TRICS Consortium Limited

TRICS Technical Note – 16/01

Examples of Office Development Modal Split Analysis by Location Type and Parking Provision

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1. Introduction

1.1. This technical note provides examples of variation in TRICS modal split when using the modal split feature available to users on the trip rate calculation results screen. Focusing on the 02/A (Employment/Office) land use sub-category, the note looks at two types of analysis. The first is a breakdown of the multi-modal office sites in the TRICS database into the four main location types, these being Town Centre, Edge of Town Centre, Suburban Area and Edge of Town. The second analysis takes each of these sets and further analyses modal split by parking provision, breaking the groups down into two types (sites with lower parking provision per 100m2 of Gross Floor Area and sites with higher parking provision).

1.2. This note is not intended to provide detailed guidance on mode split, as the sample sizes are relatively low. Instead, it is intended to show users how modal split can be affected by location type and car parking provision. There are of course other factors that can also affect mode split, and there are many land use types within TRICS that could be looked at further, but this note just focuses on the one type (offices) to provide users with examples of mode split variation using a limited number of factors. Users should be aware that sites included in the datasets are located in various towns and cities across the UK and Ireland, and there would of course have been many influencing local factors that are not taken into account in this technical note. At best, this note can provide a rough "ballpark" estimation of mode split when location type and car parking provision is taken into account.

2. The Data Sample

2.1. TRICS version 7.3.1 was used to undertaken this analysis. Using a cut of date of 01/01/2000, all available multi-modal office surveys, regardless of size, were included in the overall dataset, but only if their main location type was one of the following. Note that the total number of included survey days are also shown.

Town Centre	23 surveys
Edge of Town Centre	32 surveys
Suburban Area	20 surveys
Edge of Town	16 surveys

Table 1 - Location types and surveys per type included in the overall dataset

3. Mode Split Analysis by Location Type

3.1. Once the subsets of TRICS surveys were established, trip rate calculations were undertaken so that average modal split analysis covering all of the sites in each subset could take place. After selecting the modal split option on the trip rate calculation results screen, modal split analysis was undertaken for the following three direction and time period scenarios.

i) Total day mode split (arrivals + departures 0700-1900)
ii) Morning commute (arrivals 0700-1000)
iii) Lunchtime (arrivals + departures 1200-1400)

3.2. The results of the Town Centre analysis were as follows:

Town Centre Offices: Mode Split Analysis (23 surveys in dataset)			
Main Mode	Total Day (in + out), 0700-1900	Commute In (in only) 0700-1000)	Lunchtime (in + out) 1200-1400
Vehicle Occupants	23.8%	36.2%	10.2%
Pedestrians	53.5%	19.6%	82.2%
Public Transport Users	21.5%	41.7%	7.1%
Cyclists	1.2%	2.6%	0.5%

Table 2 - Modal Split Analysis for Town Centre Offices

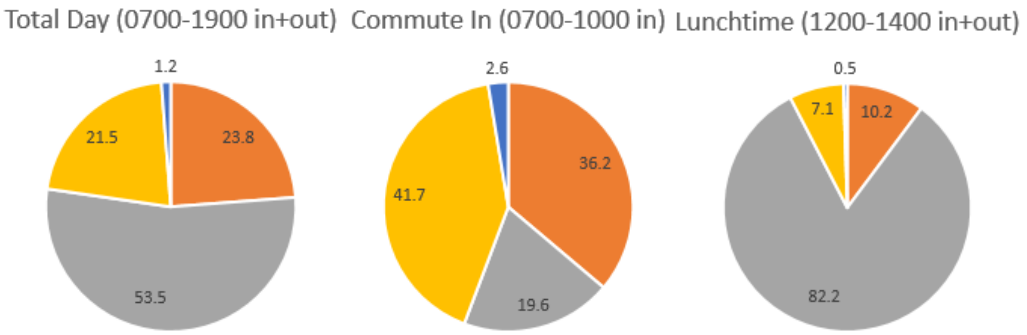

Figure 1 - Modal Split Analysis for Town Centre Offices

3.3. The results of the Edge of Town Centre analysis were as follows:

Edge of Town Centre Offices: Mode Split Analysis (32 surveys in dataset)			
Main Mode	Total Day (in + out), 0700-1900	Commute In (in only) 0700-1000)	Lunchtime (in + out) 1200-1400
Vehicle Occupants	51.5%	65.1%	26.9%
Pedestrians	36.6%	16.0%	69.9%
Public Transport Users	10.7%	17.1%	2.7%
Cyclists	1.2%	1.8%	0.5%

