



TRICS Research Report 14/1

Pass-By & Diverted Trips

Report



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1 Executive Summary

- 1.1 The TRICS Research Report 95/2 “*Pass-By and Diverted Trips: A Resume*” is one of the most used and quoted reports to be produced by TRICS. However, over the last few years there has been a strong interest in updating/refreshing this report with questions raised as to whether the application of a standard reduction in trip rate to account for pass-by and diverted trips is still accurate in a rapidly changing retail environment.
- 1.2 This report supersedes the 95/2 TRICS Research Report.
- 1.3 The report considers these questions and reviews research that has been carried out since 1995 on pass-by and diverted trips. It discusses whether current policy makes clear statements that would guide and support the assessment and analysis of these types of trips. In order to consider what has changed in travel demand and trends a range of data sets have been reviewed. Research undertaken to investigate the prevalence of such secondary trips in retail developments has been investigated. Policy and research from the United Kingdom, United States, Europe, Australia and New Zealand is incorporated.
- 1.4 Policy guidance, academic and commercial research, trip trends and travel behaviour data and online shopping trends have been reviewed within this report, with key conclusions stated throughout. A thorough investigation of the TRICS dataset (v.7.1.1) has been undertaken to find statistically significant trends relating to trip generation. The findings of this report have been presented at the TRICS User Group meeting in July 2014, where attendees were given the opportunity to ask questions and provide input into the next stages of the research process through a question and answer session. Consultation and discussions have further taken place on the TRICS LinkedIn profile and with the peer review group set up for this research project.
- 1.5 Shopping habits are changing rapidly, particularly with the growth in online retail shopping and click and collect services. The UK has one of the most developed online food retailing markets worldwide, with €5.5 billion market sales of online groceries in 2010. The UK online grocery market represents approximately 4.5% of the total grocery market, and this market share is increasing annually. Given their increasing importance, online shopping trends and click and collect services should be considered in determining trip rates and trip type proportions.
- 1.6 This report has found that many of the key conclusions made within the 1995 report are no longer valid as shopping trends and travel behaviours have changed. Simultaneously, many of the key arguments and conclusions contained within this report are not made within the 95/2 TRICS report, as transport behaviour such as new trips is now much more widely understood.
- 1.7 A standard trip reduction for pass-by and diverted trips as recommended in the 95/2 report is no longer considered applicable due to the factors set out below:
- The literature review undertaken as part of this report has demonstrated that there have been contradictory results regarding the prevalence of diverted, pass-by and linked trips. Alongside this, shopping habits and travel patterns are changing rapidly. As such, a generic value that can be applied to all retail sites is not appropriate in this dynamic environment.
 - It is recognised that there is no simple answer in determining the percentage of trips to a Site that are pass-by or diverted. It is therefore recommended that a site-by-site approach is taken in assessing the prevalence of pass-by and diverted trips.

- It is recommended that when carrying out an assessment of the quantum of pass-by and diverted trips that a first principles approach is taken for each site and that a process is defined for the assessment of these trips and agreed by the applicant and determining authority. This will form an additional task in the scoping report for any transport assessment.

1.8 A methodology of proposed steps for assessing appropriate reductions to represent pass-by and diverted trips is contained within this report.

2 Introduction

- 2.1 The TRICS Research Report 95/2 “*Pass-By and Diverted Trips: A Resume*” is one of the most used and quoted reports to be produced by TRICS. However, over the last few years there has been a strong interest in updating/refreshing this report. Key questions have been raised as to the relevance of this research report, should standard discounts be applied? What assessment method should be applied? What has changed in the travel demand – retail that should be applied to assessments now?
- 2.2 This report supersedes the 95/2 Research Report. It considers these questions and reviews the research that has been carried out since 1995 on the issues of diverted and pass-by trips. It discusses whether current policy makes clear statements that would guide and support the assessment and analysis of these types of trips. In order to consider what has changed in travel demand and trends a range of data sets are reviewed and this is reported upon.
- 2.3 In looking to answer these questions a literature and data review has been carried and included in this report. Research undertaken to investigate the prevalence of such secondary trips in retail developments has been investigated. Policy and research from the United Kingdom, United States, Europe, Australia and New Zealand is incorporated.

Definition of Pass-by and Diverted Trips

- 2.4 Certain types of development, including retail, can have significant effects on vehicular traffic and the transport network. As a result, in addressing the impact of such a development, consideration should be given to the different types of vehicular trips that are likely to be generated (DfT, 2007).
- 2.5 Trips can be seen to fall into two main categories - primary trips and secondary trips. For retail developments, the traffic volume generated by the site is different to the amount of traffic the development adds to wider road network (Moussavi & Gorman, 1991; Harries et al., 2012). This means that not all trips generated are new trips onto the surrounding work network. Instead, some already exist on the road network and in relation to the supermarket are considered as secondary trips.
- 2.6 Secondary trips can be divided further as either pass-by, diverted or transferred trips, defined by the DfT (2007) as follows.
- **Pass-by trips** are already present on the road network directly adjacent to accesses to a development, which will turn into the Site. If it can be clearly demonstrated that there will be a proportion of true pass-by trips that were already on the network, then these can be deducted from the calculated generation for a development.
 - **Diverted trips** are already present on the local road network but not the road(s) from which access is taken and would divert from their existing route to access the development. They are similar to pass-by trips, but have to deviate to make use of a development. Diverted trips will tend to return to their original route after visiting the development. It is important to identify the potential for such diversion to occur so as to ensure that the correct flows are assessed at specific junctions on the highway network.
 - **Transferred trips** are already present on the local road network, accessing similar existing sites in close proximity to the proposed development and will have the potential to transfer their destination to the proposed development. These are slightly different from diverted trips as

these wholly transfer from using an existing development to a new one, e.g. shoppers switching to a new supermarket that is more conveniently located for them.

- 2.7 Transferred trips are not considered further within this report.
- 2.8 The terms pass-by, diverted, linked and transferred trips are sometimes used interchangeably within academic literature. As such, these terms are used sometimes interchangeably in this literature review. Where there is specific reference to pass-by and diverted trips, this is highlighted and where the terms are used interchangeably this is also documented.
- 2.9 A full list of reference documents is provided in **Appendix A**.
- 2.10 Reference has been made to key policy guidance and documents that make no mention towards secondary trips in **Appendix E**.

Peer Review Group

- 2.11 A peer review group has been set up to provide guidance and input towards the research process. The group includes a wide range of experts and professionals, as detailed below:

- Graham Scholefield, University of Salford
- Martin Rogers, Dublin Institute of Technology
- Andrew MacIver, Napier University Edinburgh
- Dilum Dissanayake, University of Newcastle
- Peter Caneparo, TPP Consulting
- Richard Sweet, PB Consultants
- Melvyn Dresner, Transport for London
- Stuart Wilson, Transport Scotland

The peer review group has provided comments and feedback throughout the research process. Their feedback has been incorporated within this report.

Working Group

- 2.12 A working group has been established to take forward this research and update of the TRICS 95/02 report. The members of this working group are:

- Lawrence Stringer, East Sussex County Council;
- Claire Warwick, East Sussex County Council;
- Lynn Basford, JMP Consultants Ltd;
- Ian Coles, JMP Consultants Ltd;
- James Rhodes, JMP Consultants Ltd; and
- Owen Edwards, JMP Consultants Ltd.

3 Policy Guidance

- 3.1 This section sets out the findings from the policy guidance review. Commentary on the findings from each policy document is provided at the end of each section in bold.

Department for Communities and Local Government: National Planning Policy Framework (March 2012)

- 3.2 The National Planning Policy Framework (NPPF) sets out the Government's expectations and requirements from the planning system. It is meant as a high level guidance for local councils to use when defining their own personal local and neighbourhood plans. The essence of the document is to support sustainable development, defined as '*meeting the needs of the present without compromising the ability of future generations to meet their own needs*' (p.2).
- 3.3 NPPF recognises that transport policies have an important role to play in wider sustainability and health objectives as well as their direct influence on development. It seeks to ensure that the transport system is balanced in favour of sustainable transport modes, giving people a real choice about how they travel.
- 3.4 Developments that generate significant amounts of movement should be supported by a Transport Statement or Transport Assessment. It goes on to state that plans and decisions should take account of whether:
- 'The opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;
 - Safe and sustainable access to the site can be achieved for all people; and
 - Improvements can be undertaken within the transport network that cost-effectively limit the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe'.
- 3.5 **Conclusion of document review: No methodology is provided for undertaking a transport assessment, and no mention is made towards pass-by or diverted trips within the Framework.**

Department for Transport: Guidance on Transport Assessment, Chapter 4 (March 2007)

- 3.6 Planning Policy Guidance Note 13: Transport (PPG13) (now superseded but relevant in this context of research) states that where a new development is likely to have significant transport implications, a Transport Assessment (TA) should be prepared and submitted with a planning application for the development.
- 3.7 Transport Assessments set out transport issues relating to a proposed development. They identify what measures will be taken to deal with the anticipated transport impacts of the scheme and to improve accessibility and safety for all modes of travel.
- 3.8 Guidance on Transport Assessment (GTA) states that in order to quantify the impact of a proposed development on the transport system an estimate of the person trips that are likely to be generated should be calculated. It provides a methodology of how this should be done. In doing this, the travel

characteristics of a development should be established, and this should be based on a multi-modal assessment that identifies the number of person trips by mode and time period.

- 3.9 Conclusion of document review: Whilst the report notes that consideration should be given to the different types of vehicular trips that are likely to be generated, including pass-by and diverted trips, no methodology is provided for the way this should be done. It states that the level of reduction in vehicular trip generation based on the mix of trips is to a degree subjective and dependent on the specific characteristics of a proposed development.**

Transport for London: Transport Assessment Best Practice Guidance Document (April 2010)

- 3.10 TfL's transport assessment best practice guide assists those submitting planning applications for major developments in London where a transport assessment is required.
- 3.11 It is essential to achieving an accurate assessment of a development's impact on the transport network that a detailed trip generation analysis covering all modes, and split by mode is included with all Transport Assessments. A trip distribution analysis by time and origin should be included in order to fully assess the potential impacts on the transport infrastructure from all directions and during all hours.
- 3.12 Trip rates should be obtained from up to date travel surveys. This can be in the form of observed quantitative data or sourced from a database.
- 3.13 The London Travel Demand Survey (LTDS) provides more accurate data than the 2001 Census data relating to mode share and travel patterns in London. It includes information on travel patterns with origins and destinations and can also link to census variables such as car ownership, household structure etc.
- 3.14 Linked trips should be taken into account. Assessing such trips can be difficult without observed survey data, so assumptions need to be made about the proportion of these trips. Any assumptions made should be clearly specified.
- 3.15 Conclusion of document review: As with the guidance document provided by the Department for Transport, no methodology is provided for the way in which pass-by or diverted trips should be assessed; it is simply stated that their prevalence should be investigated.**

Transport Scotland: Transport Assessment Guidance

- 3.16 Transport Scotland's transport assessment guidance assists in the preparation of Transport Assessments for development proposals in Scotland.
- 3.17 The guidance document sets out requirements according to the scale of development being proposed; from a local development which requires a simple Transport Statement providing an explanation of transport issues through to a major development where detailed technical analyses will be required in a Transport Assessment accompanied by a supporting Travel Plan.
- 3.18 It states that an estimation of how many people will travel to a development and the mode of travel is required within any transport statement or assessment. A set of requirements that need consideration to do this is provided, including consideration of "whether people will be likely to visit the site as part of a linked-trip or other locations, for example pass-by shopping".

- 3.19 It is also stated that traffic analysis should consider catchment area and locational features, with the location determining the level of diverted and pass-by traffic.
- 3.20 **Conclusion of document review: As with guidance documents provided by the Department for Transport and Transport for London, no methodology is provided for assessing the level of pass-by and diverted trips.**

ITE Trip Generation Manual, 9th Edition (September 2012)

- 3.21 The Institute of Transportation Engineers is an international association of transport professionals that facilitate the application of technology and scientific principles to research, planning, functional design, implementation, operation, policy development and management for any mode of ground transportation.
- 3.22 The newest edition of this three-volume report contains updated introductory and instructional material, a recommended practice on the use of this resource and two data volumes with updated land use descriptions, trip generation rates, equations, and data plots. The number of studies contained in the report's database sits at more than 5,500 with a total of 172 land uses. The manual is regularly updated to reflect current industry trends.
- 3.23 This manual is designed for use by transportation professionals conducting site impact studies, determining on-site circulation patterns, performing access management studies, determining traffic signal timing, and conducting environmental assessments.
- 3.24 **Conclusion of document review: The latest version of this report contains guidance on pass-by and diverted trips and these types of trips are currently being researched further and the findings of which will be included in the updated report. However, the final published version of this report is not expected within the next 6 months.**

Auckland Regional Transport Authority: Integrated Transport Assessment Guidelines & Supplementary Documents (October 2007)

- 3.25 Guidelines and supplementary documents have been developed by the Auckland Regional Transport Authority (ARTA) to provide regional guidance on implementing well integrated multi-modal developments throughout the Auckland region alongside guidelines for Integrated Transport Assessments (ITA), a requirement of the Regional Policy Statement (RPS). An ITA is the initial assessment undertaken when considering the transport implications of a proposal, similar to a Transport Statement in the United Kingdom.
- 3.26 The guidance acknowledges that there are a wide range of assessment tools used internationally for assessing transport and draws on much of this information, reshaping it to fit with the Auckland context. Guidance from Scotland, Australia and the United Kingdom is incorporated.
- 3.27 A number of publications and databases are acknowledged sources of trip rate information, providing information on trip rates in New Zealand, Australia, UK and USA. It is stated that these should be used with care as trip rates will differ between developments with similar land uses for a variety of reasons (including size and location of catchment and the extent of passenger transport facilities).

3.28 Conclusion of document review: No reference is made to pass-by and diverted trips within the ITA guidelines.

Planning Policy Guidance (PPG6)

3.29 The now superseded Government Planning Policy Guidance for new retail developments (PPG6) sets out to regulate new retail planning in relation to town centres. The aim of the guidance is to encourage retail developments that have potential for good physical and functional linkages with town centres.

3.30 The guidance recommends that planning permissions should be granted to retail developments which generate sufficient linked trips to the town centre. The premise is that linked trips stimulate:

- Footfall to adjacent stores;
- Use of other complementary facilities and services, including banks, post offices and libraries, which in turn contribute to the economic and social vitality of town centres; and
- Use of modes of travel other than the car.

3.31 It states that “in the case of many smaller centres the best solution may be an edge-of-centre foodstore with parking facilities, which enables car-borne shoppers to walk into the centre for other purposes, and shoppers who arrive in the centre by public transport to walk to the store. One trip can thus serve several purposes, and the new shop is likely to help the economic strength of the existing town centre, be accessible to people without cars, and overall generate less car use.”

3.32 The issue of linked trips is particularly relevant regarding edge-of-centre locations. PPG6 recognises that the definition of the edge-of-centre will vary between places, with large centres usually able to attract people to walk further than small centres.

3.33 Conclusion of document review: Whilst this guidance does not provide detailed guidance on the analysis of linked trips/diverted or pass by trips it makes reference to the roll of linked trips in planning for town centres and retail. The attractiveness of town centres and issues of accessibility are also raised.

The Impact of Large Foodstores on Market Towns and District Centres (DETR, 1998)

3.34 Recognised by the NRPF (2004) as a major study on linked trips still in use by planning consultants, the Department for Environment, Transport and Regions (DETR) paper on the impact of foodstores on town centres provides four interrelated factors that influence the propensity for linked trips.

- The extent to which the store complements the town centre;
- The distance and physical linkages between the two;
- The relative size of the centre as compared with the store; and
- Accessibility, parking and orientation of the store.

3.35 The report states that “the introduction of a new out-of-centre store does not appear to have a significant effect on the propensity of people to link visits to the foodstore and town centre during the same trip.

- 3.36 The case studies of edge-of-centre locations used within this study indicate that the effect of new stores has been to divert trade from the town centre to the edge-of-centre locations. The report acknowledges however that this may be due to the characteristics of the case studies chosen, rather than a more solid trend.
- 3.37 The study concludes that that large foodstores can have adverse impacts on town and district centres, and as such that it is vital for positive steps to be taken to improve the quality and range of food retail services provided within town centres and for caution to be exerted when developing large foodstores in non-central locations (DEFT, 1998).
- 3.38 Conclusion of document review: It should be noted that this research does not consider the role of diverted trips to food stores on, for example, a journey from work to home.**

Department for Communities and Local Government: Planning for Town Centres (December 2009)

- 3.39 A key part of positive planning is to identify those sites likely to be most appropriate to meet any identified need. Adopting a sequential approach to selecting sites means wherever possible seeking to focus new development within or on the edge of existing defined centres. Only if town centre or edge-of-centre sites are not available will out of centre locations be likely to be appropriate in policy terms, provided that they are well served by alternative means of transport, and are acceptable in all other respects including impact.
- 3.40 The sequential approach is intended to achieve two important policy objectives:
- Town centre sites (or well connected edge-of-centre sites) are likely to be the most readily accessible locations by alternative means of transport and will be centrally placed to the catchments established centres serve, thereby reducing the need to travel.
 - The second, related objective is to seek to accommodate main town centre uses in locations where **customers are able to undertake linked trips** in order to provide for improved consumer choice and competition. In this way, the benefits of the new development will serve to reinforce the vitality and viability of the existing centre.
- 3.41 Conclusion of document review: This sequential test approach plays a significant role in the retail impact assessment process. Other factors in the assessment process that play a significant role in determining location and impact include the catchment population, competitiveness of the centre and the retail offer. These factors may offer an insight into the propensity for a retail centres to incur diverted trips (trips taken from less attractive centres) or pass by trips as a result of a large catchment area. These issues can be further explored through examination of TRICS data sets.**

4 Trip Trends & Travel Behaviour

- 4.1 This section considers the trends that may have occurred in travel behaviour and trip making since the previous research paper was published in 1995. Shopping trends have and are continuing to change rapidly over time, particularly when considering online shopping.

