Dartford Local Plan

Strategic transport modelling

Stage 3a –Local Plan option testing methodology

On behalf of

DARTFORD BOROUGH COUNCIL

Project Ref: 46416/001 | Rev: AA | Date: September 2021

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Report Title: **Stage 3a – Local Plan option testing methodology**

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For and on behalf of Stantec UK Limited				

Revision	Date	Description	Prepared	Reviewed	Approved

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Appendices

1 Introduction

1.1.1 Stantec have been appointed by Dartford Borough Council (DBC) to provide strategic modelling evidence in support of their emerging Local Plan. The current Dartford Local Plan comprises the Core Strategy 2011 and the Development Policies Plan 2017.

1.1.2 The Council is carrying out a review of its Local Plan, with a time horizon for the Local Plan of 2036. On current information, DBC consider that the existing permissions and identified sites will be capable of delivering the new homes required to meet local housing need. On this basis, considerations for the new Local Plan are likely to relate to the intensity of development at these locations, rather than identifying alternative spatial locations.

1.2 Dartford Cordon of the Lower Thames Area Model (DCLTAM)

1.2.1 DBC have been provided with the Dartford Cordon of the Lower Thames Area Model (DCLTAM) by National Highways (NH) (formerly Highways England). This model is the supplementary consultation version and forms a key component of the Local Plan strategic transport modelling appointment.

1.2.2 Due to the new Local Plan identifying at an early stage that the current development strategy would provide for future need, with intensification at these locations, Stantec's remit is to review and update the DCLTAM to create a base year model (see Stage 1 report) and forecast year model (see Stage 2a / 2b reports) and use this for Local Plan option testing.

1.2.3 Although a single Local Plan preferred option has been tested, the model allows for further scenario testing if required. For example, this may be considered appropriate to assess the impacts of additional development that has been identified in the Local Plan as currently unavailable, but with future development potential.

1.2.4 The following report has been prepared to set out the proposed methodology and parameters for assessing (against a Reference Case model) a Local Plan preferred option with respect to traffic generation, distribution and mode share.

1.2.5 This is Stage 3 of Stantec's appointment which comprises the following :

- A Local Plan preferred option will be assessed against the Reference Case. The Local Plan preferred option will relate to defined development quantum and land use.
- The traffic generation for the Local Plan preferred option will be calculated , taking into consideration the location of each proposed Local Plan site.
- Mode shift assumptions will be assessed for the Local Plan preferred option, and these assumptions will be selectively applied to development sites.
- For larger sites (predominantly Ebbsfleet Garden City), appropriate internalisation (internal within site trips) will also be considered. The internalisation of trips for these sites will be facilitated by the planned sustainable transport infrastructure serving those sites and the mix of uses and services within those sites (eg Ebbsfleet Garden City).
- The Local Plan sites to be assessed will be applied with an appropriate distribution based upon journey to work census and / or DCLTAM distribution data.
- The above will generate a number of 2036 Local Plan scenarios which will be incorporated to the updated DCLTAM model for morning and evening peak hours and "with" and "without" Lower Thames Crossing.
- A comparison will be made to assess the differences, between the scenarios considered, on the transport network when compared to the Reference Case.

1.3 Local Plan preferred option

1.3.1 A Local Plan preferred option has been developed by DBC and this is set out in further detail, with respect to land use and quanta, within section 5 of this report.

1.3.2 The traffic impacts of the proposed London Resort on Swanscombe Peninsula will be identified through a transport assessment provided as supporting evidence to its application. The proposed development has been designated as a Nationally Significant Infrastructure Project (NSIP) and will involve the submission of a Development Consent Order by the applicant for determination directly by the Secretary of State following an Examination. The draft Local Plan makes it clear that if the London Resort gains consent and comes forward, the need for the Local Plan to be updated would be reviewed.

1.4 This document

1.4.1 The purpose of this report is to present the proposed framework for the assessment of the Local Plan preferred option. A previous version of this report has been shared with the highway authorities for their information and comment and these have been incorporated as appropriate into this update version.

1.4.2 This document is structured in the following way.

- Section 2 considers the traffic generation parameters for various land uses.
- Section 3 considers the mode share of trip generation for various land uses.
- Section 4 describes the mode shift scenarios to be assessed.
- Section 5 summarises the land use quanta included within the assessment.
- Section 6 details the predicted traffic generation from the proposed land use quanta.
- Section 7 describes the distribution assumptions to be adopted.

2 Traffic generation

2.1.1 The following sections consider the traffic generation parameters for inclusion to the Local Plan preferred option testing. Stantec have reviewed data from the TRICS database as a standard starting point. The following general approach has been adopted to extract TRICS data for each land use.

- Sites in south England (excluding London) are selected only. If the sample size does not allow this, then the area is expanded to cover the midlands, and then the north, and finally the rest of the UK.
- Weekday data only is used.
- Multi modal data is extracted only. If sample size does not allow this then vehicle trip rates are used. This will ensure that a priority of achieving appropriate vehicle trip generation rates are extracted for input to the DCLTAM.
- Default date range used. Where sample size needs to be expanded then older data may be used. This will tend to be a robust assumption as trip generation rates have typically reduced over time.
- Sites with no Travel Plan implemented are selected.
- Town Centre and Edge of Town Centre sites used as a proxy for DBC urban locations.
- Suburban and Edge of Town sites used as a proxy for DBC suburban locations.

2.1.2 The criteria above is followed to try and achieve a sample size of at least 5 sites.

2.1.3 The TRICS data was reviewed by the highway authorities at Kent County Council and National Highways. Comments were received from National Highways and this resulted in a number of adjustments and assumptions being made to the trip rate methodology for office and parcel distribution centres. These are explained further in the subsequent sections 2.4 and 2.7.

2.1.4 Nevertheless, the trip generation rates used within the Stage 3 modelling assessment, as described below, are agreed with the highway authorities.

2.2 TRICS - residential (houses) trip generation rates

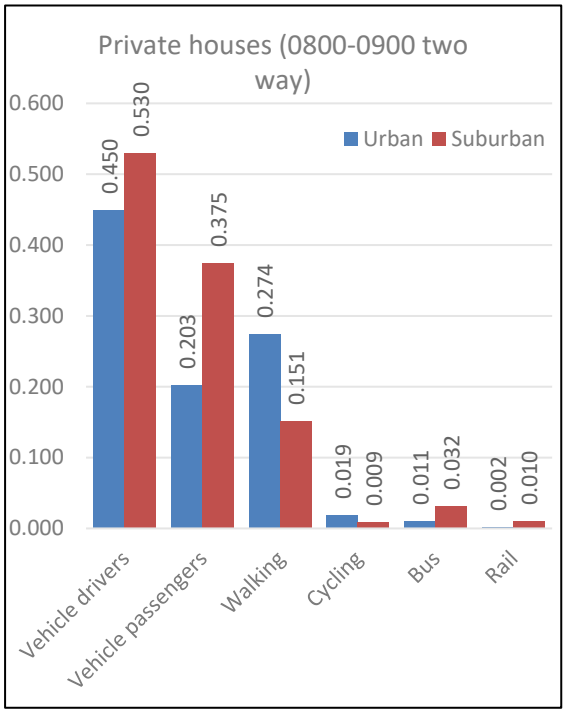
2.2.1 Trip generation data for residential dwellings has been extracted on the basis of the following criteria :

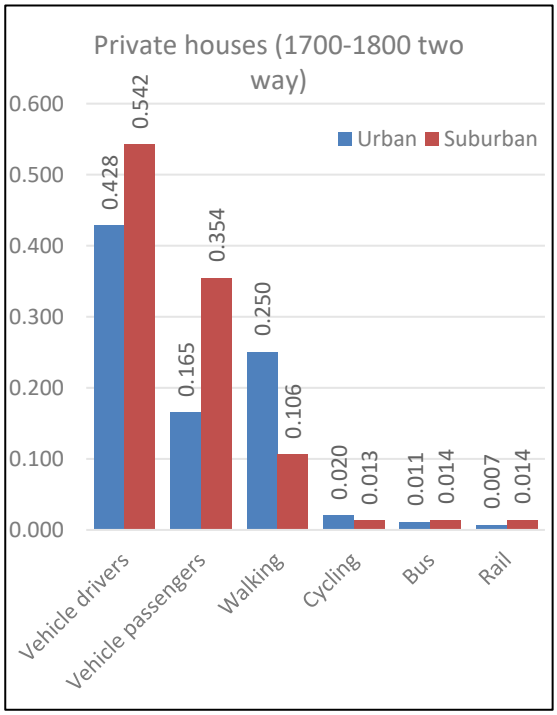
- Houses privately owned
- All sites in England except London for urban
- All sites in south England for suburban
- Default date range selected.
- Multi modal data is extracted only – for weekdays.
- Sites with no Travel Plan implemented
- Town Centre and Edge of Town Centre sites used as a proxy for DBC urban locations.
- Suburban and Edge of Town sites used as a proxy for DBC suburban locations.

2.2.2 The data extracted from TRICS has been categorised to provide an appreciation of the different trip generation rates that may occur from residential uses and by location. The TRICS data has been summarised in table format and graph format below whilst the TRICS output is included as Appendix A.

Urban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	0.146	0.304	0.450	0.243	0.185	0.428
Vehicle passengers	0.042	0.161	0.203	0.096	0.069	0.165
Walking	0.025	0.249	0.274	0.172	0.078	0.250
Cycling	0.005	0.014	0.019	0.011	0.009	0.020
Bus	0.000	0.011	0.011	0.011	0.000	0.011
Rail	0.000	0.002	0.002	0.005	0.002	0.007
Total	**0.218**	**0.741**	**0.959**	**0.538**	**0.343**	**0.881**

Suburban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	0.144	0.386	0.530	0.373	0.169	0.542
Vehicle passengers	0.047	0.328	0.375	0.255	0.099	0.354
Walking	0.038	0.113	0.151	0.072	0.034	0.106
Cycling	0.005	0.004	0.009	0.009	0.004	0.013
Bus	0.001	0.031	0.032	0.010	0.004	0.014
Rail	0.000	0.010	0.010	0.014	0.000	0.014
Total	**0.235**	**0.872**	**1.107**	**0.733**	**0.310**	**1.043**





2.2.3 It is noted that in general:

- Suburban sites generate greater vehicle movements than urban sites.
- Urban sites generate greater walking and cycling movements than suburban sites.

2.3 TRICS - residential (flats) trip generation rates

2.3.1 Trip generation data for residential dwellings has been extracted on the basis of the following criteria :

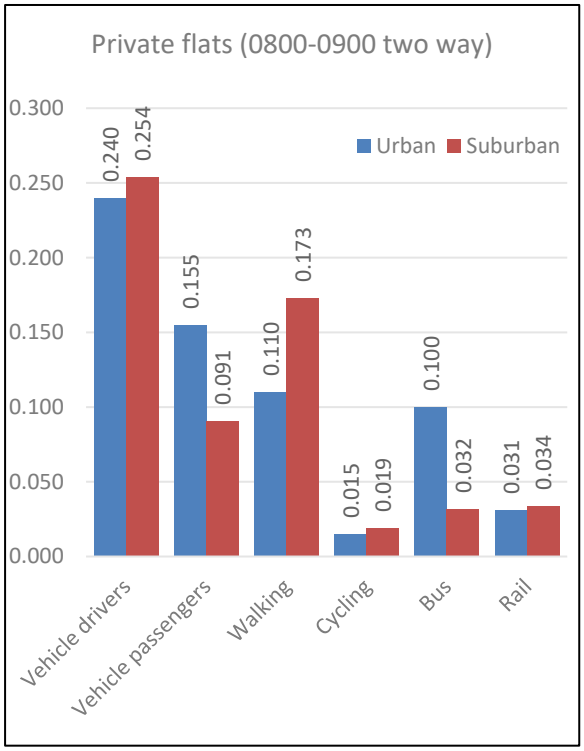
- Flats privately owned
- All sites in England except London for urban and suburban
- Default date range selected.
- Multi modal data is extracted only – for weekdays.
- Sites with no Travel Plan implemented
- Town Centre and Edge of Town Centre sites used as a proxy for DBC urban locations.
- Suburban and Edge of Town sites used as a proxy for DBC suburban locations.

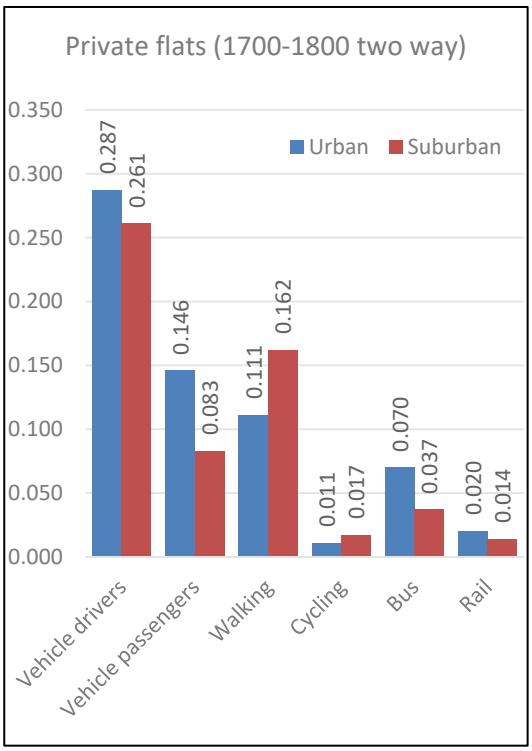
2.3.2 The data extracted from TRICS has been categorised to provide an appreciation of the different trip generation rates that may occur from residential uses and by location. The TRICS data has been summarised in table format and graph format below whilst the TRICS output is included as Appendix A.

Urban location	**0800-0900**			**1700-1800**		
	In	**Out**	**2 Way**	**In**	**Out**	**2 Way**
Vehicle drivers	0.062	0.178	0.240	0.181	0.106	0.287
Vehicle passengers	0.014	0.141	0.155	0.106	0.040	0.146
Walking	0.020	0.090	0.110	0.064	0.047	0.111
Cycling	0.003	0.012	0.015	0.008	0.003	0.011
Bus	0.003	0.097	0.100	0.059	0.011	0.070
Rail	0.002	0.029	0.031	0.020	0.000	0.020
Total	**0.104**	**0.547**	**0.651**	**0.438**	**0.207**	**0.645**

Suburban location	**0800-0900**			**1700-1800**		
	In	**Out**	**2 Way**	**In**	**Out**	**2 Way**
Vehicle drivers	0.061	0.193	0.254	0.175	0.086	0.261
Vehicle passengers	0.011	0.080	0.091	0.055	0.028	0.083
Walking	0.028	0.145	0.173	0.108	0.054	0.162
Cycling	0.001	0.018	0.019	0.010	0.007	0.017

Bus	0.000	0.032	0.032	0.032	0.005	0.037
Rail	0.000	0.034	0.034	0.014	0.000	0.014
Total	**0.101**	**0.502**	**0.603**	**0.394**	**0.180**	**0.574**





2.3.3 It is noted that in general:

- Vehicle movements are similar for urban and suburban sites.
- Suburban sites generate greater vehicle passenger movements than urban sites.
- Suburban sites generate greater walking and cycling movements than urban sites.

2.4 TRICS - B1a/b office and research trip generation rates

2.4.1 Vehicular trip generation data for B1 office use has been extracted from TRICS on the basis of the following criteria agreed with HE.

- Select Employment – office
- Select “calculate trip rates for vehicles”
- Select all regions in England except London (exclude Scotland, Wales and Ireland)
- Use default date and floor area parameters
- Use weekday data only
- Select “Town Centre” and “Edge of town centre” sites only for proxy suburban.
- Select “Edge of Town Centre” sites only for proxy urban (on the basis that this is higher than town centre).
- Select B1 use class sites only

- Select only sites that do not have a Travel Plan
- Leave population and car ownership parameters as defaults

2.4.2 With respect to the remaining modes of transport, the data for B1 office use has been extracted from TRICS on the basis of the following criteria included in the original Stage 3 report :

- Employment – office
- All sites in south England and midlands, except London, for urban
- All sites in England except London, for suburban
- Default date range selected.
- Multi modal data is extracted only - for weekdays.
- Sites with no Travel Plan implemented
- Town Centre and Edge of Town Centre sites used as a proxy for DBC urban locations.
- Suburban and Edge of Town sites used as a proxy for DBC suburban locations.

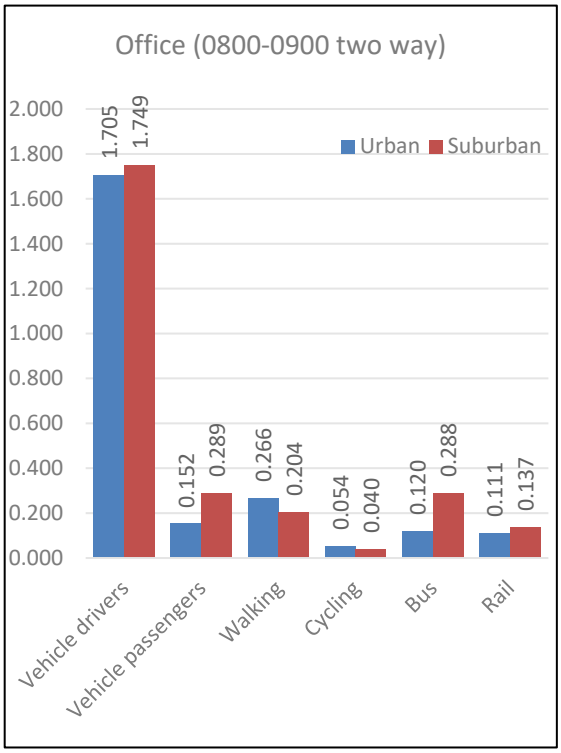
2.4.3 The trip generation data above has been extracted from TRICS and has been combined and categorised to provide an appreciation of the different trip generation rates that may occur from B1 office uses and by location. This data has also been used for research (B1b) land uses on the basis of a robust assumption and lack of a specific research use class within the TRICS database.

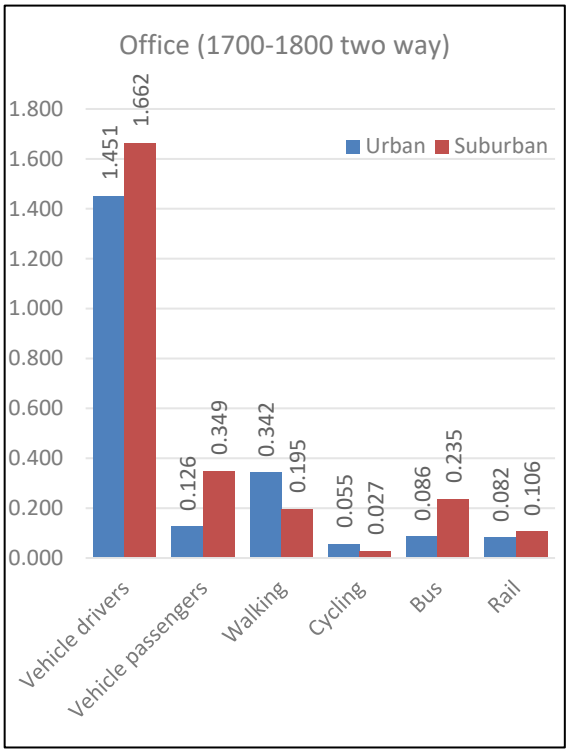
2.4.4 The TRICS data has been summarised in table format and graph format below whilst the TRICS output is included as Appendix B.

Urban location	**0800-0900**			**1700-1800**		
	In	**Out**	**2 Way**	**In**	**Out**	**2 Way**
Vehicle drivers	1.489	0.216	1.705	0.208	1.243	1.451
Vehicle passengers	0.152	0.000	0.152	0.005	0.120	0.126
Walking	0.249	0.017	0.266	0.038	0.304	0.342
Cycling	0.054	0.000	0.054	0.003	0.052	0.055
Bus	0.119	0.001	0.120	0.001	0.085	0.086
Rail	0.102	0.009	0.111	0.004	0.078	0.082
Total	**2.165**	**0.243**	**2.408**	**0.259**	**1.882**	**2.142**

Suburban location	**0800-0900**			**1700-1800**		
	In	**Out**	**2 Way**	**In**	**Out**	**2 Way**
Vehicle drivers	1.578	0.171	1.749	0.189	1.473	1.662
Vehicle passengers	0.257	0.031	0.289	0.083	0.266	0.349
Walking	0.182	0.022	0.204	0.027	0.168	0.195

Cycling	0.040	0.000	0.040	0.000	0.027	0.027
Bus	0.279	0.009	0.288	0.009	0.226	0.235
Rail	0.133	0.004	0.137	0.004	0.102	0.106
Total	**2.469**	**0.237**	**2.707**	**0.312**	**2.262**	**2.574**





2.4.5 It is noted that in general:

- Suburban sites generate greater vehicle movements than urban sites.
- Urban sites generate greater walking and cycling movements than suburban sites.
- There are relatively few vehicle passenger trips.