Table 3 - Modal Split Analysis for Edge of Town Centre Offices

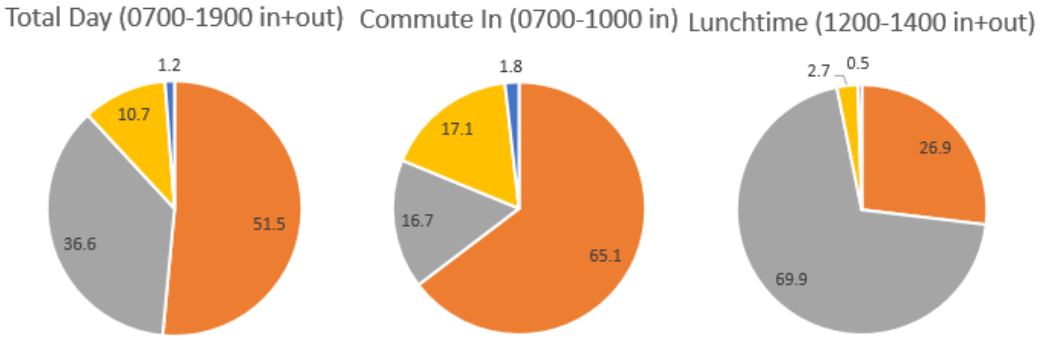

Figure 2 - Modal Split Analysis for Edge of Town Centre Offices

3.4. The results of the Suburban Area analysis were as follows:

Suburban Area Offices: Mode Split Analysis (20 surveys in dataset)			
Main Mode	Total Day (in + out), 0700-1900	Commute In (in only) 0700-1000)	Lunchtime (in + out) 1200-1400
Vehicle Occupants	69.6%	66.6%	60.1%
Pedestrians	14.1%	9.7%	27.5%
Public Transport Users	15.3%	22.6%	11.8%
Cyclists	1.0%	1.0%	0.6%

Table 4 - Modal Split Analysis for Suburban Area Offices

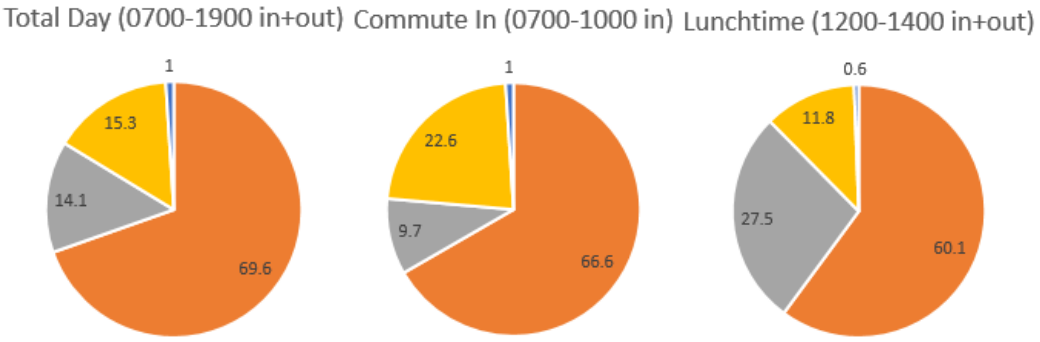

Figure 3 - Modal Split Analysis for Suburban Area Offices

3.5. The results of the Edge of Town analysis were as follows:

Edge of Town Offices: Mode Split Analysis (16 surveys in dataset)			
Main Mode	Total Day (in + out), 0700-1900	Commute In (in only) 0700-1000)	Lunchtime (in + out) 1200-1400
Vehicle Occupants	79.7%	86.3%	57.4%
Pedestrians	13.5%	4.5%	40.1%
Public Transport Users	5.8%	7.9%	2.2%
Cyclists	1.0%	1.3%	0.4%