National Travel Survey

- 4.2 Statistics from the National Travel Survey (NTS) have been analysed to provide an understanding of changes in trip trends and travel behaviour since the publication of the 1995 TRICS pass-by and diverted report. The NTS is the primary source of data on personal travel patterns in Great Britain. It is a household survey that has run continuously since 1988 and is designed to monitor long-term trends in personal travel.
- 4.3 The survey collects information on how, why, when and where people travel as well as factors which affect personal travel. Data is collected via two main sources: face-to-face interviews with people in their homes and a seven-day travel diary, allowing travel patterns to be linked with individual characteristics. The NTS covers travel by people in all age groups, including children.
- 4.4 According to 2012 statistics from the NTS, 64% of trips are made by car (42% by a driver, and 22% by a passenger). 9% are made by public transport (6% bus and 3% rail), whilst 22% of trips are made by foot, 2% by bicycle and 2% by other modes.
- 4.5 This is likely to differ in areas of higher public transport accessibility; the mode share of private vehicles is likely to decrease as public transport accessibility increases. This is likely to have an impact on the number of pass-by and diverted trips made to a development.
- 4.6 Although there is little difference in the average distance travelled by all modes between 1995 and 2012, changes in the distances travelled by both public and private transport are visible. It can be seen that the average distance travelled in miles per person per year by both car drivers and car passengers has decreased, as has the distance travelled by motorcycle. In contrast, the distance travelled by different modes of public transport (including bus, train and London Underground) has increased during these years.

'Shopping' Statistics Only

- 4.7 Shopping trips account for one fifth of all trips undertaken in Great Britain. Shopping trips account for 19% of all walking trips, 20% of all car / van trips, 26% of all local bus trips, 8% of all rail trips and 13% of all trips made by other modes of transport in 2012. Of all shopping trips undertaken in 2012, 21% were made on foot, 66% by car or van, 8% by local bus, 1% by rail and 3% by other modes of public transport.
- 4.8 The number of shopping trips made per person per year has decreased year on year between 1995 and 2012, as shown in the table below. Similarly, the average distance travelled on shopping trips has decreased annually, from 912 miles per person on all modes of transport in 2002 to 840 miles in 2012.

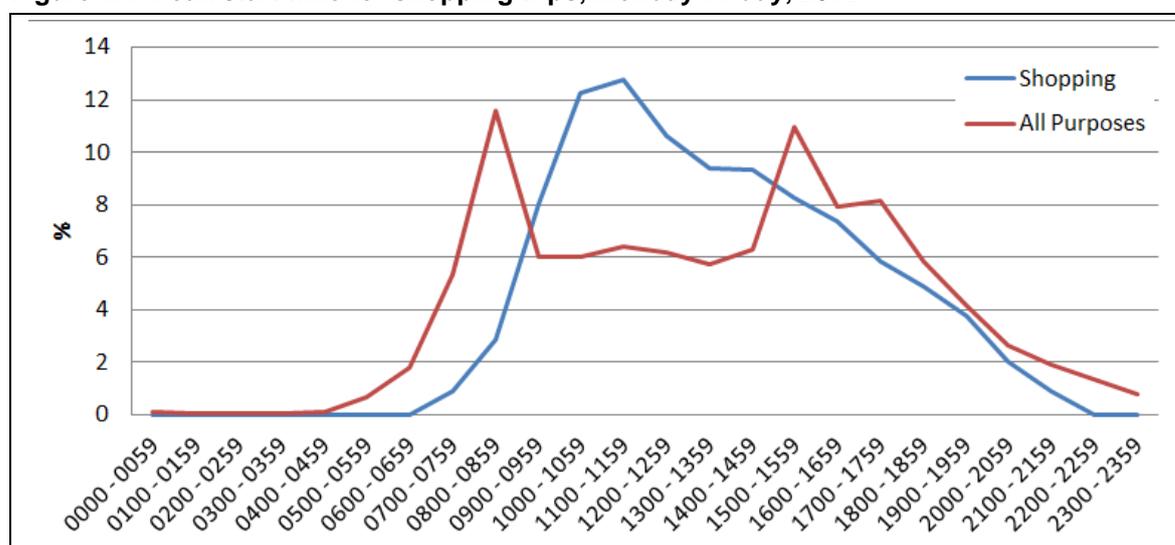
Table 4.1 Number of Trips (Shopping) per Person per Year

	1995	1998	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Shopping	237	229	214	209	208	206	219	186	198	193	194	192	189
All	1086	1071	1047	1034	1026	1044	1037	972	992	972	963	958	954

NTS, 2012

- 4.9 The figure below shows the start times of shopping trips in 2012. This is compared to the start times of all trips. It can be seen that the peak start time for shopping trips occurs between the hours of 10:00 and 12:00, whilst the peak start time for all trips coincide with commutes to match standard working start and finish times.

Figure 4.1 Peak start time for shopping trips, Monday-Friday, 2012



NTS, 2012

- 4.10 A full list of topics covered in the National Travel Survey and full analysis of the data outlined above is given in **Appendix B**.

London Travel Demand Survey

- 4.11 The London Travel Demand Survey (LTDS) is a continuous household survey of the London area. It captures information on households, people, trips and vehicles and incorporates three questionnaires: a household questionnaire, individual questionnaires for all household members, and trip sheets or travel diaries.
- 4.12 It provides data regarding a number of topics including trip rates, mode shares, trip purpose, distance travelled, car ownership and frequency of travel. A full list of topics covered in the LTDS is given in **Appendix C**.
- 4.13 Trip rates show the amount of travel people make and are defined as the number of trips made on an average day, divided by the population. Londoners make more trips on weekdays than at

weekends, with trip rates being around 5 per cent higher on an average weekday than on the average day (7-day week) including weekends. A greater proportion of weekday trips are made on public transport modes, reflecting the greater number of commuting trips made in the working week.

- 4.14 The table below shows the share of trips by London residents on an average day, split by journey purpose. It can be seen that the primary trip purpose is for shopping and personal business. Trips for leisure purposes have increased by 5.5% between the 2005/6 survey and the 2009/10 survey.

Table 4.2 Purpose Share of Trips

	2005/6	2006/7	2007/8	2008/9	2009/10
Commuting	18.3	17.3	15.9	17.0	16.7
Other Work	5.2	5.9	6.4	5.8	6.3
Education	10.1	7.8	7.8	8.7	8.3
Shopping & Personal Business	30.4	29.9	30.6	29.4	29.1
Leisure	22.1	26.1	26.1	27.5	27.6
Other	14.0	12.9	13.3	12.2	11.9

LTDS

- 4.15 The average time spent travelling by Londoners on all modes has decreased over the survey's five year period, from 72.4 minutes per day in 2005/6 to 67.8 minutes in 2009/10. Decreases are seen for car drivers. Similarly, the distance travelled by car drivers in London has decreased, however the average distance travelled by all modes has not. This indicates a reduction in overall car usage by London residents.

5 Pass-By & Diverted Trips Commercial Research

5.1 Secondary trips are significant not only in shaping government policy and guidance, but are significant for retailers and agents acting on their behalf. As such, a number of retailers have undertaken surveys of their own foodstores to investigate the prevalence of diverted trips.

Somerfield: Shopping Trip Survey (1996)

5.2 In 1996 Somerfield carried out a customer survey at 33 of their stores with different location characteristics to identify the following:

- The level linked expenditure undertaken by Somerfield shoppers in a variety of types of centre;
- The extent to which linked trips vary according to store location; and
- The beneficiaries of linked spending.

5.3 The sample was selected to reflect the different sizes of town centres, from sub regional to small district and local centres. The survey results indicate that pass-by and diverted trips is a significant feature of retail shopping in many centres. 46% of the surveyed customers visited another shop in a town centre on the same trip as that to Somerfield.

5.4 However, the amount of linked expenditure varies depending on the type of town centre, as shown in the figure below. In-town stores generate the highest average linked spend (46p per pound spent in Somerfield), followed by edge-of-centre stores at 21p per pound spent at Somerfield.

Figure 5.1 Amount of Linked spending per £1 spend in Somerfield



Somerfield, 1996

5.5 **Alongside the extent to which a store compliments a town centre, the study recognises other factors that influence pass-by and diverted trips, such as the town centre, facilities within the town and shop size.**

“It is important for a town centre to offer a good mix of shopping, work and non-shopping facilities. This increases the propensity for linked [diverted] and multi-purpose trips. Therefore local authorities need to be proactive in trying to attract new services and leisure developments.”

Bennison et al. (2000) Linked Shopping Trips: a report for Tesco Stores Ltd.

- 5.6 Linked Shopping Trips is a study commissioned by Tesco Stores Ltd (for internal use only, meaning the report is unpublished and not generally available) based on the analysis of an aggregate database of 323 household surveys containing 37,681 cases. It aimed to examine the frequency of linked (diverted) trips and how they vary according to store location, shopper characteristics and mode of travel.
- 5.7 The study concluded that linked trips do exist but that the majority of grocery shopping trips do not have a linked trip associated with them; in other words, they can be seen as primary trips. The propensity for linked trips depends on the location of the foodstore and tends to decrease as the distance between the store and town centre increases.
- 5.8 **The study is less conclusive about the effect of store size on the propensity for linked trips. Other variables that may affect this propensity are identified, and include the mode of travel, origin and destination of trips, the size of the town centre and socio-demographic characteristics such as age and household size.** Future research on the association between these and secondary trips is required.

Tesco Survey: Shopping Centres Research – Linked Trips Information, 2001

- 5.9 Tesco Stores Ltd commissioned research to consider the issue of linked trips between a number of its food stores and town/district centres in May & June 2001. Interviews were undertaken with customers leaving six Tesco stores located in existing shopping centres (Basingstoke, Coventry, Milton Keynes, Peterborough, Stevenage and Surrey Quays), with questions asked relating to their visit to Tesco and their use of other shops and services in the town centre during the same visit.
- 5.10 The majority of shoppers (82%) used Tesco for their main food shopping, whilst the average spent varied significantly between the six stores.
- 5.11 The research found that the average proportion of linked trips between the store and the town / district centre was 49%, with the range of values being from 34% (Milton Keynes) to 66% (Stevenage). Whilst respondents at all stores were likely to visit other shops prior to visiting Tesco, and despite the range of shops and facilities available within the towns, only half of shoppers were making any other shop visit on the day interviewed, as shown in the table below.

Table 5.1 Linked Trips

Store	% Respondents			
	Visit shop before Tesco only	Visit shop after Tesco only	Visit shop before and after Tesco	Total visiting another shop
Basingstoke	27	18	5	50
Coventry	34	12	3	49
Milton Keynes	25	8	1	34
Peterborough	40	6	8	54
Stevenage	46	12	8	64
Surrey Quays	38	7	8	53
Average	33	11	5	49

Tesco Stores Ltd, 2001

6 Pass-By & Diverted Trips Academic Research

6.1 Academic literature on pass-by, diverted and other secondary trips is spread across several disciplines; as a consequence there are a variety of definitions and models associated with them. The findings of a number of academic studies regarding such trips are presented below.

Harries et al. (2012) Trip Generation Characteristics of Large-Format Retail Development Sites in Auckland

6.2 The report starts by stating that transport assessments of proposed retail developments typically involve application of generic trip rates to assess traffic effects to a road network, often with little, if any regard given to the nature of the trips that are generated. It is noted that a proportion of trips will exist as pass-by and linked (diverted) trips which when not considered result in inaccurate trip assessments leading to the over-design of traffic management measures at unnecessary cost.

6.3 As part of the study, interview and traffic count surveys were undertaken at a supermarket and home improvement warehouse to determine trip type proportions (importantly in a New Zealand context).

6.4 **It found that a high proportion of secondary (pass-by and diverted) trips exist, being in the range of 57-67%.**

Ghezawi et al. (1998) Convenience Store Trip Generation

6.5 Ghezawi et al. (1998) note that traffic impact analysis relies usually on data published in documents such as the ITE Trip Generation Manual, which correlate trip generation characteristics with the nature and size of a development. However, they argue that inadequate information is available for certain land uses, **including convenience stores.**

6.6 There is also an interesting issue related to the trips generated by convenience stores, which involves pass-by trips. **If pass-by trips are assumed to be impulsive stops along predetermined routes, then these trips generated by sites such as convenience stores can be estimated based on the traffic volumes on adjacent roads.**

6.7 **Further, if many trips to a store are home-based, the size of a store's market area also should be considered in the trip generation analysis.**

6.8 This study aimed to develop mathematical models for estimating traffic generated by convenience stores using data collected at 26 stores. Two sets of equations were developed, one for all trips and one for pass-by trips only.

6.9 13 of the 26 convenience stores were selected for a questionnaire survey to assess the percentage of pass-by trips. A total of 571 interviews were undertaken with questions designed to determine whether a trip made to the store was a primary trip, a diverted trip or a pass-by trip.

6.10 **The average percentage of pass-by trips recorded was 72%, with a range between the 13 stores of 61 to 85%. The study also found a positive relationship between pass-by trip percentage and adjacent street volumes using average daily traffic flows.**

6.11 The paper recognises that pass-by trips are important to recognise when assessing the impact that a development will have on the surrounding street system since they already exist on the road network.

Wrigley (2006) The Effects of Corporate Foodstores on the High Street: Rebalancing the Debates, University of Southampton

- 6.12 This paper was written in response to the debate surrounding the Competition Commission's Inquiry into the Groceries Market, and presented, as the author states "in the spirit of attempting to rebalance debates on the effects of corporate food stores on the high street". The report considered two food stores located on the edge of town centres in Beverley in East Yorkshire and Warminster in Wiltshire. Research into the level of linked trips occurring between the stores and adjacent town centres indicated that a high level of linked trips combining food shopping and the use of other town centre shops and servicing were taking place.
- 6.13 **The level of linked (diverted) trips recorded at both locations was in the region of 60% (65% at Beverley, 58% at Warminster).**

National Retail Planning Forum Scoping Paper, 2004

- 6.14 The National Retail Planning Forum (NRPF) commissioned the Oxford Institute of Retail Management in 2004 to produce a report considering the issue of linked trips, in particular the availability of practical and theoretical research within this field. It aims to integrate existing knowledge and identify potential gaps and opportunities for future research.
- 6.15 The study outlines work done by Tesco and Somerfield to determine the level of linked trips occurring between a number of their respective stores and adjacent town centres. The Somerfield research (1996) indicates that some 46% of shoppers interviewed undertook linked trips, whilst the Tesco research (2000) based upon a household surveys aggregated database, indicated that linked trips occur in 40% of main food shopping trips and 29% of top-up trips, if petrol purchases are excluded.
- 6.16 The scoping paper concludes with a number of research gaps that exist when it comes to pass-by and diverted trips. These are set out below.

Retail Planning Terms

- 6.17 There is a considerable amount of empirical research commissioned by retailers and retail planners that contain reference to pass-by and diverted / linked trips, but the majority of these references are made just in passing. It recognises that there are minimal studies dedicated solely to pass-by and diverted trips. Although planning policy appears to have had an influence on the initiation of research on these trips, few common conclusions have been made.
- 6.18 The majority of data collected through household and street interview surveys aim to establish general shopper trends – this tends to be location specific and is often unavailable in the public domain. **Where such survey data is available, data on diverted trips is often fragmented and unanalysed.**

Douglass & Abley (2011) Trips and Parking Related to Land Use

- 6.19 The Trip Generation Handbook 2nd edition (ITE 2003b) includes information on the proportions of primary, pass-by and diverted linked trips for different land use activities. A copy of this table is found in **Appendix D**.
- 6.20 There is no formal information of trip types contained in Australia's Roads & Traffic Authority (RTA) 'Guide to traffic generating developments' (October 2002) report. However, RTA has published a

series of trip generation and parking generation technical reports for different land use activities. The table below presents a list of land use activities RTA has studied that contains trip type information.

Table 4.1 RTA land use activities with trip type data

Land Use Activity	Day of the week / period	Trip Types	No. of survey data
Housing for seniors	Weekdays and weekends	Primary, pass-by and multi-purpose trips	10
Large format goods/hardware stores	Weekdays and weekends	Primary, pass-by and multi-purpose trips	11
Drive-through restaurants	Friday and Saturday	Percentage of pass-by trips only	8
Shopping centres	Thursday 17:30-19:30 Friday all day Saturday 10:00-12:00	Percentage of linked trips only	42

Douglass & Abley (2011)

Mouchel (2009) Proposed Tesco Store & Shopping Centre, West Bromwich: Working Paper 3 – Linked Trips

- 6.21 Mouchel, on behalf of Tesco Stores Ltd, produced a working paper regarding linked and pass-by trips to be generated at a new Tesco foodstore in West Bromwich Town Centre. In order to determine the level of linked trips likely to occur at the Tesco store, a number of research papers on linked trips were investigated. It is argued that this research, much of which has been detailed above, demonstrates a high level of linkage between town centres and foodstores, with the level of linked trips ranging from 34% to 66% (Tesco Stores Ltd., 2001) and the majority of cases having a level of linked trips with adjacent town and shopping centres at above 60%.
- 6.22 To provide a robust assessment however, a proportion of linked trips between the Tesco store and shopping centre of 50% was proposed, a figure argued to be “significantly below that which could be achieved given the results ... within the available research”.
- 6.23 It is recognised within the working paper that the level of pass-by trips generated by the store would vary across the day and also from weekday to weekend. **A pass-by level of 40% was accepted to be a robust estimate during the weekday PM peak period.**

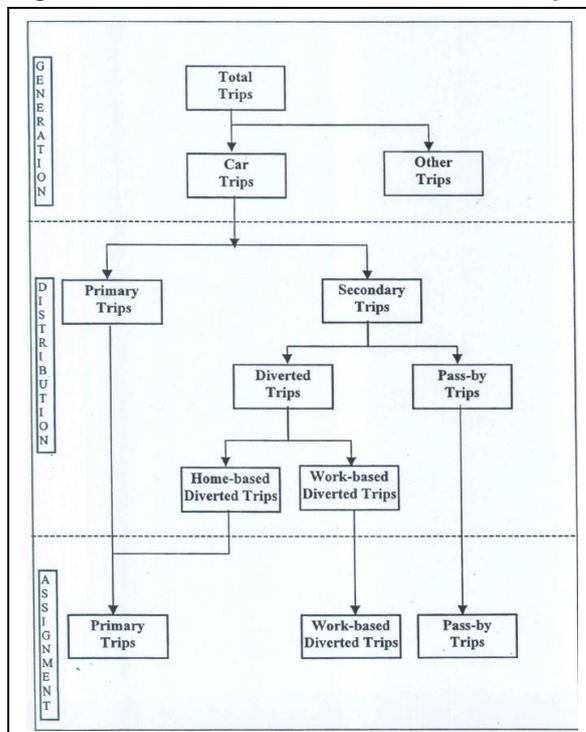
Aslop Verrill (2007) Planning and Retail Statement, Quay Street, Fareham

- 6.24 As part of a Planning and Retail Statement supporting a planning application by Tesco Stores Ltd. for a retail foodstore development in Fareham, a telephone survey was undertaken to investigate the shopping habits of residents likely in the likely catchment area of the proposed foodstore.
- 6.25 The survey found that the majority of trips to do main food shopping are single purpose journeys (primary trips). 89.8% of trips originated at home, and 97.4% ended at home. 79.4% of respondents did not carry out any other activities while completing their main food shop.
- 6.26 Data from the survey confirms that, generally speaking, town centre foodstores have a higher incidence of linked trip activity.