2.5 TRICS - B1c industrial processes

2.5.1 Data for B1c industrial use (that can be carried out in a residential area) has been extracted from TRICS on the basis of the following criteria :

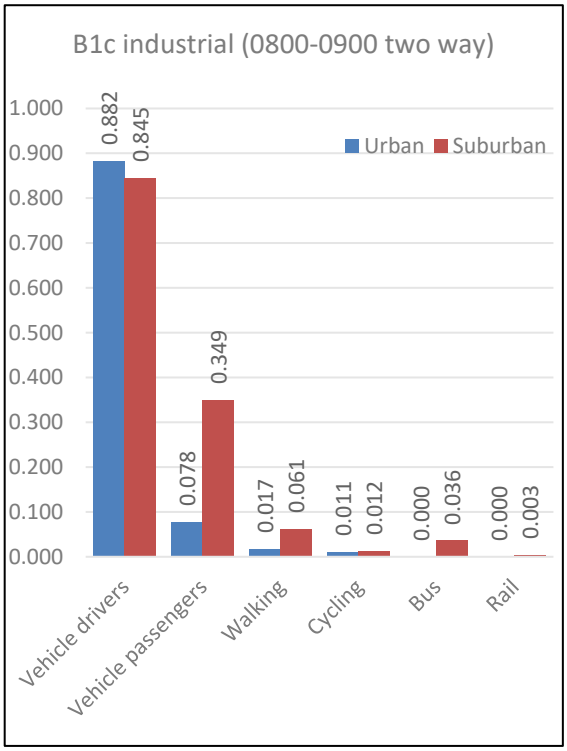
- Employment – Industrial estate (B category only)
- All sites in UK except London, for urban
- All sites in England except London, for suurban
- Default date range selected.
- Multi modal data is extracted only – for weekdays.
- Sites with no Travel Plan implemented
- Town Centre and Edge of Town Centre sites used as a proxy for DBC urban locations.

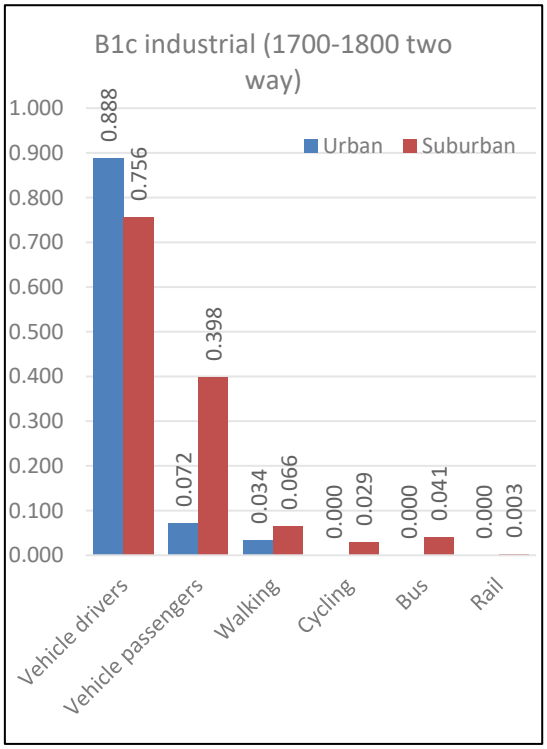
- Suburban and Edge of Town sites used as a proxy for DBC suburban locations.

2.5.2 The data extracted from TRICS has been categorised to provide an appreciation of the different trip generation rates that may occur from B1c industrial uses for a suburban location. The TRICS data has been summarised in table format and graph format below whilst the TRICS output is included as Appendix C.

Urban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	0.529	0.353	0.882	0.364	0.524	0.888
Vehicle passengers	0.045	0.033	0.078	0.028	0.044	0.072
Walking	0.000	0.017	0.017	0.017	0.017	0.034
Cycling	0.000	0.011	0.011	0.000	0.000	0.000
Bus	0.000	0.000	0.000	0.000	0.000	0.000
Rail	0.000	0.000	0.000	0.000	0.000	0.000
Total	**0.574**	**0.414**	**0.988**	**0.409**	**0.585**	**0.994**

Suburban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	0.647	0.198	0.845	0.146	0.610	0.756
Vehicle passengers	0.317	0.032	0.349	0.062	0.336	0.398
Walking	0.039	0.022	0.061	0.024	0.042	0.066
Cycling	0.010	0.002	0.012	0.011	0.018	0.029
Bus	0.034	0.002	0.036	0.004	0.037	0.041
Rail	0.003	0.000	0.003	0.000	0.003	0.003
Total	**1.050**	**0.256**	**1.306**	**0.247**	**1.046**	**1.293**





2.5.3 It is noted that in general:

- There is a high mode share for vehicle drivers.
- Vehicle drivers are similar for urban and suburban sites.
- There is a relatively high proportion of vehicle passengers (car sharing) for suburban.

2.6 TRICS - B8 warehousing trip generation rates

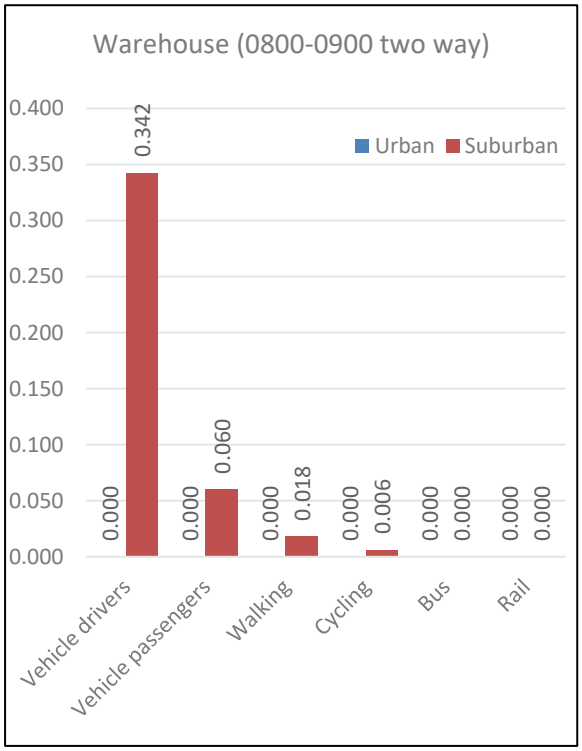
2.6.1 Data for B8 warehousing use has been extracted from TRICS on the basis of the following criteria :

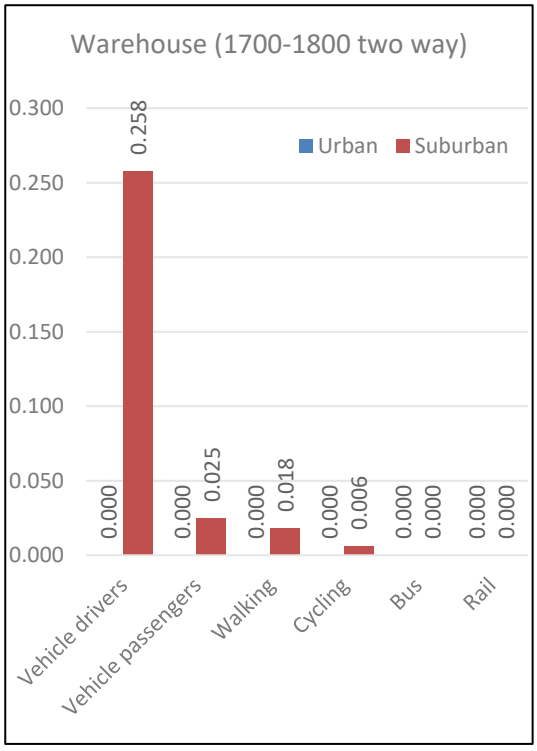
- Employment – Warehousing (commercial)
- All sites in England, Scotland and Wales (except London) for suburban.
- Insufficient urban data available.
- Multi modal data is extracted only – for weekdays.
- Sites with no Travel Plan implemented
- Data from 2000 onwards
- Suburban and Edge of Town sites used as a proxy for DBC suburban locations.

2.6.2 The data extracted from TRICS has been categorised to provide an appreciation of the different trip generation rates that may occur from B8 warehousing uses for suburban locations. Little or no data is available for urban locations and hence, for the purposes of this study, the suburban data will also be used for urban locations.

2.6.3 The TRICS data has been summarised in table format and graph format below whilst the TRICS output is included as Appendix D.

Suburban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	0.250	0.092	0.342	0.049	0.209	0.258
Vehicle passengers	0.046	0.014	0.060	0.002	0.023	0.025
Walking	0.017	0.001	0.018	0.000	0.018	0.018
Cycling	0.003	0.003	0.006	0.001	0.005	0.006
Bus	0.000	0.000	0.000	0.000	0.000	0.000
Rail	0.000	0.000	0.000	0.000	0.000	0.000
Total	**0.316**	**0.110**	**0.426**	**0.052**	**0.255**	**0.307**





2.7 TRICS - B8 parcel distribution trip generation rates

2.7.1 Vehicular trip generation data for B8 parcel distribution use has been extracted from TRICS on the basis of the following criteria agreed with HE.

- Select Employment – parcel distribution centres
- Select “calculate trip rates for vehicles”
- Select all regions in England except London (exclude Scotland, Wales and Ireland)
- Reset date to year 2000 but use default floor area parameters
- Use weekday data only
- Select “Edge of town” and “Free standing” sites only

- Select B8 use class sites only
- Select only sites that do not have a Travel Plan
- Leave population and car ownership parameters as defaults

2.7.2 With respect to the remaining modes of transport, the data for B8 parcel distribution use has been extracted from TRICS on the basis of the following criteria included in the original Stage 3 report :

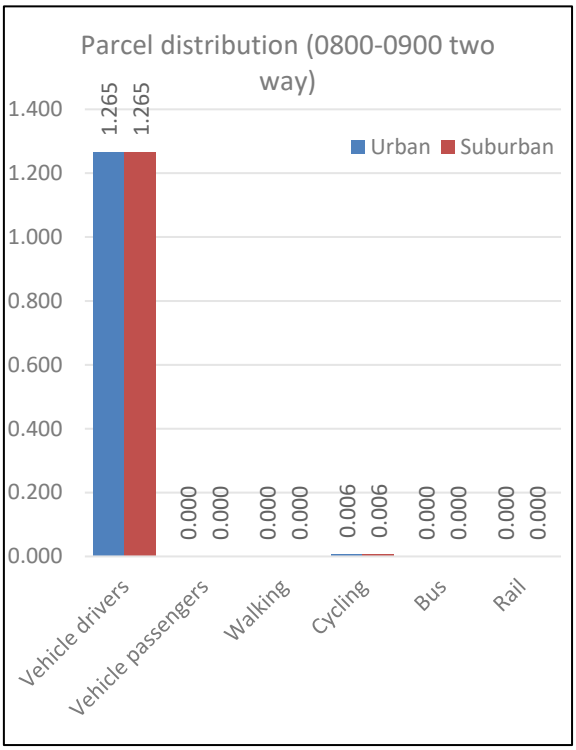
- Employment – Parcel distribution centres
- All sites in England, Scotland and Wales (except London) for suburban.
- Insufficient urban data available.
- Insufficient multi modal data available. Vehicle data extracted only – for weekdays.
- Sites with no Travel Plan implemented
- Data from 2000 onwards
- Suburban and Edge of Town sites used as a proxy for DBC suburban locations.

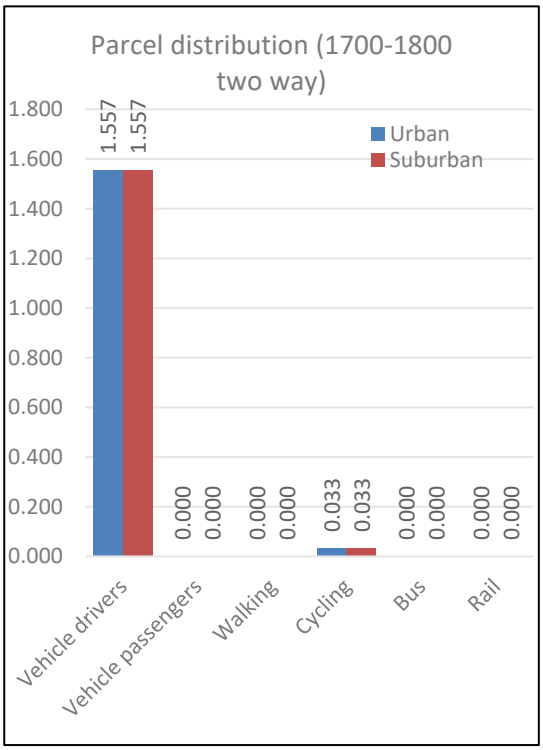
2.7.3 The trip generation data above has been extracted from TRICS and has been combined and categorised to provide an appreciation of the different trip generation rates that may occur from B8 parcel distribution centre uses for suburban locations.

2.7.4 Little or no data is available for urban locations and hence, for the purposes of this study, the suburban data will also be used for urban locations.

2.7.5 The TRICS data has been summarised in table format and graph format below whilst the TRICS output is included as Appendix E.

Suburban location	**0800-0900**			**1700-1800**		
	In	**Out**	**2 Way**	**In**	**Out**	**2 Way**
Vehicle drivers	0.389	0.876	1.265	0.756	0.801	1.557
Vehicle passengers	0.000	0.000	0.000	0.000	0.000	0.000
Walking	0.000	0.000	0.000	0.000	0.000	0.000
Cycling	0.004	0.002	0.006	0.025	0.008	0.033
Bus	0.000	0.000	0.000	0.000	0.000	0.000
Rail	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.393	0.878	1.271	0.781	0.809	1.590





2.7.6 It is noted that in general:

- Only vehicle trips have been extracted
- Trips are almost exclusively vehicle driver trips

2.8 TRICS - Retail trip generation rates

2.8.1 Data for retail uses has been extracted from TRICS as described below. The data extracted from TRICS has been categorised to provide an appreciation of the different trip generation rates that may occur from different retail uses and by location.

2.8.2 The TRICS data has been summarised in table format and graph format below whilst the TRICS output is included as Appendices F and G.

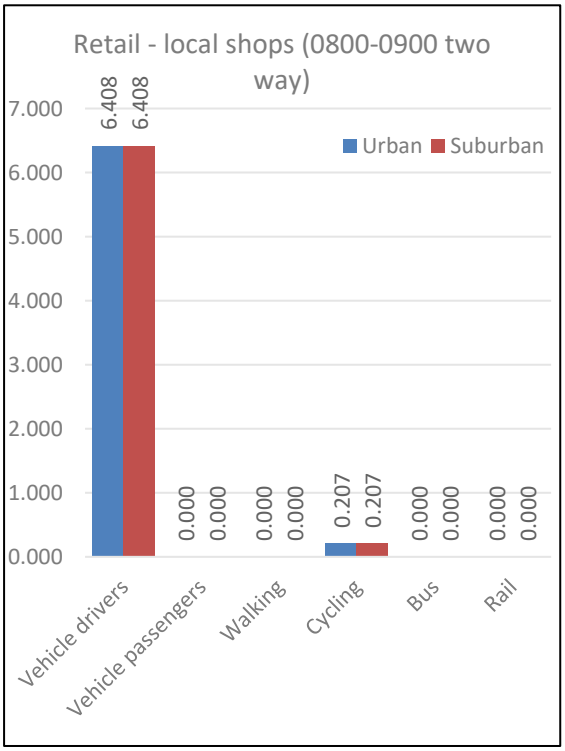
Shopping centre – local shops

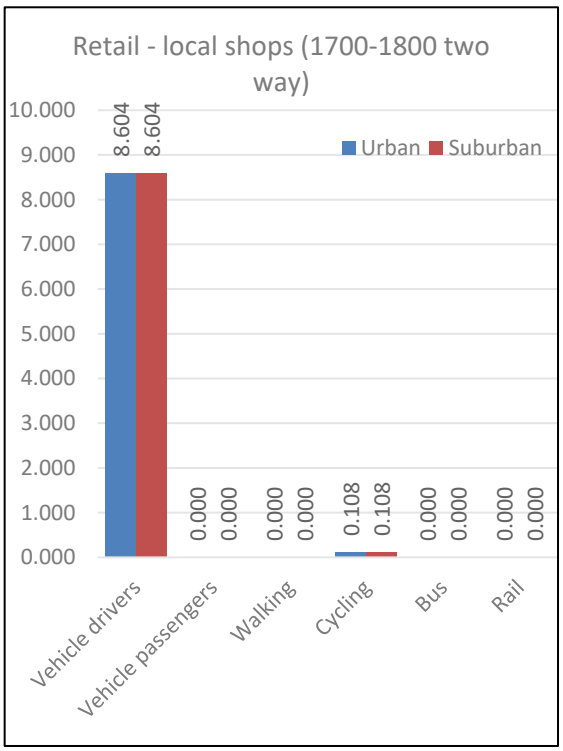
2.8.3 Data for shopping centre – local shops use has been extracted from TRICS on the basis of the following criteria :

- Retail – shopping centre – local shops.
- All sites in England, Scotland and Wales (except London).
- Insufficient data available for urban.
- Multi modal data is extracted only for suburban sites - for weekdays.
- Sites with no Travel Plan implemented
- Data from 2000 onwards.
- Suburban and Edge of Town sites used as a proxy for DBC suburban locations.

2.8.4 Little or no data is available for urban locations and hence, for the purposes of this study, the suburban data will also be used for urban locations.

Suburban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	3.375	3.033	6.408	4.113	4.491	8.604
Vehicle passengers	0.000	0.000	0.000	0.000	0.000	0.000
Walking	0.000	0.000	0.000	0.000	0.000	0.000
Cycling	0.099	0.108	0.207	0.036	0.072	0.108
Bus	0.000	0.000	0.000	0.000	0.000	0.000
Rail	0.000	0.000	0.000	0.000	0.000	0.000
Total	3.474	3.141	6.615	4.149	4.563	8.712





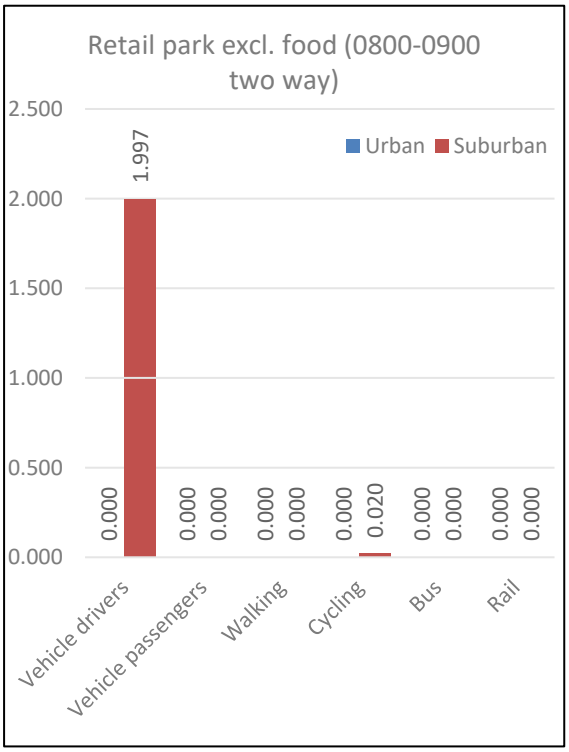
Retail park – including food

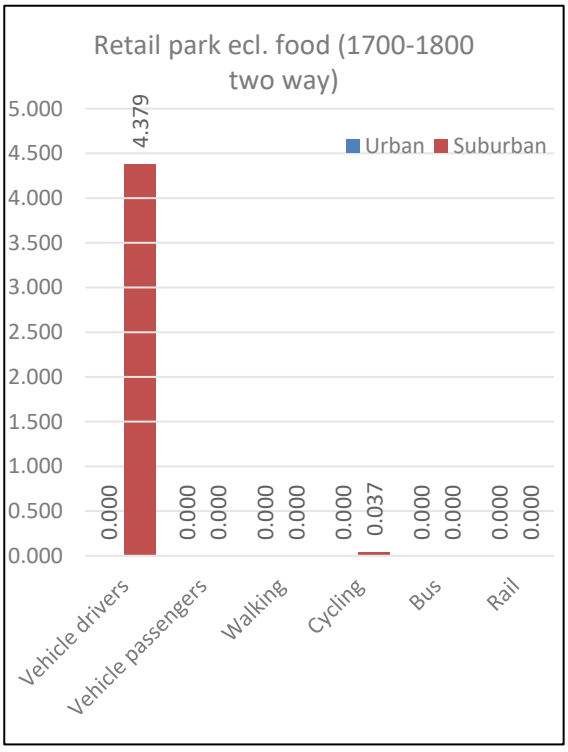
2.8.5 Data for retail park use has been extracted from TRICS on the basis of the following criteria :

- Retail – Retail park including food
- All sites in UK (except London)
- Insufficient urban data available.
- Insufficient multi modal data available. Vehicle trip rates extracted - for weekdays.
- Data from 2000 onwards.
- Sites with no Travel Plan implemented
- Suburban and Edge of Town sites used as a proxy for DBC suburban locations.

2.8.6 Little or no data is available for urban locations and hence, for the purposes of this study, the suburban data will also be used for urban locations.

Suburban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	1.217	0.780	1.997	2.264	2.115	4.379
Vehicle passengers	0.000	0.000	0.000	0.000	0.000	0.000
Walking	0.000	0.000	0.000	0.000	0.000	0.000
Cycling	0.011	0.009	0.020	0.016	0.021	0.037
Bus	0.000	0.000	0.000	0.000	0.000	0.000
Rail	0.000	0.000	0.000	0.000	0.000	0.000
Total	**1.217**	**0.780**	**1.997**	**2.264**	**2.115**	**4.379**





2.9 TRICS - Leisure trip generation rates

2.9.1 Data for different leisure uses has been extracted from TRICS as described below. The data extracted from TRICS has been categorised to provide an appreciation of the different trip generation rates that may occur from different leisure uses and by location.

2.9.2 The TRICS data has been summarised in table format and graph format below whilst the TRICS output is included as Appendices H to J.

