TRICS® Good Practice Guide 2016

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Contents

1   Overview

1.1   This TRICS® Good Practice Guide supersedes the 2013 guide. It is fully endorsed by TRICS Consortium Limited and its six County Council Shareholders (Dorset, Kent, East Sussex, West Sussex, Surrey and Hampshire).

1.2   The aim of this document is to provide guidance to users of TRICS® so they may undertake good practice when using the system. Version 7.3.1 of the software (released in March 2016) has been used in all examples given within the document.

1.3   TRICS® is a very powerful and flexible system, and allows great variation in the calculation of both vehicular and multi-modal trip rates. It is possible, therefore, that two users of the system, applying different criteria and ranges to a task, may end up producing different results. This guide is intended to assist users in ensuring that correct procedures and understanding of the system are practised in the production of data, and is also intended to provide guidance to assist in the correct and thorough auditing of TRICS® data once it is received by third parties.

1.4   There are many areas within the system whereby careful selection criteria and ranges are important to assist in achieving robust and reliable data calculated by the system. This guidance is designed to assist users in this task.

1.5   The correct way to build a selection of surveys is to decide initial criteria and then filter the database to provide a representative sample. The incorrect method is to produce trip rates to fit a pre-determined preferred figure. This guidance, if followed correctly, will assist users in avoiding such incorrect, "predeterminate" methods.

1.6   Recipients of TRICS® data need to be assured that the data has been produced in accordance with the guidance contained within this document. It is, therefore, the responsibility of all TRICS® users to ensure that full details of how the data was obtained, and clear indications of what the data represents, are provided to data recipients. Additional assistance for auditors of reports where TRICS data has been used can be found within Section 19 of this document.

1.7   The principles covered in the guide apply to both traffic surveys and multi-modal surveys. However, it should be noted that as traffic surveys currently outnumber multi-modal surveys, extra caution should apply when dealing with the latter, as users obtaining multi-modal data will find that the number of sites at their disposal are more limited.

1.8   Previous versions of the TRICS® Good Practice Guide have been used widely to reinforce data produced in accordance with this guidance. In cases of dispute, such as when conflicting data sets are presented at Public Inquiries, it has often been the Good Practice Guide which has, quite correctly, influenced the Inspector in his decision making.

2 Using the most up to date version of TRICS®

2.1 TRICS® software updates are issued on a quarterly basis, usually in March, June, September and December. New survey data is added each quarter, with major system enhancements added in system updates as and when they are developed. The current series of TRICS® versions is Series 7. During 2016 there are four scheduled releases, these being 7.3.1 in March, 7.3.2 in July, 7.3.3 in September, and 7.3.4 in December. In 2017 the next version will start with 7.4.1, and so on.

2.2 There is no set rule against using an earlier version of the system. However, users should always aim to use the most up to date version. The version in use is indicated by the issue number, which is always present on the Homescreen of the system. Between updates, new data is added, and from time to time, some sites are removed from the system due to issues with data, or moved from one land use category to another (due to re-classification). All instances of this are recorded within the list of new sites per software version, which can be viewed in the Library module of TRICS® (accessible from the icons at the top of the screen). Users can often use the up-to-date version of TRICS® to audit data supplied from an earlier version; it is not always necessary to revert to using the older software.

Figure 2.1   The TRICS® version in use is shown by the issue number.

2.3 When logging on to TRICS® on the web, users will always be operating the most up-to-date version of the system. If using the downloaded "off-line" facility (which was made available in June 2008), users will be regularly asked if they wish to download updates from the web. To ensure that the most up-to-date off-line version is being used, it is highly recommended that users always check for and download updates when prompted. The downloadable version is released every quarter at the same time as the on-line version of the system.

2.4 In an instance where there is a conflict between two sets of data, the set which most adheres to the Good Practice Guide should be considered to be more representative and robust. This takes precedence over the actual version of the software being used. However, users should ensure that when using older versions of TRICS® there are no issues relating to data which has subsequently been moved or deleted *(see 2.2)*. The inclusion of such data could render the trip rate results unreliable.

2.5 Users may from time to time require the use of an older version of TRICS® to audit previously produced information. This can be done using the TRICS® software archive, available to all users once logged in. Older versions of the downloadable system can be downloaded and examined accordingly. See Section 19 which goes into more detail about auditing TRICS® data.

3   Understanding land use definitions

3.1   There are 110 land use sub-categories within TRICS®, all of which are defined within the Help section of the software, and are available by clicking on the Help icon at the top of the screen at any point.
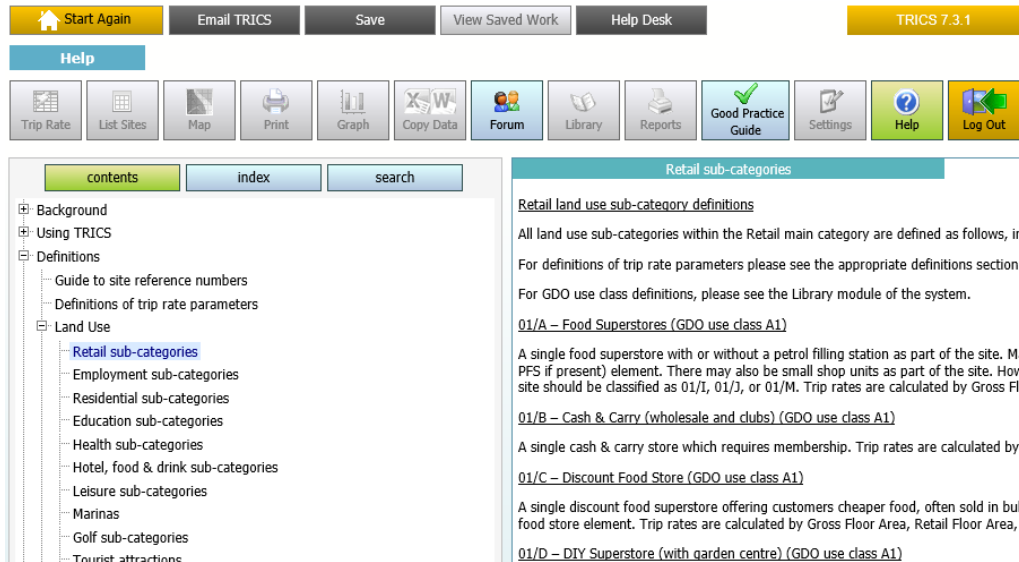

Figure 3.1   The Help section provides land use type definitions.