Table 5 - Modal Split Analysis for Edge of Town Offices

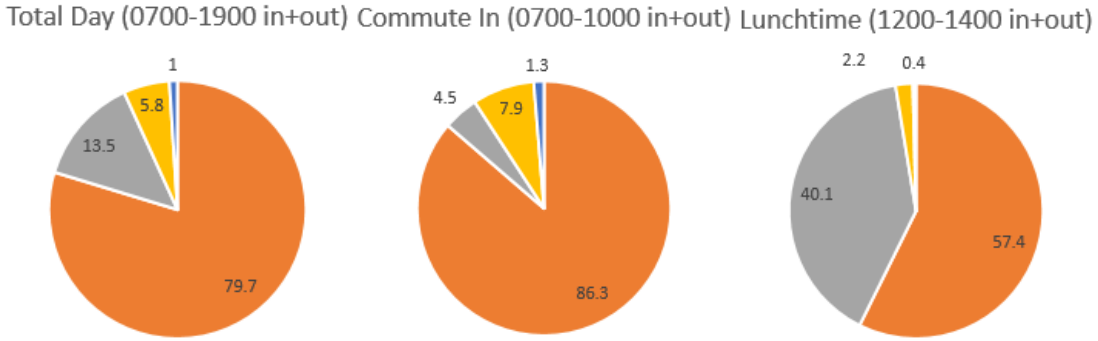

Figure 4 - Modal Split Analysis for Edge of Town Offices

3.6. We can already see from the analysis undertaken that the percentage of mode share being vehicle trips increases the further you go from the town/city centre. Even with a relatively modest data set this is quite clear. We can also see that public transport use (in percentage terms) mostly increases the closer you get to the town centre. However, note that the public transport percentage in Figure 3.5 below appears to increase from Edge of Town Centre out to Suburban Area sites. We believe this to be a result of relatively small datasets, and the fact that the definition of "Suburban Area" in TRICS includes sites just outside the edge of a town centre to those near the edge of town.

3.7. We can now compare the mode splits location by location, as follows:

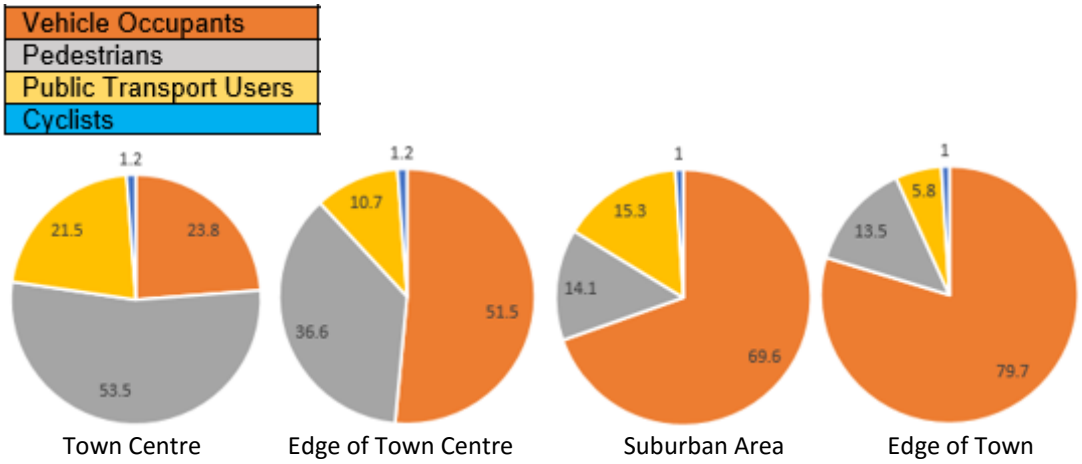

Figure 5 - Modal Day Mode Split by Location Type (0700-1900 in + out)

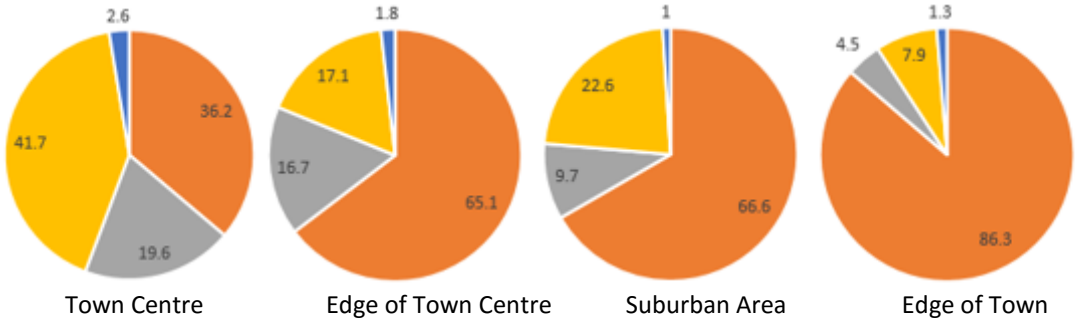

Figure 6 – Commute In Mode Split by Location Type (0700-1000 in)