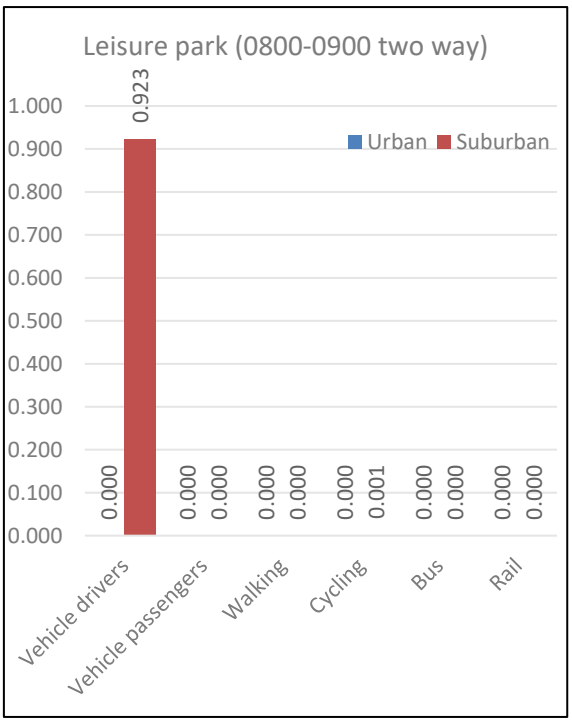
Leisure park

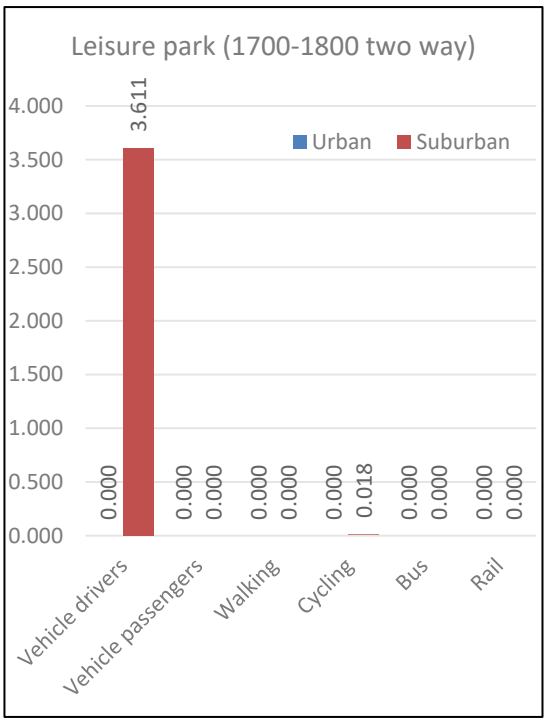
2.9.3 Data for leisure park use has been extracted from TRICS on the basis of the following criteria :

- Leisure – leisure park
- All sites in UK (except London).
- Insufficient data available for urban.
- Insufficient multi modal data. Vehicle data extracted only for suburban – for weekdays.
- Sites with no Travel Plan implemented
- Data from 2000 onwards.
- Suburban and Edge of Town sites used as a proxy for DBC suburban locations.

2.9.4 Little or no data is available for urban locations and hence, for the purposes of this study, the suburban data will also be used for urban locations. The TRICS data has been summarised in table format and graph format below whilst the TRICS output is included as Appendix H.

Suburban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	0.514	0.409	0.923	2.204	1.407	3.611
Vehicle passengers	0.000	0.000	0.000	0.000	0.000	0.000
Walking	0.000	0.000	0.000	0.000	0.000	0.000
Cycling	0.001	0.000	0.001	0.010	0.008	0.018
Bus	0.000	0.000	0.000	0.000	0.000	0.000
Rail	0.000	0.000	0.000	0.000	0.000	0.000
Total	**0.515**	**0.409**	**0.924**	**2.214**	**1.415**	**3.629**





Leisure centre

2.9.5 Data for leisure centre use has been extracted from TRICS on the basis of the following criteria :

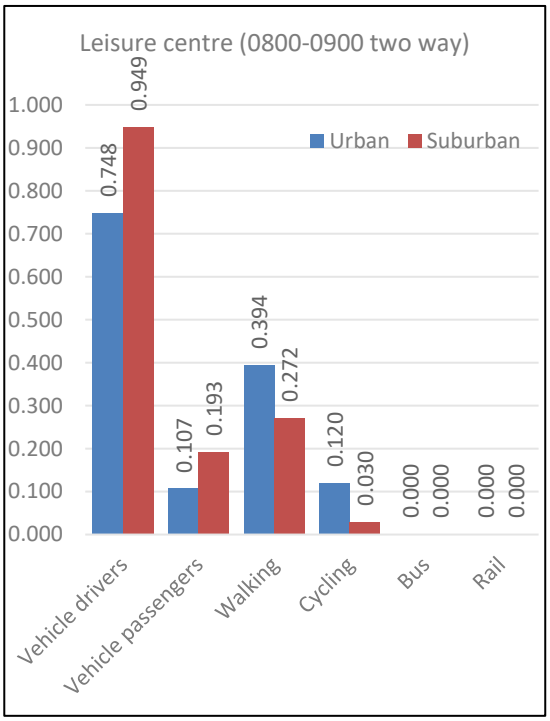
- Leisure – leisure centre
- All sites in UK (except London).
- Default date range selected.
- Multi modal data is extracted only - for weekdays.
- Select D2 use class sites only
- Sites with no Travel Plan implemented
- Data from 2000 onwards.
- Town Centre and Edge of Town Centre sites used as a proxy for DBC urban locations.
- Suburban and Edge of Town sites used as a proxy for DBC suburban locations.

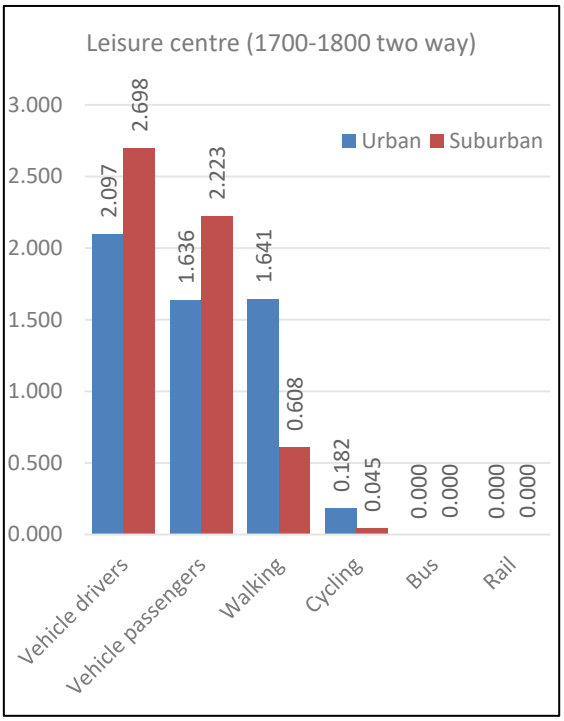
2.9.6 The data extracted from TRICS has been categorised to provide an appreciation of the different trip generation rates that may occur from Leisure Centre uses for a suburban location. The TRICS data has been summarised in table format and graph format below whilst the TRICS output is included as Appendix I.

Urban location	**0800-0900**			**1700-1800**		
	In	**Out**	**2 Way**	**In**	**Out**	**2 Way**
Vehicle drivers	0.388	0.360	0.748	1.025	1.072	2.097
Vehicle passengers	0.079	0.028	0.107	0.609	1.027	1.636
Walking	0.240	0.154	0.394	0.856	0.785	1.641
Cycling	0.066	0.054	0.120	0.081	0.101	0.182
Bus	0.000	0.000	0.000	0.000	0.000	0.000
Rail	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.773	0.596	1.369	2.571	2.985	5.556

Suburban location	**0800-0900**			**1700-1800**		
	In	**Out**	**2 Way**	**In**	**Out**	**2 Way**
Vehicle drivers	0.518	0.431	0.949	1.562	1.136	2.698
Vehicle passengers	0.132	0.061	0.193	1.134	1.089	2.223
Walking	0.186	0.086	0.272	0.353	0.255	0.608
Cycling	0.015	0.015	0.030	0.021	0.024	0.045
Bus	0.000	0.000	0.000	0.000	0.000	0.000
Rail	0.000	0.000	0.000	0.000	0.000	0.000

Total	0.851	0.593	1.444	3.070	2.504	5.574





2.9.7 It is noted that in general:

- Suburban sites generate greater vehicle movements than urban sites.
- Urban sites generate greater walking and cycling movements than suburban sites.

Leisure – cinema

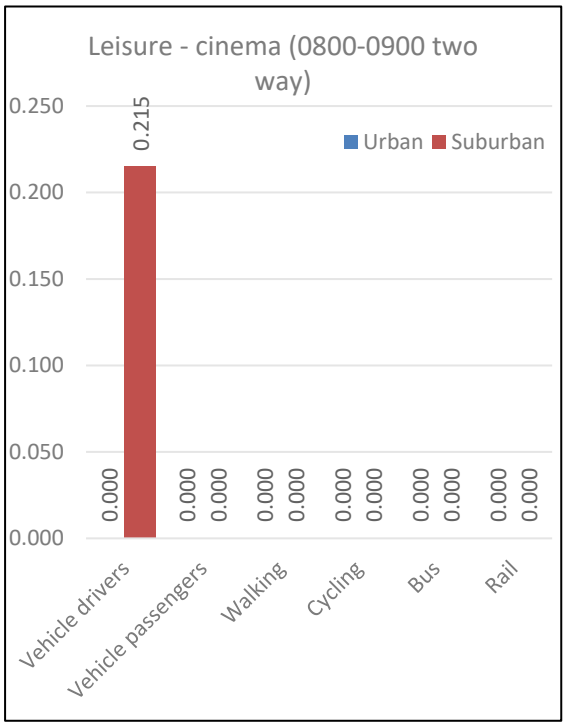
2.9.8 Data for cinema use has been extracted from TRICS on the basis of the following criteria :

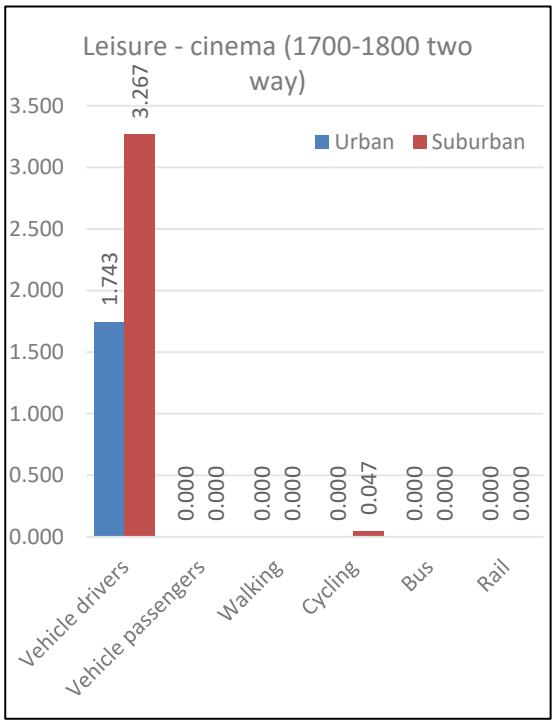
- Leisure – multiplex cinema
- All sites in England, Scotland and Wales (except London).
- Insufficient multi modal data available. Vehicle data is extracted only - for weekdays.
- Data from 2000 onwards.
- Sites with no Travel Plan implemented
- Town Centre and Edge of Town Centre sites used as a proxy for DBC urban locations.
- Suburban and Edge of Town sites used as a proxy for DBC suburban locations.

2.9.9 The data extracted from TRICS has been categorised to provide an appreciation of the different trip generation rates that may occur from cinema uses for a suburban location. The TRICS data has been summarised in table format and graph format below whilst the TRICS output is included as Appendix J.

Urban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	0.000	0.000	0.000	1.054	0.689	1.743
Vehicle passengers	0.000	0.000	0.000	0.000	0.000	0.000
Walking	0.000	0.000	0.000	0.000	0.000	0.000
Cycling	0.000	0.000	0.000	0.000	0.000	0.000
Bus	0.000	0.000	0.000	0.000	0.000	0.000
Rail	0.000	0.000	0.000	0.000	0.000	0.000
Total	**0.000**	**0.000**	**0.000**	**1.054**	**0.689**	**1.743**

Suburban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	0.215	0.000	0.215	1.832	1.435	3.267
Vehicle passengers	0.000	0.000	0.000	0.000	0.000	0.000
Walking	0.000	0.000	0.000	0.000	0.000	0.000
Cycling	0.000	0.000	0.000	0.010	0.037	0.047
Bus	0.000	0.000	0.000	0.000	0.000	0.000
Rail	0.000	0.000	0.000	0.000	0.000	0.000
Total	**0.215**	**0.000**	**0.215**	**1.842**	**1.472**	**3.314**





2.10 TRICS – Hospitality trip generation rates

Hotel

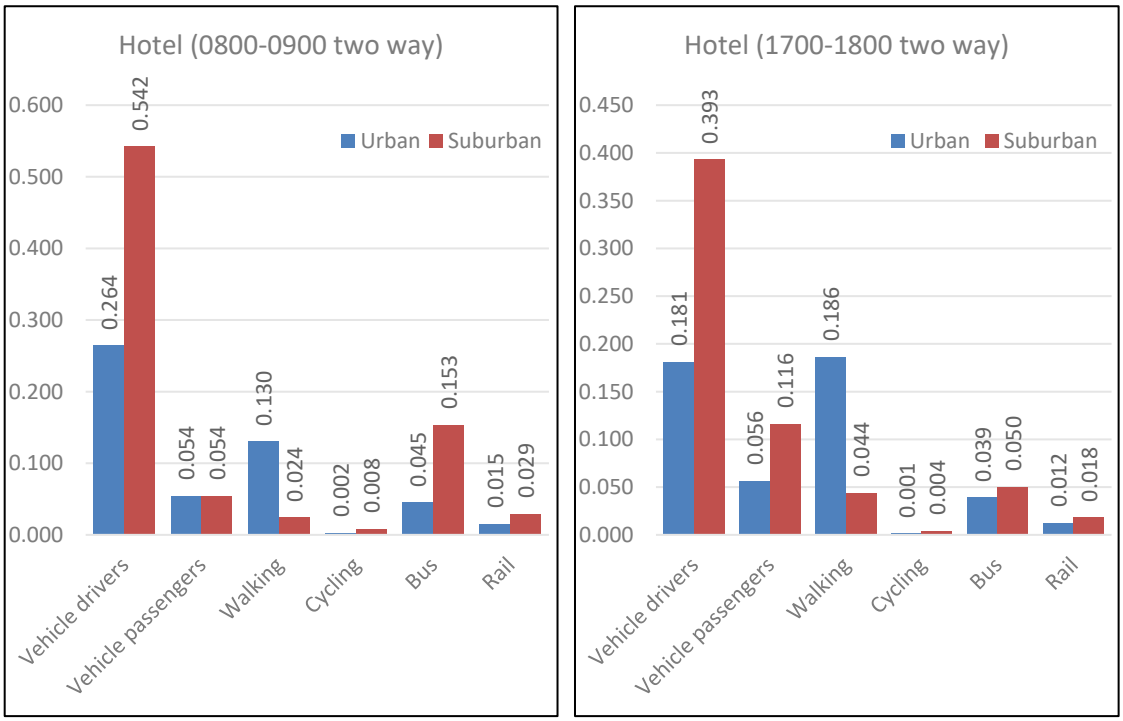
2.10.1 Data for hotel use has been extracted from TRICS on the basis of the following criteria :

- Hotel, food and drink – Hotels
- All sites in England except London.
- Multi modal data is extracted only – for weekdays.
- Default date range selected for urban.
- Data from 2010 onwards selected for suburban.
- Town Centre and Edge of Town Centre sites used as a proxy for DBC urban locations.
- Suburban and Edge of Town sites used as a proxy for DBC suburban locations.

2.10.2 The data extracted from TRICS has been categorised to provide an appreciation of the different trip generation rates that may occur from hotel uses and by location. The TRICS data has been summarised in table format and graph format below whilst the TRICS output is included as Appendix K.

Urban location	**0800-0900**			**1700-1800**		
	In	**Out**	**2 Way**	**In**	**Out**	**2 Way**
Vehicle drivers	0.113	0.151	0.264	0.104	0.077	0.181
Vehicle passengers	0.018	0.036	0.054	0.042	0.014	0.056
Walking	0.052	0.078	0.130	0.102	0.084	0.186
Cycling	0.002	0.000	0.002	0.000	0.001	0.001
Bus	0.006	0.039	0.045	0.037	0.002	0.039
Rail	0.012	0.003	0.015	0.010	0.002	0.012
Total	**0.203**	**0.307**	**0.510**	**0.295**	**0.180**	**0.475**

Suburban location	**0800-0900**			**1700-1800**		
	In	**Out**	**2 Way**	**In**	**Out**	**2 Way**
Vehicle drivers	0.242	0.300	0.542	0.208	0.185	0.393
Vehicle passengers	0.003	0.051	0.054	0.081	0.035	0.116
Walking	0.009	0.015	0.024	0.019	0.025	0.044
Cycling	0.007	0.001	0.008	0.001	0.003	0.004
Bus	0.003	0.150	0.153	0.028	0.022	0.050
Rail	0.016	0.013	0.029	0.009	0.009	0.018
Total	**0.280**	**0.530**	**0.810**	**0.346**	**0.279**	**0.625**



2.10.3 It is noted that in general:

- Suburban sites generate greater vehicle movements than urban sites.
- Urban sites generate greater walking movements than suburban sites.
- Suburban sites generate greater bus and rail movements than urban sites.
- There are relatively few vehicle passenger trips.

Pub / Restaurant

2.10.4 Data for pub / restaurant use has been extracted from TRICS on the basis of the following criteria :

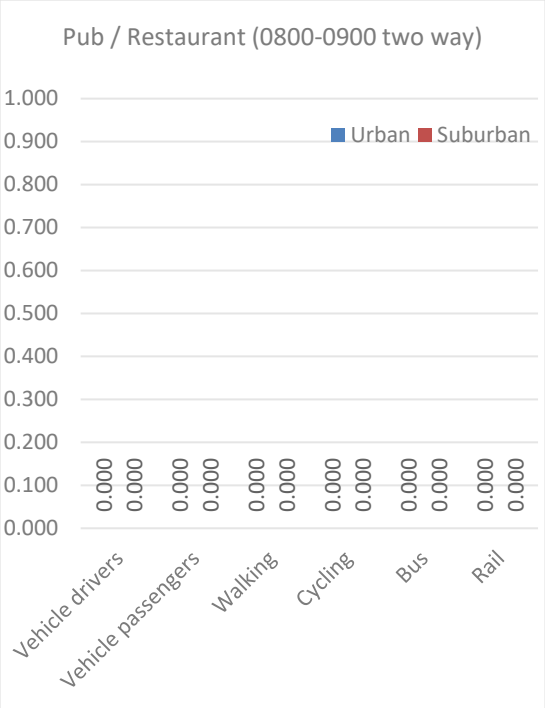
- Hotel, food and drink – Pub / restaurant
- All sites in England except London.
- Multi modal data is extracted only – for weekdays.
- Default date range selected for urban.
- Data from 2000 onwards
- Town Centre and Edge of Town Centre sites used as a proxy for DBC urban locations.
- Suburban and Edge of Town sites used as a proxy for DBC suburban locations.

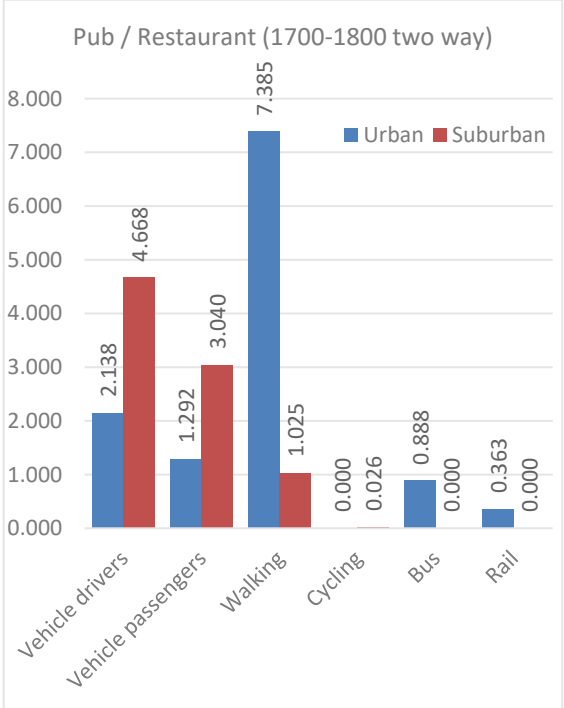
2.10.5 The data extracted from TRICS has been categorised to provide an appreciation of the different trip generation rates that may occur from pub / restaurant uses and by location.

2.10.6 The TRICS data has been summarised in table format and graph format below whilst the TRICS output is included as Appendix L.