3.2   It is vital that users apply trip rate calculation data from land uses which correctly apply to their individual cases. For example, a DIY Superstore is not compatible with a Builders Merchant site in TRICS®. For more obscure types of land use, users need to proceed with greater caution. The Miscellaneous category (16/A in the database) contains all sites that do not fit into any other category. It is here that users should search if they are unable to find a suitable site in any other category. However, note that, due to the mixed nature of the category, trip rates cannot be calculated for Miscellaneous sites.

4 Site selection by region and data fields

4.1 The issue of data being included/excluded by region has often been raised by users. This has led to TRICS® undertaking research into trip rates and regional variation. This research was inconclusive in its results. In some areas where compatibility was expected, the reverse was true. The converse was also true. Therefore, the one conclusion that can be drawn from this research (which is unpublished and was used for internal TRICS® system development purposes only), is that regional selection is not as important a factor as location type and other important factors.

4.2 There are clearly some extreme exceptions to the above. For example, trip rates obtained from a major city centre cannot apply to trip rates generated from the Shetland Islands, for obvious reasons. But, taking into account all local factors, especially the location type, there is no obvious reason why some data from, say, Glasgow, cannot apply to some data from Greater Manchester. Similarly, some site scenarios in parts of London may be compatible with sites in other large cities. However, the importance of compatibility in terms of local population, vehicle ownership, location type, etc. cannot be stressed enough. It is in the areas of site and development data where true compatibility should be sought, rather than just through the exclusion of regions, which could unnecessarily remove many compatible sites from a user's selected set.

4.3 Care should also be taken to ensure that data fields used in site selection filtering are relevant to each individual case. For example, using levels of car ownership as a filtering criteria would seem to be more appropriate for a land use category such as a food superstore than it would be for a residential development. For the latter, average car ownership per household within a 5 mile radius would not be an effective filter, as it is the car ownership level of the households actually making the trips that we would be more interested in. Users should take care to ensure that each instance of filtering by database field can be justified in the context of the type of development being analysed.

4.4 A specific example where the correct filtering of a database field is essential is when dealing with food superstore sites with or without petrol filling stations included in the survey count. If a proposed development is to include a PFS, then this should be reflected by the exclusion of sites within the database that do not include a PFS in their survey counts. Similarly, if a proposed development is not to include a PFS, then filtering should take place to ensure that sites with a PFS included in their surveys are excluded. This approach is necessary as surveys at food superstores with a PFS included record trips to the PFS only, in addition to trips to the store only and trips that take in both the store and the PFS. It should be noted that individual TRICS® surveys at food superstores do not break down counts into trips to the PFS only, trips to the store only, or trips that include a visit to both the PFS and the store. The total number of trips observed is always recorded without any further breakdown.

4.5 The most important data fields in terms of site selection compatibility are the main category and sub-category location types. Sites in a town centre with good local public transport accessibility will naturally, as a rule, achieve a different type of modal split to a site in the countryside without any public transport. Mixing sites which are clearly incompatible in a set for trip rate calculation could lead to the production of misleading trip rates. A general guide to compatibility by main location category is shown in the table below.

Location Type	Town Centre	Edge of Town Centre	Suburban Area	Edge of Town	Neighbourhood Centre	Free Standing
Town Centre	-	Possibly compatible	Not compatible	Not compatible	Not compatible	Not compatible
Edge of Town Centre	Possibly compatible	-	Possibly compatible	Possibly compatible	Not compatible	Not compatible
Suburban Area	Not compatible	Possibly compatible	-	Possibly compatible	Possibly compatible	Not compatible
Edge of Town	Not compatible	Possibly compatible	Possibly compatible	-	Possibly compatible	Possibly compatible
Neighbourhood Centre	Not compatible	Not compatible	Possibly compatible	Possibly compatible	-	Not compatible
Free Standing	Not compatible	Not compatible	Not compatible	Possibly compatible	Not compatible	-

Table 4.1   General guide to site compatibility by main location type.

4.6   Clearly, there are many "borderline" cases where compatibility between a number of different location types may be possible. Therefore, the guide shown above is not to be taken as an absolute table of compatibility. A town or city centre may be very close to the town or city's actual physical edge, for example. Another example could be the "Suburban Area" main category, which can include both sites in quiet residential areas a significant distance from a town/city centre, and sites within busy built-up areas just outside the edge of a town/city centre. To tackle such issues, in December 2007, a number of additional location sub-categories were introduced, and the entire TRICS® database reviewed as a result. Users are now encouraged to examine both the main and sub categories to identify compatibility of sites within the selected set. The best approach is to examine the location of the development in question, and then combine this with an examination of compatibility through the definitions as shown in TRICS®. A full definition of locations can be obtained by clicking on the "Definitions" button next to the Location indicator on the Site Details screen of an individual site record.

4.7   In the first instance, it is recommended that users include sites across location types that are possibly compatible, and then examine the individual site locations in more detail using facilities such as Google Maps, before refining the dataset further based on visual location.

Location Edge of Town Centre
Locn Sub Cat Built-Up Zone

Figure 4.1   Location fields and definitions button within Site Details.