Maclver, A. (1999) Transportation Impact Assessment: Forecasting Travel Demand

- 6.27 Methodologies for estimating trip generation rates are well established as a result of major data collection programmes. At the same time, it can also be argued that experienced transportation engineers have become extremely astute at predicting trip rates for new developments.
- 6.28 However, it is evident that trip distribution methodology is far from being clearly understood by practitioners.
- 6.29 The first and possibly most important stage in the traffic forecasting process is the estimation of the likely number of trips that will be generated by the development. It is widely recognised that the most accurate method for estimating trip rates is to use trip rates from comparable developments, hence the development of the ITE's Trip Generation manual and of trip generation databases such as TRICS.
- 6.30 However, there are two major problems with these approaches: the limited amount of data available for certain landuses; and the considerable variations between sites in a particular land use category; estimating trip rates is not straightforward.
- 6.31 Research carried out at Napier University has shown a poor relationship between the predicted and actual trip distribution of trips at a major food store in Edinburgh. The main reason for this discrepancy was that the gravity model approach used at the trip distribution stage assumed that all trips were home-based primary trips and little consideration was given to competing superstores.
- 6.32 An outline suggested by Maclver for forecasting the traffic demand at retail developments is outlined in the figure below.

Figure 6.1 Traffic Demand at Retail Developments



Maclver (1995)

- 6.33 Primary trips are simple trip chains made from home, which return directly home after the shopping activity; they are new trips on the local road network. The methodology used to estimate the distribution of primary trips has already been well developed in practice and requires little change.
- 6.34 These methods range from simple approaches using drive-time isochrones to allocate trip ends in proportion to the number of households to more complex methods which assume that trip length is based on a gravity model trip distribution function, incorporating zonal population and travel time.
- 6.35 However, it is secondary trips, particularly pass-by trips that are of most interest, mainly due to the fact that they can be discounted during the assessment of traffic impact on the local road network.
- 6.36 A 1996 ITE study suggests that gross floor area and PM peak-hour traffic on the adjacent road are the most appropriate variables for estimating pass-by trip percentages. A number of studies have shown that pass-by trips decrease as gross floor area increases, and that there is little correlation between pass-by trip percentages and traffic flow on the adjacent road. This suggests that shoppers are more inclined to make primary trips to larger shopping centres.
- 6.37 Although in the ITE method gross floor area of the development is used as the independent variable, studies undertaken in the UK have shown this approach to be questionable. For example, two stores with identical gross floor areas (approximately 6,200 sqm) had pass-by trip proportions during the Friday evening peak of 6% and 28% respectively. Another surveyed store, with a GFA of 4,000 sqm had 30% pass-by trips during the same period (Maclver, 1997).
- 6.38 Previous trip type surveys have indicated that on average 70% of pass-by trips during the evening peak originated at work. The increase in pass-by trip proportions during this period can largely be attributed to these work trips. Although pass-by trips do occur at other times of the day they are not usually work-based, but involve other purpose.
- 6.39 The results of trip type studies carried out in the UK indicate that the stores with the highest proportions of pass-by trips during the Friday evening peak period are located on busy commuting routes in cities such as London and Edinburgh, where pass-by proportions varied from 24 to 37%. Other stores surveyed located in smaller towns or in locations with lower traffic levels produced lower percentages of pass-by trips during the same period. This suggests that supermarkets located on routes used by commuters travelling from work to home will 'capture' more pass-by trips than those in town centres or in urban areas with lower levels of commuting traffic.
- 6.40 Maclver recommends that the following general rules are used for determining the proportions of pass-by trips at superstore developments in the United Kingdom:
- For superstores located on major commuting routes in larger urban areas, the pass-by proportion may range between 25-35% depending on the levels of traffic flow. It may be assumed that more populous urban areas will generate higher levels of pass-by trips;
 - On other less significant commuting routes, in out-of-town locations and in urban areas with smaller populations, the pass-by proportion can be assumed to be in the range of 15 to 25%;
 - In town centres and on non-primary routes the proportion will be approximately 10%; and
 - In locations with little propensity to generate pass-by trips the proportion can be as low as 5%.
- 6.41 **The methodology used to devise these percentages is not provided within Maclver's report.** However, it is stated that extreme care must be taken when assigning pass-by trips to the road network.

7 Online Shopping Trends

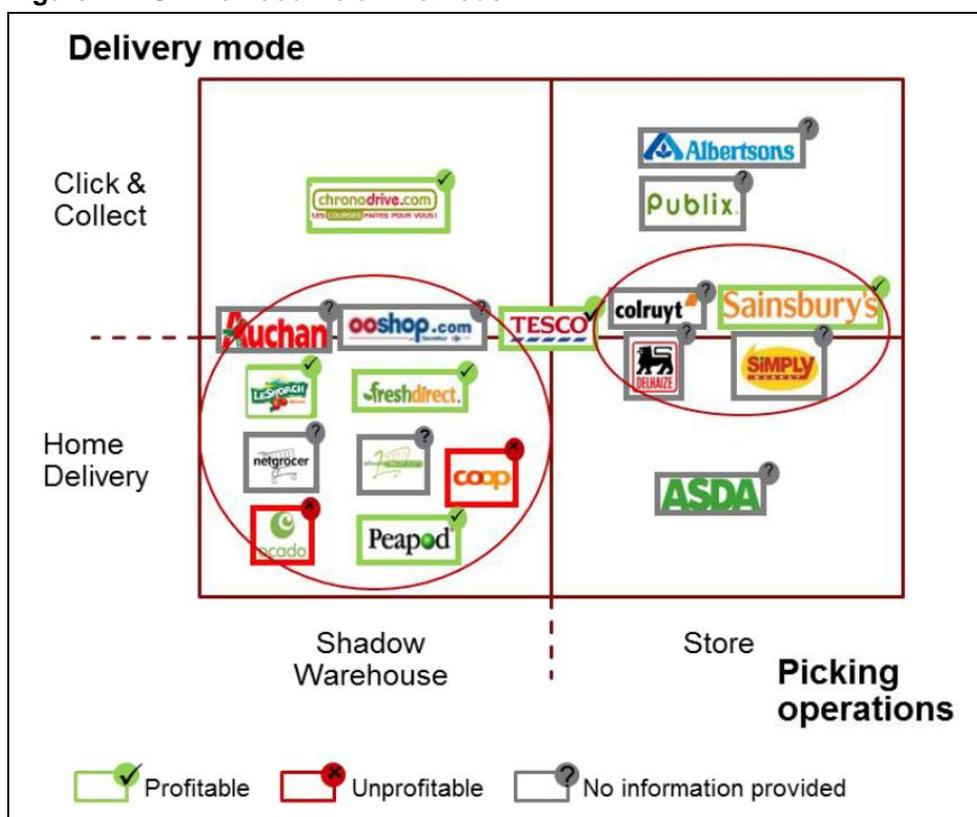
7.1 Retail shopping trends have been investigated to examine the potential impact their prevalence may have on pass-by and diverted trips, with a particular focus on the rise of both shopping online for groceries and click and collect services.

General

7.2 The United Kingdom can be considered to have the most developed online food retailing market worldwide, with €5.5 billion market sales of online groceries in 2010 (Werner et al., 2010). In relative terms, the UK online grocery market represents approximately 4.5% of the total grocery market. Online grocery sales per capita in the UK, Switzerland and Belgium are €82, €23 and €18 respectively.

7.3 Four main business models can be identified in online food retailing, as illustrated in **Figure 7.1** below. It is intended to provide an overview of the different retail methods applied rather than an exhaustive list of all retailers providing such services.

Figure 7.1 Online Food Retail Methods



Werner et al. (2010)

7.4 The figure shows traditional and pure online retailers that provide complete grocery portfolios that allow consumers to order online. The vertical axis differentiates the way in which customers can receive their goods, either by collecting products themselves (click and collect), or have the products delivered to their homes (home delivery).

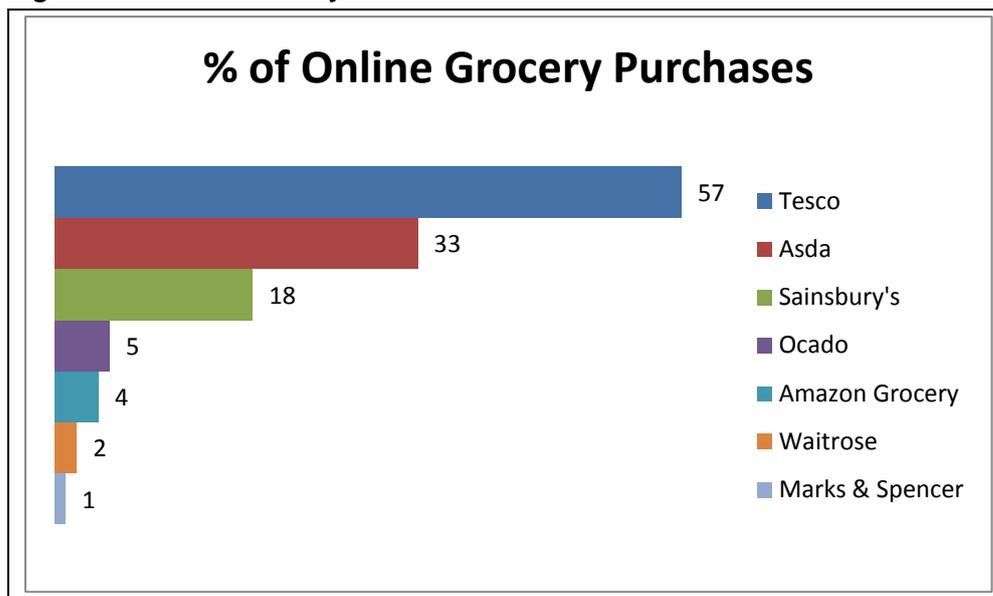
7.5 When providing means of online shopping, traditional food retailers often choose to offer a click and collect service as well as a home delivery option, both provided from their stores. However, it

should be noted that some retailers, such as Publix and Albertsons (both located in the USA) have ceased providing home delivery options in favour of operating a click and collect service.

Online Shopping

- 7.6 According to a 2012 study by Kantar Media, 20% of the UK's internet population visit the leading grocery retailers' websites each month, with an average of 1.3 million consumers purchasing groceries online in the same period. The flexibility to shop any time and the convenience of having items delivered to the front door are cited as the top reasons for undertaking grocery shopping online. It is noted however that the majority of online grocery shoppers still make most of their grocery purchases in traditional stores, with approximately one-third of such shoppers indicating that 60% or more of their grocery purchases are made online.
- 7.7 Among the 1.3m consumers that purchase groceries online between May and July 2012, over half are observed to make a grocery purchase on Tesco – this represents a greater share of grocery shoppers than the share held by its traditional stores. Asda ranks second with one-third of online grocery purchasers converting on its site.
- 7.8 **Figure 7.2** below details the market shares held by various retailers offering online shopping facilities.

Figure 7.2 Online Grocery Purchases



Kantar Media, 2012

- 7.9 Online shopping is the fastest growing channel for grocery shopping, with revenues of online grocery shopping increasing by 18.7% over the past 12 months. However, this remains only 5% of grocery spend; on the whole shoppers are still choosing to spend the overwhelming majority of their money in traditional store environments.
- 7.10 Although the growth in online shopping is rapid, the market share held by online grocery shopping is still relatively small. Only 22% of households shopped online for groceries over the past 12 months (to November 2013) and even these still spent 75% of their money in an off-line environment.

Click & Collect

- 7.11 Click and collect services provide shoppers with the benefits of shopping online with the added convenience for the customer of being able to pick up shopping at a time that suits them.
- 7.12 The table below details the click and collect services provided in the major supermarkets operating in the United Kingdom. Asda, Tesco and Waitrose operate click and collect services within their stores, whilst Iceland and Morrisons both plan to introduce such services in the near future.

Table 7.1 Supermarket Click & Collect Services

Store	Click & Collect Services
Aldi	Not available
Asda	Available
Iceland	Plans to introduce in near future
Lidl	Not available
Marks & Spencer	Not available on food items; clothing, beauty and hardware only
Morrisons	Plans to introduce in near future
Sainsbury's	Not available on groceries or entertainment products
Tesco	Available
Waitrose	Available

Figure 7.3 Tesco and Asda Click & Collect Bays



bradleystokejournal.co.uk; global-msi.com

Chronodrive, France

- 7.13 Chronodrive operates as a supermarket providing solely click and collect services with the aim of making the shopping experience as convenient as possible for its customers. The company operates dedicated pick-up / drive-through supermarkets whereby customers place orders with choice of over 8,000 products, and designate a Chronodrive pickup location and pickup time. Collections can be made between 8:30am and 8:30pm daily and are ready 90 minutes after an order has been placed, and can be held for up to 24 hours after the scheduled pick up time.
- 7.14 Orders can be made online or via an app through which consumers can access the full range of groceries on their smartphones. The app function is promoted through a reduction in processing time from 90 minutes to 30 minutes for orders made in this way. Chronodrive offers its collection service for free and commits to a high standard of customer service, with Chronodrive employees

transporting products and loading them into customers' vehicles, meaning customers do not need to get out of their car during the process.

- 7.15 With an annual turnover of €20 million in 2009, the company has approximately over 50 stores, 130,000 regular customers and an average of 40 items bought per purchase in 2010.
- 7.16 Chronodrive's success can be linked to both customer frustration with home delivery fees and steep food charges set by other retailers, and the convenience factor offered by a click and collect service. Stores are located in suburban, middle-class French neighbourhoods, where on the whole residents shop frequently who live busy lives, and so value the convenience factor offered by Chronodrive.
- 7.17 Kurt Salmon Associates, a Paris-based retail consultant, predicts this format of shopping will hold a 4 or 5% share of the French grocery shopping market in the next few years, compared to its current share of 0.6% (Soverinsky, 2010).
- 7.18 No such service is provided within the UK. Whilst dedicated click and collect bays exist at a number of Tesco and Asda supermarkets, as seen in **Figure 6.3** above, these are located within the ground of traditional stores rather than at stores dedicated solely to providing click and collect services.

Amazon

- 7.19 Amazon, the world's largest online retailer, now operates two pick-up methods that aim to provide increased convenience to go alongside the traditional method of delivering an order to a home or business address – Collect+ and Amazon Locker. These pick up methods can influence the type of trip undertaken by the customer. It should be noted that the type of trip, and their proportion, is hard to quantify.
- 7.20 Collect+ allows customers to have their Amazon orders delivered to a participating store, allowing them to pick it up at a time that's convenient. An e-mail notification is sent by Collect+ to inform customers that their order is ready for collecting, with instructions and a unique pick-up code. Parcels are delivered to the Collect+ store on the estimated delivery date between the hours of 07:00 and 21:00 and can be picked up on providing a pick-up code and valid identification. All parcels delivered to Collect+ stores must be picked up within ten days, although this can be extended if a customer is unable to pick up a delivery within the time period.
- 7.21 Amazon Locker provides a self-service delivery location to pick up Amazon parcels. Lockers are currently available in a variety of locations throughout the UK. Selecting an Amazon Locker location allows the customer to pick up their order at a time that's convenient. All parcels delivered to Amazon Locker locations must be picked up within three business days.
- 7.22 A number of Amazon lockers are found in strategic locations to provide easy access for commuters to pick up their purchases whilst travelling to or from work without deviating from their usual route. Collections made in this way can trips could be defined as pass-by trips, although the methodology applied to quantify this is difficult to devise. Other collections could be considered to be diverted trips, whereby commuters and shoppers divert from their existing route to access the lockers.

eBay

- 7.23 As with Amazon, eBay are now branching out delivery options from the traditional home delivery to incorporate click and collect services. Select eBay sellers offer a click and collect option. Large merchants offer collection from their high street stores, and additional sellers offer collection from participating Argos stores.

- 7.24 When purchasing an item on eBay, the customer can choose to select 'Free Click & Collect' at checkout. On entering their postcode, stores near them offering this service are identified, and confirmation is given as to whether the item is in stock. The checkout process is then completed as usual.

Non-food Retail

- 7.25 Click and collect services are also offered by a number of non-food retail outlets in the United Kingdom. These include, but are not limited to Selfridges, Next, John Lewis, Matalan, British Home Stores, New Look, French Connection and Claire's.

Transport for London

- 7.26 In January 2014, Transport for London announced that Tesco, Waitrose and automated parcel Locker Company InPost are to establish 'click and collect' facilities at stations on the London Underground network. Click and collect enables customers to place orders online, which they then pick up from stations or station car parks on their way home.
- 7.27 TfL has been developing click and collect services at London Underground station car parks since November 2013 through a six month trial with Asda at six station car parks. The trial was successful and has resulted in discussions to allow Asda to provide click and collect services at all 62 London Underground stations that have car parks.
- 7.28 Tesco plans to provide collection points at Osterley, Newbury Park, Rayners Lane, Finchley Central, Arnos Grove and Cockfosters stations. Waitrose will operate at six stations and are working to install temperature-controlled lockers at stations to provide further click and collect services. InPost, which delivers parcels across the United Kingdom, will work out of three stations, with the locations yet to be decided.
- 7.29 It was announced on the 6th June 2014 that Sainsbury's is to launch a click and collect service for the London Underground, whereby shoppers will be able to order groceries on their smartphones and tablets on their commute to work and pick them up on their way home, as long as the order is placed before 1pm. Seven London Underground stations will act as pick up locations; Oakwood, Totteridge & Whetstone, Woodside Park, Leytonstone, Loughton, Debden and South Woodford.
- 7.30 Although there are no studies in the public domain that evaluate the success of the London Underground click and collect partnerships, the plans to expand the scheme mean it can be presumed to have been a success. The majority of these trips can be seen as pass-by trips; the intention is for commuters to pick up their shopping on their way to or from work.