Urban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	0.000	0.000	0.000	1.291	0.847	2.138
Vehicle passengers	0.000	0.000	0.000	0.848	0.444	1.292
Walking	0.000	0.000	0.000	4.116	3.269	7.385
Cycling	0.000	0.000	0.000	0.000	0.000	0.000
Bus	0.000	0.000	0.000	0.404	0.484	0.888
Rail	0.000	0.000	0.000	0.282	0.081	0.363
Total	0.000	0.000	0.000	6.941	5.125	12.066

Suburban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	0.000	0.000	0.000	2.851	1.817	4.668
Vehicle passengers	0.000	0.000	0.000	1.920	1.120	3.040
Walking	0.000	0.000	0.000	0.637	0.388	1.025
Cycling	0.000	0.000	0.000	0.026	0.000	0.026
Bus	0.000	0.000	0.000	0.000	0.000	0.000
Rail	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	0.000	5.434	3.325	8.759





2.10.7 It is noted that in general:

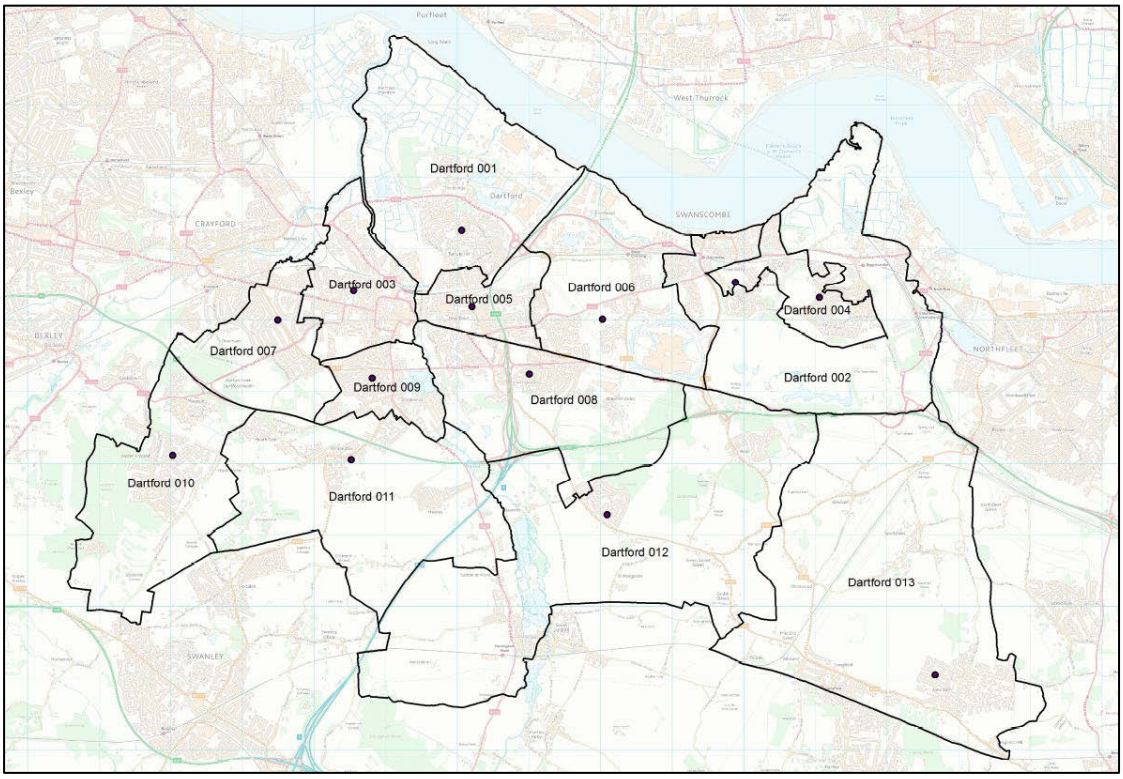
- Suburban sites generate greater vehicle movements than urban sites.
- Urban sites generate greater walking movements than suburban sites.
- Suburban sites generate greater bus and rail movements than urban sites.

3 Mode share data

3.1.1 The following section considers the existing mode share data available from the 2011 census and the TRICS data mode share.

3.2 2011 census

3.2.1 Data has been extracted from the 2011 census database (ONS) for the Dartford Borough Mid Size Output Areas (MSOAs). There are 13 MSOAs within Dartford Borough and these are illustrated on the map below.



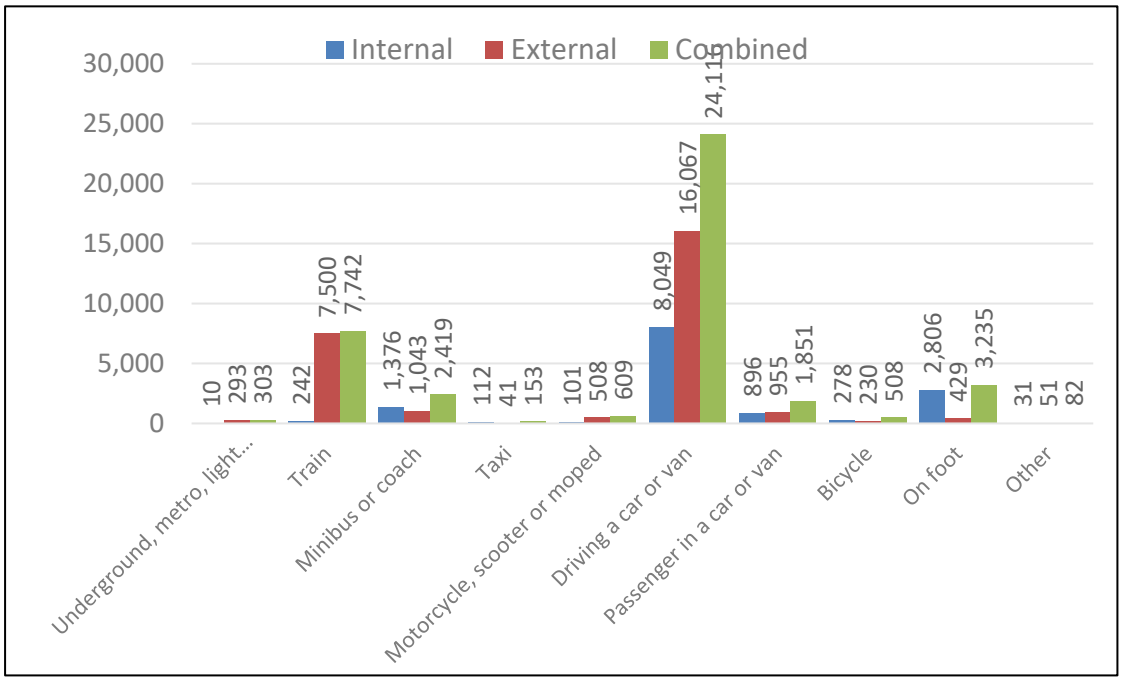
3.2.2 The data extracted allows the recorded number of person trips to be determined from each of the Dartford Borough MSOAs travelling to each of the other Dartford Borough MSOAs, and travelling to destinations external to Dartford Borough.

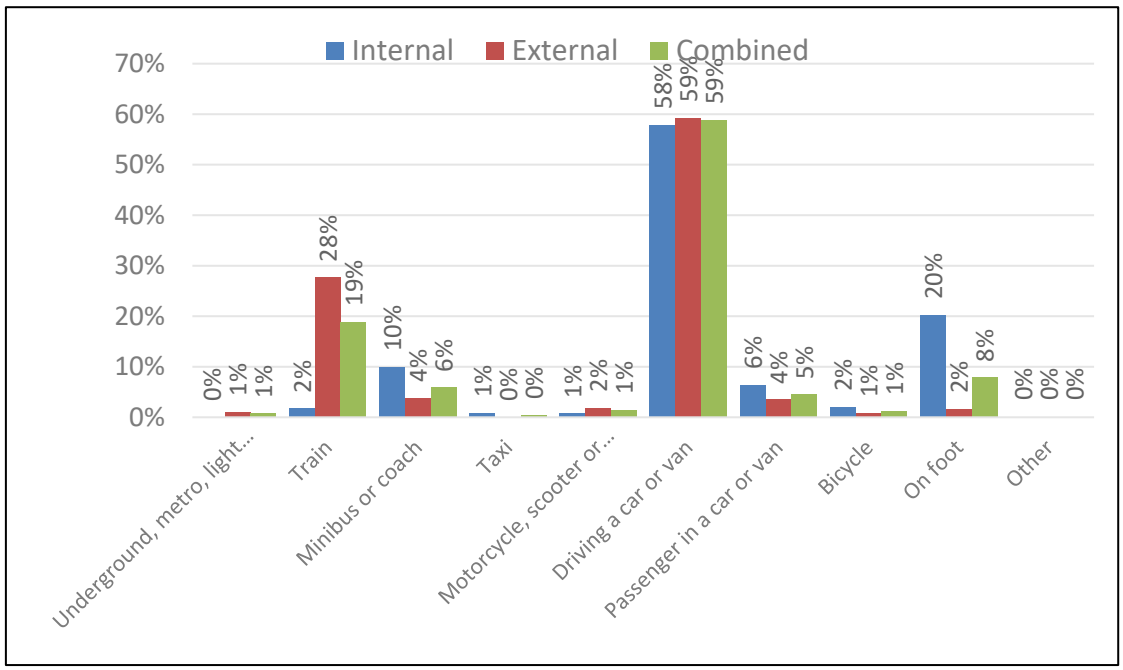
3.2.3 The mode share of the person trips can also be determined from the data and this is considered in further detail in the following paragraphs.

3.3 2011 journey to work census data mode share – Dartford residents

3.3.1 The mode share of person trips from the 2011 census journey to work data has been determined and this is illustrated on the graphs below for the combined Dartford MSOAs.

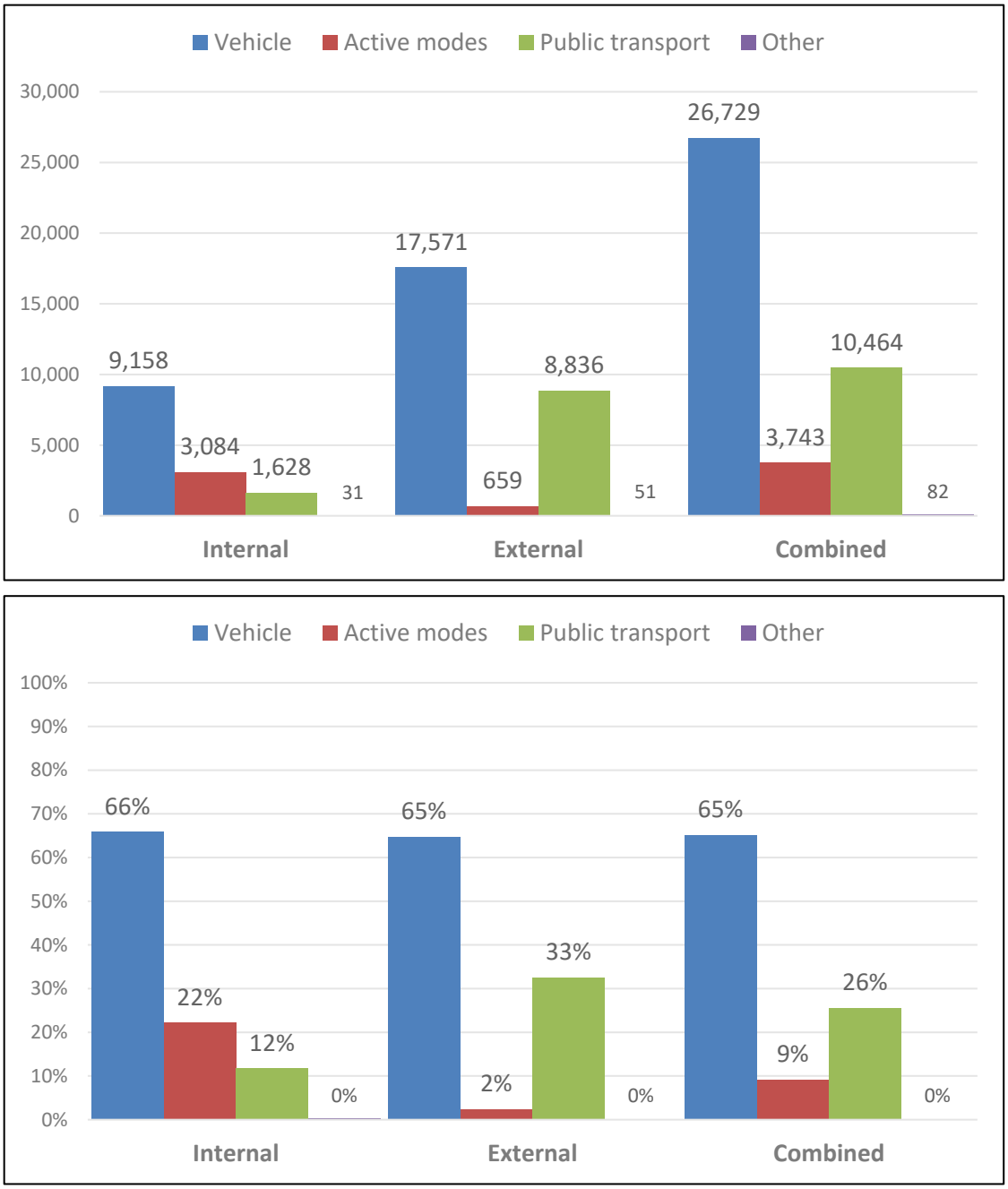
3.3.2 The graphs show number of person journeys (by people living in Dartford) and the percentage share for the mode breakdown available from the census data. Internal refers to journeys by Dartford residents who remain in Dartford to travel to work. External refers to journeys by Dartford residents who travel to work external to Dartford.





3.3.3 The same data has been presented in the graphs below for grouped modes as follows :

- "Driving a car or van", "Passenger in a car or van". "Taxi" and "Motorcycle" modes can be grouped as "vehicle" mode
- "On foot" mode and "Bicycle" mode can be grouped as "active" mode.
- "Minibus or coach", "Underground, metro, light rail" and "train" modes can be grouped as "public transport" mode.
- "Other" mode is grouped by itself.



3.3.4 It is evident from the graphs above that the mode share of journeys by vehicle (either driver or passenger) is similar between internal and external journeys (around 65%).

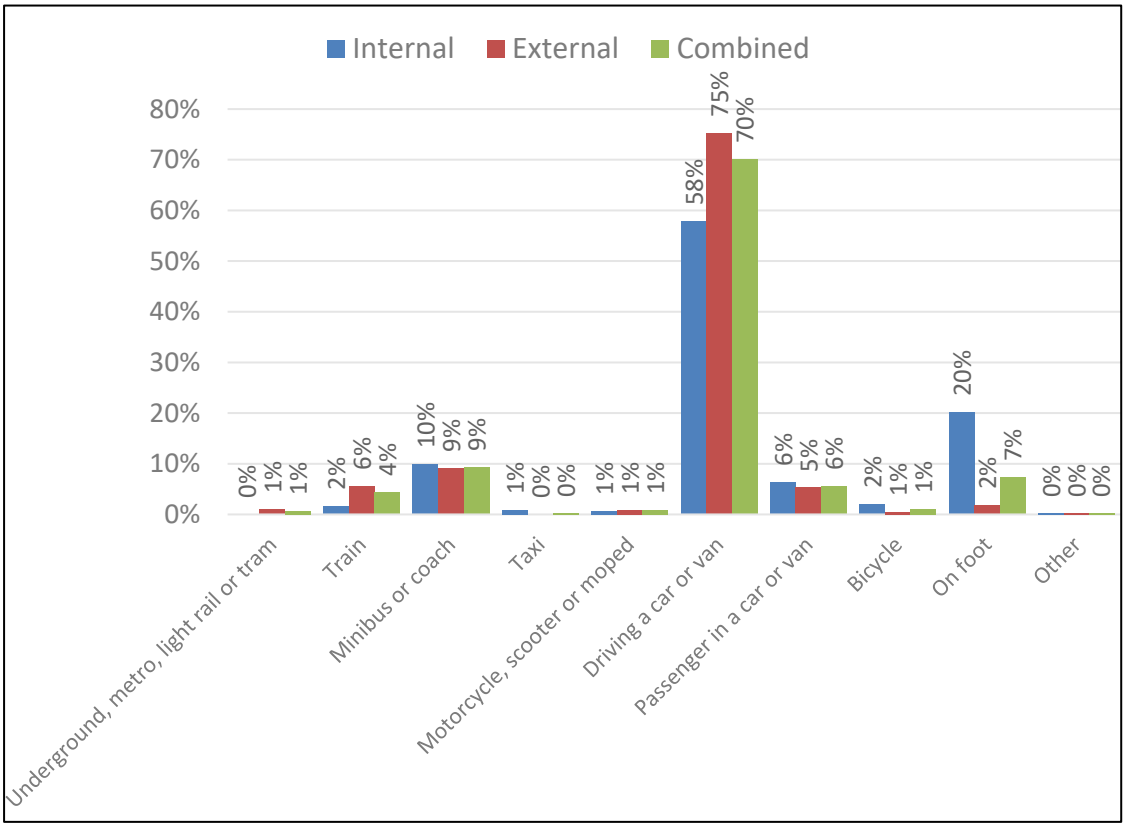
3.3.5 With respect to active modes (walking and cycling) it is noted that these are significantly higher for internal trips than external trips and that the majority of these are walking trips rather than cycling. This is likely to be due to the shorter trip distance for internal trips.

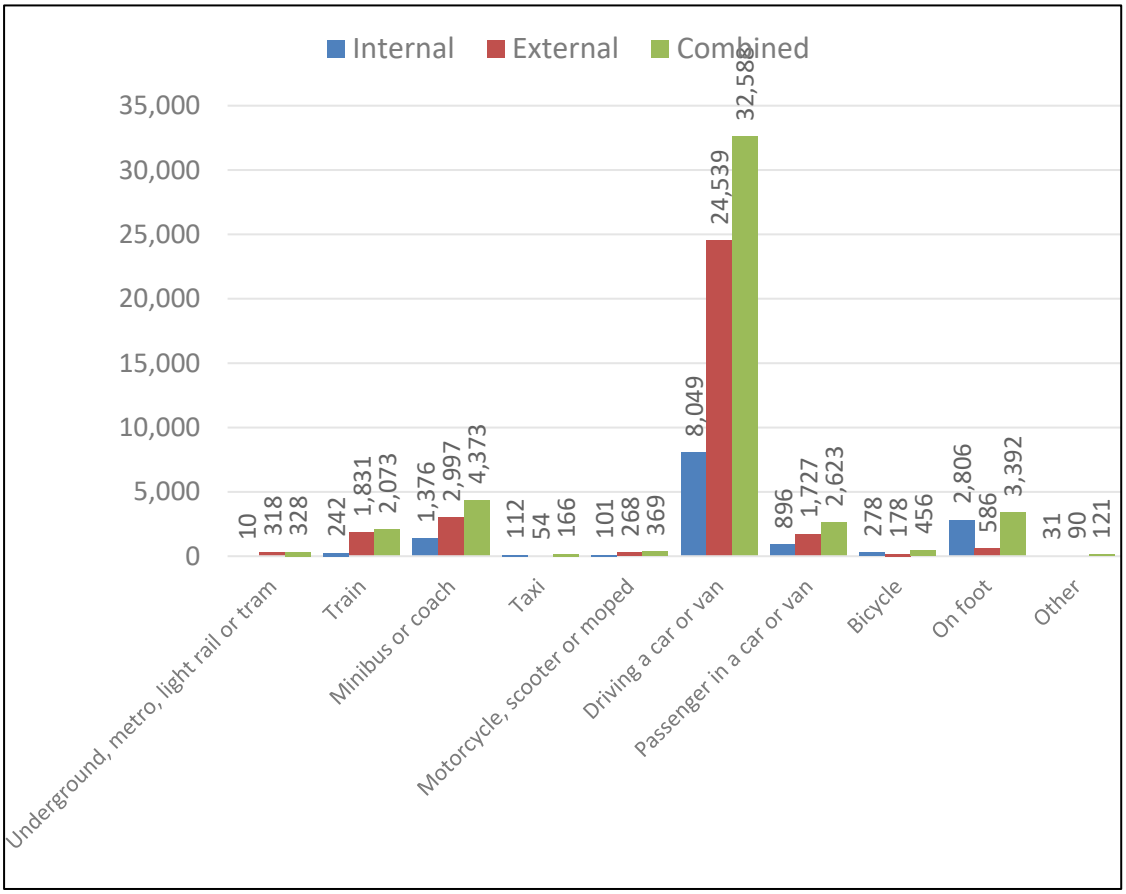
3.3.6 Public transport mode share is greater for external trips when compared to internal trips and this is due to the significantly greater number and mode share of rail trips for external trips than internal.