TRICS® LOCATION DEFINITIONS – DECEMBER 2008

NOTE: Individual development sites within the TRICS® database are allocated location categories (and sub-categories if applicable) on a site-by-site basis, at the discretion of the TRICS® system development team. If there is no significant predominance of local features that places a site within an appropriate location sub-category, the selection of "No sub-category" is displayed.

Main Location: Town Centre
Within the central core area of the heart of the town/city (e.g. the primary shopping area), as defined in the local development plan (if appropriate).

Figure 4.2   TRICS® location definitions.

4.8   There are occasions where the location mix within a selected data set is not acceptable. For example, a mix of sites containing both "Town Centre" and "Free Standing (out of town)" location types will most likely produce incorrect and misleading trip rate results. If a mix of location types is used *(based on Table 4.1)*, it is the data supplier's responsibility to ensure that justification for the inclusion of the mix is given. This should include geographical location evidence, such as maps, etc.

4.9   Users should note that there is no compatibility matrix for location sub-categories, as they are sub-sets which fall within the overall location type. However, users should consider the relevance of these sub-categories when selecting data sets.

5 The use of comment boxes

5.1 Within individual TRICS® sites there is a wide variety of information available, assisting users in the site selection process. Additional information also exists within comment boxes, containing further site, development and survey count details which do not directly fit into the set data fields. This additional information is often important, and users should study comment boxes, as such additional information may affect the compatibility of a site.

5.2 TRICS® Research Report 99/2 ("Research into Trip Rate Variation" – Harrison Webb) analysed variations in trip rates at retail stores, taking into account factors such as consumer expenditure, time series analysis, and analysis of parking supply and peak demand. These are just a few examples of additional factors which may affect trip rates, which fall outside the set data fields within the TRICS® database *(also see 7.3).* A more recent piece of research (Research Report 09/1 – "An econometric study of the relationship between land use and vehicle trip generations" – David Broadstock) examines economic and demographic influences, which are also outside of the current TRICS® system.

5.3 Comment box information is only visible within individual site, development, parking, travel plan, and survey day screens. Comment boxes are not used in the site selection filtering process, or at any other point within the system, being purely descriptive data fields. If a site is output to a PDF document, all comment box information will be included in the output. Data recipients, if suspecting that a particular site may not be compatible, should ask the data supplier to provide this wider information, so that the comment boxes can be examined. It is, therefore, in the data supplier's interest to ensure that comment boxes are checked before sites are included in a selected set. Of course, this may not be practical in very large data sets, but in smaller sets it is highly recommended, to avoid any potential conflict at a later stage.

Population within 1 mile	5,001 to 10,000	Comment
Population within 5 miles	25,001 to 50,000	The site is located on Castle Way close and very close to Antrim town centre. Castle Way join Dublin Road to the west which then runs north towards Ballymena and south towards Belfast International Airport. Local roads also lead east towards the M2, which runs south-east into Belfast city centre.
Population within 500m	1000	There is a primary school, office buildings, training centre, and other various town centre developments located in the surrounding area of the site. Antrim station is located just behind the site, to the north, off Station Road.
Car ownership (5 miles)	0.6 to 1.0	The site has 2 access points, 1 for pedestrians and 1 for vehicles.
Is the location of the site hilly or flat	Flat	

Figure 5.1   Comment boxes are present within individual site records.

6 Understanding trip rate calculation parameter definitions

6.1   Trip rates can be calculated using a variety of data fields, known as trip rate calculation parameters. It is important that users understand the definitions of the various parameter fields available. A full list of definitions is available within the Help module, which users can access by clicking on the Help icon whenever using the system.
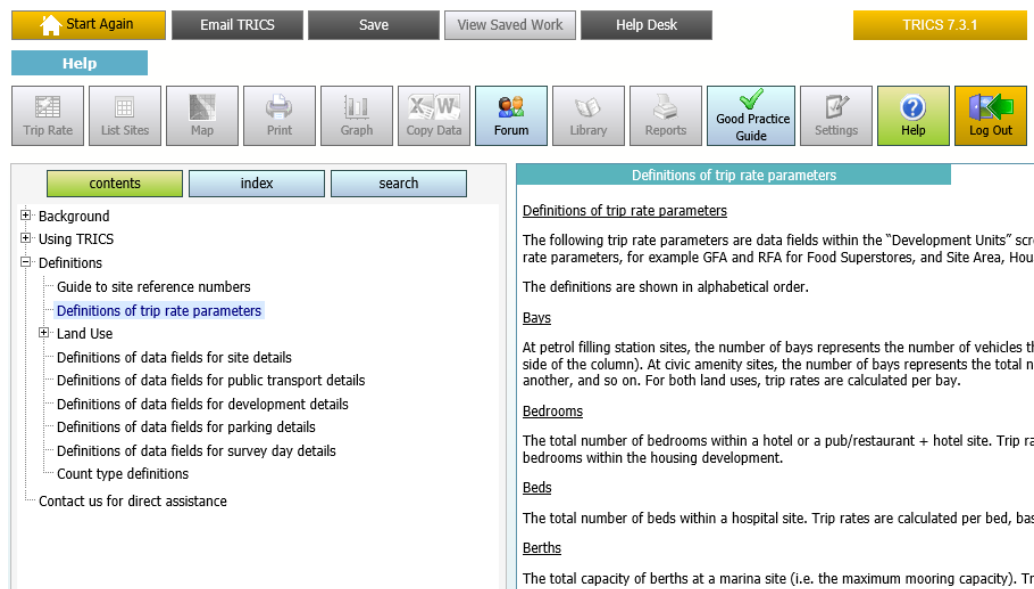

Figure 6.1 Definitions of all trip rate parameters can be easily found.