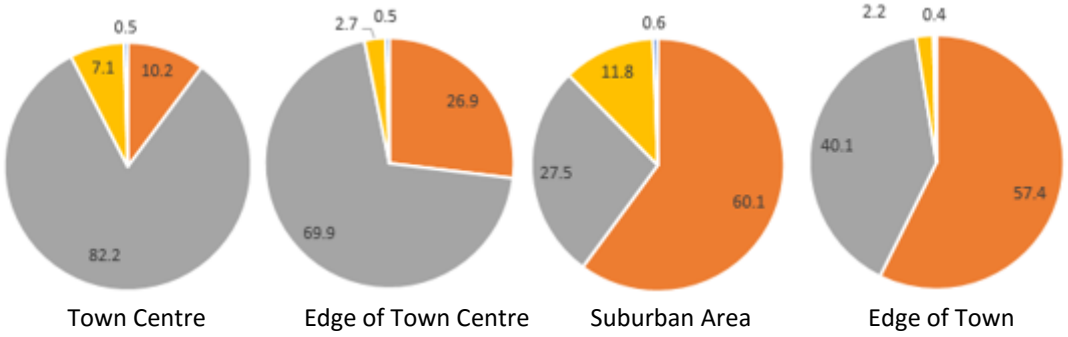

Figure 7 – Lunchtime Mode Split by Location Type (1200-1400 in + out)

3.8. One thing to note about Figure 3.7 is how the number of pedestrians in and out of sites at the lunchtime period diminishes as you move further away from the town/city centre. Of course, this is something to be expected, seeing as central locations will have more local facilities available within walking distance. Again, note the slight discrepancy between the percentage of pedestrians in the Suburban Area and Edge of Town categories. We expect this is due again to the relatively small dataset that was used.

4. Mode Split Analysis by Car Parking Provision

4.1. Following on from the mode splits by location type, each location type was further analysed by its level of parking provision. The four sets of surveys were divided into two sub-sets based on the level of car parking provision at the sites. The two subsets were arbitrary in each case, with no fixed formula involved, and were separated so that there would be close to an equal number of surveys in both the higher provision and lower provision sets. Appendices A to C provide a record of all of the sites that were used in the analyses.

4.2. Car parking provision was identified as the number of spaces per 100m2 of each site's Gross Floor Area. This was an easy figure to obtain as it is shown on the parking details section of individual TRICS database sites. It was then a case of making the separation so that there would be the two sub-groupings of sites, those with lower parking provision and those with higher parking provision. For this analysis the Commute In (0700-1000 in+out) modal split was used, as this was considered to be the most appropriate when dealing with parking provision at office sites.

4.3. The results of the Town Centre analysis were as follows:

Town Centre Offices: Inbound Commute Mode Split Analysis by Parking Provision (0700-1000 in)		
Main Mode	Lower Provision (0-0.327 spaces/100m2 GFA)	Higher Provision (0.488-7.5 spaces/100m2 GFA)
Vehicle Occupants	23.8%	47.0%
Pedestrians	18.4%	21.9%
Public Transport Users	56.1%	28.2%
Cyclists	1.7%	2.9%

Table 6 - Inbound Commute Modal Split Analysis for Town Centre Offices

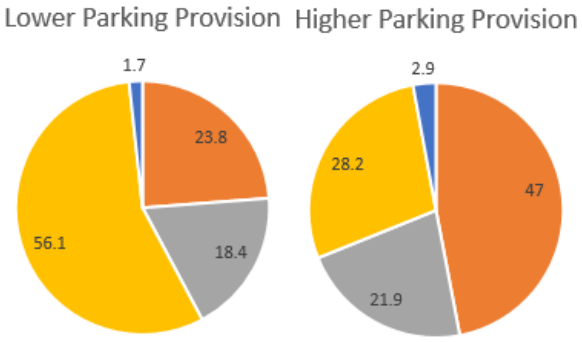

Figure 8 – Inbound Commute Modal Split Analysis for Town Centre Offices

4.4. The results of the Edge of Town Centre analysis were as follows:

Edge of Town Centre Offices: Inbound Commute Mode Split Analysis by Parking Provision (0700-1000 in)		
Main Mode	Lower Provision (0-1.967 spaces/100m2 GFA)	Higher Provision (2.413-9.167 spaces/100m2 GFA)
Vehicle Occupants	56.8%	73.5%
Pedestrians	16.5%	15.3%
Public Transport Users	24.2%	9.8%
Cyclists	2.5%	1.4%