3.4 2011 journey to work census data mode share – Dartford employees

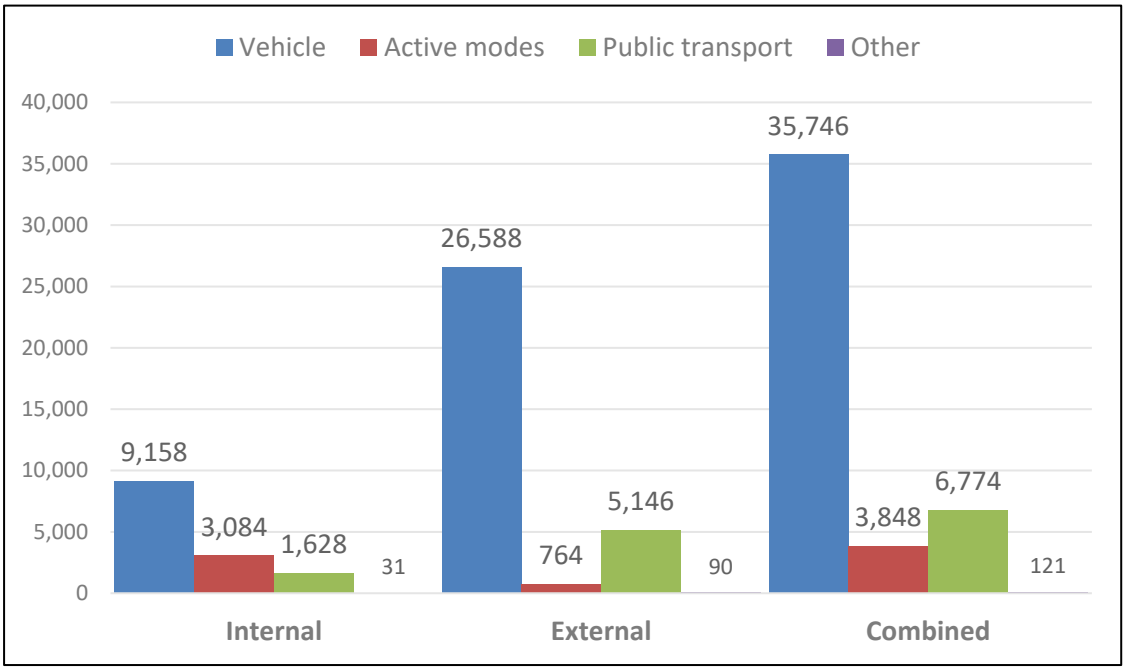
3.4.1 The graphs below show number of person journeys (by people working in Dartford) and the percentage share for the mode breakdown available from the census data. Internal refers to

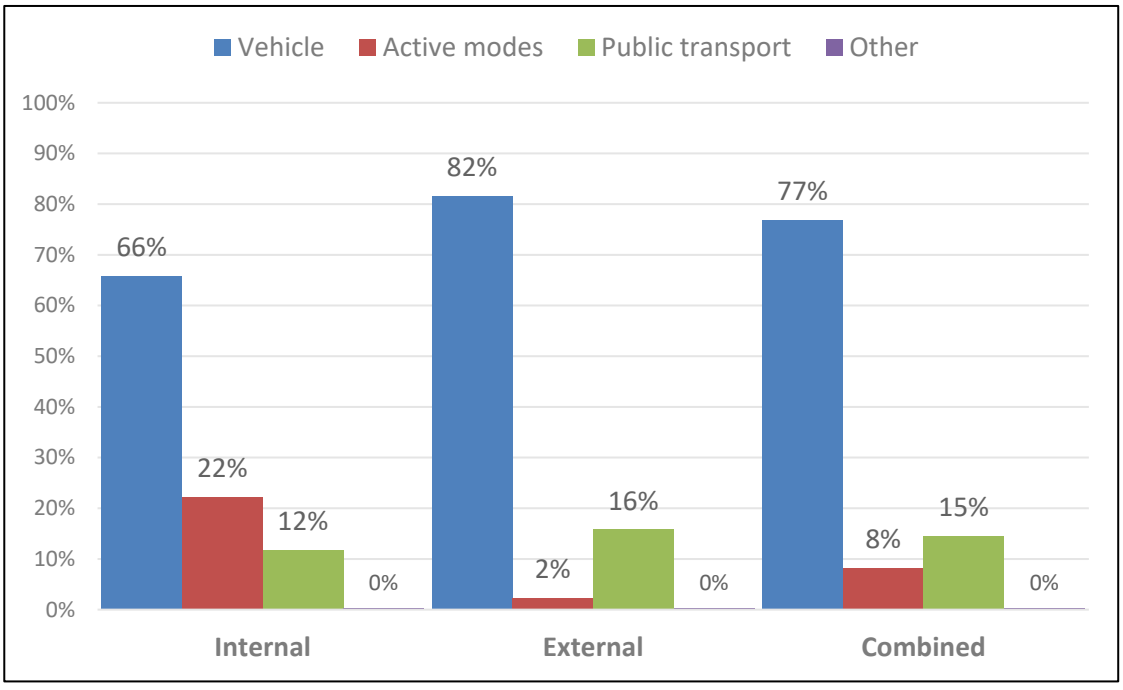
journeys by people who work in Dartford and have travelled from within DBC to work. External refers to journeys by people who work in Dartford and have travelled from external to DBC to work.





3.4.2 The same data has been presented in the graphs below for the grouped modes.





3.4.3 It is evident from the graphs above that the mode share of journeys by vehicle (either driver or passenger) is different between internal and external journeys (66% and 82% respectively) whilst the combined mode share is 77%.

3.4.4 With respect to active modes (walking and cycling) it is noted that these are significantly higher for internal trips than external trips and that the majority of these are walking trips rather than cycling. This is likely to be due to the shorter trip distance for internal trips.

3.4.5 Public transport mode share is greater for external trips when compared to internal trips and this is due to the greater number and mode share of rail trips for external trips than internal.

3.5 2011 census data summary

3.5.1 The above graphs could be referred to when considering the likelihood that a particular mode share target may be achieved for a particular site location.

3.5.2 For example, those sites that sit within an MSOA with an already high mode share for active travel and public transport modes would reasonably be expected to more readily achieve a high mode share target for non vehicle modes.

3.6 TRICS mode share

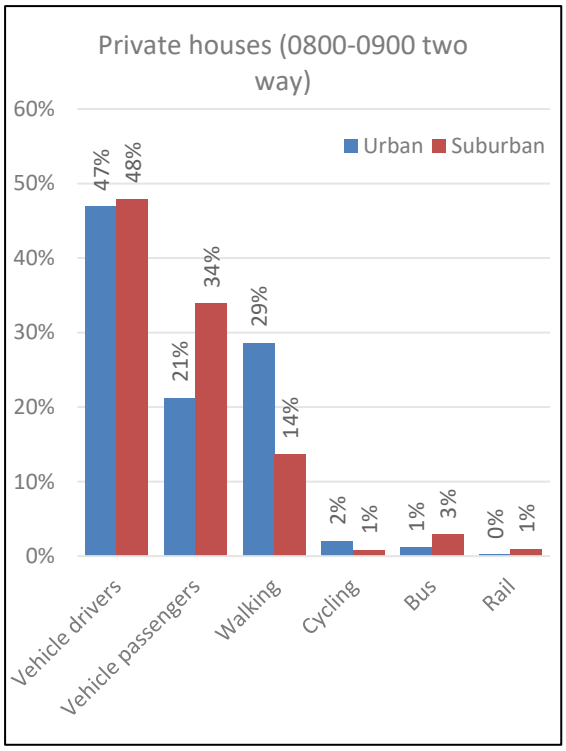
3.6.1 The data extracted from TRICS can also be summarised as mode share. The following paragraphs summarise TRICS mode share data using tables and graphs for the full breakdown of modes.

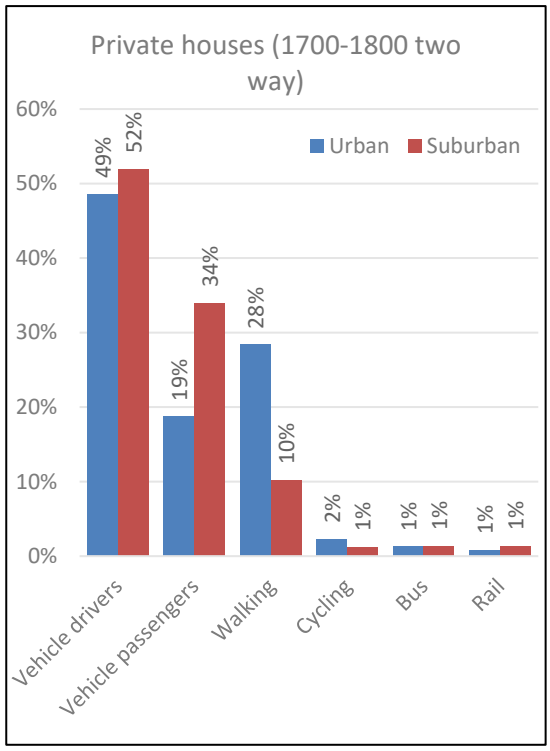
3.7 TRICS mode share – residential (houses)

3.7.1 The mode share calculations for residential (houses) use using the TRICS data are summarised in the tables below. The graphs show the two way mode share comparison between urban and suburban sites.

Urban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	67%	41%	47%	45%	54%	49%
Vehicle passengers	19%	22%	21%	18%	20%	19%
Walking	11%	34%	29%	32%	23%	28%
Cycling	2%	2%	2%	2%	3%	2%
Bus	0%	1%	1%	2%	0%	1%
Rail	0%	0%	0%	1%	1%	1%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Suburban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	61%	44%	48%	51%	55%	52%
Vehicle passengers	20%	38%	34%	35%	32%	34%
Walking	16%	13%	14%	10%	11%	10%
Cycling	2%	0%	1%	1%	1%	1%
Bus	0%	4%	3%	1%	1%	1%
Rail	0%	1%	1%	2%	0%	1%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**





3.7.2 In general terms it is noted that :

- The mode share for vehicles is greater for suburban locations than urban locations during both peak hours.
- The mode share for walking and cycling is greater for urban locations than suburban locations during both peak hours.

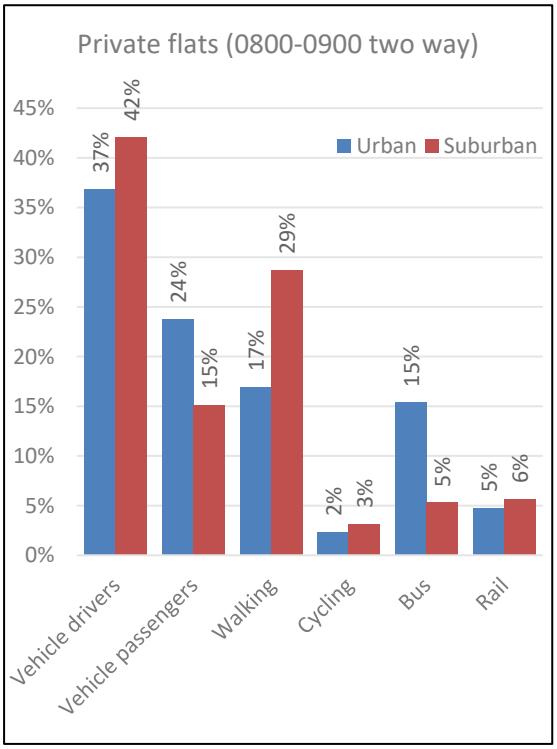
3.8 TRICS mode share – residential (flats)

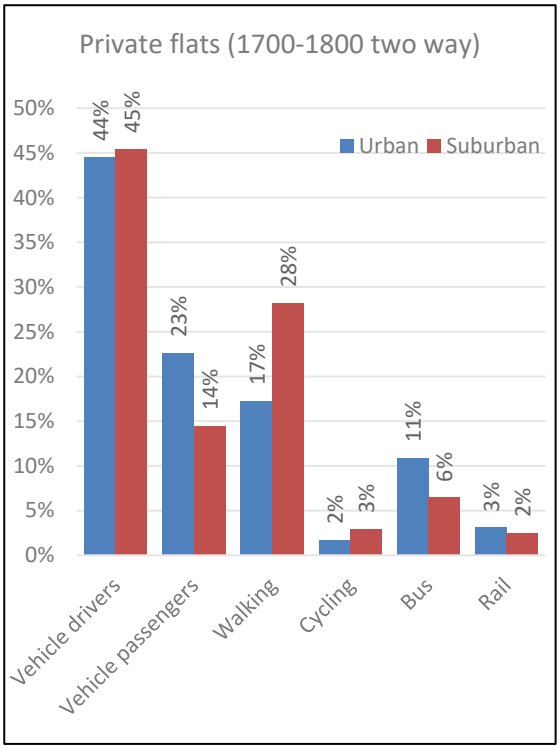
3.8.1 The mode share calculations for residential (flats) use using the TRICS data are summarised in the tables below. The graphs show the two way mode share comparison between urban and suburban sites.

Urban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	60%	33%	37%	41%	51%	44%
Vehicle passengers	13%	26%	24%	24%	19%	23%
Walking	19%	16%	17%	15%	23%	17%
Cycling	3%	2%	2%	2%	1%	2%
Bus	3%	18%	15%	13%	5%	11%
Rail	2%	5%	5%	5%	0%	3%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Suburban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way

Vehicle drivers	60%	38%	42%	44%	48%	45%
Vehicle passengers	11%	16%	15%	14%	16%	14%
Walking	28%	29%	29%	27%	30%	28%
Cycling	1%	4%	3%	3%	4%	3%
Bus	0%	6%	5%	8%	3%	6%
Rail	0%	7%	6%	4%	0%	2%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**





3.8.2 In general terms it is noted that :

- The mode share for vehicle drivers is greater for suburban locations than urban locations during both peak hours.
- The mode share for public transport is greater for urban locations than suburban locations during both peak hours.

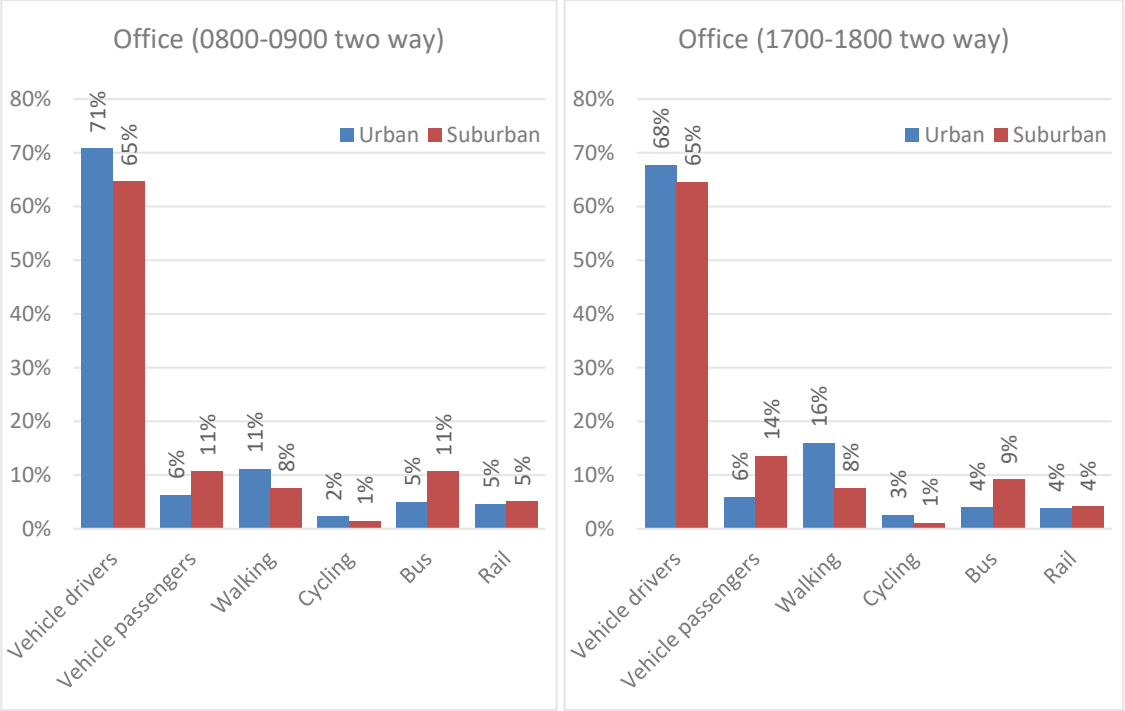
3.9 TRICS mode share – B1a/b office and research

3.9.1 The mode share calculations for B1a/b office and research use using the TRICS data are summarised in the tables below. The graphs show the two way mode share comparison between urban and suburban sites.

Urban location	**0800-0900**			**1700-1800**		
	In	**Out**	**2 Way**	**In**	**Out**	**2 Way**
Vehicle drivers	69%	89%	71%	80%	66%	68%
Vehicle passengers	7%	0%	6%	2%	6%	6%

Walking	11%	7%	11%	15%	16%	16%
Cycling	2%	0%	2%	1%	3%	3%
Bus	5%	0%	5%	0%	5%	4%
Rail	5%	4%	5%	2%	4%	4%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Suburban location	**0800-0900**			**1700-1800**		
	In	**Out**	**2 Way**	**In**	**Out**	**2 Way**
Vehicle drivers	64%	72%	65%	61%	65%	65%
Vehicle passengers	10%	13%	11%	27%	12%	14%
Walking	7%	9%	8%	9%	7%	8%
Cycling	2%	0%	1%	0%	1%	1%
Bus	11%	4%	11%	3%	10%	9%
Rail	5%	2%	5%	1%	5%	4%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**



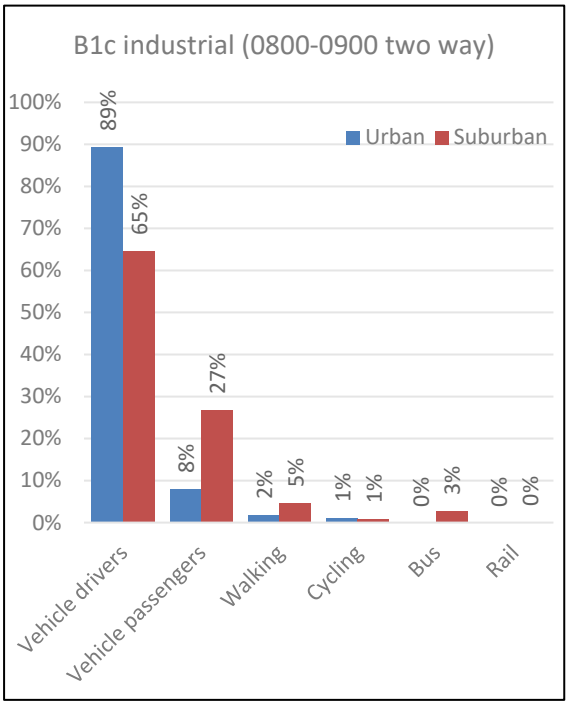
3.10 TRICS mode share – B1c industrial processes

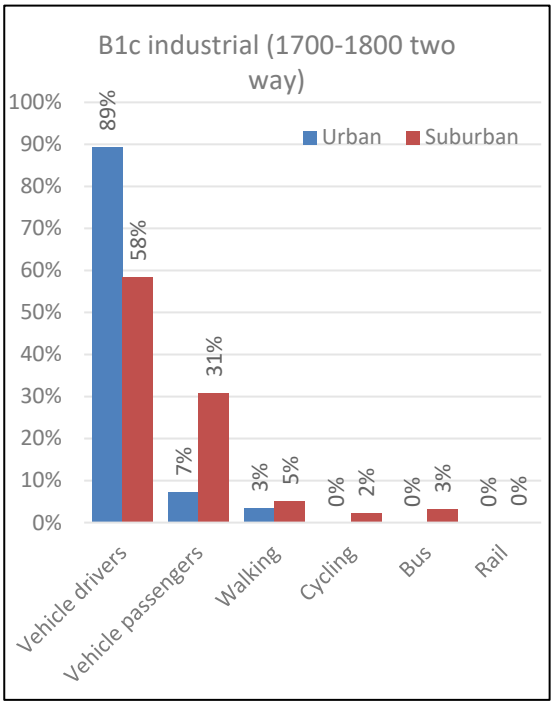
3.10.1 The mode share calculations for B1c industrial use using the TRICS data are summarised in the tables below. The graphs show the two way mode share comparison between urban and suburban sites.

Urban location	**0800-0900**	**1700-1800**

	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	92%	85%	89%	89%	90%	89%
Vehicle passengers	8%	8%	8%	7%	8%	7%
Walking	0%	4%	2%	4%	3%	3%
Cycling	0%	3%	1%	0%	0%	0%
Bus	0%	0%	0%	0%	0%	0%
Rail	0%	0%	0%	0%	0%	0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Suburban location	**0800-0900**			**1700-1800**		
	In	**Out**	**2 Way**	**In**	**Out**	**2 Way**
Vehicle drivers	62%	77%	65%	59%	58%	58%
Vehicle passengers	30%	13%	27%	25%	32%	31%
Walking	4%	9%	5%	10%	4%	5%
Cycling	1%	1%	1%	4%	2%	2%
Bus	3%	1%	3%	2%	4%	3%
Rail	0%	0%	0%	0%	0%	0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**





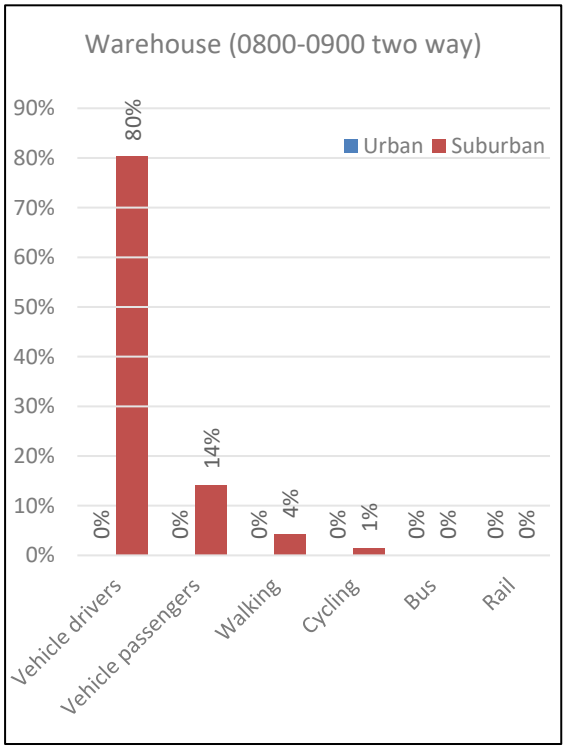
3.10.2 In general terms it is noted that :

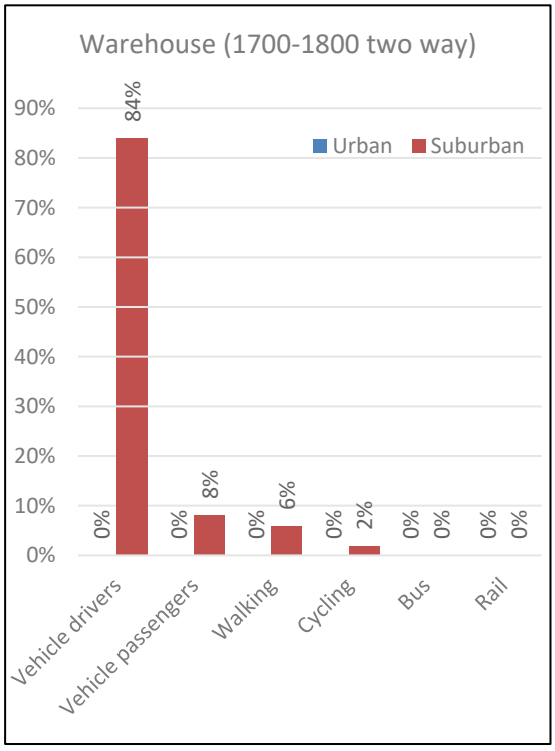
- The mode share for vehicle is greater for urban locations than suburban locations during both peak hours.