6.2   Users should also understand the trip rate calculation factor, which is always displayed at the top left hand corner of the trip rate calculation results screen *(see Figure 6.2 below)*. In the case of Gross Floor Area (GFA), the calculation factor is always 100m², so all trip rates produced by the system are trip rates per 100m² of GFA. For trip rates calculated by Employees, the factor is per 1 employee. It is important that this is understood by the user and incorporated into the results presented to the recipient. For example, a GFA trip rate of 35.78 should be presented as "35.78 per 100m² of GFA", along with information on the time period and direction (i.e. arrivals, departures or total), so that the data can be fully understood. Section 17 goes into more detail regarding the correct presentation of TRICS® data.

Figure 6.2   The trip rate calculation value is always displayed (top left).

6.3   Some more recent sites within the database include a "GFA Not In Use" figure, which represents GFA as defined within the TRICS® Help section that was not in use at the time the survey was undertaken. Older data within TRICS® does not display this figure. Where the "GFA Not In Use" figure is known, users have the option to include or exclude the figure from the total GFA used in trip rate calculations. Users should note that with older data, any obvious GFA not in use was identified and excluded wherever possible. Users should always make it clear in their reports whether or not "GFA Not In Use" has been excluded through Settings (accessed via the Settings icon at the top of the screen).

7 Using older TRICS® data

7.1 TRICS® contains data from as far back as the 1980's to the present day, with a large data collection programme undertaken every year. There are 7,310 survey days in TRICS® version 7.3.1, which is a vast database. Users will find that within their site filtering processes some survey days will be automatically excluded from the selected set by a minimum date cut-off.

7.2 In TRICS® 7.3.1, the minimum date cut-off is set by default to 01/01/08, i.e., 8 years prior to its release date, rounded down to the first day of the calendar year. There is no fixed rule as to whether or not older data (which falls outside the minimum cut-off date) should be included or excluded from the selected set, and the minimum cut-off date can be amended by users to any required date. The 8-year default is particularly helpful in assisting TRICS® system developers in determining future data collection programmes.

Figure 7.1   The minimum survey cut-off date is defaulted to –8 years.

7.3 Users are encouraged to include/exclude data in line with research commissioned by the TRICS® Consortium, which assessed whether older data is valid. The report, entitled "Does Historic Site and Survey Data Remain Valid to Use – TRICS® Research Report 04/1", can be viewed via the Library module of the system, which can be accessed at any point. A number of factors, which may influence trip rates, were identified by this research, and a "pop-up" summary by land use category is displayed whenever trip rates are calculated. Users should present their data taking these factors into account.

7.4 Users wishing to apply their own factors to older count data, in order to achieve "2016 equivalent results", should make this very clear when presenting their results. Data initially produced by TRICS®, prior to any factoring, should be first presented, and then the factored data (with details of the factoring used) presented second. This will ensure that the data recipient is made aware of which data has been produced by TRICS®, and which data has been factored. This practice is especially important if data is to be audited by a third party (also using TRICS®).

8   Seasonal trip rate variation

8.1   For the use of TRICS® to be fully effective in a "typical peak day" scenario, users should aim to ensure that non-typical seasonal travel behaviour is avoided whenever practical and possible, when producing data. For example, trip rates for a golf course in January will be lower than in August, for obvious reasons. Research commissioned by the TRICS® Consortium, entitled "Seasonality Research Report – TRICS® Research Report 02/2" looks into seasonal variation in detail, across a number of different land use categories, and users are advised to produce and present TRICS® data with the results of this research in mind.

8.2   In order to comply with good practice, users should always present survey dates for all sites used in the trip rate calculation process. This data is available in the trip rate calculation results output.

LIST OF SITES relevant to selection parameters

```
1   CP-01-A-01      SAINSBURYS                          CAERPHILLY
    NEWBRIDGE ROAD

    PONTLLANFRAITH
    Edge of Town
    No Sub Category
    Total Gross floor area:              7124  sqm
        Survey date: SATURDAY            08/10/11        Survey Type: MANUAL
2   DC-01-A-20      MORRISONS                           DORSET
    DORCHESTER ROAD

    WEYMOUTH
    Edge of Town
    No Sub Category
    Total Gross floor area:              5500  sqm
        Survey date: SATURDAY            29/03/14        Survey Type: MANUAL
3   DE-01-A-03      SAINSBURY'S                         DERRY
    STRAND ROAD
    PENNYBURN
    LONDONDERRY
    Suburban Area (PPS6 Out of Centre)
    No Sub Category
    Total Gross floor area:              4500  sqm
        Survey date: SATURDAY            23/06/12        Survey Type: MANUAL
```

Figure 8.1   Survey dates are displayed in TRICS® output.

8.3   When examining a typical peak time scenario, if there is sufficient data available within the selected land use category to avoid using survey dates outside of typical peak times, such that removal of these days would not compromise the robustness and representative integrity of the remaining data set _(see Section 11)_, then users should remove "out of season" survey days. Leaving such days in the selected set is unnecessary, and might lead to the generation of artificially low trip rates. If the inclusion of "out of season" survey days cannot be avoided, this should be made clear in the results provided to the data recipient. On the other hand, users should also avoid using "extraordinary peak" surveys (e.g. the days leading up to Christmas for food superstores) when attempting to provide data for more typical peak periods, as this might lead to the generation of artificially high trip rates. In either case, it should be made clear in the presentation of data whenever data from "out of season" or "extraordinary peak" times has been included in a selected set.

8.4   If a user wishes to use "out of season" data and then apply factoring to the results, then it should be made clear in the data supplied to the recipient which data has been produced using TRICS®, and which has been factored. This is particularly important for auditing purposes. Any factors used will need to be explained and justified, and it should also be made clear that this process is outside the use of TRICS®.

