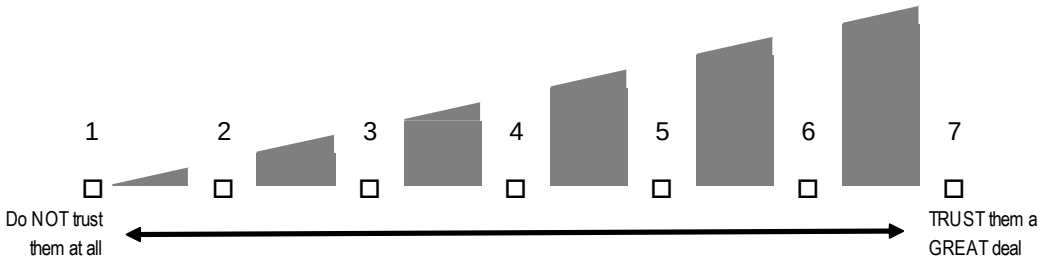
Q32 How satisfied were you with the value for money of your journey?

Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know/no opinion
☐	☐	☐	☐	☐	☐

Q33 What had the biggest influence on the 'value for money' rating you gave in the previous question?

- The cost for the distance travelled ☐
- The cost of the bus versus other modes of transport ☐
- The fare in comparison to the cost of everyday items ☐
- Comfort/journey quality for the fare paid ☐
- A reason not mentioned above ☐

Q34 All things considered, how much do you trust the bus company that operated the bus you used for this journey? *(Please tick one box only)*



6 Your opinion of bus travel in your local area

When answering this section please consider bus services generally (Not just the journey you made when given this questionnaire)

Q35 How would you rate your local bus services for the following?

	Very good	Fairly good	Neither good nor poor	Fairly poor	Very poor
Ease of getting to local amenities (e.g. shops, hospitals)	☐	☐	☐	☐	☐
Connections with other forms of public transport (e.g. trains)	☐	☐	☐	☐	☐
The frequency of services in your area	☐	☐	☐	☐	☐
The reliability of services in your area	☐	☐	☐	☐	☐

Q36 How often do you typically travel by bus?
(Please tick the closest to your frequency of bus use)

- 5 or more days a week ☐
- 3 or 4 days a week ☐
- Once or twice a week ☐
- Once a fortnight ☐
- Once a month ☐
- Less frequently ☐

7 About you

In this final section we ask for some information about you, some of which, like your health and ethnicity, is considered to be sensitive information. Any information you give us here is used for research purposes only and not to identify any particular individual. You are also free to decide whether you want to give us this information or not.

We ask these questions so that we can understand how different passengers' experiences vary, so, for example, what do younger passengers think compared to those who are middle-aged or of retirement age.

QA Are you?

Male	☐	Female	☐
Prefer another term	☐	Prefer not to say	☐

QB In which age group are you?

16 to 18	☐	35 to 44	☐	65 to 69	☐
19 to 21	☐	45 to 54	☐	70 to 79	☐
22 to 25	☐	55 to 59	☐	80+	☐
26 to 34	☐	60 to 64	☐	Prefer not to say	☐

QC Which of the following best describes your ethnic background?

White ☐
Mixed/multiple ethnic groups ☐
Asian or Asian British ☐
Black, African/Caribbean or Black British ☐
Chinese ☐
Arab ☐
Other ethnic group ☐
Prefer not to say ☐

QD In terms of having a car to drive, which of the following applies?

You have a car available and don't mind driving ☐
You have a car available but prefer not to drive ☐
You don't have a car available ☐

QE How often are you able to ask someone else to drive you for local journeys?

All or most of the time	☐	You don't have anybody you can ask	☐
Some of the time	☐	Not applicable	☐

QF Are you affected by any physical or mental health conditions or illnesses lasting or expected to last 12 months or more? *(Please tick all that apply)*

No: None ☐

Yes: Vision (e.g. blindness or partial sight) ☐
Yes: Hearing (e.g. deafness or partial hearing) ☐
Yes: Mobility (e.g. only able to walk short distances or difficulty climbing stairs) ☐
Yes: Dexterity (e.g. difficulty lifting and carrying objects or using a keyboard) ☐
Yes: Learning or understanding or concentrating ☐
Yes: Memory ☐
Yes: Mental health ☐
Yes: Stamina or breathing or fatigue ☐
Yes: Socially or behaviourally (for example associated with autism, attention deficit disorder or Asperger's syndrome) ☐
Yes: A condition not mentioned above ☐
Prefer not to say ☐

Does your condition/illness have an adverse affect on your ability to make journeys by bus?