3.11 TRICS mode share – B8 warehousing

3.11.1 The mode share calculations for B8 warehousing use using the TRICS data are summarised in the tables below. The graphs show the two way mode share comparison between urban and suburban sites.

Suburban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	79%	84%	80%	94%	82%	84%
Vehicle passengers	15%	13%	14%	4%	9%	8%
Walking	5%	1%	4%	0%	7%	6%
Cycling	1%	3%	1%	2%	2%	2%
Bus	0%	0%	0%	0%	0%	0%
Rail	0%	0%	0%	0%	0%	0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**



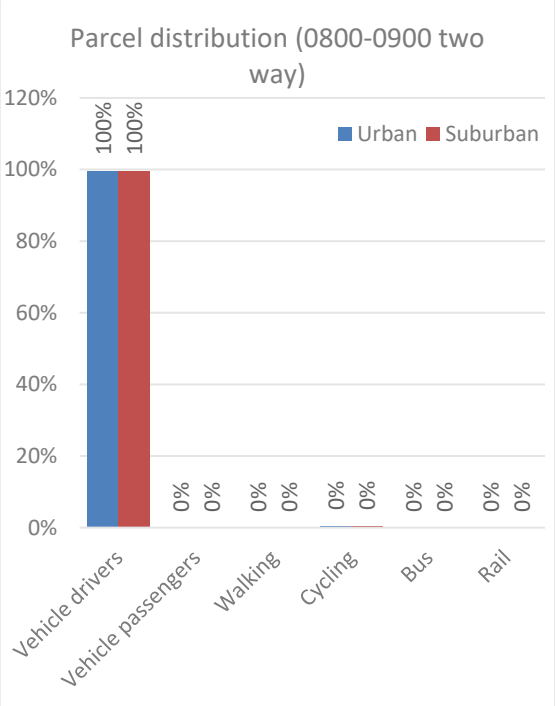


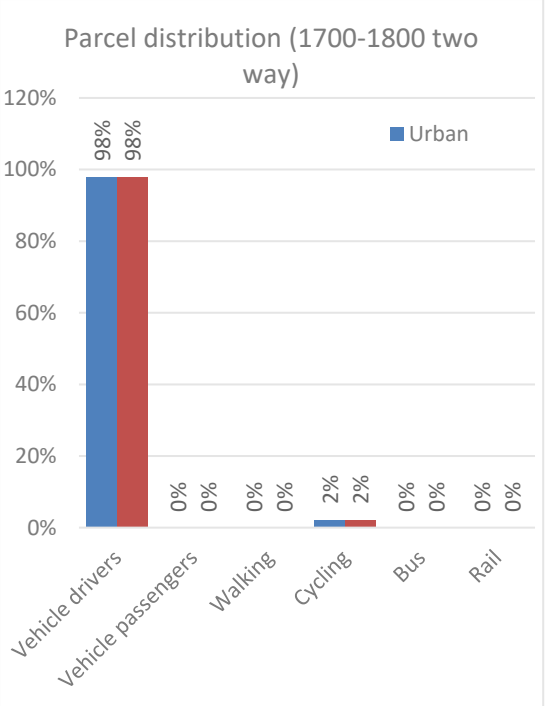
3.12 TRICS mode share – B8 parcel distribution

3.12.1 The mode share calculations for B8 parcel distribution use using the TRICS data are summarised in the tables below. The graphs show the two way mode share comparison between urban and suburban sites.

Suburban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	99%	100%	100%	97%	99%	98%

Vehicle passengers	0%	0%	0%	0%	0%	0%
Walking	0%	0%	0%	0%	0%	0%
Cycling	1%	0%	0%	3%	1%	2%
Bus	0%	0%	0%	0%	0%	0%
Rail	0%	0%	0%	0%	0%	0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**



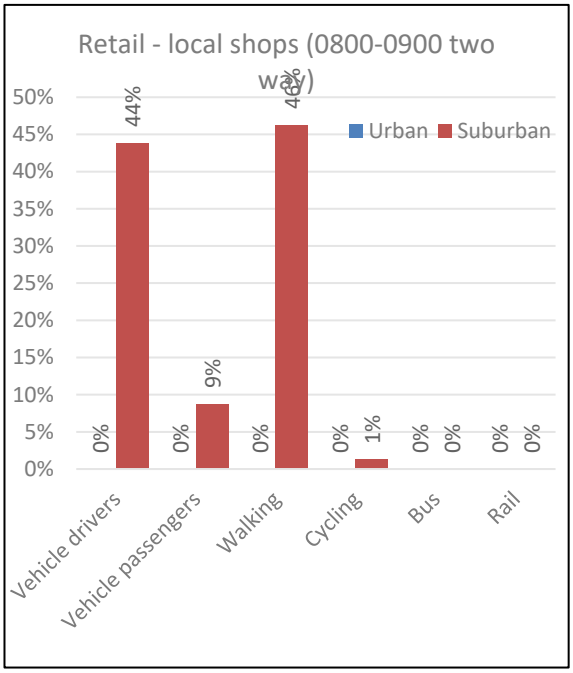


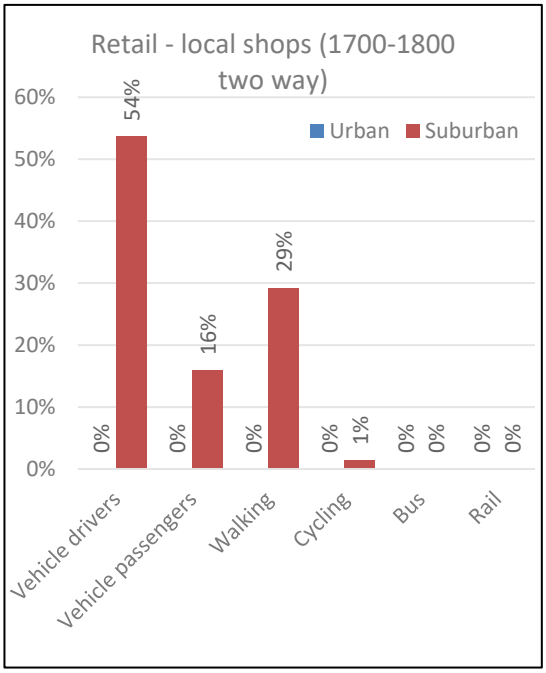
3.13 TRICS mode share – Retail

3.13.1 The mode share calculations for retail use using the TRICS data are summarised in the tables below. The graphs show the two way mode share comparison between urban and suburban sites.

Shopping centre – local shops

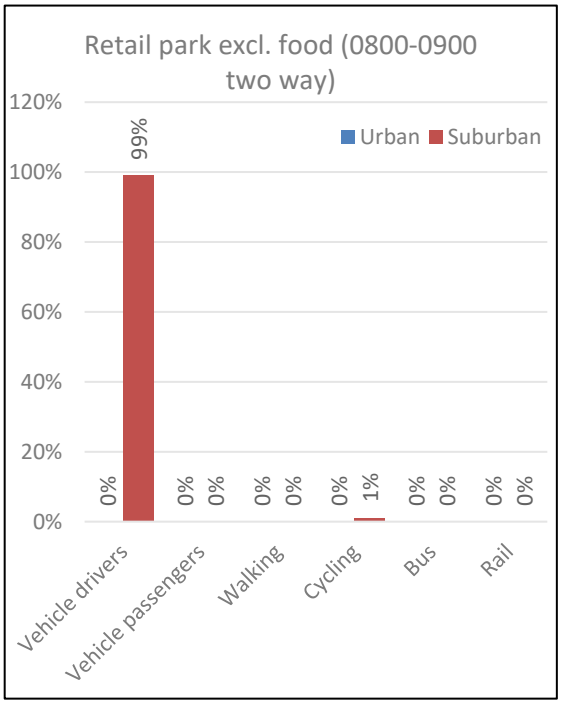
Suburban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	44%	44%	44%	54%	54%	54%
Vehicle passengers	9%	8%	9%	16%	15%	16%
Walking	46%	47%	46%	29%	30%	29%
Cycling	1%	1%	1%	1%	1%	1%
Bus	0%	0%	0%	0%	0%	0%
Rail	0%	0%	0%	0%	0%	0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

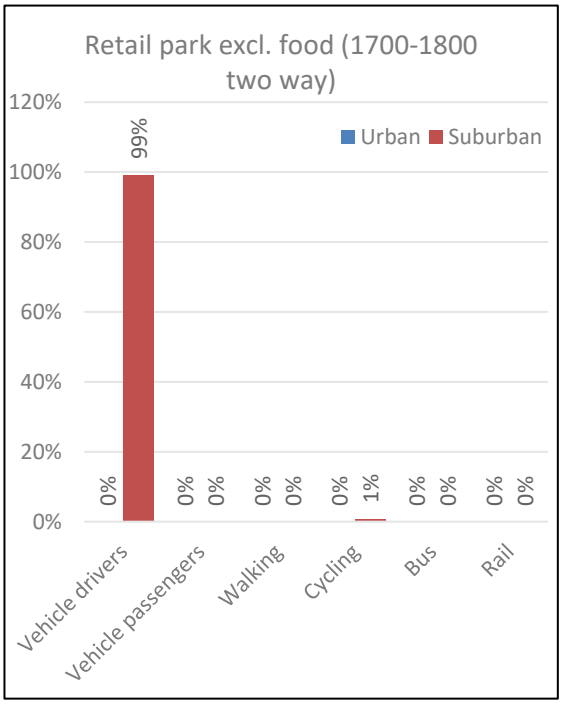




Retail park – including food

Suburban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	99%	99%	99%	99%	99%	99%
Vehicle passengers	0%	0%	0%	0%	0%	0%
Walking	0%	0%	0%	0%	0%	0%
Cycling	1%	1%	1%	1%	1%	1%
Bus	0%	0%	0%	0%	0%	0%
Rail	0%	0%	0%	0%	0%	0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**





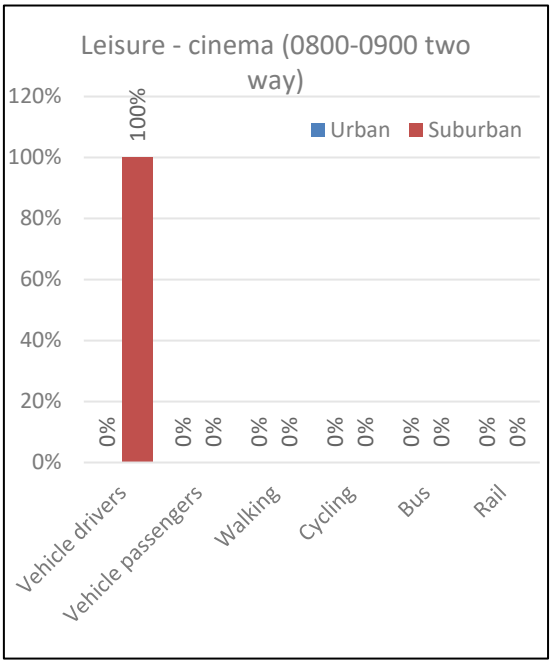
3.14 TRICS mode share – Leisure

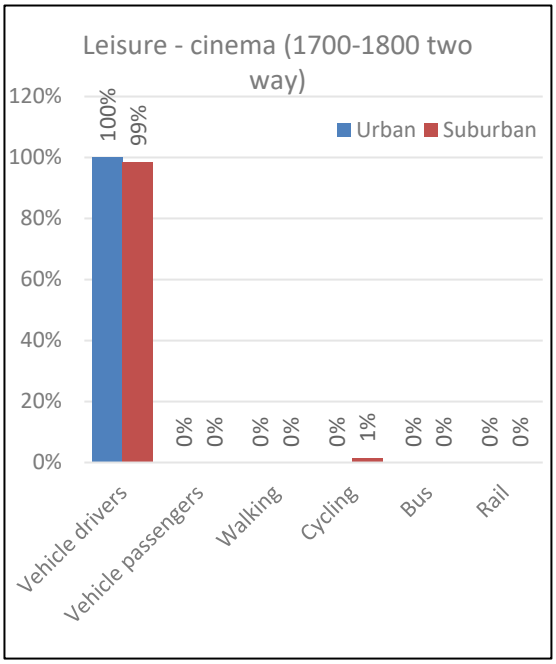
3.14.1 The mode share calculations for leisure use using the TRICS data are summarised in the tables below. The graphs show the two way mode share comparison between urban and suburban sites.

Leisure – cinema

Urban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers				100%	100%	100%
Vehicle passengers				0%	0%	0%
Walking				0%	0%	0%
Cycling				0%	0%	0%
Bus				0%	0%	0%
Rail				0%	0%	0%
Total				**100%**	**100%**	**100%**

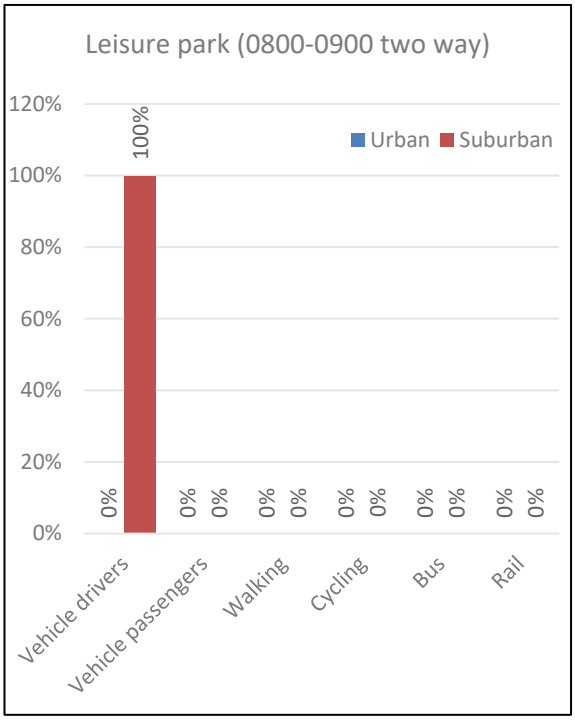
Suburban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	100%	0%	100%	99%	97%	99%
Vehicle passengers	0%	0%	0%	0%	0%	0%
Walking	0%	0%	0%	0%	0%	0%
Cycling	0%	0%	0%	1%	3%	1%
Bus	0%	0%	0%	0%	0%	0%
Rail	0%	0%	0%	0%	0%	0%
Total	**100%**	**0%**	**100%**	**100%**	**100%**	**100%**

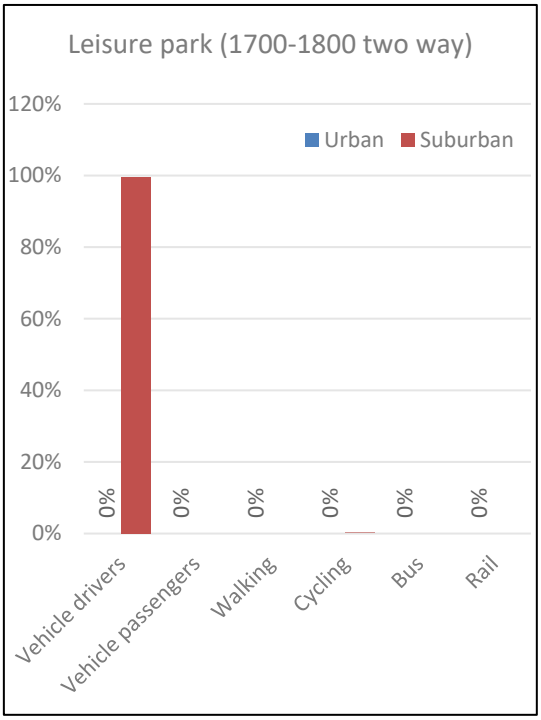




Leisure park

Suburban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	100%	100%	100%	100%	99%	100%
Vehicle passengers	0%	0%	0%	0%	0%	0%
Walking	0%	0%	0%	0%	0%	0%
Cycling	0%	0%	0%	0%	1%	0%
Bus	0%	0%	0%	0%	0%	0%
Rail	0%	0%	0%	0%	0%	0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**



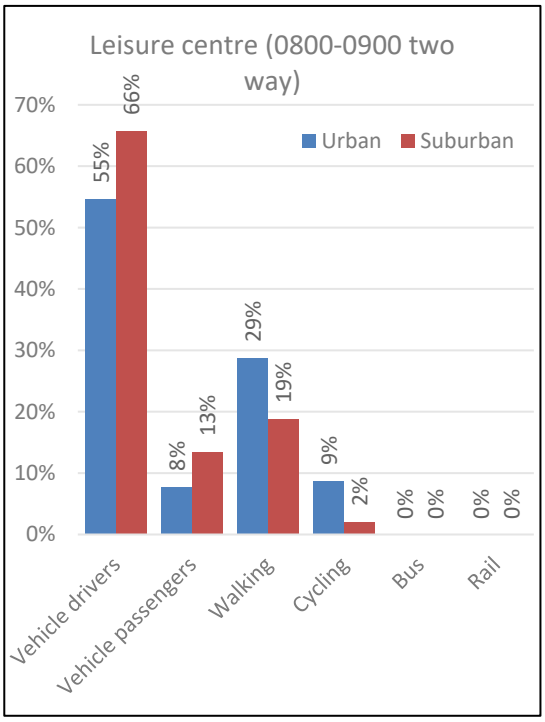


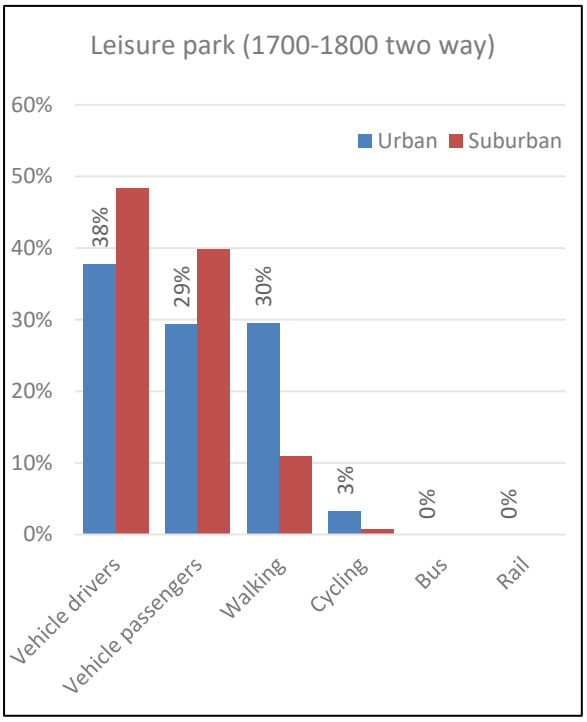
Leisure – leisure centre

Urban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers	50%	60%	55%	40%	36%	38%
Vehicle passengers	10%	5%	8%	24%	34%	29%
Walking	31%	26%	29%	33%	26%	30%
Cycling	9%	9%	9%	3%	3%	3%
Bus	0%	0%	0%	0%	0%	0%
Rail	0%	0%	0%	0%	0%	0%

Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Suburban location	**0800-0900**			**1700-1800**		
	In	**Out**	**2 Way**	**In**	**Out**	**2 Way**
Vehicle drivers	61%	73%	66%	51%	45%	48%
Vehicle passengers	16%	10%	13%	37%	43%	40%
Walking	22%	15%	19%	11%	10%	11%
Cycling	2%	3%	2%	1%	1%	1%
Bus	0%	0%	0%	0%	0%	0%
Rail	0%	0%	0%	0%	0%	0%
Total	**100%**	**0%**	**100%**	**100%**	**100%**	**100%**





3.15 TRICS mode share – Hospitality

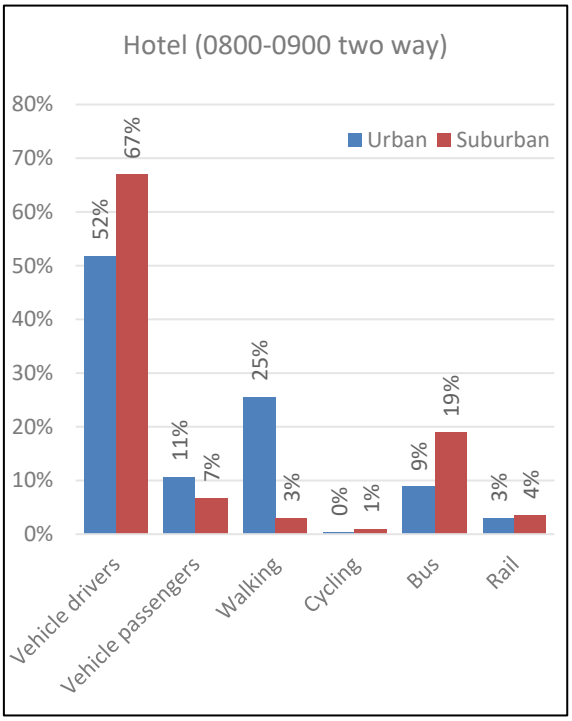
3.15.1 The mode share calculations for hospitality uses using the TRICS data are summarised in the tables below. The graphs show the two way mode share comparison between urban and suburban sites.