9 Peak hours and days

9.1   When presenting TRICS® data, it is good practice to provide trip rate calculation results covering peak hours of activity alongside the accepted "road peak hours" (i.e. 0800-0900 weekday mornings and 1700-1800 weekday evenings). The actual site peak hours (for arrivals and departures) will not necessarily correspond with the road peaks. In cases where they do not, trip rates for both road peaks and site peaks should be supplied if requested by the data recipient. To cover both peaks, the supply of trip rate graphs is recommended. These can be accessed directly from the trip rates calculation results screen.
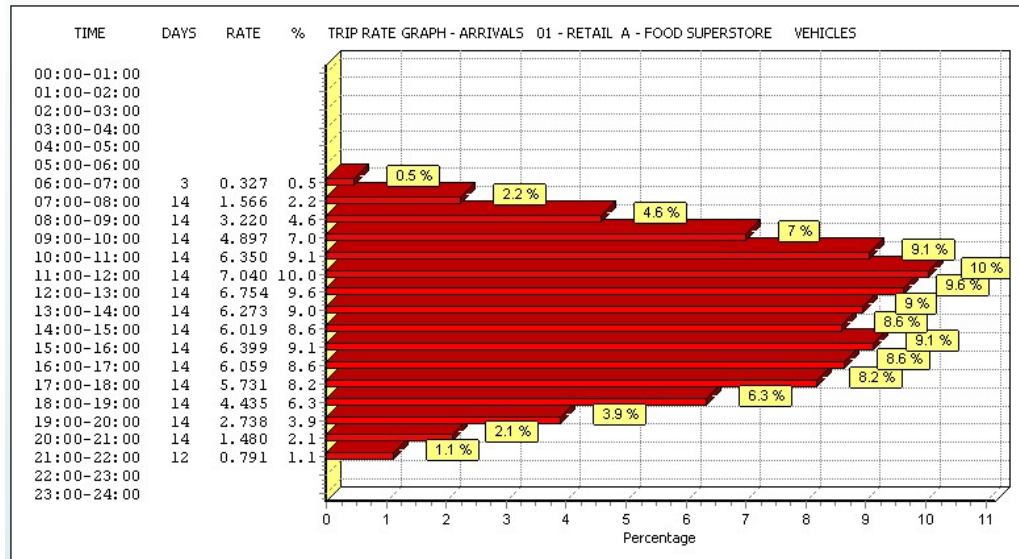

Figure 9.1   Peak trip rates are best illustrated in graphical format.

9.2   When supplying peak trip rates, it should be made clear by the supplier whether the "peak" represents the road peak or the hour of peak activity at the site (or selected set of sites). *See Section 17* for further detail on how to correctly present TRICS® data.

9.3   The peak trip rate hours are also presented at the top of the trip rate calculation results screen, as shown below. These are site peaks, the actual busiest hours in terms of traffic/transport activity, rather than road peaks. By supplying the results table and accompanying trip rate graphs, all peak information will be supplied in full to the recipient. The total rates are also shown – these are the trip rates for the whole day, and should not be confused with the peak hour trip rates.

TRIP RATE VALUE PER 100 SQM	ARRIVALS Total rate: **70.079** Peak: 11:00-12:00			DEPARTURES Total rate: **70.119** Peak: 12:00-13:00			TOTALS Total rate: **140.198** Peak: 12:00-13:00		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00									
01:00-02:00									
02:00-03:00									
03:00-04:00									
04:00-05:00									
05:00-06:00									
06:00-07:00	3	6734	0.327	3	6734	0.030	3	6734	0.357
07:00-08:00	14	5874	1.566	14	5874	1.041	14	5874	2.607
08:00-09:00	14	5874	3.220	14	5874	2.402	14	5874	5.622

Figure 9.2   Peak trip rate hours are displayed in the results table.

9.4   A visual example of the range of peaks and the fluctuation of trip generation across a range of selected sites can be found when viewing the "Survey Selection" within the trip rate calculation process and clicking on the "Graph" icon. A line graph that plots and compares each individual site is then displayed, with time shown on the x-axis and vehicular trip rates shown on the y-axis. This provides an excellent example of the range of trip rates that TRICS® generates within a selected set of surveys, with the individual survey peaks throughout the day clearly identified. This clearly emphasises that TRICS® is not intended to provide an exact "prediction" of trip rates for any given scenario. Instead the system provides a range, with best and worst case scenarios, which users can work with. TRICS® data should always be treated as such.
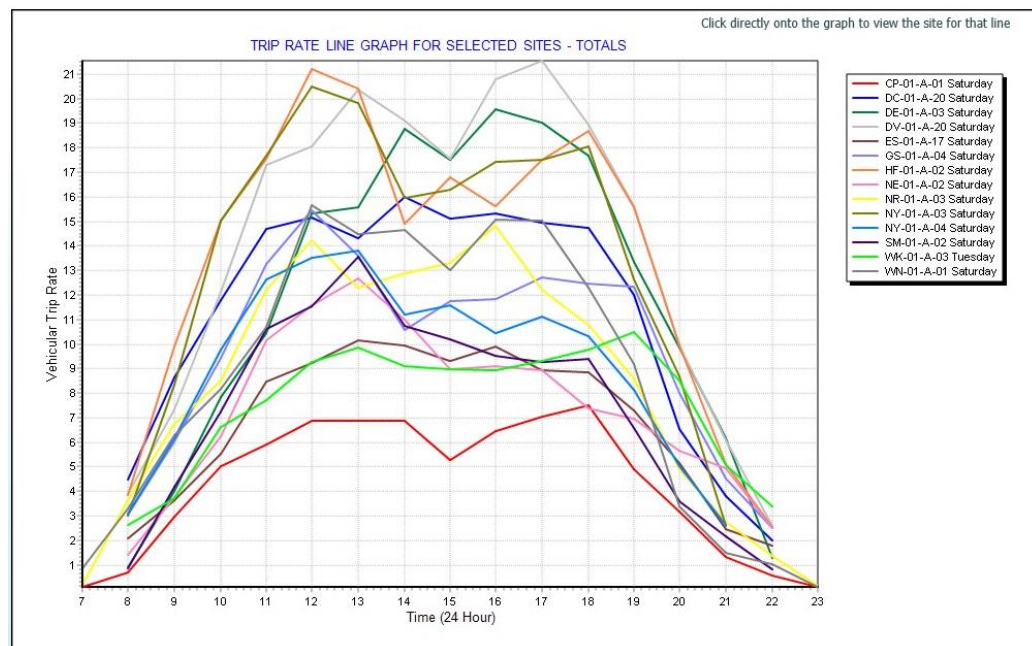