Table 7 - Inbound Commute Modal Split Analysis for Edge of Town Centre Offices

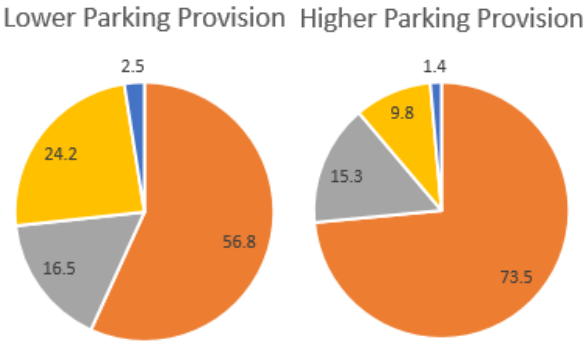

Figure 9 – Inbound Commute Modal Split Analysis for Edge of Town Centre Offices

4.5. The results of the Suburban Area analysis were as follows:

Suburban Area Offices: Inbound Commute Mode Split Analysis by Parking Provision (0700-1000 in)		
Main Mode	Lower Provision (0.382-2.936 spaces/100m2 GFA)	Higher Provision (3.226-8.000 spaces/100m2 GFA)
Vehicle Occupants	74.4%	63.9%
Pedestrians	10.8%	9.3%
Public Transport Users	13.3%	25.9%
Cyclists	1.6%	0.9%

Table 8 - Inbound Commute Modal Split Analysis for Suburban Area Offices

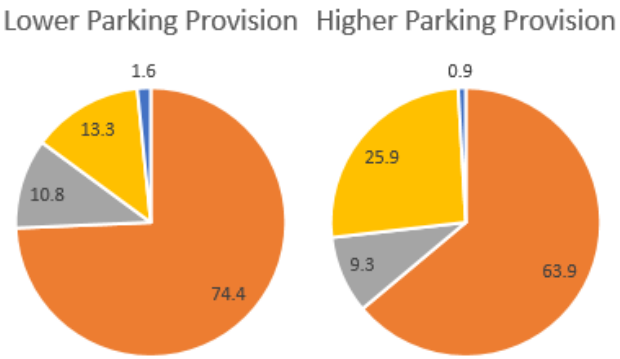

Figure 10 – Inbound Commute Modal Split Analysis for Suburban Area Offices

4.6. The results of the Edge of Town analysis were as follows:

Edge of Town Offices: Inbound Commute Mode Split Analysis by Parking Provision (0700-1000 in)		
Main Mode	Lower Provision (0.637-4.229 spaces/100m2 GFA)	Higher Provision (4.444-8.504 spaces/100m2 GFA)
Vehicle Occupants	85.5%	87.6%
Pedestrians	4.3%	4.8%
Public Transport Users	9.2%	5.9%
Cyclists	1.0%	1.8%

Table 9 - Inbound Commute Modal Split Analysis for Edge of Town Offices

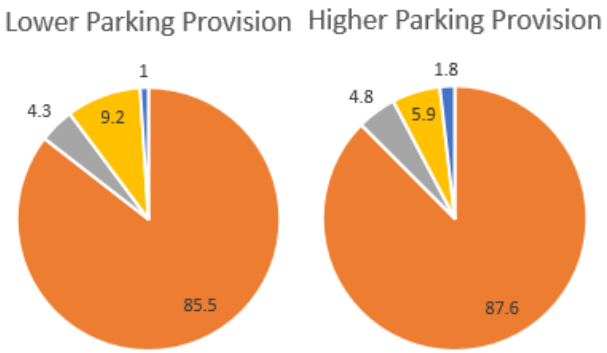

Figure 11 – Inbound Commute Modal Split Analysis for Edge of Town Offices

4.7. It generally appears that when there is a greater level of parking spaces by 100m2 GFA, the percentage of vehicle occupants increases. There is one exception to this. When you look at the Suburban Area analysis, the percentage of vehicle occupants actually decreases for the higher provision grouping. However, caution should be applied here, as the relative datasets are quite small when they are separated into the lower provision and higher provision groupings (see Appendices A to D for details). It should also be noted that TRICS also surveys all off-site parking associated with developments, so the vehicle occupants percentages also takes this into account.

4.8. We can now compare the lower and higher parking provision analyses by location type, as follows, starting with the lower parking provision groupings.