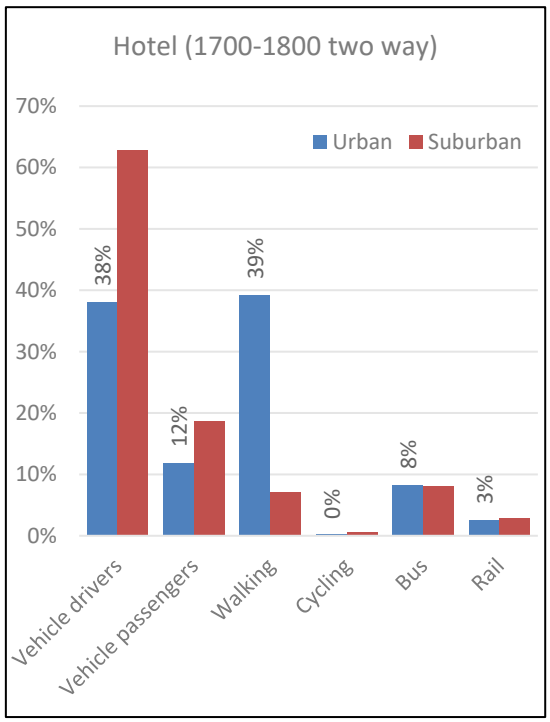
Hotel

Urban location	**0800-0900**			**1700-1800**		
	In	**Out**	**2 Way**	**In**	**Out**	**2 Way**
Vehicle drivers	56%	49%	52%	35%	43%	38%

Vehicle passengers	9%	12%	11%	14%	8%	12%
Walking	26%	25%	25%	35%	47%	39%
Cycling	1%	0%	0%	0%	1%	0%
Bus	3%	13%	9%	13%	1%	8%
Rail	6%	1%	3%	3%	1%	3%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Suburban location	**0800-0900**			**1700-1800**		
	In	**Out**	**2 Way**	**In**	**Out**	**2 Way**
Vehicle drivers	86%	57%	67%	60%	66%	63%
Vehicle passengers	1%	10%	7%	23%	13%	19%
Walking	3%	3%	3%	5%	9%	7%
Cycling	3%	0%	1%	0%	1%	1%
Bus	1%	28%	19%	8%	8%	8%
Rail	6%	2%	4%	3%	3%	3%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**





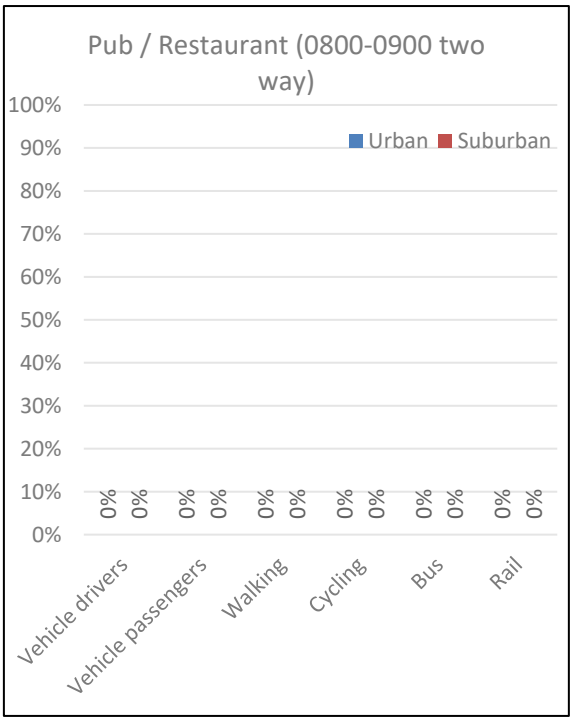
3.15.2 In general terms it is noted that :

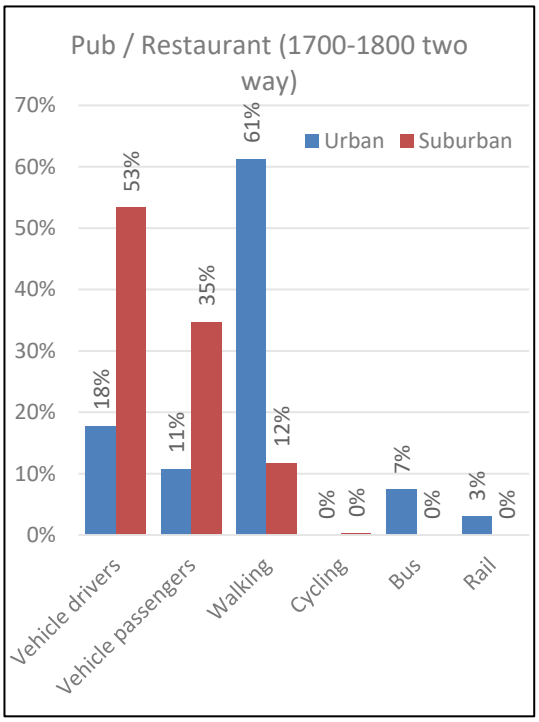
- The mode share for vehicle is greater for suburban locations than urban locations during both peak hours.
- The mode share for walking is greater for urban locations than suburban locations during both peak hours.

Pub / Restaurant

Urban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers				19%	17%	18%
Vehicle passengers				12%	9%	11%
Walking				59%	64%	61%
Cycling				0%	0%	0%
Bus				6%	9%	7%
Rail				4%	2%	3%
Total				**100%**	**100%**	**100%**

Suburban location	0800-0900			1700-1800		
	In	Out	2 Way	In	Out	2 Way
Vehicle drivers				52%	55%	53%
Vehicle passengers				35%	34%	35%
Walking				12%	12%	12%
Cycling				0%	0%	0%
Bus				0%	0%	0%
Rail				0%	0%	0%
Total				**100%**	**100%**	**100%**





4 Mode shift scenarios

4.1.1 The following section summarises the mode share assumptions to be taken forward in the Local Plan preferred option testing.

4.2 Context

4.2.1 DBC are seeking to be ambitious in their mode share targets for sustainable travel modes. This is consistent with national policy, local aspirations within North Kent, particularly at Ebbsfleet Garden City, and emerging trends. It is also consistent with growing evidence that travel habits and patterns are changing towards reduced use of private vehicle for journeys.

4.2.2 For example, it is understood that EDC are considering low mode share targets for vehicle trips for new development within the Ebbsfleet Garden City. This is included within the 2017 Implementation Framework document produced by EDC which states the following (p56) :

"Influencing modal share

Kent Thameside Partnership's legacy approach of pursuing 40% of trips by non-car modes has informed the transport strategies of planning consents to date. However residents' concerns over localised congestion has informed a more demanding approach to be adopted within the Framework that reflects the changing perceptions of North Kent as an urbanising area, and the changing characteristics of car ownership and use in general.

The ability to influence mode share is complex. Traditional travel-planning methods go some way to motivating people to use alternative modes of transport. However availability of alternative modes and their associated ease and speed of use must be commensurate through clear principles.

The Implementation Framework will use transport oriented design to seek to achieve the following ambitions for short and longer distance workplace commuting patterns;

- *Short distance local trips (under 4 miles):*
  - *55% by active modes (including internalised movement for working from home)*
  - *30% by public transport*
  - *15% private car*
- *Longer distance commuting (over 4 miles)*
  - *40% by public transport*
  - *25% by active modes*
  - *35% private car share"*

4.2.3 It is expected that this high mode share for non vehicular modes will be carried forward to future masterplan assessment and planning applications by EDC. In addition, significant vehicle monitoring and sustainable travel obligations are already embedded to existing planning consents that have commenced, particularly within Ebbsfleet Garden City for example.

4.2.4 The above approach being proposed by EDC is set within the context of building out a new Garden City at Ebbsfleet (incorporating Eastern Quarry which sits within Dartford Borough). This includes a significant investment in sustainable transport infrastructure including new walking and cycling routes and dedicated public transport routes which all facilitates the ability to set such ambitious targets.

4.2.5 The ability to develop a new transport system within the established urban fabric of Dartford Borough is more challenging. On this basis it is unlikely that setting the same targets as EDC would be realistic. Nevertheless, it is understood that DBC would like to consider ambitious mode share targets for non vehicular modes whilst developing the assessment of their Local Plan.

4.3 Mode shift scenarios

4.3.1 On the basis of the evidence above, a number of mode shift scenarios will be assessed which are considered reasonable and deliverable, albeit dependent upon the package of sustainable transport measures implemented to facilitate them. The mode share scenarios assessed are as follows :

- Scenario 1 – Standard TRICS
- Scenario 2 - Core mode shift
- Scenario 3 - High mode shift assessment.

4.3.2 The following sections summarise the approach to be undertaken for each scenario.

4.4 Mode shift scenario 1 – Standard TRICS

4.4.1 Mode shift scenario 1 is a standard TRICS trip generation rate assessment based upon selective filtering for urban and suburban areas. This will result in a TRICS trip generation rate that would be akin to a standard Transport Assessment approach.

4.4.2 This approach could be argued to represent a worst case “business as usual” scenario with no significant additional support for sustainable travel modes.

4.4.3 Scenario 1 will adopt the TRICS trip generation rates as detailed within section 2 for the proposed Local Plan land uses.

4.4.4 The trip generation rates would be applied on the basis of the quantum of development proposed and the defined location of the site (either urban or suburban). Therefore, proposed urban sites would have urban TRICS trip rates applied, and suburban sites would have suburban trip rates applied.

4.4.5 However, an adjustment would need to be made to the quantum of development assessed, based upon the Local Plan proposal and the allowance already included within the DCLTAM (based upon the Uncertainty Log).

4.4.6 For example, a Local Plan site that is now identified for 500 residential units may already have 200 units allowed for within the DCLTAM as a result of the existing Local Plan allowances in that model. In this instance a net increase adjustment of 300 units will be allowed for (not 500) to the DCLTAM to represent the new proposals, and this will form the basis of assessment for the new Local Plan. This would avoid double counting development already allowed for within the DCLTAM.

4.4.7 There may be sites within the DCLTAM that have an allowance for existing Local Plan development, but which are no longer proposed for development, or are proposed for a lower quantum. An adjustment (net reduction) would be made for this situation aswell.

4.4.8 Hence, for each Local Plan site a calculated number of trips in and out would be calculated and this would be completed for each mode of travel.

4.5 Mode shift scenario 2 – Core mode shift assessment

4.5.1 Scenario 2 will consider a mode shift of movement away from the vehicular traffic mode share inherent in the Scenario 1 assessment, to greater use of active and public transport modes.

4.5.2 At this stage it is proposed that this scenario will assume a 15% mode shift (reduction) away from vehicular trips to more sustainable travel modes when compared to Scenario 1 above. This mode shift assumption is being referred to as the core mode shift assessment.

4.5.3 The application of this mode shift will be applied to Local Plan sites only and will be based upon the distribution of journeys to and from those sites.

4.5.4 Local Plan site journeys that have an origin and destination within the built up urban and suburban areas of Dartford will be assumed to be able to achieve the core mode shift.

4.5.5 Similarly, journeys that have an origin and destination within the built up urban and suburban areas of Dartford and the neighbouring urban area of Gravesham will be assumed to be able to achieve the core mode shift.

4.5.6 This assumption is made on the basis that the built up areas of the Borough are those areas most likely to be able to encourage greater use of walking and cycling and public transport, perhaps with appropriate interventions. It is also made on the basis that evidence suggests that mode switching of longer distance car journeys is more challenging (see later within this chapter).

4.5.7 Similarly, journeys within and between the built up areas of the Borough and the neighbouring urban area of Gravesham are those areas most likely to be able to encourage greater use of public transport (particularly bus and Fastrack).

4.5.8 To calculate the mode **shift** (reduction) away from the Scenario 1 TRICS trip rate data the following methodology will be adopted:

- The Scenario 1 vehicle trip generation rates would be adjusted to account for this mode **shift** by reducing the vehicle trip generation rates by 15%.
- The 15% mode **shift** away from the Scenario 1 vehicle trips mode (ie a 15% reduction in vehicle trips which transfer to PT and active modes) would be redistributed amongst other modes as follows:
    - Calculate the Scenario 1 vehicle mode **share**. Lets assume it is an 80% vehicle mode **share**.
    - A 15% mode **shift** (reduction) in vehicle trips from a current 80% mode **share** for vehicle trips would result in a new vehicle mode **share** of 80% - (15% x 80%) = 68%.
    - The 80% - 68% = 12% reduction in vehicle mode **share** would be distributed amongst the remaining travel mode **shares** pro rata their Scenario 1 mode share. The trip rates for all modes would be adjusted to reflect this.

4.5.9 The adjusted trip generation rates would be applied to the proposed Local Plan development sites for journeys that are contained within the built areas of Dartford Borough or to the urban areas of Gravesham as described above. All other Local Plan development journeys will retain the Scenario 1 assumptions.

4.6 Mode shift scenario 3 – High mode shift assessment

4.6.1 Scenario 3 will consider a higher mode shift away from the vehicular traffic mode share, to a greater use of active and public transport modes, when compared to Scenario 2, for certain journeys.

4.6.2 It is proposed that Scenario 3 will assess a 30% mode shift away from vehicle trips when compared to Scenario 1. This is double the mode shift assumed for Scenario 2 and will hence reduce the Scenario 1 vehicle trip generation rates by 30%. This mode shift assumption is referred to as the high mode shift assessment.

4.6.3 The application of this mode shift will be applied to Local Plan sites only and will be based upon the distribution of journeys to and from those sites.

4.6.4 Local Plan site journeys that have an origin and destination within the built up urban and suburban areas of Dartford will be assumed to be able to achieve the high mode shift.

4.6.5 This assumption is made on the basis that the built up areas of the Borough are those areas most likely to be able to encourage greater use of walking and cycling and public transport, perhaps with appropriate interventions.

4.6.6 Calculating the trip generation rates, for an assumed 30% mode shift, will use the same methodology as for Scenario 2 above, but substituting 15% with 30%.

4.6.7 The adjusted trip generation rates would be applied to the proposed Local Plan development sites for journeys that are contained within the built areas of Dartford Borough. All other Local Plan development journeys will retain the Scenario 1 or 2 assumptions.

4.7 Achieving the proposed mode shift

4.7.1 The following paragraphs provide a number of sources of information which provide evidence why, with the right measures (some likely to be included in the Dartford Local Plan), achieving a mode shift of 15% to 30% should be considered a realistic prospect.

4.8 Smarter Choices (2004)

4.8.1 In 2004, the Department for Transport published Smarter Choices: Changing the Way We Travel (Cairns et al., 2004), which reviewed the evidence available at that time on the effect and scale of implementation of smarter choice measures, previously called ‘soft measures’.

4.8.2 The review suggested that these measures had the potential to deliver substantial changes in travel behaviour and reductions in traffic, if implemented in a supportive policy context and on a large scale over a period of ten years. For example, the evidence gathered indicated the following for different soft measures :

Travel Plans

4.8.3 Most travel plans achieve cuts in car use of 0 - 35%, with a few best practice plans achieving cuts of over 40% and some delivering no reduction at all. Data suggests that, broadly:

- 10% of travel plans achieve no change
- 20% reduce car use by >0-10%
- 35% reduce car use by >10-25%
- 25% reduce car use by >25-35%
- 10% reduce car use by over 35%.

- The average reduction was 18%.

Personalised Travel Planning

4.8.4 In the high intensity scenario (ie more expenditure than at present) personalised travel planning programmes cut car driver trips by an average of 15% in urban areas and 6% in non-urban areas.

4.8.5 In the low intensity scenario (ie expenditure continues as existing) it was assumed that personalised travel planning programmes cut car driver trips by an average of 7% in urban areas and 2% in non-urban areas.

Public Transport marketing and information

4.8.6 Based on findings from the literature and the case studies it is assumed that 30% of patronage increases may be attributed to former car users, made up of 19% former car drivers and 11% former car passengers.

Travel awareness campaigns

4.8.7 Difficult to quantify, but in York somewhere between 3% and 12% of drivers probably reduced their car travel as a result of the campaign. The reduction in car use for those people who respond to travel awareness campaigns might be 5% (as a minimum that would be noticeable), through to 20% (as a maximum, perhaps equivalent to say, foregoing car use approximately one day a week).

Car clubs

4.8.8 Based on international studies it was assumed that the net effect of car club membership is to reduce average car mileage of all members by about a third.

Car sharing

4.8.9 Would be expected to achieve around a 7% reduction in number of trips.

Teleworking

4.8.10 Would be expected to achieve around a 3% to 12% reduction in number of trips.

Combined journey change factors

4.8.11 The report provided the following journey change factors for a high intensity scenario:

Table 13.11: Journey change factors in a 'high intensity' scenario

	Non-urban areas	Urban areas
Cars work	Workplace travel plans, car sharing and teleworking together cut car travel to work by 24%; personalised travel planning cuts it by 0.2%; public transport information and marketing by 0.3%; travel awareness campaigns by 1%; car clubs by 0%. Total reduction of 25.5%	Workplace travel plans, car sharing and teleworking together cut car travel to work by 26%; personalised travel planning cuts it by 5%; public transport information and marketing by 1.1%; travel awareness campaigns by 1%; car clubs by 0.06%. Total reduction of 33.16%
Journey change factor	**0.75**	**0.67**

	Cars business		Teleconferencing cuts business travel by 18%; personalised travel planning cuts it by 0.2%; public transport information and marketing by 0.3%; travel awareness campaigns by 1%; car clubs by 0%. Total reduction of 19.5%	Teleconferencing cuts business travel by 18%; personalised travel planning cuts it by 5%; public transport information and marketing by 1.1%; travel awareness campaigns by 1%; car clubs by 0.06%. Total reduction of 25.16%
	Cars other	'escort education = 2.2% of 'cars other' 'shopping' = 18.7% of 'cars other' 'personal business' = 10.0% of 'cars other'	Personalised travel planning cuts 'cars other' travel by 0.2%; public transport information and marketing cuts it by 0.3%; travel awareness campaigns by 1%; car clubs cut it by 0%; school travel plans cut the escort education portion of 'cars other' by 20%; home delivery cuts the shopping portion of 'cars other' by 4%; local collection points cut the personal business portion of 'cars other' by 1.5%. Total reduction of 2.84%	Personalised travel planning cuts 'cars other' travel by 5%; public transport information and marketing cuts it by 1.1%; travel awareness campaigns by 1%; car clubs by 0.06%; school travel plans cut the escort education portion of 'cars other' by 20%; home delivery cuts the shopping portion of 'cars other' by 4%; local collection points cut the personal business portion of 'cars other' by 1.5%. Total reduction of 8.50%
	Journey change factor		**0.97**	**0.92**

4.8.12 It is noted that a significant journey change factor was derived for commuting journeys as a result of considering a combined number of measures.

4.9 Sustainable Travel Towns

4.9.1 During consultation with KCC and NH officers the subject of mode shift examples has been discussed. It has been suggested by officers that the Sustainable Travel Towns (STT) project should be reviewed in the context of informing the assumptions for potential for mode shift that may be achieved by various measures.

4.9.2 Although the SST project only considers soft measures, rather than infrastructure, it nevertheless provides an informative on the scope for mode shift as a result of certain measures being implemented.

4.9.3 The 2010 report titled "The Effects of Smarter Choice Programmes in the Sustainable Travel Towns: Summary Report" contains chapter 8 which draws a number of conclusions about the nature of the behaviour change that occurred in the towns (Darlington, Peterborough and Worcester).

4.9.4 The change in behaviour was driven by the implementation of a number of soft travel measures comprising :

- a large-scale personal travel planning programme;
- travel awareness campaigns;
- cycling and walking promotion;

- public transport information and marketing;
- school travel planning;
- workplace travel planning.

4.9.5 The change in behaviour effects are summarised below.

- Car driver trips per person fell by 9%
- Bus trips per person grew by 10% to 22%.
- Cycling trips per person grew by 26% to 30%
- Walking trips per person grew by 10% to 13%

4.10 Fastrack

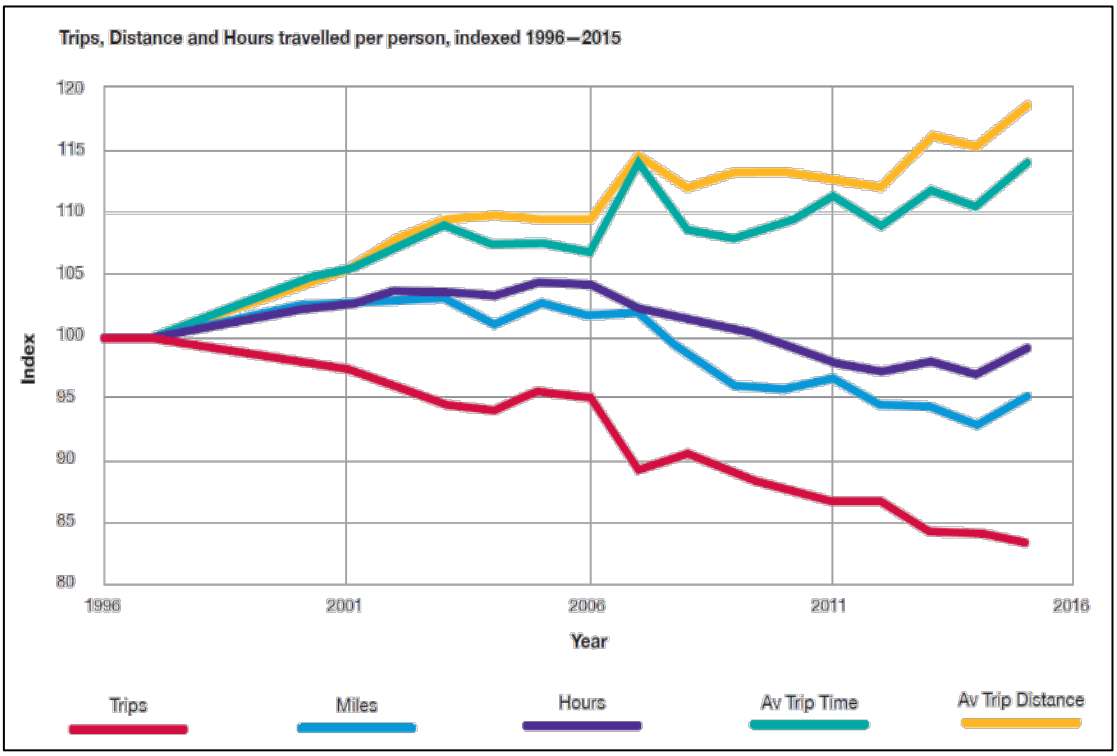
4.10.1 KCC have advised that in August 2019 the public transport team carried out a survey at Bluewater and Greenhithe Station to try to determine the Fastrack mode share.