Figure 9.3   Comparative survey trip rate line graphs are available in TRICS.

9.5   Users should not mix weekday and weekend surveys together. The profiles of travel during the week and at weekends can differ considerably; by mixing weekdays and weekends together a "hybrid" profile will emerge, which is not representative of any day, and can lead to artificially inflated trip rates (*see 9.7 below*). For this reason, the day of the week for each survey included should be included with the data supplied to the recipient, in summary form or in an appendix. In TRICS® output such information is readily available, as shown below.

Figure 9.4   Days of the week are included in TRICS® output.

9.6 Some land use categories typically generate peak activity on specific days of the week. For example, offices tend to be consistent from Monday to Friday, whilst food superstores will usually peak on Fridays, Saturdays and Sundays (with the busiest of these normally the Saturday). In the first example (offices), a data set covering a range of days from Monday to Friday would be fine. In the second example (food superstores), it would be best to provide trip rates for Fridays only, then Saturdays, and finally Sundays. Of course, there may be a specific need for a certain day of the week to be examined, but the peak days should also be presented alongside this data.

9.7 The phenomenon of "double-peaking" can produce artificially high trip rates, which are misrepresentative. This can happen when weekdays are mixed with weekends in a selected survey set. For example, food superstores display different peak activity times on Saturdays than on Fridays. Therefore, when combined, results can show higher total trip rates than if they had been calculated for just Fridays or Saturdays.
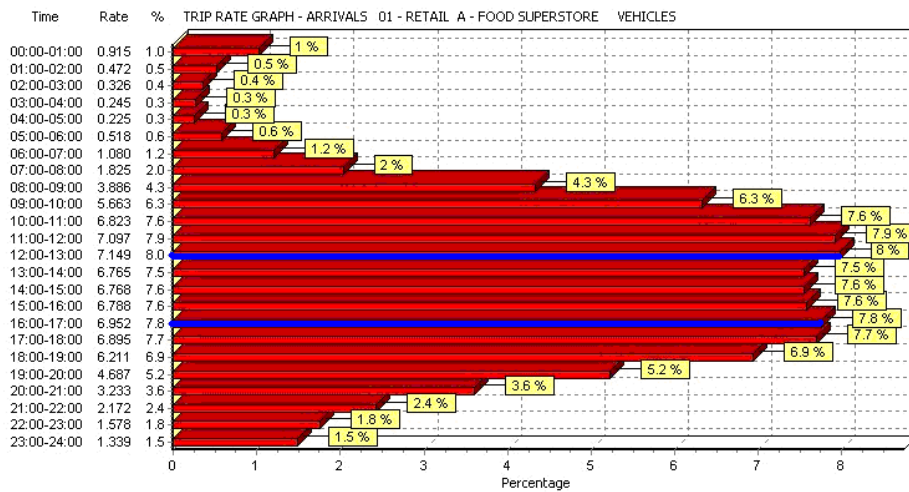

Figure 9.5   Mixing weekdays with weekends can result in "double-peaking".

10 Avoiding the production of pre-determined "preferred" trip rates

10.1 The correct procedure for filtering sites is to apply selection criteria to an initially complete set of data within a given land use category. In order to produce reliable and robust trip rates, users must avoid attempting to "aim" trip rates towards meeting pre-determined preferred levels. Such methods, constituting bad practice, can be identified by data recipients and third parties auditing the data.

10.2 The approach that must ALWAYS be followed when producing trip rates is to first identify the criteria for site selection, then filter the sites according to that criteria, and then produce the trip rates once filtering is complete. All stages of this process can be tracked through the output of a full set of procedures *(see Section 17)*. The First Principle of Good Practice is ADD: Agreement of criteria, Data production, and Data audit. It is by this principle that all projects obtaining TRICS® data should be followed.

10.3 Methods of bad practice, whereby users obtain trip rates through incorrect procedures, in order to produce trip rate levels that they want to see, can be identified through careful auditing. For example, rank order list scatterplots identify trip rate levels (on the y axis) by trip rate parameter levels (on the x axis). By examining the position of sites provided by the data supplier on the rank order scatterplot, data recipients and auditors can identify whether the sites supplied are within acceptable limits when compared to other sites within the land use category selected. If this is clearly not the case, auditors should request an explanation from the data supplier, as there may be a risk that selective sites have been included in order to produce misleading results.