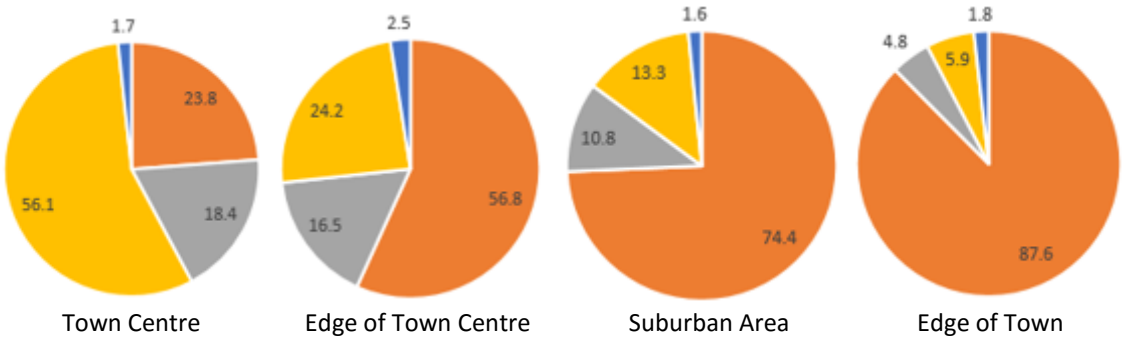

Figure 12 – Inbound Commute Modal Split Analysis – Lower Parking Provision by Location Type

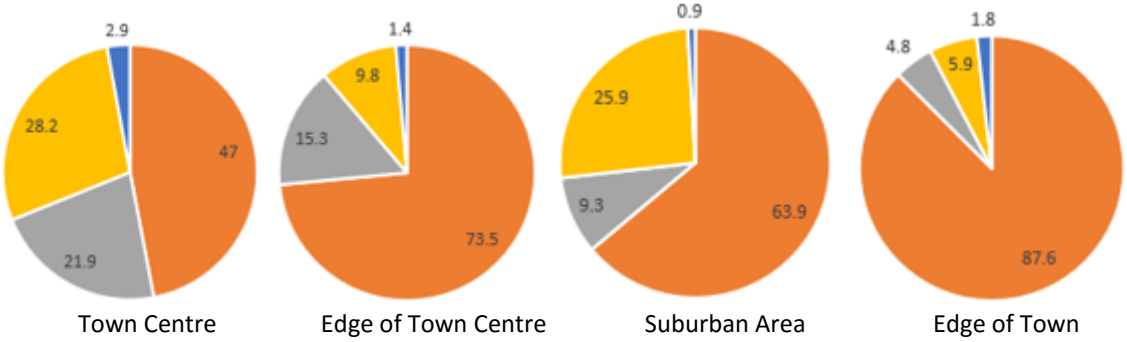

Figure 13 – Inbound Commute Modal Split Analysis – Higher Parking Provision by Location Type

5. Summary of Findings

5.1. Having undertaken this series of analyses of mode split variation for office developments within the TRICS database, we can summarise the findings as follows:

i) There are clearly a number of factors that can influence mode split, covering a wide variety of land use types. This set of analyses has focused on 02/A (Employment/Office) sites within TRICS, and has just looked at two types of factor, these being location type and parking provision.

ii) The further office developments are located from town and city centres it would appear that there is growth in the mode percentage of vehicle occupants for main method of transport.

iii) The further office developments are located from town and city centres it would appear that there is reduction in the mode percentage of pedestrians for main methods of transport. This can presumably be put down to town/city centres having more facilities close by that can be conveniently reached by office workers on foot.

iv) The closer office developments are to town and city centres, the more likely it appears that public transport would be the main mode choice. However, this may not always be the case, as several local factors can also influence trip rates. In this analysis the public transport percentage increased from the Edge of Town Centre out to the Suburban Area location type. This could be a result of relatively modest datasets being used, and the broad definition of "Suburban Area" within TRICS. Something similar was also noted with the pedestrian percentage difference between the Suburban Area and Edge of Town categories. Larger datasets would probably have clarified these anomalies.

v) It generally appears that the percentage of vehicle occupants as the main mode of travel increases with an increase in parking provision. This is quite consistent across the datasets, with one exception. The Suburban Area groupings show a higher percentage of vehicle occupants for the lower provision set that for the higher provision set. But caution must be applied here, as the two datasets used were quite small. This is most likely caused by other local factors within the two datasets, and again, larger datasets would probably have removed this anomaly.

vi) It is very clear from this set of analyses that the average modal split pie chart facility in TRICS is very useful in analysing various types of mode split diversity. TRICS encourages our users to make good use of this facility when undertaking trip generation and mode split analysis.

vii) The analyses that have been undertaken represent just one particular land use, and only a limited number of factors have been looked into. There are many other ways that other factors could be used, such as perhaps weather conditions or population levels in surrounding areas of sites. Future development of the TRICS system may enhance the current average modal split facility further.