8 TRICS Data Review

Introduction

- 8.1 The TRICS database (v.7.1.1) has been interrogated with the aim of finding characteristics of sites suitable for further data analysis as part of the pass-by and diverted trips research process.
- 8.2 Data for all sites on TRICS under the category Retail: Food Superstore (01/A) from 2000 onwards was extracted and basic details collated. A total of 88 sites have been included in the data review.

GFA & Location Type

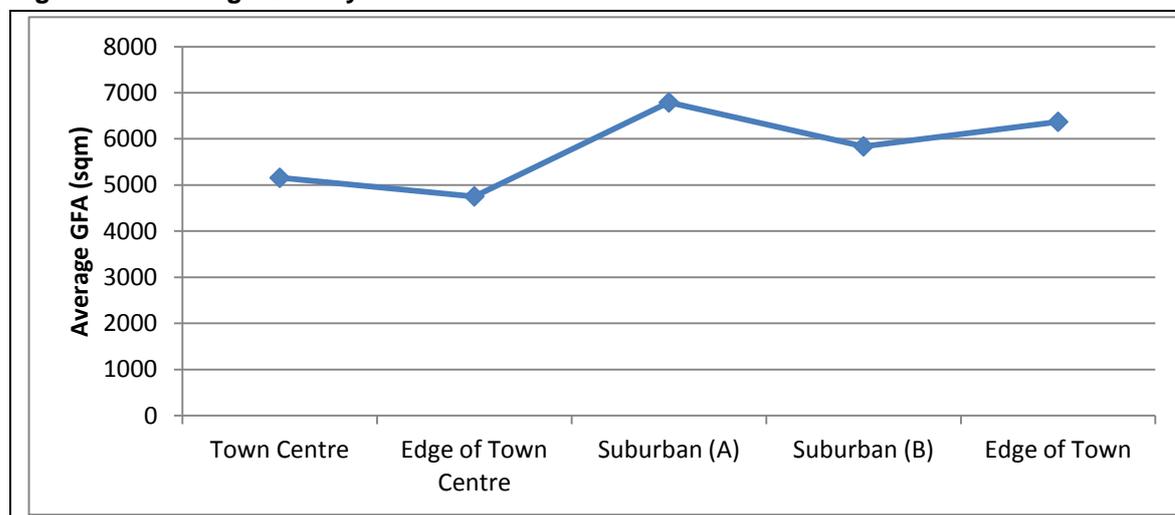
- 8.3 Gross Floor Area (GFA) and location type information was recorded to investigate whether a correlation between GFA and location type existed. No correlation was seen, as shown in **Table 8.1** below.

Table 8.1 GFA by Location

Location	No. of Stores	Average GFA	GFA Range
Town Centre	7	5,156m ²	9,223m ² - 1,920m ²
Edge of Town Centre	13	4,753m ²	9,104 m ² – 1,825m ²
Suburban Area (A)	11	6,790m ²	12,642m ² – 1,700m ²
Suburban Area (B)	22	5,837m ²	10,725m ² - 800m ²
Edge of Town	35	6,370m ²	11,101m ² – 1,487m ²

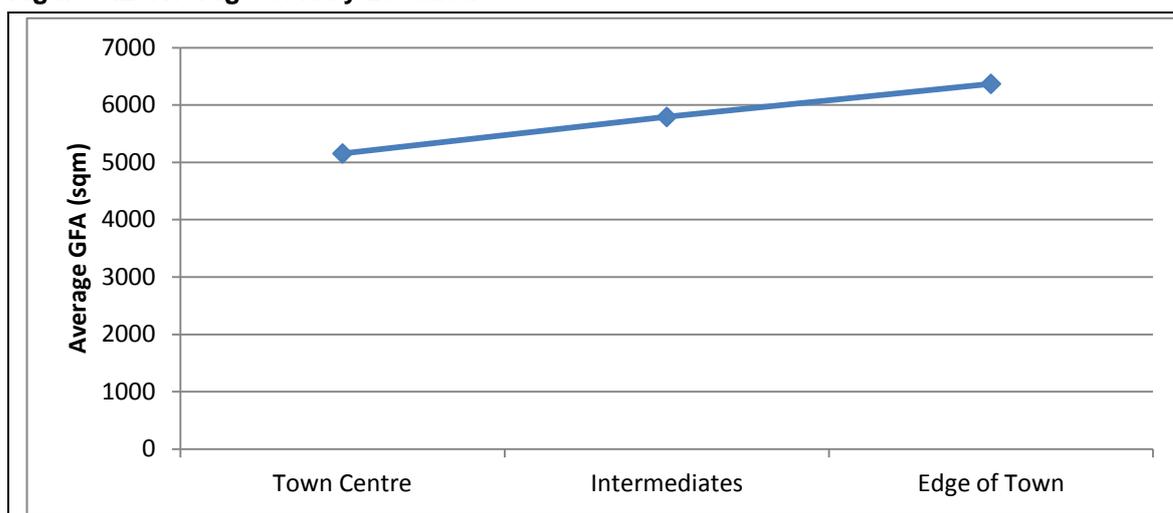
- 8.4 This is shown in graphical form in **Figure 8.1** below.

Figure 8.1 Average GFA by Location



- 8.5 However, when Edge of Town Centre, Suburban (A) and Suburban (B) are grouped together and the average of the three locations added, a more defined positive correlation can be seen. This is shown in **Figure 8.2** below.

Figure 8.2 Average GFA by Location



8.6 The review undertaken of commercial and academic research has not suggested a correlation between GFA and location type.

Proximity to Major Area Types

8.7 The distance between each store and the nearest direct competition (another food superstore), residential area, commercial area and strategic road network was then calculated. This has been done to determine whether proximity to different area types is an influencing factor. No correlation between location type and proximity to these categories was observed, as seen in **Table 8.2** below.

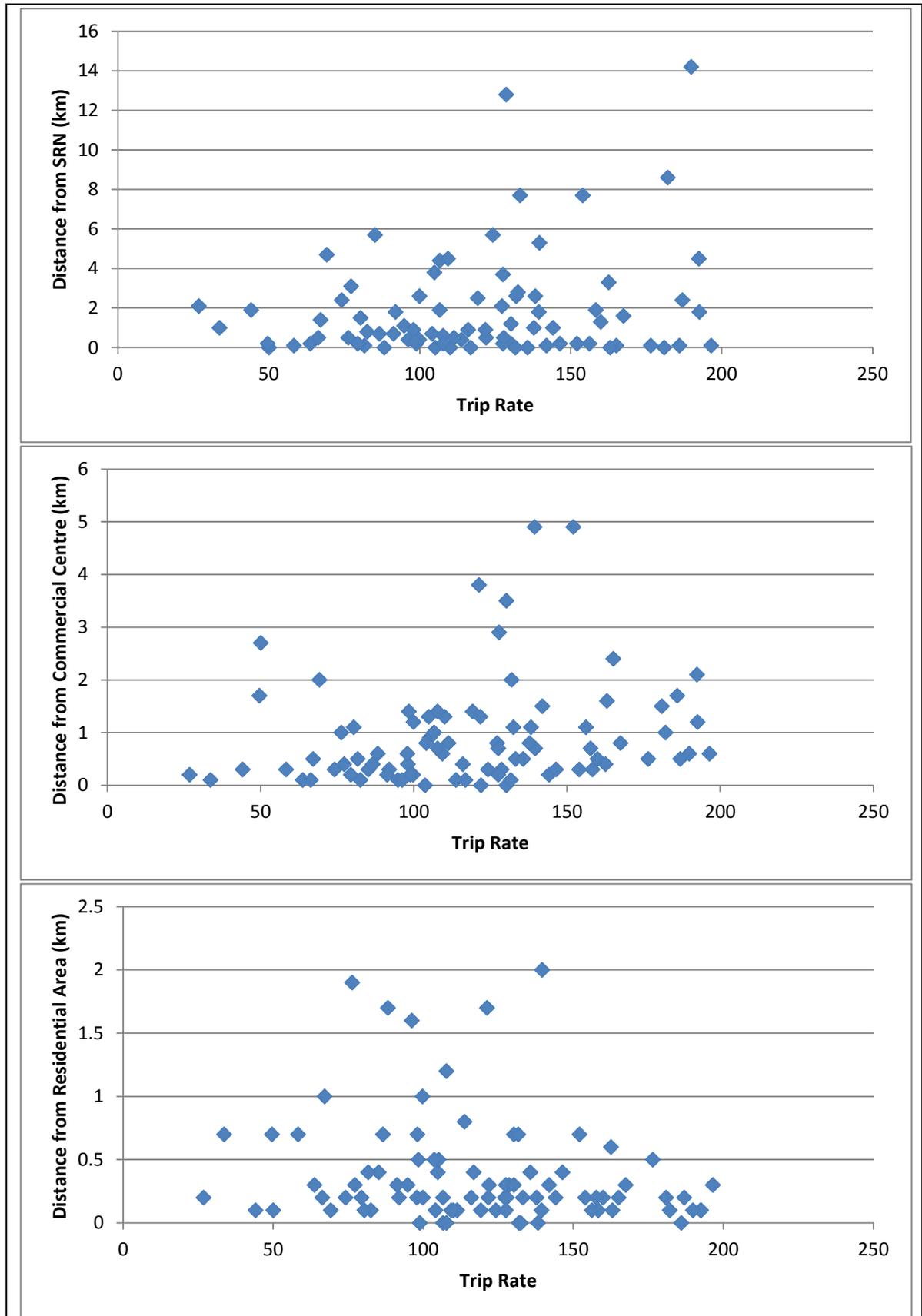
Table 8.2 Major Area Types by Location

Location	Proximity to Major Area Types			
	Residential	Commercial	Competition	SRN
Town Centre	0.5km	0.3km	3.6km	2.5km
Edge of Town Centre	0.5km	0.6km	6.0km	8.4km
Suburban Area (A)	0.3km	0.4km	2.2km	1.1km
Suburban Area (B)	0.2km	1.1km	1.8km	3.5km
Edge of Town	0.4km	1.2km	4.2km	3.8km

8.8 No correlation between location type and proximity to residential areas, competition stores or the strategic road network is observed. However, a correlation between location type and proximity to the nearest commercial area can be seen. Commercial research carried out by Somerfield and Tesco has presented a correlation between the proximity of a store to a town centre and the propensity for store customers to visit other shops within a town centre. The increasing proximity to the nearest commercial area as location type changes reinforces this claim.

8.9 Daily trip rates have been compared against proximity to SRN, commercial areas and residential areas, and no correlation has been found. A stats test has been undertaken comparing the trip rates of sites under 1km from the SRN and sites over 1km from the SRN to confirm the lack of correlation. This showed no statistically significant relationship between the two groups, meaning proximity to SRN does not impact trip rate.

Figure 8.3 Distance from Major Area Type against Daily Trip Rate (07:00-19:00)



GFA & Store Facilities

8.10 The various facilities provided at each store have been examined using the websites of each store and compared against GFA. Facilities considered are as follows:

- Café or Restaurant;
- Click and Collect Services;
- Clothing;
- Electricals;
- Garden Centre;
- Homeware;
- Opticians;
- Petrol Station;
- Pharmacy;
- Post Office;
- Recycling;
- Stationery; and
- Travel Agents.

8.11 As can be expected, as gross floor area increases, the facilities provided within the store expands. It should be noted however that no store in the TRICS database has all the services listed above. The biggest store, with a gross floor area of 12,642m² has nine of the facilities listed above.

Figure 8.4 Facilities by GFA



8.12 When the average number of facilities is compared against location type, no clear correlation can be seen. However, when Edge of Town Centre, Suburban (A) and Suburban (B) sites are

incorporated into one group, it can be seen that the range of facilities on offer increases as distance from the town centre increases. This is shown in **Figures 8.5** and **8.6** below.

Figure 8.5 Facilities against Location Type

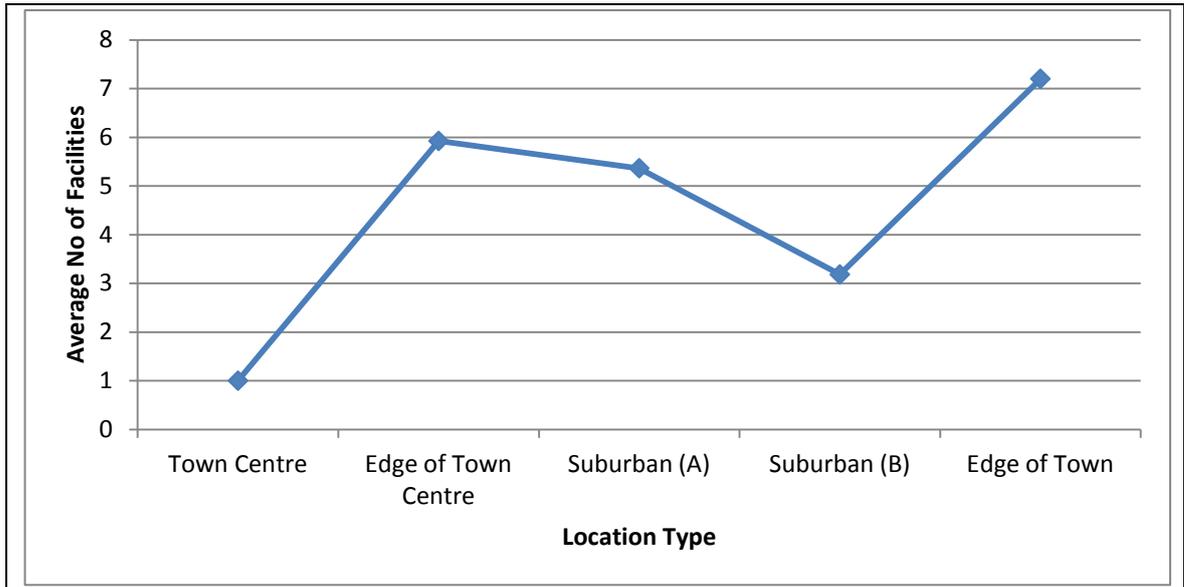
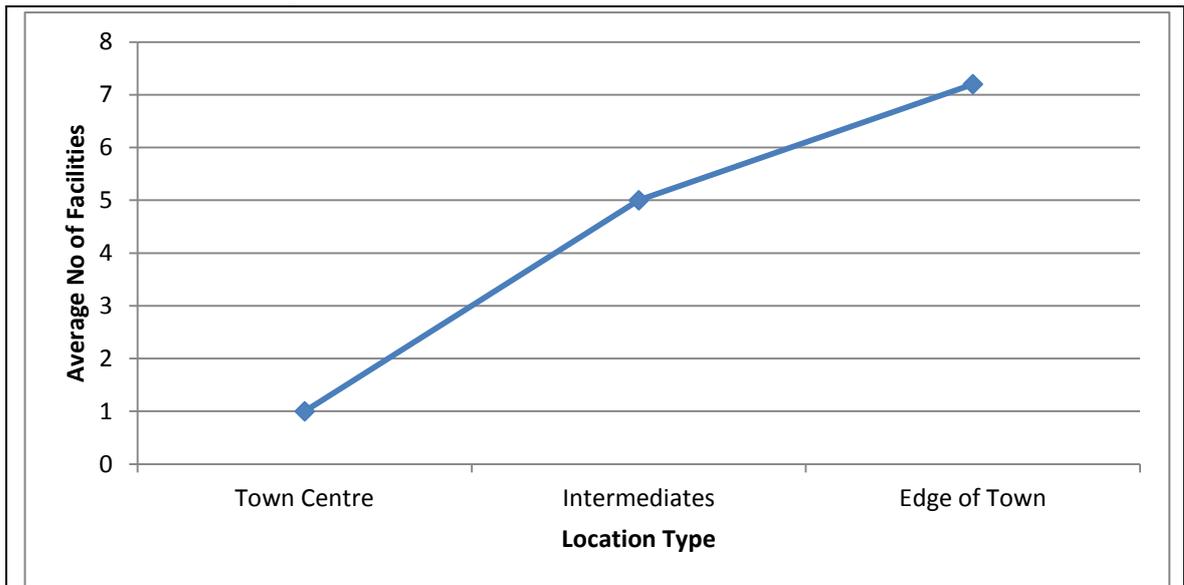


Figure 8.6 Facilities against Location Type



Trip Rates

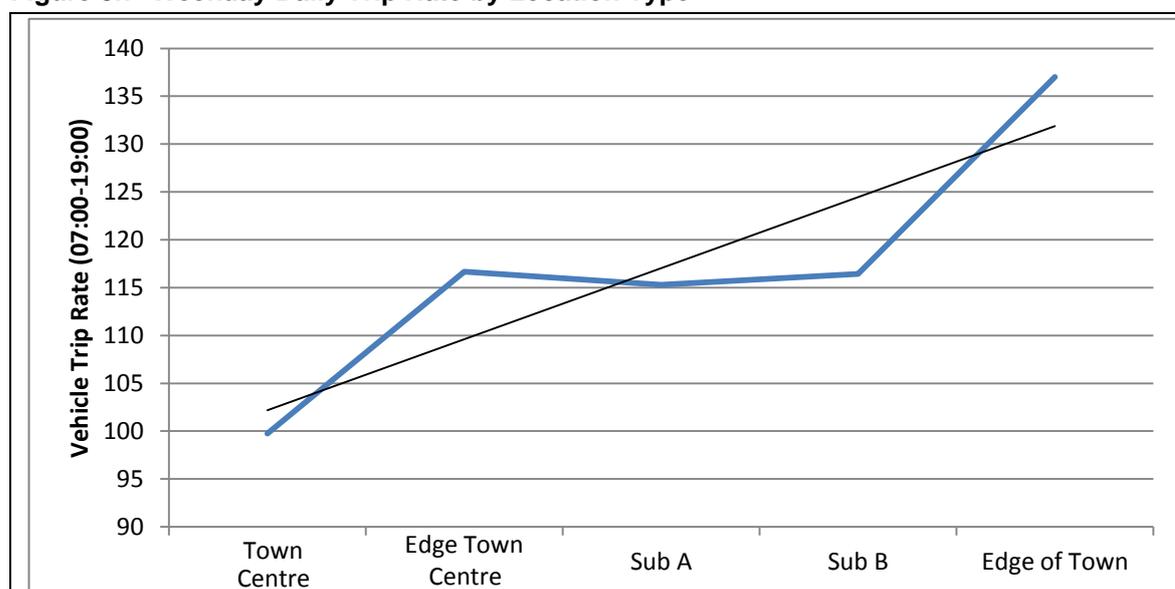
- 8.13 The trip rates and trip trends for each store were investigated and grouped by location type. This found that during the weekday daily period (07:00 – 19:00), the further out the location type from the town centre, the busier the store as seen in **Table 8.3** below.
- 8.14 The peak period for store activity was between 17:00 and 19:00. The trip rate between these hours increased as distance from the town centre increased, as seen in **Table 8.3**.