10.4 A user may argue that a particular development is expected to generate unusually high or low trip rates, if there is evidence outside of TRICS® to back up this assertion. However, it is the initial agreed selection criteria that should reflect the anticipated unusual elements of the site which may affect trip rates, and this criteria should be made clear from the outset. Once trip rates have been produced, users should not make further amendments to the selected data set to influence the trip rate results towards a pre-determined, preferred level.
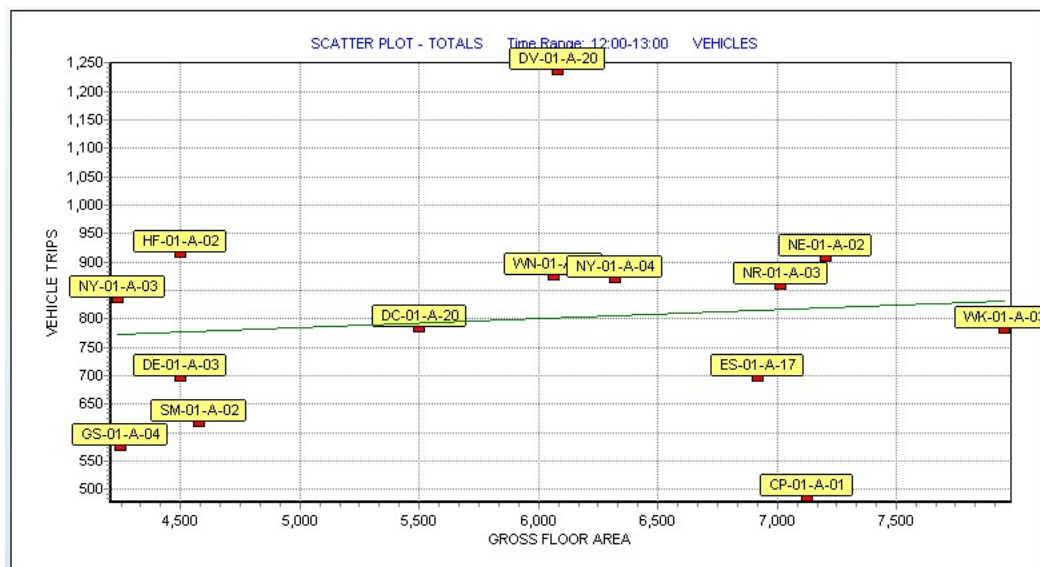

Figure 10.1   Scatterplots can identify sites with low/high relative trip rates.

10.5 Data recipients have the right to request full details of how all trip rates have been calculated, including all procedures undertaken prior to calculation. A handy quick-

glance method of identifying a few of the procedures undertaken is the trip rate parameter summary, which is always present at the bottom of the trip rate calculation results screen. If this summary is not present in the results screen when supplied to the recipient, this should be requested, since the summary must have been manually removed by the data supplier and is therefore potentially a cause for concern.

21:00 - 22:00	12	5973	0.791	12	5973	1.098	12	5973	1.889
22:00 - 23:00	3	6734	0.000	3	6734	0.114	3	6734	0.114
23:00 - 24:00									
Total Rates:			70.079			70.119			140.198

Parameter summary

Trip rate parameter range selected:	4237 - 7951 (units: sqm)
Survey date date range:	01/01/08 - 29/11/14
Number of weekdays (Monday-Friday):	1
Number of Saturdays:	13
Number of Sundays:	0
Surveys manually removed from selection:	3

Figure 10.2   The trip rate parameter summary is a handy reference.

10.6   The trip rate parameter summary is not by any means the only method of tracking procedures undertaken by the data supplier, but it is nevertheless useful. The summary can raise questions relating to data robustness and representation, which should always be checked by the data recipient when in doubt as to the integrity of the process used to produce the trip rates supplied. It is the data supplier's responsibility to make clear that the procedures followed in producing the trip rates supplied are sound, and do not incorporate any pre-determined preferred trip rate levels. When in doubt, users should insist on a full trail of evidence, as discussed in *Section 17*.

11 Representative sample sizes & cross testing

11.1 The TRICS® database contains a wide variety of different land use categories, each of which contains a set of sites varying in size. The food superstore category has 307 sites present (in version 7.3.1), whilst other sets of data contain lower levels. Because of this, obtaining a representative sample of data for a trip rate calculation involves a balance between meeting a set of criteria for inclusion and the availability of data.

11.2 The general rule for obtaining a representative sample of data is to include as many sites as possible. But this should not be to the detriment of selection criteria. Wherever possible, users should aim to use as stringent a set of criteria as possible and obtain a representative, reasonable sample of surveys. However, there are no fixed rules; the aim is to achieve a balance. It is better practice to have a lower but practical number of sites acceptable to the selection criteria than to have a larger data set which is not. In the latter case, the trip rates produced will more likely be misrepresentative when compared to the former case. However, because of the complex diversity of the database, it is impossible to define a preferred number of sites. It is more important that users ensure that all sites selected are compatible with the appropriate criteria, agreed in advance by all parties involved in the project. After this, trip rates can be scrutinised for basic reliability and robustness in the first instance using "cross testing" *(see 11.7)*, with more detailed auditing to follow this. TRICS® suggests that a more "inclusive" than "exclusive" approach to site filtering is applied, as long as search criteria are not compromised. This is the important part. Be flexible with your criteria, but not so much that the results could be deemed meaningless.

11.3 If it is clear from auditing supplied TRICS® data that there are more sites within the database which match all relevant criteria for inclusion than those presented by the data supplier, the data recipient can insist on the inclusion of these further sites in a revised data set, on the condition that the selection criteria are agreed between both parties. The opposite applies to sets of data presented where the auditor believes sites have been wrongly included (in that they are incompatible with the agreed criteria).

11.4 If users are limited to data from one site only, it should be made clear that this is the case, and it would be good practice to supply the full site, development and survey day details of the site used.

11.5 15th and 85th percentile trip rates are available through the rank order procedure, which follows on from the trip rate calculation results screen. The method by which TRICS® identifies the 15th and 85th percentile surveys in the rank order list is simple and not mathematically complex. Simply, the surveys which are closest to 15 and 85 percent of the way down the list are regarded as the 15th and 85th percentile surveys for the specified time period (or peak period per survey) selected when calculating the rank order list. Therefore, it is important for as many surveys as possible to be included in the rank order list in order to maximise reliability of both the 85th and 15th percentile figures displayed.