APPENDIX A: Town Centre TRICS Office Sites Used in this Analysis

Site Ref	Site	GFA (m2)	Parking Spaces	Spaces per 100m2 GFA	Parking Provision
BR 02 A 02	Arup, Bristol	5,736	28	0.488	Higher
CA 02 A 05	Churchgate, Peterborough	8,793	72	0.819	Higher
CI 02 A 01	Offices, City of London	1,386	2	0.144	Lower
CI 02 A 02	33 Gracechurch Street, City of London	9,803	0	0	Lower
CI 02 A 03	Providian House, City of London	1,951	0	0	Lower
CN 02 A 02	Fox Court, Clerkenwell	6,056	33	0.545	Higher
CS 02 A 02	Sligo Town Hall, Sligo	2,750	9	0.327	Lower
EX 02 A 03	HMRC, Southend	45,000	281	0.624	Higher
GC 02 A 01	Direct Line, Glasgow	10,000	0	0	Lower
GC 02 A 02	Lloyds TSB, Glasgow	9,000	28	0.311	Lower
EM 02 A 07	Cobbett's Law, Manchester	4,200	39	0.929	Higher
LC 02 A 06	Blackburn Town Hall, Blackburn	11,225	130	1.158	Higher
MG 02 A 01	Motor Tax Office, Monaghan	400	6	1.5	Higher
MS 02 A 01	Castle Chambers, Liverpool	9,000	19	0.211	Lower
SC 02 A 10	G.O.S.E. Headquarters, Guildford	4,312	38	0.881	Higher
SK 02 A 01	City Hall, Southwark	17,187	4	0.023	Lower
SO 02 A 01	Slough Borough Council, Slough	1,800	31	1.722	Higher
TV 02 A 04	Middlesbrough House, Middlesbrough	3,950	0	0	Lower
TW 02 A 02	Transport House, Newcastle	1,675	12	0.716	Higher
WH 02 A 02	Penhurst House, Battersea	1,215	0	0	Lower
WK 02 A 01	Quadrant Business Centre, Coventry	960	72	7.5	Higher
WM 02 A 03	Lloyds TSB, Birmingham	8,200	23	0.280	Lower
WR 02 A 01	Guildhall, Wrexham	2,500	59	2.360	Higher

APPENDIX B: Edge of Town Centre TRICS Office Sites Used in this Analysis

Site Ref	Site	GFA (m2)	Parking Spaces	Spaces per 100m2 GFA	Parking Provision
BD 02 A 03	Charter House, Bedford	1,469	55	3.744	Higher
CN 02 A 01	Ely Place, Holborn	4,062	40	0.985	Lower
CW 02 A 02	Inland Revenue, St Austell	4,850	126	2.598	Higher
DC 02 A 08	Pullman Court, Dorchester	1,550	75	4,839	Higher
DC 02 A 09	County Hall, Dorchester	11,664	706	6.053	Higher
DL 02 A 04	La Touche House, Dublin	13,827	0	0	Lower
DN 02 A 01	M&H Associates, Letterkenny	232	0	0	Lower
DN 02 A 02	Buncrana Civic Offices, Buncrana	400	26	6.5	Higher
ES 02 A 12	Wealden District Council, Hailsham	3,640	78	2.143	Higher
HD 02 A 07	Rackspace, Hayes	12,100	915	7.562	Higher
HF 02 A 03	60 Victoria Street, St Albans	610	12	1.967	Lower
HF 02 A 04	Verulam Point, St Albans	5,000	205	4.1	Higher
KC 02 A 09	Cantium House, Maidstone	1,500	25	1.667	Lower
KC 02 A 10	Brenchley House, Maidstone	2,900	0	0	Lower
KC 02 A 11	County Hall, Maidstone	32,793	369	1.125	Lower
LC 02 A 08	Chorley Metropolitan Borough Council, Chorley	2,000	57	2.850	Higher
MT 02 A 02	Merthyr Tydfil County Borough Council, M. Tydfil	5,250	56	1.067	Lower
NF 02 A 01	Kings Lynn & W. Norfolk Borough Council, K. Lynn	5,500	5	0.091	Lower
OX 02 A 01	Speedwell House, Oxford	2,633	18	0.684	Lower
PS 02 A 01	Powys County Council, Welshpool	3,920	121	3.087	Higher
RO 02 A 01	Motor Tax & Rates Office, Roscommon	531	0	0	Lower
RO 02 A 02	Government Offices, Roscommon	5,100	162	3.176	Higher
SF 02 A 02	I.P. City Centre, Ipswich	6,505	160	2.460	Higher
SK 02 A 02	City Business Centre, Rotherhithe	2,371	30	1.265	Lower
SO 02 A 02	Slough Borough Council, Slough	5,050	216	4.277	Higher
SW 02 A 01	Admiral House, Swansea	6,630	184	2.775	Higher
SW 02 A 02	Offices, Swansea	2,225	131	5.898	Higher
TV 02 A 01	Inland Revenue, Middlesbrough	4,100	80	1.951	Lower
TW 02 A 01	Century FM Radio, Gateshead	645	12	1.860	Lower
WH 02 A 01	Getronics UK, Putney	5,500	39	0.709	Lower
WM 02 A 02	British Telecom, Birmingham	12,200	89	0.730	Lower
WY 02 A 01	Royal Bank of Scotland, Bradford	2,400	220	9.167	Higher