Table 8.3 Friday Trip Rates (per 100m2)

Location Type	07:00-19:00	08:00-09:00	16:00-17:00	17:00-18:00	18:00-19:00
Town Centre	71.573	5.452	7.260	7.423	6.186
Edge of Town Centre	95.317	4.018	10.808	11.001	11.287
Suburban Area (A)	111.585	2.661	11.066	11.621	11.251
Suburban Area (B)	121.428	4.845	11.552	12.104	12.654
Edge of Town	134.059	5.402	13.104	14.271	12.392
TRICS Average	116.983	7.134	11.632	12.334	11.639

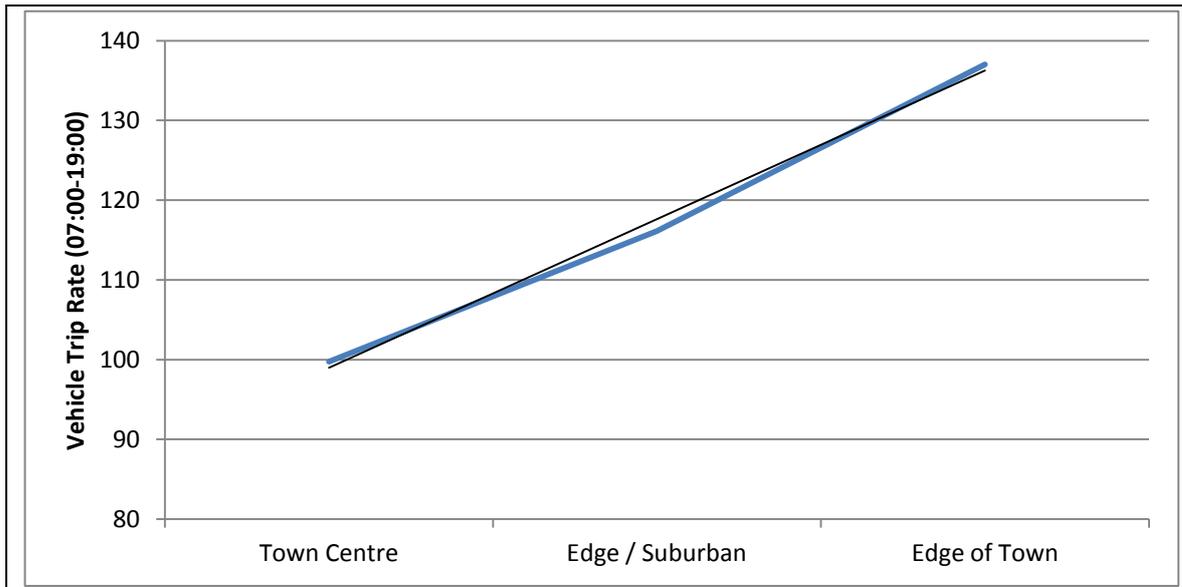
8.15 The correlation between store location type and daily trip rate (07:00 – 19:00) can be seen in **Figure 8.7** below.

Figure 8.7 Weekday Daily Trip Rate by Location Type



8.16 When Edge of Town Centre, Suburban (A) and Suburban (B) sites are incorporated into one group, the correlation between location and trip rate is more defined, as seen in **Figure 8.8**.

Figure 8.8 Weekday Daily Trip Rate by Location Type



8.17 Similar patterns are observed at TRICS sites with surveys undertaken on Saturdays. The daily period trip rate increases as distance from town centre increases, as shown in **Table 8.4**. A defined peak hour of 11:00-12:00 is seen in all location types.

Table 8.4 Saturday Trip Rates (per 100m2)

Location Type	07:00-19:00	11:00-12:00
Town Centre	99.742	11.136
Edge of Town Centre	116.658	12.071
Suburban Area (A)	115.309	11.419
Suburban Area (B)	116.424	12.062
Edge of Town	137.005	14.643
TRICS Average	124.661	12.992

8.18 This is shown graphically in **Figure 8.9** for all location types separately, whilst **Figure 8.10** incorporates Edge of Town Centre, Suburban (A) and Suburban (B) sites together.

Figure 8.9 Saturday Daily Trip Rate by Location Type

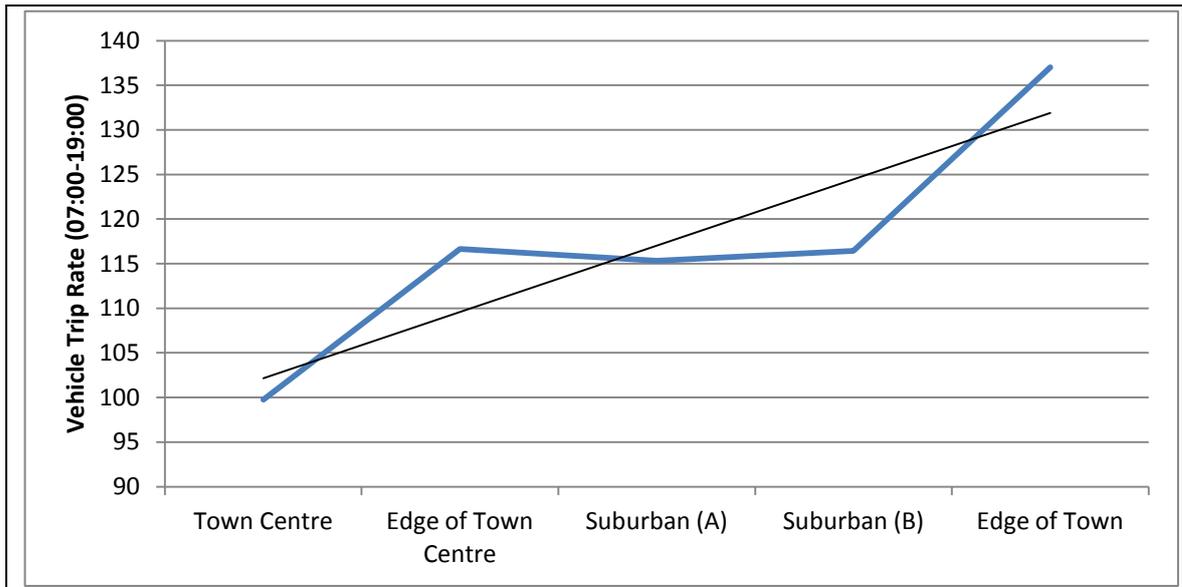
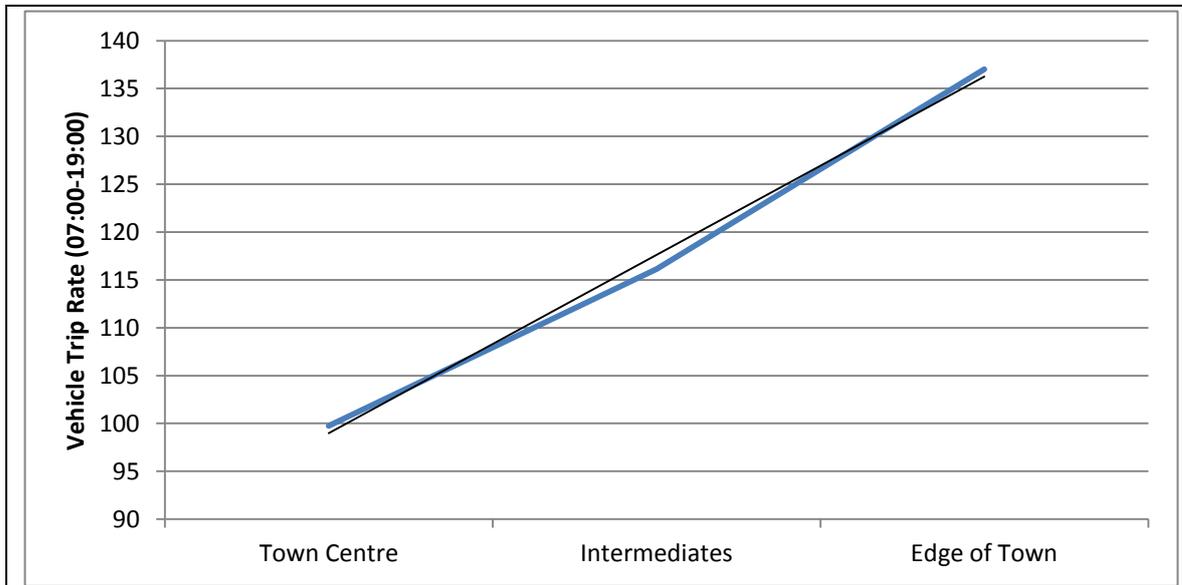
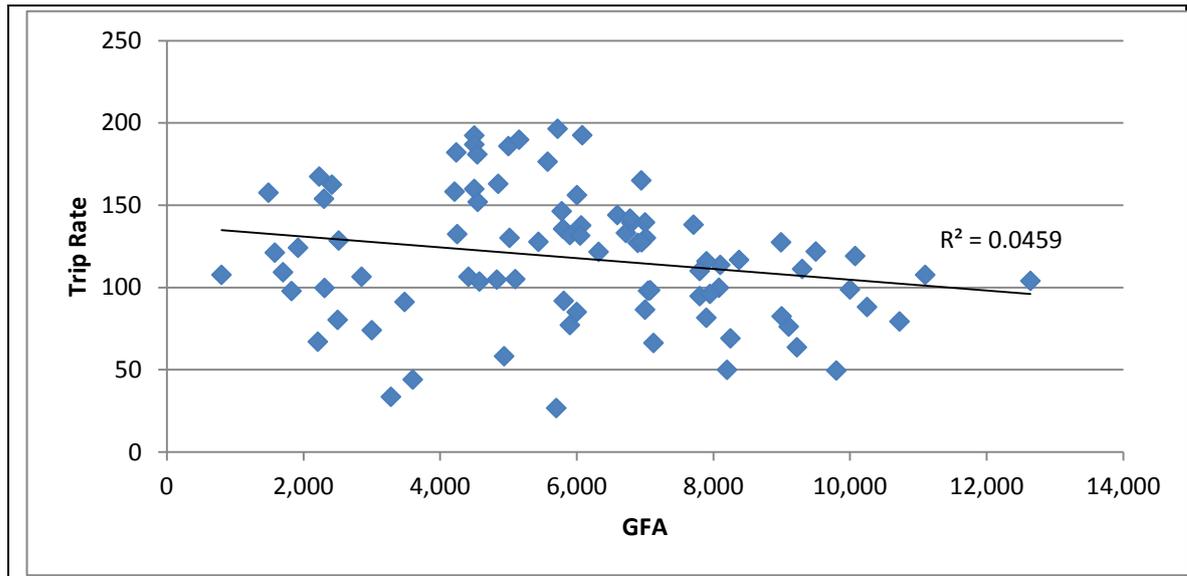


Figure 8.10 Saturday Daily Trip Rate by Location Type



8.19 GFA has been tested against trip rate, and no obvious correlation can be seen. A statistical test has been undertaken to compare sites with GFA over 5,000m² compared to sites under 5000m², and there's no statistically significant difference. However, if the same test is undertaken with sites over and less than 7000m², there is a statistically significant difference at 95% confidence level, which shows sites with bigger GFA have significantly higher trip rate. This indicates that for smaller stores increasing area does not really impact trip rate, and that trip rate is only related to size over a certain threshold.

Figure 8.11 Daily Trip Rate (07:00-19:00) against GFA



GFA & Population

- 8.20 In order to create a suitable catchment area for each store, the following steps were taken. Firstly, the facilities offered at each store were considered; stores with four or more of the facilities described above were designated as **comparison** stores, whilst those with fewer than four were designated as **convenience** stores.
- 8.21 It was considered that shoppers would be prepared to travel for a maximum of 20 minutes to access a comparison store, and 10 minutes to access a convenience store.
- 8.22 Secondly, local maps of the postcode of each store were looked at to determine how far a shopper could travel in that time. This is dependent on the local road network – for example, close proximity to a motorway would allow a further distance to be travelled than congested city streets.
- 8.23 These two steps were combined to create a catchment area for each store, shaped in relation to major roads. This resulted into random polygon shaped catchment areas unique to each store.
- 8.24 Middle layer super output areas (MSOAs), using 2011 Census data were then overlayed onto each catchment area polygon. Output areas within each polygon were added together to produce a population figure.
- 8.25 This was then divided by the store's gross floor area and multiplied by 1000 to give a population per 1,000m² GFA figure.
- 8.26 There is no observable correlation between population per 1,000m² GFA and GFA, location type, proximity to nearest competition, proximity to nearest residential area or commercial area of type of facilities provided.
- 8.27 However, as GFA drops below 3,000m², population per 1,000m² GFA decreases also.

Survey Year & Trip Rate

- 8.28 The year each survey was undertaken has been compared against the daily trip rate (between the hours of 07:00 and 19:00). This has been done for each location type, with Edge of Town Centre,

Suburban (A) and Suburban (B) sites considered in the same grouping (named intermediate sites). For Edge of Town sites, a correlation between survey year and daily trip rate exists for both Friday and Saturday surveys, as shown in **Figure 8.12**. This correlation is less defined for intermediate sites, as seen in **Figure 8.13**. No correlation can be seen between survey year and daily trip rate for Town Centre sites, as seen in **Figure 8.14**. This can in part be explained by the low number of such sites in the TRICS database.

Figure 8.12 Daily Trip Rate by Survey Year: Edge of Town

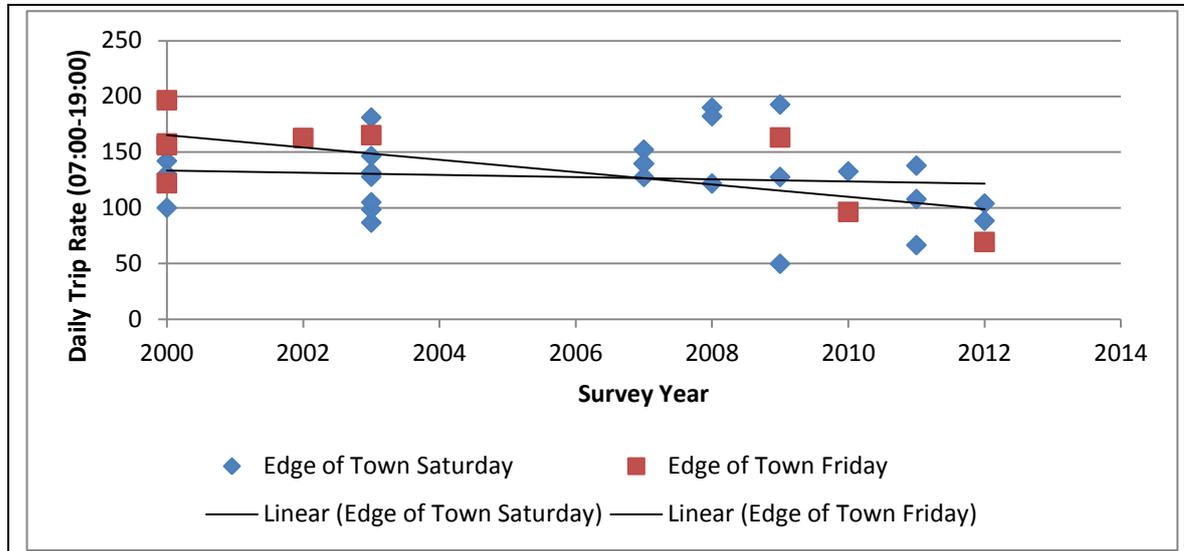


Figure 8.13 Daily Trip Rate by Survey Year: Intermediate

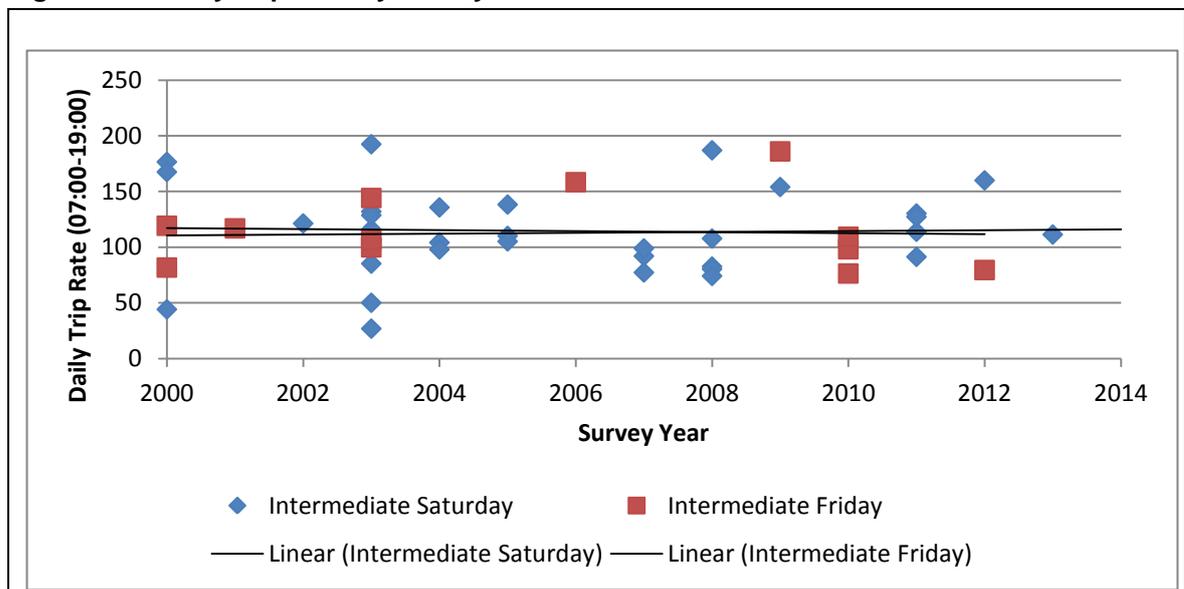
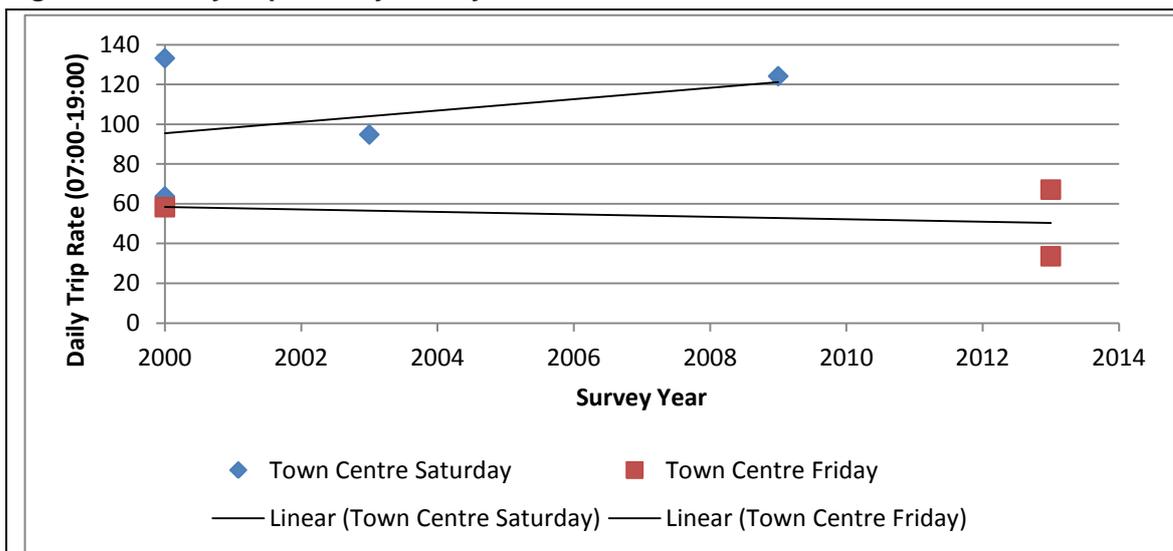