Yes, a lot	☐	Yes, a little	☐	Not at all	☐

QG And finally, to help us get a better picture of bus services at a local level, it would be helpful if you could provide us with your home postcode.

If you provide it, this will be used to help understand bus usage and make improvements locally. Your postcode will not be used to identify you personally and will only be used **for research purposes.**

Please write in your home postcode here: | | | | | | | |

This survey is being undertaken for Transport Focus by BDRC, an independent market research agency which adheres to the Market Research Society's code of conduct. You were handed this questionnaire by an interviewer working for Perspective Research Services, a part of BDRC.

How the information you have provided will be used (General Data Protection Regulations)

Your name, address, email address, or phone number – your personal information

Your personal information will always be handled confidentially. We will not make your personal information available to anyone without your knowledge and consent. It will be used solely for the purposes of the research and quality control, and no sales or marketing contact will result from this survey. You have the right to access, withdraw your consent to use and object to processing of your personal information.

Your responses to the questions in this survey, including the 'about you' section

Your responses to the questions in this survey will always be handled confidentially. They will be used solely for the purposes of the research and will not be used to identify you personally. We may share the responses to the questions in this survey, including postcode (if you have provided this) with other organisations that have a legitimate interest in the survey data, such as, but not limited to, local transport authorities, local authorities, government departments, bus operating companies and academic institutions. Any organisations receiving the data will also be subject to the same restrictions and obligations under GDPR.

As some of the information we ask for in the 'about you' section is considered to be sensitive information we require your consent for this sensitive information to be stored and processed as described above.

Please confirm whether or not you consent to this.

Yes, I consent..... ☐ **No, I do not consent**..... ☐

You also have the right to access, withdraw your consent to use, and object to processing of your sensitive information. For further information about your legal rights and how to exercise these please see the Privacy Notice on our website (www.bdrc-group.com).

If you have any queries about this survey or how your data will be used please contact Sashika Sullivan at BDRC on 0207 490 9156. If you would like to check that this survey is genuine, you can contact the Market Research Society on 0800 9759596 or www.mrs.org.uk who will verify BDRC's status as a legitimate market research organisation.

To find out more about the Bus Passenger Survey or Transport Focus' work visit our website (www.transportfocus.org.uk) or follow us on Twitter (@transportfocus).

If you would be happy to participate in future research projects about the transport industry for Transport Focus please complete the contact details below. If we contact you for other research, we would anticipate this to be within the next 12 months, you would be contacted directly by Transport Focus.

Name:

Email address:

Thank you for completing this questionnaire. You have made your opinion count

Please return it in the envelope provided or use the following Freepost address:

Bus Passenger Survey
Perspective Research Services Ltd
FREEPOST (RTLU-YLTS-TGYY)
12-20 Baron Street
Angel, London N1 9LL

bdrc

transportfocus

Appendix 2: PV2 models

The following models were used to estimate the number of unique passengers on board each bus service, from one end of its route to another.

Models were found to provide a better fit if the specific local authority area (or operator area) was used, than if the area type (PTE, Unitary, Two Tier, or Scottish RTP) was used. Therefore where the specific local authority (or operator) area was surveyed in the previous year and thus had its own (robust) data, the specific PSU model was used. Where the PSU was not surveyed previously and there was no specific model available, the relevant area type model was used. The area type model was also used in cases where the specific PSU was surveyed but on a relatively small scale, i.e. in those cases where the number of on-board patronage counts was fewer than 10.

Similarly, if one of the "big five" operators was present in the area, a better model fit was found when the operator was factored into the model; therefore models were generated with and without this factor in order to provide the best estimates possible. In Autumn 2018, a further development was made to the operator factor, where it was found that some other large or dominant operators in certain areas (other than the "big five") could also be factored in to create a better model fit for those PSUs.

As such in Autumn 2018 there were six possible models.

The model for an area that had been surveyed before included a constant specific to that area, and then coefficients covering the time of day, duration of journey and operator. For an area that had not been surveyed before, the model was of the same structure but with coefficients depending upon the type of area (PTE, unitary, Two Tier, Scottish RTP).

	model number	**1**	**2**	**3**	**4**	**5**	**6**
	Basis	Area	Area Type	Area	Area Type	Area	Area Type
	big 5	Yes	Yes	No	No	No	No
	big5 or other dominant local	No	No	No	No	Yes	Yes
	Constant	27.84	27.84	27.84	27.84	27.84	27.84
Duration	30 minutes or less	-7.25	-11.02	-7.44	-10.42	-7.23	-11.00
	30 and up to 45 mins	-0.76	-2.65	-0.87	-2.27	-0.80	-2.83
	45 mins and up to one hour	-1.96	-2.42	-1.76	-2.30	-2.10	-2.28
	over 1 hour	3.93	6.53	3.95	6.05	4.03	6.56
Day-part	Evening peak	5.97	5.83	5.54	5.07	5.95	5.71
	Morning peak	-3.32	-5.11	-3.38	-5.55	-3.57	-5.21
	Offpeak	-0.08	-0.07	-0.13	-0.01	-0.11	-0.04
	Weekend	-2.34	-1.20	-1.74	-0.59	-2.05	-1.19
Operator ("big 5")	Arriva	0.39	0.01				
	First	-0.63	-0.01				
	Go ahead	-0.34	2.53				
	National Express	7.71	7.81				
	Other	-0.15	-1.07				