APPENDIX C: Suburban Area TRICS Office Sites Used in this Analysis

Site Ref	Site	GFA (m2)	Parking Spaces	Spaces per 100m2 GFA	Parking Provision
AN 02 A 03	RPS Consultants, Belfast	2,908	130	4.470	Higher
AN 02 A 04	Northgate Managed Services, Newtownabbey	11,736	309	2.633	Lower
BT 02 A 02	Mahatma Ghandi House, Wembley	4,750	43	0.905	Lower
CA 02 A 01	Demeter House, Cambridge	4,344	48	1.105	Lower
CA 02 A 02	British Sugar, Peterborough	12,500	252	2.016	Lower
CB 02 A 01	BBC Radio Cumbria, Carlisle	999	10	1.001	Lower
CW 02 A 01	Kerrier District Council, Camborne	5,400	202	3.741	Higher
DH 02 A 01	R.P.M.I., Darlington	3,372	99	2.936	Lower
ES 02 A 11	Orbit, Hastings	186	6	3.226	Higher
HF 02 A 02	Welwyn Hatfield Council, Welwyn Garden City	2,700	106	3.926	Higher
IS 02 A 01	Leroy House, Islington	5,500	21	0.382	Lower
KK 02 A 01	Government Offices, Kilkenny	19,500	272	1.395	Lower
LC 02 A 09	Blackburn Enterprise Centre, Blackburn	2,600	89	3.423	Higher
LE 02 A 03	Melton Mowbray District Council, Melton Mowbray	3,251	214	6.583	Higher
SC 02 A 15	Baker Tilly, Guildford	1,896	63	3.323	Higher
SC 02 A 17	Glaxo Smithkline, Weybridge	10,293	252	2.448	Lower
SF 02 A 01	West Suffolk House, Bury St Edmunds	8,000	342	4.275	Higher
TW 02 A 05	ITV Tyne Tees, Gateshead	1,500	120	8	Higher
TW 02 A 06	Benton Park View, Newcastle	70,291	2923	4.158	Higher
WM 02 A 01	Dudley Metropolitan Borough Council, Stourbridge	2,725	134	4.917	Higher

APPENDIX D: Edge of Town TRICS Office Sites Used in this Analysis

Site Ref	Site	GFA (m2)	Parking Spaces	Spaces per 100m2 GFA	Parking Provision
CR 02 A 01	Central Statistics Office, Cork	8,600	318	3.698	Lower
CW 02 A 03	County Hall, Truro	30,000	862	2.873	Lower
DH 02 A 02	E.S.H. Construction, Bowburn	2,000	125	6.250	Higher
EX 02 A 02	British Telecom, Brentwood	19,667	827	4.205	Lower
HC 02 A 11	B&Q Headquarters, Chandler's Ford	26,100	1,319	5.054	Higher
HI 02 A 01	Forestry Commission Headquarters, Inverness	804	34	4.229	Lower
HI 02 A 02	Vertex Data Science, Nairn	929	79	8.504	Higher
HI 02 A 03	Highlands & Islands Enterprise, Inverness	5,400	121	2.241	Lower
KC 02 A 06	Land Registry, Tunbridge Wells	5,677	276	4.862	Higher
KC 02 A 07	Kent County Council Regional Highways, Ashford	2,525	147	5.822	Higher
KC 02 A 08	Kent County Council Regional Highways, Aylesford	3,168	155	4.893	Higher
LC 02 A 07	Fylde Borough Council, Blackpool	6,678	59	0.883	Lower
SC 02 A 14	Unilever, Leatherhead	19,974	596	2.984	Lower
SC 02 A 16	Bank of America, Camberley	39,230	250	0.637	Lower
TW 02 A 03	One Northeast, Newcastle	6,480	288	4.444	Higher
TW 02 A 04	Gateshead Housing Company, Gateshead	2,500	116	4.640	Higher