Figure 8.14 Daily Trip Rate by Survey Year: Town Centre



9 Consultation

TRICS User Group Meeting

- 9.1 The main findings of this literature and data set review were presented as part of the TRICS User Group Meeting on the 1st July 2014 in Leeds by Lawrence Stringer of East Sussex County Council. Following the presentation, attendees were given the opportunity to ask questions and provide input into the next stages of the research process through a question and answer session, where the following questions and discussions were raised.
- 9.2 **Question:** Interviews are to be conducted at supermarkets, but have household interviews where new developments have been built been considered?
- Although this could be an option in principle, it is necessary to consider the breadth of surveys to be undertaken – household surveys would lead to a huge survey sample with cost implications. Another factor to consider is that this work has not revealed any helpful guidance since the publication of the 95/2 TRICS report. It must be considered whether this is still relevant or whether advances been made? Nothing has been revealed through the literature review. Similarly, the TRICS data review has shown little correlation although is a substantial sample.
 - It would be possible to do lots of surveys but is a standard discount relevant that can be applied to all sites? Probably not; instead a recommendation for a site by site assessment could be more beneficial, linking with the retail impact assessment.
- 9.3 **Question:** Although a site by site basis is a good starting point (for example, having a business park nearby would impact on pass-by proportions), one of the things hoped for is for a methodology that can be followed to be provided – pass-by often used as a gatekeeping mechanism – to say there's no pass-by trips at a site is not true but at the same time no rate can easily be applied. A logical process that can be followed would be helpful.
- This was agreed with.
- 9.4 **Question:** Will the impact of travel behaviour and the impact of click and collect services be considered? For example, the impact of delivery vans. Click and collect services do not necessarily mean fewer trips, but instead produce a different type of trip.
- This was agreed as something that could be looked into further. The impact of delivery warehouses catering for online shopping was suggested as a point for further research also.
- 9.5 **Question:** Consideration for the differences between discount stores and conventional supermarkets. In the past, people simply went to their favourite shop. Now however, people often go to one supermarket and then to a discount store as well; does this count as an additional trip? Also, will the role of local competition be considered? For example, a rural area is likely to not have a discount store – they are harder to get to.
- It is hard to work out the impact of visiting both a conventional and discount store, and would be hard to calculate without a huge amount of survey data collection. The question to be considered is how this could be generalised. It depends on, for example, if Lidl on the route to Tesco. Also, is this part of the discount store model? They are often found close to other retailers.

- What we need to do is to try and figure out the specific questions that we are trying to answer, and to create specific topics for the data collection process. Surveys can then be tailored to get answers to these. Peer review and user group comments can be incorporated into this.

9.6 **Question:** Will further research on linked trips in retail parks, for example, be considered?

- The whole question of linked trips is blended with the definition of pass-by trips: the terminology is often used interchangeably and integrated with each other. How much they are actually linked would be interesting to look into – the TRICS data insinuates that an increase in floor area does not increase trip rate and distance. But how other retail facilities nearby impact on supermarket trips has not been looked into yet.

9.7 **Question:** TRICS= guidance on how trip rates may apply – use characteristics of the site to get a range of pass-by proportions; study = give data to select pass-by range, giving answers / certainty. There is data that precedes the 95/2 report that gives a range for different land types.

- It would be good to be able to apply rates, but the more research undertaken that looks at the existing TRICS data and work by Maclver and others, the less relevance a standard pass-by rate seems to have.
- It could be possible to give direction on the type of discounts for pass-by trips at town centre locations (convenience trips), where standard rates could potentially be applied. The same could be done for edge of town sites also. However, there is a grey area in the middle (intermediate sites). To provide a range of trip discount would be misleading – there is variety in travel trends; guidance on a site by site basis would be more useful.

9.8 Not suggesting one figure but site ranges with different characteristics – RIA accounting for peak hours. Having a range available would be useful, appreciate that it isn't applicable for every site but would still be good.

- Aim to move away from a standard percentage that has been applied in the past for pass-by / diverted trips – aim to give a more logical and genuine answer instead.

Peer Review Group

9.9 A peer review group including a wide range of experts and professionals has been set up to provide guidance and input towards the research process. The review group has provided comments and feedback throughout the research process. Their feedback has been incorporated within this report.

Key Issues

9.10 There was agreement within the peer review group that a site-by-site approach with surveys undertaken at comparable locations is the most accurate method of determining the proportion of pass-by and diverted trips at a proposed development. It has also been suggested that the level of diverted trips to a development may be directly related to the proximity of major link roads to the site and the volume of trips on them at on peak and off peak times. The more isolated the site in terms of major road infrastructure, the less likely that the trip in question is part of an onward journey to a final destination elsewhere.

10 Key Results & Considerations

10.1 The following conclusions have been drawn from this literature and data set review:

- Policy guidance, both at a local and regional level, recognises the issue of pass-by, diverted and other secondary trips; however, there is a lack of direction in providing information on how their prevalence should be addressed. Methodologies in assessing pass-by and diverted trips are not provided in the majority of policy guidelines.
- Notably from a United Kingdom perspective, the National Planning Policy Framework makes no mention to pass-by or diverted trips and therefore does not support or negate the 95/2 TRICS research report.
- As literature on pass-by, diverted and other secondary trips is spread across several disciplines, there are a variety of definitions of secondary trips used. Notably, the terms diverted trips and linked trips are used interchangeably in a number of research papers. This needs to be taken into account when understanding how the trips have been defined in any Transport Assessment.
- Similarly, many documents and research papers do not define precisely what they mean in describing pass-by, diverted, linked or other secondary trips. This should also be noted.
- Commercial research carried out by Somerfield and Tesco has brought contradictory results regarding the prevalence of diverted / linked trips. However, both have presented a correlation between the proximity of a store to a town centre and the propensity for store customers to visit other shops within a town centre. This should be recognised in the determination of the prediction of linked trips.
- Shopping habits are changing rapidly, particularly in terms of online retail shopping and with regard to the growth of click and collect services. The UK has one of the most developed online food retailing markets worldwide, with €5.5 billion market sales of online groceries in 2010. The UK online grocery market represents approximately 4.5% of the total grocery market, and this market share is increasing annually. Given their importance, online shopping trends and click and collect services should be considered in determining trip rates and trip type proportions.
- A detailed review has been undertaken of the existing TRICS dataset of food superstores, totalling 88 sites. No significant correlation between location type and gross floor area can be seen. However, on average Town Centre sites have a lower average GFA than Edge of Town sites.
- No significant correlation between location type and proximity to major area types has been observed. A correlation between location type and proximity to the nearest commercial area can be seen and has been shown to be statistically significant.
- It should be noted that from the data review as gross floor area increases, the facilities provided within the store expands.
- No clear correlation can be seen when the average number of facilities is compared against location type and trip generation. However, when Edge of Town Centre, Suburban (A) and Suburban (B) sites (as defined in the TRICS database) are incorporated into one group for statistical analysis. The range of facilities on offer increases as distance from the town centre increases.

- From the data review it can be concluded that the Friday peak period for store activity was shown to be between 17:00 and 19:00. Trip rate between these hours increases as distance from the town centre increases. On Saturdays, the daily period trip rate increases as distance from town centre increases. A defined peak hour of 11:00-12:00 is seen in all location types.
- No obvious correlation can be seen between GFA and daily trip rate. This contradicts the 95/2 TRICS Pass-by and diverted trips report, which states that GFA is one of a number of factors that influences trip type percentages. A statistical test has been undertaken to compare sites with GFA over and less than 7000m² shows a statistically significant difference at 95% confidence level, meaning sites with bigger GFA have significantly higher trip rates. For smaller stores increasing area does not really impact trip rate, and that trip rate is only related to size over a certain threshold. This is an important factor to recognise when reviewing transport assessments.
- When considering whether density is a factor for consideration in pass-by diverted trips, there is no observable correlation between population per 1,000m² GFA and GFA, location type, proximity to nearest competition, proximity to nearest residential area or commercial area or type of facilities provided. However, as GFA drops below 3,000m², population per 1,000m² GFA decreases also.
- In considering transport over time the survey year is compared against the daily trip rate for edge of town sites, a correlation was found for both Friday and Saturday surveys. This correlation is less defined for intermediate sites whilst no correlation can be seen between survey year and daily trip rate for town centre sites, in part explained by the low number of town centre sites in the TRICS database.
- Many of the key arguments and conclusions contained within this report are not made within the 95/2 TRICS pass-by and diverted trips report as transport behaviour such as new trips is now much more widely understood. It should also be noted that many of the key conclusions made within the 1995 report are no longer valid as shopping trends and travel behaviours have changed.
- The 95/2 report states that “the proportion of trips generally accepted to be non-primary is 30%. Most of the non-primary trips tend to be home-work-site-home and hence values are generally lower than this at the weekend when there is less home commuting but could be higher on a Friday evening but would not expect to exceed 40%”. This standard application is no longer considered relevant due to the factors set out below in this report.
- The literature review undertaken as part of this report has demonstrated that there have been contradictory results regarding the prevalence of diverted / linked trips. Alongside this, shopping habits and travel patterns are changing rapidly. As such, a generic value that can be applied to all retail sites is not appropriate in this dynamic environment.
- The assessment of the TRICS data has not found any real correlations. This is partly due to there being so many variables in the data and site selection. Therefore it will be difficult for users to find a comparable store from the data sets available. It is therefore recommended that a **site by site approach** is taken in justifying the proportion of pass by and diverted trips that are to be attributed to the proposed development.

10.2 It is recommended that for an assessment of the quantum of pass-by and diverted trips that a first principles approach is taken for each site, whereby a process is defined for the assessment of these trips and agreed by the applicant and determining authority. This will form an additional task in the scoping report for any Transport Assessment. Chapter 11 contains a process diagram and associated explanatory note that are intended to aid with the undertaking of this assessment.

11 Pass-By & Diverted Trips Assessment Methodology

Explanatory Note: Pass-By and Diverted Trips Process

Introduction

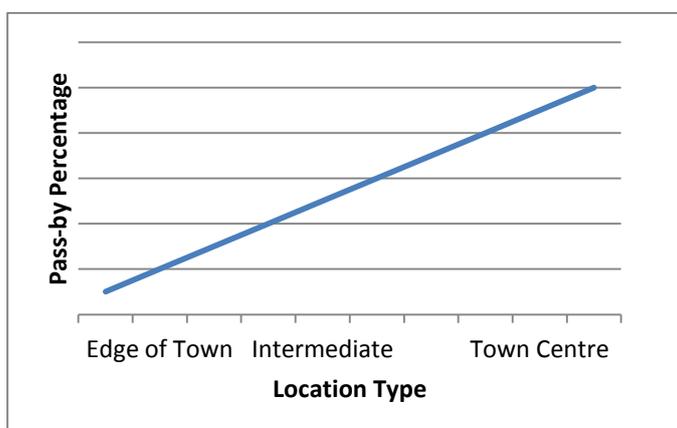
- 11.1 The proportion of trips that are pass-by and diverted should be considered as part of the TA Scoping Process. A generic standard reduction is no longer applicable – instead a level of reduction should be determined on a site-by-site basis.
- 11.2 Steps on how this should be done are illustrated in a process diagram contained within this report. Before starting the process, it is important that the developer and all parties have a clear understanding of the definition of distinction between pass-by and diverted trips. Different development characteristics will produce different trip types.
- 11.3 It is important to note that this explanatory note does not contain any definitive pass-by and diverted trip percentages that would be used as a standard deduction in trip generation.

Stage 1: Development Definition

- 11.4 The first stage of the process is to ensure that a clear definition of the development exists. This will provide all involved parties with a better understanding of the development and will help to start to understand potential trip rates and pass-by and diverted percentages. This definition should cover location, facilities, GFA, proximity to infrastructure and SRN, and provision of click & collect services. These five parameters are detailed in turn below.

Location

- 11.5 The location type should be assigned to one of the following categories:
- Town Centre;
 - Intermediate Location; or
 - Edge of Town.
- 11.6 A store's location type can influence both the daily trip rate and percentage of secondary (pass-by and diverted) trips. As a store's proximity to a town centre increases, the potential percentage of pass-by trips also increases.



Facilities

11.7 It should be assessed to see whether the development will have any of the following facilities within the retail store:

- Café or Restaurant;
- Clothing;
- Electricals;
- Garden Centre;
- Homeware;
- Opticians;
- Petrol Station;
- Pharmacy;
- Post Office;
- Recycling;
- Stationary; or
- Travel Agents.

11.8 A higher number of facilities may produce a greater percentage of secondary trips.



GFA

11.9 The gross floor area of the store should be noted. Two store categories have been devised based on GFA; stores with a GFA of 4,000m² or less are more likely to act as convenience stores, whilst those with a GFA higher than 4,000m² are more likely to act as comparison stores.

11.10 Convenience stores are more likely to produce pass-by trips, whilst comparison stores are more likely to produce diverted trips. People are prepared to travel further to access a comparison store than a convenience store (20 minutes for a comparison store, compared to 10 minutes for convenience).

11.11 Note that the TRICS data review has shown that GFA does not influence daily trip rate, with the exception of stores over 7,000m² having a significantly higher trip rate than those with a smaller floor area. GFA does not have a linear correlation with pass-by and diverted percentages; however, facilities within store does (this is shown to increase with increase in GFA).

Proximity to Infrastructure

11.12 The proximity of the development to major infrastructure should be calculated. This includes, but is not limited to, railway stations and public transport interchanges; schools; large residential areas; other commercial areas; competition sites; and major office / workplace areas.

- 11.13 The daily trip rate peak will not necessarily coincide with pass-by and diverted trip peaks. The weekday daily trip rate peak occurs Friday evenings, as shown by TRICS data, but this is not necessarily when the peak pass-by trips will occur. For example a store near a school could have a pass-by peak of 09:15-09:45 as parents visit the development after dropping off a child at school.

Click & Collect Services

- 11.14 The provision of click and collect services should be considered. If such services are to be provided as part of the development, the extent of their provision should be detailed. Having click and collect services as part of a development is likely to increase the proportion of pass-by trips.

Stage 2: Pass-By & Diverted Trips Reduction

- 11.15 Having considered these parameters, the developer should calculate an appropriate percentage of pass-by and diverted trips. These can then be reduced from the overall trip generation figures. The trip generation exercise should be undertaken following usual best practice.
- 11.16 It is recommended that the developer undertakes a survey to assess the proposed store's percentage of potential pass-by and diverted trips. This, alongside the parameters detailed above, can be used to provide an evidence base to justify potential pass-by and diverted trips reduction.
- 11.17 A survey methodology for ascertaining whether a trip is pass-by or diverted is contained at **Appendix F** that allows survey data to be incorporated into the TRICS database. An example pass-by and diverted trip survey specification is contained at **Appendix G**. This survey methodology and specification should be adapted to reflect the context of the surveyed store.