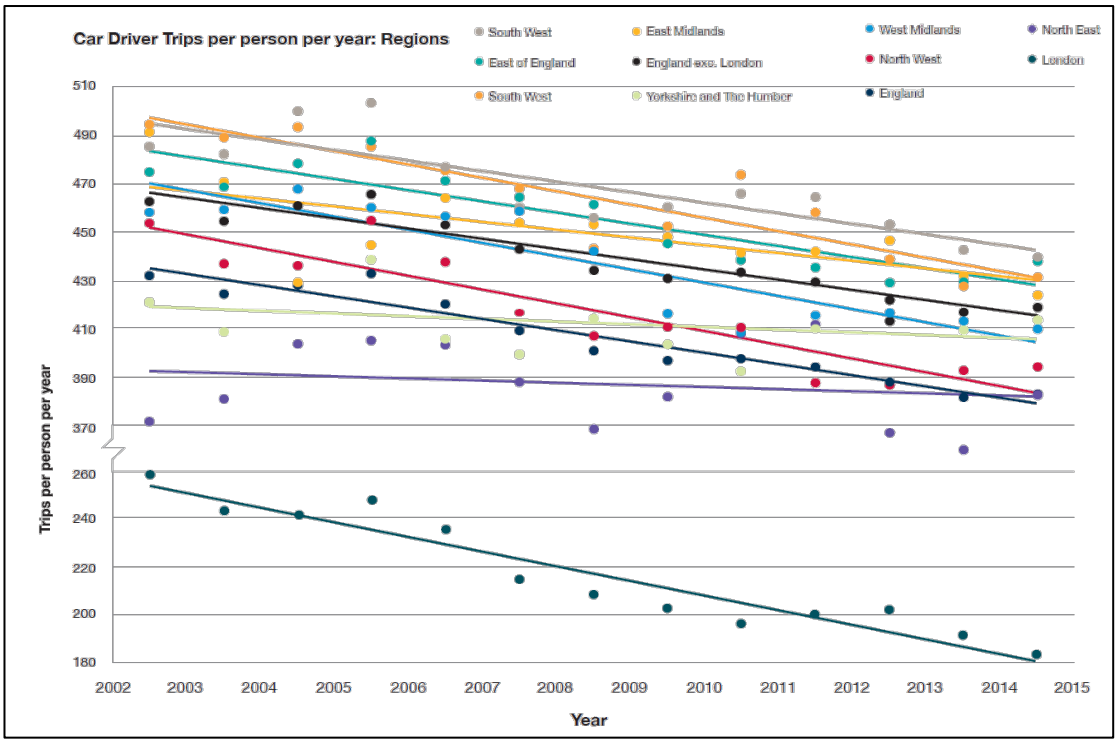
4.10.2 The public were presented with a map and stickers representing modes taken to arrive at the destination and were asked to plot their origin. A corridor was then drawn 500m either side of Fastrack on the maps and other stickers were discounted. The result was a 22% mode share for Fastrack.

4.10.3 Policies such as car restraint and effective bus priority as well as the operation of a well-marketed and high quality of service with easy to use ticketing will determine the level of growth achieved on Fastrack. There is also a requirement for development design to provide ease of access to Fastrack as set out within the Local Plan.

4.11 Travel trends

4.11.1 The graphs below are extracted from a 2016 PBA report titled “Planning Transport and Development – All change?” and are based upon published DfT statistics.





4.11.2 Key facts from the report are as follows:

- There have been huge changes to our travel patterns over the last 20 years. The number of trips (in all regions) and number of miles travelled per person per year have declined since the late 1990s, whilst average trip distance and time have increased…in both rural and urban areas.
- Despite a 9% increase in population, total personal car traffic has remained broadly constant between 2002 and 2014.
- Commuting miles per person per year have reduced by 7%.

- Total miles travelled per person per year has reduced by 7%.
- Car driver and passenger travel has reduced by 11%.
- There has been a reduction in car travel in all age and gender bands, except men and women over 60.
- Since 2002 in England, travel distance by non-car modes has increased by 19%, with the biggest increase being seen in surface rail travel, and rail usage has increased in all areas, except the most rural areas of the country.

5 Land use quanta

5.1.1 The following section summarises the 2036 land use quanta proposed for the Local Plan preferred option assessment purposes.

5.2 Local Plan preferred option quanta

5.2.1 DBC have defined a Local Plan preferred option development schedule for assessment purposes. This quanta will be assessed and compared to the Reference Case. The Local Plan (preferred) quanta are summarised below (relative to a base year of 2019) and included in greater detail at Appendix M.

Land use	Quantum
Flats	8,444
Houses	5,552
Residential	**13,996**
B1a and B1c (Office-Industrial)	128,210
Industrial	25,791
Warehousing	162,381
Parcel Distribution	243,572
Employment	**559,954**
Local shops	14,900
Retail Park-incl food	24,233
Retail	**39,133**
Hotel	14,668
Pub Restaurant	10,200
Hospitality	**24,868**
Leisure - centre	5,000
Leisure - park	14,072
Leisure - cinema	14,400
Leisure	**33,472**

5.3 Comparison with Reference Case

5.3.1 The Local Plan preferred option quanta has been compared with the Reference Case land use quanta (as described within the Stage 2b report). This comparison is summarised in the table below.

Land use	Reference Case	Local Plan (preferred)	Local Plan (preferred) vs Reference Case
Flats	6,504	8,444	1,940

Houses	5,237	5,552	315
Residential	**11,741**	**13,996**	**2,255**
B1a and B1c (Office-Industrial)	97,837	128,210	30,373
Industrial	62,990	25,791	-37,199
Warehousing	122,768	162,381	39,613
Parcel Distribution	184,153	243,572	59,419
Employment	**467,748**	**559,954**	**92,206**
Local shops	13,400	14,900	1,500
Retail Park-incl food	24,233	24,233	0
Retail	**37,633**	**39,133**	**1,500**
Hotel	4,107	14,668	10,561
Pub Restaurant	8,700	10,200	1,500
Hospitality	**12,807**	**24,868**	**12,061**
Leisure - centre	5,000	5,000	0
Leisure - park	13,400	14,072	672
Leisure - cinema	13,400	14,400	1,000
Leisure	**31,800**	**33,472**	**1,672**

5.3.2 It is noted that the Local Plan is forecasting more development quanta than the Reference Case.

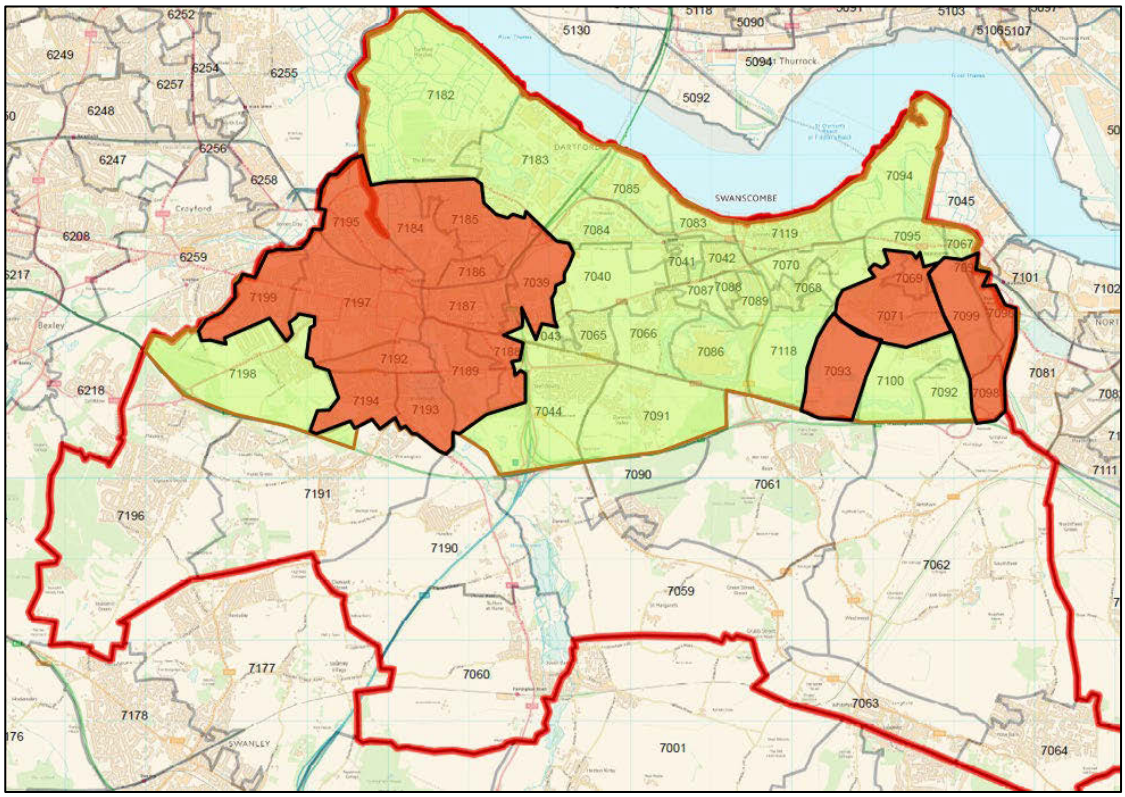
6 Potential traffic generation

6.1.1 The following section considers the potential traffic generation for the land use schedules summarised in the previous section.

6.2 Site locations

6.2.1 Where appropriately available, trip generation rates have been extracted for urban and suburban locations for each land use to be assessed.

6.2.2 The DCLTAM zones within Dartford have been considered as either urban in nature, or suburban in nature. The categorisation assumed is illustrated below, with orange indicating urban and green indicating suburban.



6.2.3 The urban or suburban trip generation rates have been applied in each zone dependent upon the categorisation above.

6.3 Local Plan preferred option generation

6.3.1 The potential Local Plan preferred option traffic generation has been calculated by multiplying the land use quanta by the appropriate land use urban / suburban trip generation rate.

6.3.2 A summary of the calculated traffic generation is shown below whilst further details are included at Appendix N.

Land use	AM peak hour vehicle generation (2-way)	PM peak hour vehicle generation (2-way)
Flats	2,066	2,350
Houses	2,796	2,800
Residential	**4,862**	**5,150**
B1a and B1c (Office-Industrial)	2,211	1,982
Industrial	219	197
Warehousing	555	419
Parcel distribution	3,081	3,792
Employment	**6,067**	**6,391**
Local shops	955	1,282
Retail Park-incl food	484	1,061
Retail	**1,439**	**2,343**
Hotel	68	49
Pub Restaurant	0	284
Hospitality	**68**	**333**
Leisure - centre	37	105
Leisure - park	130	508
Leisure - cinema	0	251
Leisure	**167**	**864**
TOTAL	**12,602**	**15,082**

6.4 Comparison with Reference Case (AM peak hour)

6.4.1 The Local Plan preferred scenario traffic generation described above has been compared to the Reference Case traffic generation (as described in the Stage 2b report) for the AM peak hour. This comparison is summarised in the table below.

Land use	Reference Case (2-way)	Local Plan (preferred) (2-way)	Local Plan (preferred) vs Reference Case
Flats	1,596	2,066	470
Houses	2,650	2,796	146
Residential	**4,246**	**4,862**	**615**
B1a and B1c (Office-Industrial)	1,681	2,211	531
Industrial	533	219	-314
Warehousing	420	555	135
Parcel distribution	2,330	3,081	752
Employment	**4,963**	**6,067**	**1,104**

Local shops	859	955	96
Retail Park-incl food	484	484	0
Retail	**1,343**	**1,439**	**96**
Hotel	11	68	57
Pub Restaurant	0	0	0
Hospitality	**11**	**68**	**57**
Leisure - centre	37	37	0
Leisure - park	124	130	6
Leisure - cinema	0	0	0
Leisure	**161**	**167**	**6**
TOTAL	**10,724**	**12,602**	**1,878**

6.4.2 It is noted from the table above that the Local Plan preferred option is predicted to generate more vehicle trips than the Reference Case. The main increase relates to the generation of Residential and Employment uses.

6.5 Comparison with Reference Case (PM peak hour)

6.5.1 The Local Plan preferred scenario traffic generation described above has been compared to the Reference Case traffic generation (as described in the Stage 2b report) for the PM peak hour. This comparison is summarised in the table below.

Land use	Reference Case (2-way)	Local Plan (preferred) (2-way)	Local Plan (preferred) vs Reference Case
Flats	1,801	2,350	549
Houses	2,660	2,800	140
Residential	**4,461**	**5,150**	**690**
B1a and B1c (Office-Industrial)	1,479	1,982	503
Industrial	479	197	-281
Warehousing	317	419	102
Parcel distribution	2,867	3,792	925
Employment	**5,142**	**6,391**	**1,250**
Local shops	1,153	1,282	129
Retail Park-incl food	1,061	1,061	0
Retail	**2,214**	**2,343**	**129**
Hotel	7	49	42
Pub Restaurant	252	284	32
Hospitality	**259**	**333**	**74**
Leisure - centre	105	105	0

Leisure - park	484	508	24
Leisure - cinema	234	251	17
Leisure	**822**	**864**	**42**
TOTAL	**12,898**	**15,082**	**2,183**

6.5.2 It is noted from the table above that the Local Plan preferred option is predicted to generate more vehicle trips than the Reference Case. The main increase relates to the generation of Residential and Employment uses.

7 Distribution

7.1.1 During the consultation process with the highway authorities, the merits of using census data or the DCLTAM model to determine trip distribution was discussed.

7.1.2 The overview of the consultation was that whilst the 2011 Journey to Work census data has its merits, it is increasingly old and only includes journeys to work. The DCLTAM distribution is based upon more recent data, based upon mobile phone movements.

7.1.3 It was suggested that a blend or combination of the two data sources would be a reasonable approach for distributing the Local Plan traffic generation.

7.1.4 The following section summarises the way in which Local Plan development traffic will be distributed across the modelling network.

7.2 Principles

7.2.1 An approach that uses both the census data and the DCLTAM distribution data has been derived. The following principles have been adopted :

- The 2011 census journey to work data has been used as the basis for distributing employment related vehicle trips. This distribution has also been adopted for the residential distribution (which is typically either the origin or destination of an employment trip).
- Local shops have been assigned a local distribution related to the communities that they serve.
- The DCLTAM distribution has been used as the basis of vehicle trip distribution for leisure, hotel and retail park Local Plan sites.
- An element of double counting of trips has been removed on the basis of the calculations and assumptions described in the following sections.

7.3 Methodology

7.3.1 The 2011 journey to work census data (for vehicle trips) has been reviewed for people working in Dartford. This data has been used to determine the distribution of vehicle journeys to and from Local Plan places of employment in Dartford.

Employment trips (employees working in DBC)

7.3.2 The 2011 census journey to work data has been used as the basis for distributing employment related vehicle trips as follows :

- Areas internal to Dartford is defined as people who work in DBC and also live in DBC. The 2011 census data demonstrates that 24.7% of employees in Dartford Borough driving to work in Dartford Borough also live in Dartford Borough, and that 33% of Dartford Borough residents who drive to work, work in Dartford Borough. These distribution parameters have been adopted for assessment purposes.
- Areas within Gravesham is defined as people who work in DBC but live in Gravesham. The census data demonstrates that 14.6% of people driving to work in DBC live in Gravesham.
- Areas external to these is defined as people who work in DBC but live outside of DBC and Gravesham. The census data demonstrates that 60.7% of people who drive to work

in DBC live external to DBC and Gravesham. Theses external trips have been considered split as follows :

- External east = Thanet, Dover, Canterbury, Shepway, Swale, Ashford, Medway, Maidstone, Rother, Hastings, Gravesham (south of A2)
- External south = Tonbridge and Malling, Tunbridge Wells, Wealden, Eastbourne
- External west = Sevenoaks, London Boroughs, Rest of country

7.3.3 On the basis of the above, the traffic generation calculated for each Local Plan employment site is distributed to internal Dartford, Gravesham or external areas (east, south and west) based upon the census data proportions for each of these areas.

7.3.4 To avoid (or reduce) the double counting of vehicle trips, it is reasonable to link Local Plan employment sites with Local Plan residential sites in terms of the internal traffic distribution between the two. The following process has been adopted:

- Assume that a Local Plan employment site in DBC has been calculated to generate 100 inbound vehicle trips.
- Based upon the Census data above, 25 (24.7%) of the inbound trips are calculated to come from within DBC, 15 (14.6%) from Gravesham and 60 (60.7%) from areas external to DBC and Gravesham. The outbound trips from these employment sites are treated in the same proportions.
- This is repeated for every Local Plan employment site within Dartford, until eventually a combined total number of vehicle trips from within DBC, Gravesham and external areas, to each Local Plan employment site, is derived.
- The Local Plan employment trips from areas internal to DBC have been distributed amongst the Local Plan residential zones, proportionately to the number of Local Plan residential units proposed in each zone. Any additional Local Plan employment trips that are required to meet the 2011 Census data criteria of 33% of Dartford Borough residents who drive to work, work in Dartford Borough have been distributed to existing DBC zones.
- The DBC internal employment trips are removed from the calculated Local Plan residential traffic generation to avoid double counting.
- For the purposes of this assessment, the remaining (surplus) Local Plan residential traffic generation (once double counting is removed as described above) is assumed to be employment trips heading out of DBC to work.

7.3.5 With respect to Local Plan employment trips to / from outside of DBC :

- The proportion of Local Plan employment trips, calculated from Census data, to / from Gravesham will be distributed amongst Gravesham zones (the populated areas north of the A2) based upon the DCLTAM trip end totals / proportions for those zones.
- The proportion of Local Plan employment trips, calculated from Census data, to / from the external areas will be distributed to model cordon zones based upon a north, east, south and west split calculated from Census data.

Employment trips (DBC residents working outside of DBC)

7.3.6 Any surplus Local Plan residential trips (once double counting has been removed as described above) are assumed to be employment trips travelling to work outside of DBC.

7.3.7 The proportion of residential trips (by vehicle) by DBC residents driving to work outside of DBC has been calculated, from Census data, as follows :

- Areas within Gravesham is defined as people who live in DBC but work in Gravesham. The census data demonstrates that 6.2% of DBC residents driving to work, work in Gravesham.
- Areas external to these is defined as people who live in DBC but work outside of DBC and Gravesham. The census data demonstrates that 60.4% of DBC residents driving to work, work external to DBC and Gravesham. Theses external trips have been considered split as follows :
  - External east = Thanet, Dover, Canterbury, Shepway, Swale, Ashford, Medway, Maidstone, Rother, Hastings, Gravesham (south of A2)
  - External south = Tonbridge and Malling, Tunbridge Wells, Wealden, Eastbourne
  - External west = Sevenoaks, London Boroughs, Rest of country

7.3.8 Hence, the surplus residential trips remaining (once double counting has been adjusted for) have been distributed to Gravesham and areas external to DBC / Gravesham in the ratio 6.2 / 60.4 respectively. The distribution of these trips will be calculated in the same manner as described in 7.3.5.

Retail trips – local shops

7.3.9 It has been assumed that any local shop retail use will comprise a local offer rather than a regional offer (which is catered for by Bluewater).

7.3.10 On this basis, local retail trips have been distributed to the Dartford Borough zone they sit within and immediate surrounding Dartford Borough zones.

Retail trips – retail park

7.3.11 It has been assumed that the retail park floor area at Bluewater will comprise a regional offer. On this basis it is proposed that retail park trip generation will be distributed in accordance with the existing DCLTAM distribution for the Bluewater zone.

Leisure trips

7.3.12 It has been assumed that any leisure uses (including pub / restaurant) will comprise a relatively local offer. On this basis it is proposed that leisure vehicle trip generation will be distributed in accordance with the DCLTAM distribution but for zones limited geographically to those within Dartford and Gravesham.

Hotel trips

7.3.13 Any hotel trips will comprise both staff and visitors. It has been assumed that hotel trips will distribute in accordance with the DCLTAM distribution and hence comprise a mix of local and longer distance trips.

Ebbsfleet Valley

7.3.14 With respect to the Ebbsfleet and Eastern Quarry zones (Ebbsfleet Valley), these have been handled differently from the description above.

7.3.15 For the Ebbsfleet Valley zones the 2019 matrices (see Stage 1 report) have been adopted for the base year trips for these zones. The absolute number of development trips calculated for

these zones, for the DCLTAM, Reference Case and Local Plan scenarios, have then been added explicitly to the 2019 base year trips.

7.4 Local Plan preferred option vehicle matrix

7.4.1 The above calculations allow matrices of vehicle movements to be created for employment, retail, leisure and hotel journeys. These are then combined to create a total vehicle matrix of Local Plan preferred option development vehicle trips.

7.4.2 A similar exercise is completed for both the DCLTAM land use schedule (based upon the Uncertainty Log) and the Reference Case to derive vehicle matrices for these land use schedules. This is described in the Stage 2b methodology report.

7.4.3 The above process results in the derivation of a set of vehicle matrices, produced on the same basis, for the DCLTAM, Reference Case and Local Plan preferred option land use scenarios.

7.4.4 The difference between each vehicle matrix scenario will calculate the expected difference in vehicle movements between each scenario, based upon the differences in the land use schedules for each scenario. On this basis :

- The difference between the Reference Case and DCLTAM (Uncertainty Log) vehicle matrices can be added to the 2036 baseline matrix (see Stage 2a report) to derive a 2036 Reference Case matrix.
- The difference between the Local Plan preferred option and DCLTAM (Uncertainty Log) vehicle matrices can be added to the 2036 baseline matrix (see Stage 2a report) to derive a 2036 Local Plan preferred option matrix.
- The difference can be completed for the AM and PM peak hours, and for the “with” and “without” Lower Thames Crossing scenarios.
- The difference can also be completed for the mode shift sensitivity assessments.