	Stagecoach	-1.55	-3.21				
Large operators (including “big 5” in areas where another of these other named large operators is also present)	big5plusArriva					0.69	0.04
	big5plusBlackpool Transport					-9.89	-10.63
	big5plusFirst					-0.48	-0.03
	big5plusGo-Ahead					-0.46	2.31
	big5plusLothian Buses						
	big5plusMcgills Bus Service						
	big5plusNational Express					8.53	8.13
	big5plusNottingham City Transport					-2.07	-8.13
	big5plusOther					1.80	-0.17
	big5plusReading Buses					-5.82	3.51
	big5plusStagecoach					-1.81	-3.18
	big5plusTrent Barton					0.92	-3.59
Area type	PTE		6.78		7.57		6.37
	Scottish RTP		-9.08		-9.80		-9.22
	Two Tier		-3.42		-3.60		-3.11
	Unitary		1.79		1.70		2.12
	Welsh Region		-9.38		-10.61		-9.85
Actual PSU	Blackpool Transport Services	1.86		1.14		6.69	
	Cornwall	20.12		19.72		19.41	
	Essex	-13.37		-13.95		-11.29	
	First Buses Glasgow	0.89		1.46		0.50	
	First Buses Scotland East	-7.43		-8.46		-7.61	
	First South Coast	-1.40		-1.38		-1.84	
	GA – Bluestar	-0.22		-0.70		-0.28	
	GA - Brighton & Hove	29.35		29.02		29.50	
	GA – Metrobus	10.03		9.87		10.17	
	GA - Plymouth CityBus	-5.13		-5.58		-4.96	
	Greater Manchester	4.10		3.27		4.00	
	Mersey Main	-1.96		-2.27		-2.66	
	Mersey QP	22.78		21.92		22.57	
	NESTRANS Aberdeenshire	-18.07		-18.41		-18.32	
	Norfolk	-5.88		-6.86		-6.16	
	Oxfordshire	-9.17		-9.76		-8.98	
	Reading Buses	-4.68		-4.78		-2.45	
	South Yorkshire	22.36		21.63		25.72	
	Staffordshire	-7.97		-8.13		-8.10	
	Stagecoach East Scotland	-16.08		-17.54		-15.95	
	Stagecoach Highland & Blu	-11.80		-13.13		-11.57	
	Stagecoach South	-1.13		-2.70		-0.95	
	Stagecoach South East	11.68		11.05		11.20	
	Wales – Mid	-16.49		-16.71		-17.34	
	WECA & North Somerset	9.30		9.30		9.16	
	West Midlands	7.11		11.07		6.19	
	West Yorkshire	-7.39		-0.67		-8.38	

Example, based on local authority area West Midlands:

- This specific area was covered in 2017 and therefore the specific area was able to be modelled. Some services in this area were run by "big five" operators (National Express). Therefore the West Midlands used model number 1
- In this case we started with the base assumption that all buses had 27.84 people on board (this was the constant)
- Then this figure was increased by 7.11 for all individual bus services for the fact that they were all in the West Midlands local authority area
- It was then increased or decreased depending on the other attributes of each bus; for instance:
    - If one whole journey for that bus service was less than 30 minutes in duration, it would be decreased by 7.25
    - If the bus service was also travelling in the morning peak it would be decreased by 3.32
    - If it was run by National Express it would be increased by 7.71
- In this case then, the 'passenger value' (PV2) for this bus service (i.e. the estimated total number of unique passengers on board throughout its journey) would be 32.09. That is [constant 27.84] + [West Midlands 7.11] – [<30mins 7.25] - [morning peak 3.32] + [National Express 7.71].

A hypothetical, similar journey (less than 30 minutes long, in the morning peak, run by National Express) but in a PTE area not surveyed in Autumn 2017 would have had a PV2 of 26.3. This is because it would have used model 2 (where the local authority area does not have its own specific data but the area type is known), and the values would be: [constant 27.84] + [PTE 6.78] – [<30mins 11.02] - [morning peak 5.11] + [National Express 7.81].