Notes

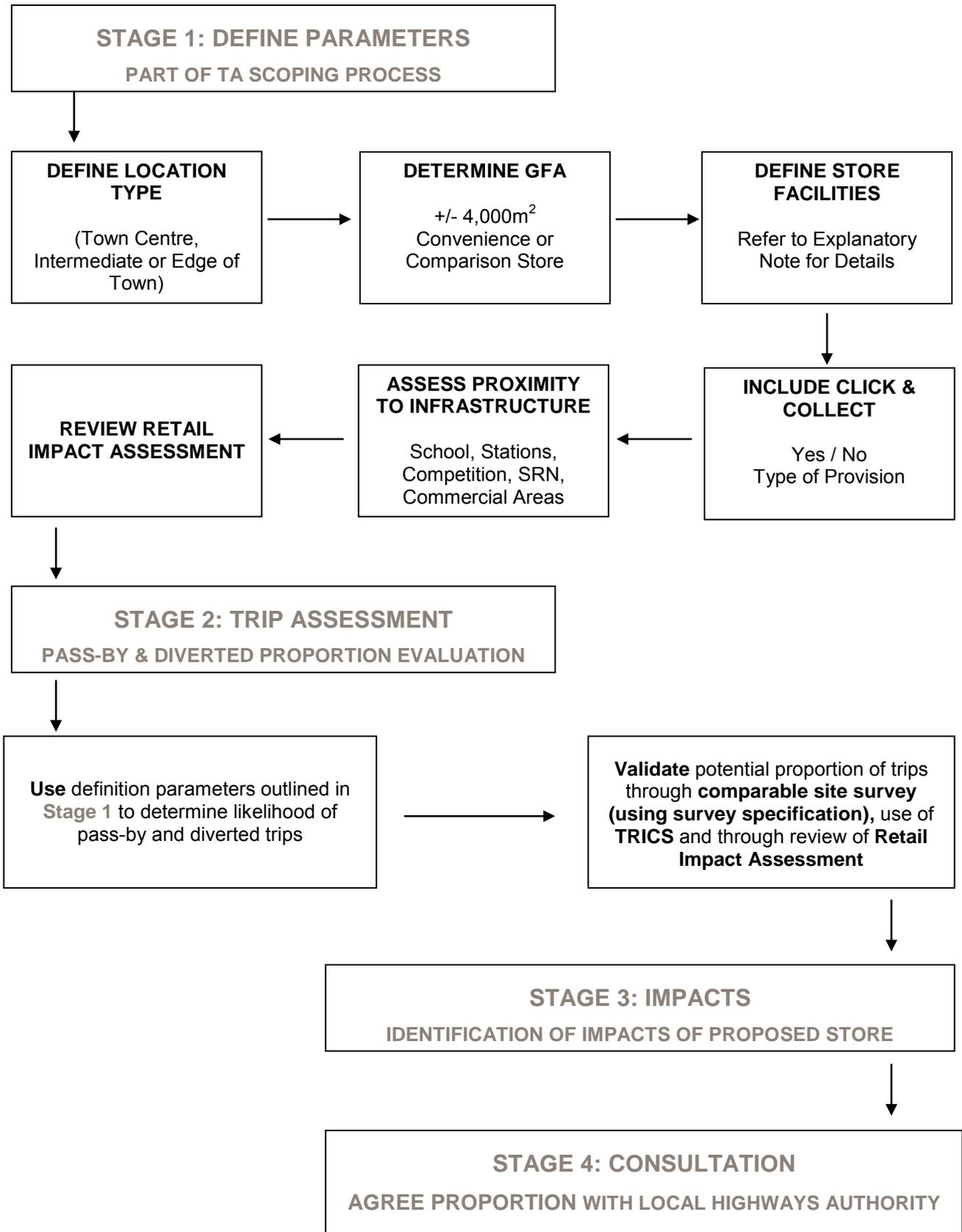
- 11.18 A key question of a development, taking into consideration the above factors, is what trips could be already present on network adjacent to the development.
- 11.19 There would be a low percentage of diverted trips at a town centre convenience store, whilst there would be a low percentage of pass-by trips at an edge of town comparison store. The fact that people are prepared to travel further for an edge of town store gives a presumption against the prevalence of pass-by trips.

Retail Impact Assessment

- 11.20 The Retail Impact Assessment should be considered alongside the Transport Assessment in the assessment of potential pass by and diverted trips.
- 11.21 It important for the applicant and the determining authority to engage closely with those that are preparing the Retail Impact Assessment for the proposed development so that the outcomes arising from the analysis of the Retail Impact Assessment can be taken into account in the Transport Assessment.
- 11.22 The analysis of retail demand and location will influence the trip generation assessment that will be included in the Transport Assessment. The following key issues should be considered within the Retail Impact Assessment and the Transport Assessment:
- GFA + location type defined by RIA;

- Relationship between area type and infrastructure; and
- Population / catchment area / isochrones – comparison vs. convenience store.

Process Diagram: Assessment of Pass-By and Diverted Trips through the Transport Assessment and Retail Impact Assessment Process



Appendix A

Reference List

Job No	Report No	Issue no	Report Name	Page
TRC1502	14/1	1	TRICS Research Report 14/1	A1

Reference List

The following documents have been included within this literature review.

- TRICS Research Report 95/2, Pass By & Diverted, a Resume, 1995;
- Department for Communities and Local Government: National Planning Policy Framework (March 2012);
- Department for Transport: Guidance on Transport Assessment, Chapter 4 (March 2007);
- Transport for London: Transport Assessment Best Practice Guidance Document (April 2010);
- ITE Trip Generation Manual, 9th Edition (September 2012);
- Auckland Regional Transport Authority: Integrated Transport Assessment Guidelines & Supplementary Documents (October 2007);
- Planning Policy Guidance (PPG6);
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- Somerfield Shopping Trip Survey, 1996;
- National Retail Planning Forum Scoping Paper, 2004;
- Mouchel: Proposed Tesco Store & Shopping Centre, West Bromwich: Working Paper 3 – Linked Trips, 2009;
- Aslop Verrill: Planning and Retail Statement, Quay Street, Fareham, 2007;

- Maclver, A., Transportation Impact Assessment: Forecasting Travel Demand, 1999;
- Maclver, A., Transportation Impact Assessment and Trip-Chaining Behaviour, 1999;

Appendix B

National Travel Survey

National Travel Survey

Mode share – average number of trips: Great Britain, 2012

Table 1.1 Mode Share

Mode	Percentage
Car / Van Driver	42
Car / Van Passenger	22
Bus	6
Rail	3
Walk	22
Bicycle	2
Other	2

Average Distance Travelled by Mode, Great Britain 1995-2012.

Mode	Miles per person per year												
	1995/97	1998/00	2002 ^f	2003 ^f	2004 ^f	2005 ^f	2006 ^f	2007 ^f	2008 ^f	2009 ^f	2010 ^f	2011 ^f	2012
Private:													
Walk ¹	200	198	198	201	203	197	201	190	193	196	183	187	181
Bicycle	43	40	36	37	39	36	39	40	42	46	42	49	53
Car / van driver	3,623	3,725	3,661	3,659	3,675	3,682	3,660	3,640	3,494	3,340	3,416	3,438	3,367
Car / van passenger	2,082	2,086	2,114	2,099	2,032	2,063	2,033	1,990	1,973	1,984	1,841	1,958	1,847
Motorcycle	35	33	35	41	38	35	34	35	38	38	30	36	35
Other private transport ²	134	143	145	163	156	156	118	111	111	148	138	126	95
Public:													
Bus in London	43	44	56	60	59	67	63	67	69	71	81	70	67
Other local bus	225	218	224	230	219	212	233	239	243	237	226	228	233
Non-local bus	94	100	59	87	70	75	63	71	56	56	63	53	68
London Underground	60	65	81	68	68	67	75	71	75	77	73	68	73
Surface Rail	321	401	413	384	433	461	466	509	494	470	506	484	553
Taxi / minicab	46	63	59	55	51	60	52	56	53	56	54	55	53
Other public transport ³	75	46	55	108	61	97	96	83	80	56	77	73	67
All modes	6,981	7,164	7,136	7,192	7,103	7,208	7,133	7,103	6,920	6,774	6,732	6,826	6,691
Unweighted sample size:													
individuals	22,861	21,868	16,886	19,467	19,199	19,904	19,490	19,735	18,983	19,914	19,072	18,069	19,154
stages ('000s)	510	475	349	397	392	409	400	384	372	391	370	345	367

Average Trip Length by Main Mode, Great Britain 1995-2012.

Main mode	Average trip length (miles)												
	1995/97	1998/00	2002 ^r	2003 ^r	2004 ^r	2005 ^r	2006 ^r	2007 ^r	2008 ^r	2009 ^r	2010 ^r	2011 ^r	2012
Private:													
Walk ¹	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Bicycle	2.3	2.3	2.2	2.3	2.4	2.4	2.4	2.8	2.6	2.9	2.8	3.0	3.2
Car / van driver	8.5	8.6	8.4	8.6	8.7	8.4	8.5	8.9	8.5	8.4	8.4	8.6	8.4
Car / van passenger	8.7	8.7	8.8	9.0	8.8	8.7	8.9	9.1	8.7	9.1	8.6	9.2	8.6
Motorcycle	8.9	9.2	9.6	10.6	11.8	9.9	11.3	10.7	10.4	12.4	10.7	10.2	10.9
Other private transport ²	16.0	18.3	17.0	19.9	18.7	17.9	15.3	14.5	12.8	16.9	17.7	18.8	13.2
Public:													
Bus in London	3.2	3.4	3.6	3.8	3.5	3.8	3.7	3.7	3.7	3.6	3.5	3.7	4.0
Other local bus	4.3	4.4	4.6	4.5	4.6	4.6	4.8	5.0	5.1	4.9	4.9	5.0	5.3
Non-local bus	59.8	60.3	85.9	92.4	96.8	95.9	93.8	71.5	83.4	96.9	102.3	99.1	98.3
London Underground	7.9	7.7	8.5	8.3	8.8	8.5	8.6	8.0	7.6	8.2	8.4	8.0	8.3
Surface Rail	30.8	33.8	35.7	31.0	29.5	32.3	31.8	32.8	30.9	31.7	30.4	31.2	31.9
Taxi / minicab	3.8	4.5	4.4	4.1	4.1	4.7	4.6	4.3	4.3	4.7	4.7	4.9	4.7
Other public transport ³	60.0	26.1	34.4	39.8	30.4	35.5	33.9	42.7	41.2	30.9	36.1	34.0	30.0
All modes	6.4	6.7	6.8	7.0	6.9	6.9	6.9	7.3	7.0	7.0	7.0	7.1	7.0
Unweighted sample size:													
individuals	22,861	21,868	16,886	19,467	19,199	19,904	19,490	19,735	18,983	19,914	19,072	18,069	19,154
trips ('000s)	461	432	326	370	364	379	369	353	342	359	337	316	335

Trip Purpose by Trip Start Time (Mon-Fri only), Great Britain, 2008/12.

Start time	Percentage/thousands								
	Commuting	Business	Education	Escort education	Shopping	Other personal business and escort	Visiting friends/ entertainment/ sport	Holiday/ Day trip/ Other	All purposes
0000 - 0059	-	-	-	0	-	-	-	-	-
0100 - 0159	-	-	-	-	-	-	-	-	-
0200 - 0259	-	-	-	-	-	-	-	-	-
0300 - 0359	-	-	-	-	-	-	-	-	-
0400 - 0459	1	-	-	-	-	-	-	-	-
0500 - 0559	3	1	-	-	-	-	-	1	1
0600 - 0659	7	3	-	-	-	1	-	2	2
0700 - 0759	16	7	7	3	1	4	1	4	5
0800 - 0859	15	10	40	36	3	8	2	5	12
0900 - 0959	4	8	2	7	8	8	4	7	6
1000 - 1059	2	7	1	-	12	8	5	9	6
1100 - 1159	2	7	1	2	13	8	6	8	6
1200 - 1259	3	7	2	2	11	8	6	6	6
1300 - 1359	3	7	2	1	9	7	6	7	6
1400 - 1459	3	7	3	9	9	7	6	8	6
1500 - 1559	4	8	32	33	8	8	8	9	11
1600 - 1659	9	9	5	4	7	9	8	9	8
1700 - 1759	15	8	2	2	6	8	9	7	8
1800 - 1859	7	4	1	1	5	6	10	7	6
1900 - 1959	2	2	-	-	4	4	10	5	4
2000 - 2059	2	2	-	-	2	2	6	3	3
2100 - 2159	1	1	-	-	1	2	5	2	2
2200 - 2259	1	1	-	-	-	1	4	1	1
2300 - 2359	1	-	-	-	-	-	3	1	1
All day	100	100	100	100	100	100	100	100	100

Appendix C

London Travel Demand Survey

London Travel Demand Survey

The London Travel Demand Survey (LTDS) is a continuous household survey of the London area. It captures information on households, people, trips and vehicles and incorporates three questionnaires: a household questionnaire, individual questionnaires for all household members, and trip sheets or travel diaries.

It provides data for the following topics:

- Trip rates;
- Trip rates by day of the week;
- Trip rates by area of residence;
- Trip rates by purpose;
- Travel by time of day (weekday and weekend);
- Mode shares;
- Mode share by area of residence;
- Purpose shares;
- Time spent travelling;
- Distance travelled;
- Travel by age group;
- Travel by working status;
- Gender and mode use;
- Travel by household income;
- Travel by ethnic group;
- Mode shares by area of trip origin and destination;
- Travel by borough of residence and trip origin;
- Car ownership patterns in London;
- How car ownership is related to trip making;
- Working patterns;
- Non-travel;
- Frequency of use of travel modes and changes in travel behaviour; and
- Tours.

Appendix D

ITE Trip Generation Table

Job No	Report No	Issue no	Report Name	Page
TRC1502	14/1	1	TRICS Research Report 14/1	D1

ITE Trip Generation Table

Table A.1 ITE land use activities with trip data

Land Use Activity	Day of the week / period	No. of surveys
Free-standing discount superstore	Weekday, pm peak period	8
Free-standing discount store	Weekday, pm peak period	32
Hardware/paint store	Weekday, peak period	2
Shopping Centre	Weekday, pm peak period	100
Automobile parts sales	Weekday, pm peak period	1
Tyre store	Weekday, pm peak period	3
Supermarket	Weekday, pm peak period	9
Convenience market (24 hours)	Weekday, pm peak period	11
Convenience market with gasoline pumps	Weekday, am & pm peak periods	24
Discount supermarket	Weekday, pm peak period	10
Home improvement superstore	Weekday, pm peak period	3
Electronics superstore	Weekday, pm peak period	1
Pharmacy/drugstore without drive-through window	Weekday, pm peak period	6
Pharmacy/drugstore with drive-through window	Weekday, pm peak period	3
Furniture store	Weekday, pm peak period	3
Drive-in bank	Weekday, pm peak period	6
Quality restaurant	Weekday, pm peak period	4
High-turnover (sit-down restaurant)	Weekday, pm peak period	12
Fast food restaurant with drive-through window	Weekday, am & pm peak periods	24
Fast food restaurant without drive-through window	Weekday	4
Gasoline/service station	Weekday, am & pm peak periods	9
Gasoline/service station with convenience market	Weekday, am & pm peak periods	19

Douglass & Abley (2011)

Documents with no reference to Pass-By and Diverted Trips

Documents with no reference to Pass-By and Diverted Trips

Key policy guidance and documents that have been considered, but make no mention towards secondary trips or were considered unsuitable for use in this literature review are as follows:

- Chik & Shankar, Estimating the Pass-by and Diverted Trips for Shopping Types Land Use, Journal of Civil Engineering, 1998;
- Monks Cross, Vangarde, Transport Assessment: Trip Generation and Mode Share, February 2012.
- Topic 6: Traffic Impact Studies, 2006.
- Richard Jackson Intelligent Engineering: Proposed Food Store, Hadleigh, Suffolk – Transport Assessment Appraisal.
- Cinnedie & Grealy (2008) Vehicle Trip Generation from Retail, Office and Residential Developments, University College Cork.
- Improvement Service Fact Sheet: Retail Capacity and Impact Assessment, date unknown.
- Greally et al. (2011) An Idiot's Guide to Retail Planning.

Pass-By & Diverted Trips Example Survey Methodology

Example of a Pass-By & Diverted Trips Survey Methodology (Food Superstores)

Introduction

This is an example of a survey methodology to identify the proportions and total numbers of pass-by and diverted trips at a food superstore. This methodology, and its accompanying survey specification, is based on one particular scenario, that being a suburban food superstore with a petrol filling station as part of the development, with there being separate inbound and outbound doors to the superstore building, and no off-site parking by site visitors taking place. All trips solely to the petrol filling station are to be identified and excluded from the count, so that the count only consists of actual trips to the food superstore.

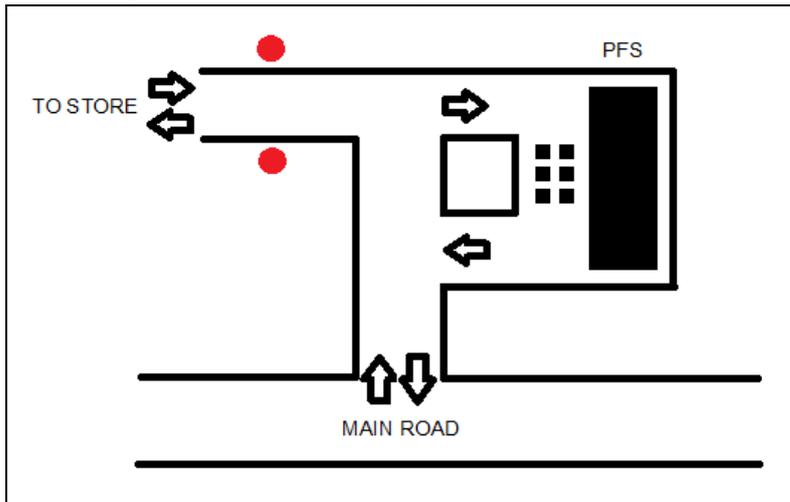
This scenario of a superstore in a suburban area with a petrol filling station (with all parking taking place within the site) is considered to be the most common. If a survey is to take place in a different scenario to this, then the methodology would of course need to be amended accordingly.

It is recommended that the traffic survey data and supporting site, development and parking information from these surveys is supplied to TRICS for inclusion in its database. TRICS is the national standard system of trip generation analysis, and its data validation methods are comprehensive. Having survey data validated and accepted by TRICS is a very good way of displaying robustness and accuracy in data.

Step 1: Identification of inbound and outbound vehicular access points

In this example we are assuming that the site has a petrol filling station as part of the development, and so we need to establish the points of inbound and outbound access to the food superstore car park excluding any trips to the site that are for the sole purpose of visiting the PFS. These points of access will of course vary from site to site, with the variation often being considerable. Let's say in this example that there is a single access road into the site car park, which then branches into a loop for those wanting to visit the petrol filling station, as in the diagram below. We need to position two enumerators, one inbound and one outbound, to ensure that all PFS-only trips are identified and excluded from the count. These enumerators are shown in **Figure F.1** below as red circles. If they had been placed at the access from the main road, then PFS-only trips would have been incorrectly included in the count. By moving the enumerators to the position where they are shown in **Figure F.1** we have avoided this.

Figure F.1 Example of road layout and positions of enumerators (in red) to avoid PFS-only trips being included in the survey



The above diagram is of course simplistic in that it shows a reasonably easy scenario. There will of course be some stores that require a more complicated approach in order to exclude PFS-only trips from the survey. Each store must be dealt with on a case-by-case approach.

Step 2: Recording of inbound and outbound vehicles by type

An added advantage of undertaking a pass-by and diverted trips survey using this method is that a vehicular count could be added to the TRICS database, as long as the vehicles recorded are split between the seven TRICS-specific vehicle types. However, for a count to be included in TRICS, any separate deliveries access point would also need to be covered by an additional enumerator. It is recommended that completed traffic count data sets, including supporting site, development and parking details (see the TRICS data collection forms for further details) are supplied to TRICS. The data would then be put through validation testing for no charge and added to the TRICS database. Once fully validated, the vehicle count data and its supporting information would be considered TRICS compliant.

Typically, there would be two enumerators required to undertake the vehicles count, one for inbound trips and the other for outbound trips. The count should be undertaken by hourly time periods, with the vehicles count split between the following types:

- Cars
- Motorcycles
- Taxis (including black cabs and minicabs)
- Light Goods Vehicles (mini vans, transit vans, etc)
- Public Service Vehicles (minibuses, coaches, buses)
- OGV1 (heavy goods up to and including 3 axles)
- OGV2 (heavy goods over 3 axles)

TRICS data collection forms are available for summarising the counts by vehicle type per direction per hour.

Step 3: Pass-by & diverted trips interviews

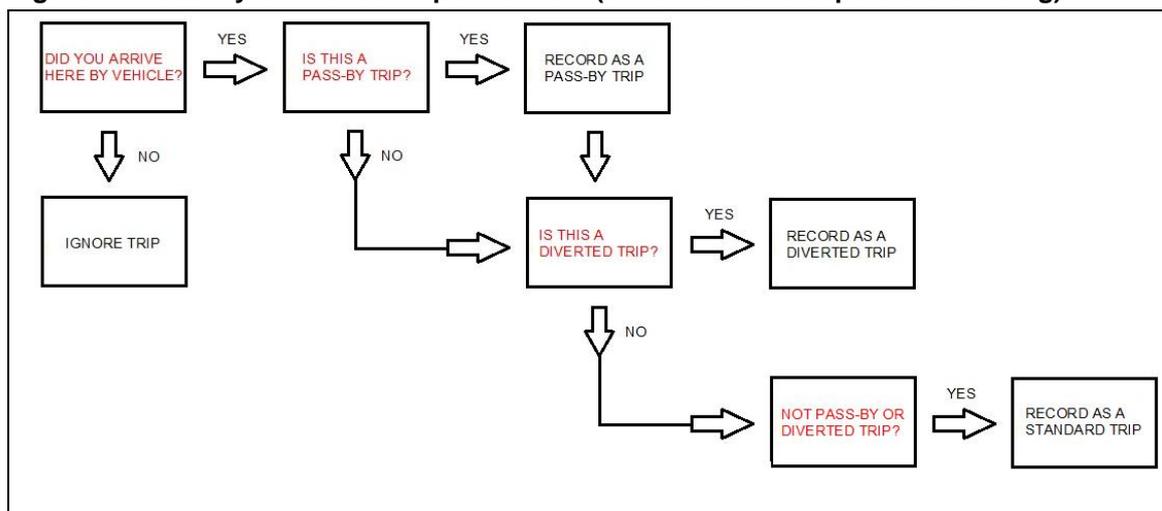
Once we have established the correct positioning of enumerators to undertake the total vehicles count, we can then move on to dealing with the interview element, the enumerators required to ascertain pass-by & diverted trips from vehicles occupants visiting the superstore.

In this example we have a superstore with a front door inbound access and a front door outbound access. In other cases the arrangement may of course be different, with there being more doors or a shared access for both inbound and outbound trips. But for the purposes of this methodology the scenario shall be one door for people walking in and one door for people walking out.

The number of enumerators for these interviews should be dictated by the intensity of people walking in and out of the site. In our example we have three enumerators stationed at the inbound door, with another three at the outbound door. There will be no need for a “head count” of pedestrians at these doors, as the “head count” we will be using will be the total vehicles count being recorded separately. Bear in mind that in this methodology we are ultimately recording the number of vehicles, not the number of people.

Care should be taken by enumerators to ensure that only one person per vehicle is interviewed. For people walking into the superstore at the inbound front door access the procedure for interview should be as shown in **Figure F.2**.

Figure F.2 Pass-By & Diverted Trips Interview (at front door to superstore building)



The interview can be broken down into the following steps.

- Ask the subject if they have arrived at the site by vehicle. If they have not, then the interview ends and nothing is recorded.
- If the subject has arrived by vehicle, then ask the question necessary to establish if the trip is a pass-by trip. If it is a pass-by trip then record the vehicle as such, and if it is not a pass-by trip then proceed to the next question.
- Ask the subject the question necessary to establish if the trip is a diverted trip. If it is a diverted trip then record the vehicle as such. If answers to both questions have been “no”, then record the vehicle as a standard trip (i.e. neither a pass-by trip or a diverted trip).

It should be noted at this stage that a trip can be recorded as both a pass-by trip and a diverted trip (i.e. a trip can count twice in this survey), should the answer to both of the key questions be positive.

There is a slight variation for interviews of people walking out of the superstore. Before the first question above is asked, subjects should be first asked if they have already been interviewed at the inbound access, as people should not be interviewed twice under any circumstances.

An example survey specification is contained at **Appendix G**.

Step 4: Factoring of Interview Sample

When the survey has been completed, we then need to factor up the interview results to 100% of the total vehicles count. Firstly, we should combine the inbound and outbound counts per hourly period, so that we have a total (two-directional) count. This forms the second column of diagram 3, the first column of which shows the hourly time periods of the survey.

We will know from the interview sample the percentages of vehicles that were recorded as pass-by or diverted trips (or both), and the percentage of vehicles that were recorded as standard trips (i.e. not pass-by and not diverted). So, the total vehicles count (inbound plus outbound), per hour, should be used to factor up the interview results proportionately to 100%. So, for example, if for a time period 20% of all interviews were identified by pass-by, then the total number of pass-by trips recorded in this period should be factored up to be 20% of the total number of vehicles recorded separately by enumerators undertaking the observational vehicular count.

The key to this survey is of course to achieve a good interview sample rate, hence the number of enumerators shown in the survey specification example (3 interviewing inbound and 3 interviewing outbound). Once this factoring is complete, we can populate the remaining columns of **Table F.1** as shown below.

Table F.2 Factored up results showing Pass-By and Diverted Trips and Percentages

Time	Vehicles (two-way)	Standard	Pass-By	%	Diverted	%
0700-0800	28	24	4	14.3	1	3.6
0800-0900	101	78	18	17.8	5	5.0
0900-1000	188	141	30	16.0	22	11.7
1000-1100	264	190	39	14.8	40	15.2
1100-1200	312	156	81	26.0	80	25.6
1200-1300	295	140	85	28.8	77	26.1
1300-1400	280	132	100	35.7	50	17.9
1400-1500	341	290	31	9.1	23	6.7
1500-1600	396	301	49	12.4	47	11.9
1600-1700	387	277	81	20.9	34	8.8
1700-1800	340	271	47	13.8	26	7.6
1800-1900	211	185	10	4.7	17	8.1
1900-2000	156	137	10	6.4	10	6.4
2000-2100	99	70	19	19.2	10	10.1
2100-2200	34	28	4	11.8	2	5.9
Totals	3432	2420	608	17.7	444	12.9

Pass-By & Diverted Trips Example Survey Specification



TRICS® Pass-By & Diverted Trips (Food Superstores) Survey Specification 2014

TRICS Land Use: 01/A (Food Superstore)

Land Use & Location

Site name: Superstore name here
Street/Road name: Example Road
Area/District:
Town/City: Manchester
Postcode: M4 6BT
Google Ref: 53.56556,-0.651412

Survey Day, Duration & Type

Survey day: Day of week here
Survey period: 0700-2200 (example duration)
Total access points: 2 (represents the entrance door and the exit door)
Vehicular access points: 0
Enumerator positions: 8
Survey type: Part-Observational (counts + interviews)

Special Survey Conditions

This is a vehicular survey to establish pass-by & diverted trips by hourly period. It requires a total vehicles count of vehicles visiting the superstore, with all vehicles visiting the petrol filling station only (and not visiting the superstore) identified and excluded from the count. This count is to be used to factor up the interview sample at the inbound and outbound pedestrian front doors to/from the superstore to 100% of vehicle trips, using the proportions of interviews indicating pass-by and diverted trips to calculate the total number of such trips taking place.

Enumerator Position 1

Position of Enumerator At the point where vehicles enter the superstore car park (Photograph 1).

Vehicles Count	Record all vehicles entering the superstore car park. Vehicles should be broken down into the 7 standard classifications (car, motorcycle, taxi, light goods vehicle, public service vehicle, OGV1, OGV2). Any vehicles visiting the petrol filling station (and not visiting the superstore) should be identified and excluded from the count, but all vehicles that visit both the PFS and the store should be included.
Special Conditions	It is important that this enumerator is positioned so that all vehicles visiting the superstore can be identified and recorded, with all vehicles visiting only the petrol filling station identified and excluded.

Enumerator Position 2

Position of Enumerator	At the point where vehicles exit the superstore car park (Photograph 2).
Vehicles Count	Record all vehicles exiting the superstore car park. Vehicles should be broken down into the 7 standard classifications (car, motorcycle, taxi, light goods vehicle, public service vehicle, OGV1, OGV2). Any vehicles visiting the petrol filling station (and not visiting the superstore) should be identified and excluded from the count, but all vehicles that visit both the PFS and the store should be included.
Special Conditions	It is important that this enumerator is positioned so that all vehicles visiting the superstore can be identified and recorded, with all vehicles visiting only the petrol filling station identified and excluded.

Enumerator Position 3

Position of Enumerator	By the inbound front door to the superstore building (Photograph 3).
Pass-By & Diverted Trips Interview	<p>All people who walk into the inbound front door should be asked the following question: <i>“Did you arrive here by vehicle?”</i> If the answer is “no” then ignore the trip. If the answer is “yes” then ask the following questions. <i>“Is this location your only destination, or are you coming from or going elsewhere?”</i> If the answer is “no” then record a primary trip. If the answer is “yes” then ask the following question (as appropriate). <i>“If you were not visiting this location, would you have used [INSERT ROAD NAME] as part of your journey to your other destination(s)?”</i> If the answer is “yes” then record a vehicular pass-by trip and then ask the next question: <i>“Is this store your usual destination for food shopping?”</i> If the answer is “yes” then record a vehicular diverted trip. If the answer is “no” to both pass-by & diverted trip questions then record as a standard vehicular trip.</p>
Special Conditions	The vehicles count (two-way) obtained by Enumerators 1 and 2 should be used as a “head count”. This should be used to factor up the interview sample at the inbound and outbound front door accesses to 100% of vehicles. The proportion of interviews that result in being recorded as pass-by and diverted trips will be known, so then the number of all vehicles that are pass-by or diverted trips by time period can then be estimated.

	This enumerator should make sure that only one person per vehicle is interviewed.
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Enumerator Position 4

Position of Enumerator	By the inbound front door to the superstore building (Photograph 3).
Pass-By & Diverted Trips Interview	<p>All people who walk into the inbound front door should be asked the following question: <i>“Did you arrive here by vehicle?”</i> If the answer is “no” then ignore the trip. If the answer is “yes” then ask the following questions. <i>“Is this location your only destination, or are you coming from or going elsewhere?”</i> If the answer is “no” then record a primary trip. If the answer is “yes” then ask the following question (as appropriate). <i>“If you were not visiting this location, would you have used [INSERT ROAD NAME] as party of your journey to your other destination(s)?”</i> If the answer is “yes” then record a vehicular pass-by trip and then ask the next question: <i>“Is this store your usual destination for food shopping?”</i> If the answer is “yes” then record a vehicular diverted trip. If the answer is “no” to both pass-by & diverted trip questions then record as a standard vehicular trip.</p>
Special Conditions	<p>The vehicles count (two-way) obtained by Enumerators 1 and 2 should be used as a “head count”. This should be used to factor up the interview sample at the inbound and outbound front door accesses to 100% of vehicles. The proportion of interviews that result in being recorded as pass-by and diverted trips will be known, so then the number of all vehicles that are pass-by or diverted trips by time period can then be estimated.</p> <p>This enumerator should make sure that only one person per vehicle is interviewed.</p>

Enumerator Position 5

Position of Enumerator	By the inbound front door to the superstore building (Photograph 3).
Pass-By & Diverted Trips Interview	<p>All people who walk into the inbound front door should be asked the following question: <i>“Did you arrive here by vehicle?”</i> If the answer is “no” then ignore the trip. If the answer is “yes” then ask the following questions. <i>“Is this location your only destination, or are you coming from or going elsewhere?”</i> If the answer is “no” then record a primary trip. If the answer is “yes” then ask the following question (as appropriate). <i>“If you were not visiting this location, would you have used [INSERT ROAD NAME] as party of your journey to your other destination(s)?”</i> If the answer is “yes” then record a vehicular pass-by trip and then ask the next question: <i>“Is this store your usual destination for food shopping?”</i> If the answer is “yes” then record a vehicular diverted trip.</p>

	If the answer is “no” to both pass-by & diverted trip questions then record as a standard vehicular trip.
Special Conditions	<p>The vehicles count (two-way) obtained by Enumerators 1 and 2 should be used as a “head count”. This should be used to factor up the interview sample at the inbound and outbound front door accesses to 100% of vehicles. The proportion of interviews that result in being recorded as pass-by and diverted trips will be known, so then the number of all vehicles that are pass-by or diverted trips by time period can then be estimated.</p> <p>This enumerator should make sure that only one person per vehicle is interviewed.</p>

Enumerator Position 6

Position of Enumerator	By the outbound front door from the superstore building (Photograph 4).
Pass-By & Diverted Trips Interview	<p>All people who walk out of the outbound front door should be asked the following question: <i>“Were you interviewed on the way into the store?”</i> If the answer is “yes” then ignore the trip and ask no more further questions. <i>“Did you arrive here by vehicle?”</i> If the answer is “no” then ignore the trip. If the answer is “yes” then ask the following questions. <i>“Is this location your only destination, or are you coming from or going elsewhere?”</i> If the answer is “no” then record a primary trip. If the answer is “yes” then ask the following question (as appropriate). <i>“If you were not visiting this location, would you have used [INSERT ROAD NAME] as party of your journey to your other destination(s)?”</i> If the answer is “yes” then record a vehicular pass-by trip and then ask the next question: <i>“Is this store your usual destination for food shopping?”</i> If the answer is “yes” then record a vehicular diverted trip. If the answer is “no” to both pass-by & diverted trip questions then record as a standard vehicular trip.</p>
Special Conditions	The vehicle count obtained by Enumerators 1 and 2 should be used as a “head count”. This should be used to factor up the interview sample at the inbound and outbound front door accesses to 100%. The proportion of interviews that result in being recorded as pass-by and diverted trips will be known, so then the number of all vehicles that are pass-by or diverted trips by time period can then be estimated.

Enumerator Position 7

Position of Enumerator	By the outbound front door from the superstore building (Photograph 4).
Pass-By & Diverted Trips Interview	<p>All people who walk out of the outbound front door should be asked the following question: <i>“Were you interviewed on the way into the store?”</i> If the answer is “yes” then ignore the trip and ask no more further questions. If the answer is “no” then ask the following question: <i>“Did you arrive here by vehicle?”</i></p>

	<p>If the answer is “no” then ignore the trip. If the answer is “yes” then ask the following questions. <i>“Is this location your only destination, or are you coming from or going elsewhere?”</i> If the answer is “no” then record a primary trip. If the answer is “yes” then ask the following question (as appropriate). <i>“If you were not visiting this location, would you have used [INSERT ROAD NAME] as party of your journey to your other destination(s)?”</i> If the answer is “yes” then record a vehicular pass-by trip and then ask the next question: <i>“Is this store your usual destination for food shopping?”</i> If the answer is “yes” then record a vehicular diverted trip. If the answer is “no” to both pass-by & diverted trip questions then record as a standard vehicular trip.</p>
Special Conditions	<p>The vehicle count obtained by Enumerators 1 and 2 should be used as a “head count”. This should be used to factor up the interview sample at the inbound and outbound front door accesses to 100%. The proportion of interviews that result in being recorded as pass-by and diverted trips will be known, so then the number of all vehicles that are pass-by or diverted trips by time period can then be estimated.</p>

Enumerator Position 8

Position of Enumerator	<p>By the outbound front door from the superstore building (Photograph 4).</p>
Pass-By & Diverted Trips Interview	<p>All people who walk out of the outbound front door should be asked the following question: <i>“Were you interviewed on the way into the store?”</i> If the answer is “yes” then ignore the trip and ask no more further questions. If the answer is “no” then ask the following question: <i>“Did you arrive here by vehicle?”</i> If the answer is “no” then ignore the trip. If the answer is “yes” then ask the following questions. <i>“Is this location your only destination, or are you coming from or going elsewhere?”</i> If the answer is “no” then record a primary trip. If the answer is “yes” then ask the following question (as appropriate). <i>“If you were not visiting this location, would you have used [INSERT ROAD NAME] as party of your journey to your other destination(s)?”</i> If the answer is “yes” then record a vehicular pass-by trip and then ask the next question: <i>“Is this store your usual destination for food shopping?”</i> If the answer is “yes” then record a vehicular diverted trip. If the answer is “no” to both pass-by & diverted trip questions then record as a standard vehicular trip.</p>
Special Conditions	<p>The vehicle count obtained by Enumerators 1 and 2 should be used as a “head count”. This should be used to factor up the interview sample at the inbound and outbound front door accesses to 100%. The proportion of interviews that result in being recorded as pass-by and diverted trips will be known, so then the number of all vehicles that are pass-by or diverted trips by time period can then be estimated.</p>

Photograph 1

Insert image of inbound access to superstore car park here.

Photograph 2

Insert image of outbound access to superstore car park here.

Photograph 3

Insert image of inbound front door to superstore building here.

Photograph 4

Insert image of outbound front door from superstore building here.