11.6 TRICS® recommends that users have at least 20 surveys in a rank order list before 85th and 15th percentile highlighted trip rates are quoted. A warning message to this effect is displayed in the rank order list screen whenever less than 20 surveys are included in the data set. This figure is based on the experience of TRICS® system developers. TRICS® will not endorse any 85th or 15th percentile quotations from data suppliers if less than 20 survey days have been included in the selected set. Nonetheless, such quotes may indeed be valid, but it is the data supplier's responsibility to prove the robustness of the figures quoted.
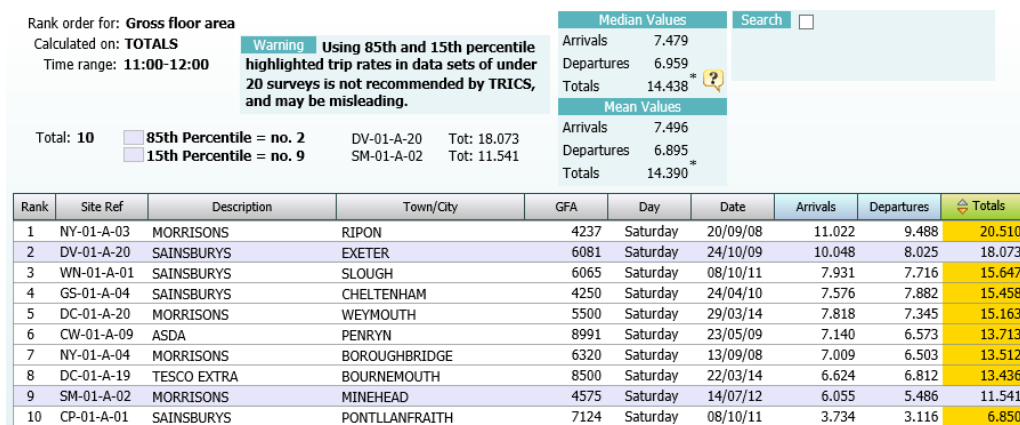
Figure 11.1   85th/15th percentiles are highlighted, often with a warning.

The figure above contains the following:

Rank order for: **Gross floor area**
Calculated on: TOTALS
Time range: 11:00-12:00

Warning: Using 85th and 15th percentile highlighted trip rates in data sets of under 20 surveys is not recommended by TRICS, and may be misleading.

Total: 10

85th Percentile = no. 2   DV-01-A-20   Tot: 18.073
15th Percentile = no. 9   SM-01-A-02   Tot: 11.541

Median Values
Arrivals   7.479
Departures 6.959
Totals   14.438 *

Mean Values
Arrivals   7.496
Departures 6.895
Totals   14.390 *

Search ☐

Rank	Site Ref	Description	Town/City	GFA	Day	Date	Arrivals	Departures	Totals
1	NY-01-A-03	MORRISONS	RIPON	4237	Saturday	20/09/08	11.022	9.488	20.510
2	DV-01-A-20	SAINSBURYS	EXETER	6081	Saturday	24/10/09	10.048	8.025	18.073
3	WN-01-A-01	SAINSBURYS	SLOUGH	6065	Saturday	08/10/11	7.931	7.716	15.647
4	GS-01-A-04	SAINSBURYS	CHELTENHAM	4250	Saturday	24/04/10	7.576	7.882	15.458
5	DC-01-A-20	MORRISONS	WEYMOUTH	5500	Saturday	29/03/14	7.818	7.345	15.163
6	CW-01-A-09	ASDA	PENRYN	8991	Saturday	23/05/09	7.140	6.573	13.713
7	NY-01-A-04	MORRISONS	BOROUGHBRIDGE	6320	Saturday	13/09/08	7.009	6.503	13.512
8	DC-01-A-19	TESCO EXTRA	BOURNEMOUTH	8500	Saturday	22/03/14	6.624	6.812	13.436
9	SM-01-A-02	MORRISONS	MINEHEAD	4575	Saturday	14/07/12	6.055	5.486	11.541
10	CP-01-A-01	SAINSBURYS	PONTLLANFRAITH	7124	Saturday	08/10/11	3.734	3.116	6.850

11.7   A good method to establish the robustness of trip rates is to subject the data to mean/median "cross-testing", and this can also help in identifying the appropriateness of 85th and 15th percentile trip rates. This is a simple procedure that may highlight "weighting" factors in the main trip rate calculation *(see Section 13)*, and is recommended for all trip rate quotations. Users should compare mean trip rates from the main calculation results screen for a selected time period (for example, the peak hour), with the median figure for the same time period in the corresponding rank order list. This can be achieved automatically by selecting the "Cross Test" icon shown on the trip rate calculation results screen. This automated procedure compares mean trip rates with corresponding median values in a dataset's rank order list. A percentage variation figure is then displayed alongside the two trip rate figures. If this variation percentage is low, then, broadly speaking, trip rates can be considered not to have significant "weighting" factors affecting the data's basic level of robustness. If there is a significant difference between the mean and median figures, this suggests that there is "weighting" or "bias" in the data, and that the data may be misleading as a result.

11.8   With larger datasets it would be unusual to see a mean to median variation exceeding 5 percent. With smaller data sets, "weighting" or "bias" in the survey data may have a greater effect. For example one site may be extremely busy whilst the others are not, and this would push the mean trip rates up somewhat. Once you get down to a very small data set (for example 3 surveys), the risk of weighting becomes greater, and this may indeed be reflected in a higher variation percentage figure being displayed. For instance, it would not be unusual for a small dataset of, say, 5 surveys, producing a Cross Test variation greater than 10%. This does not mean that your data is invalid, it just means that "weighting" factors naturally have a stronger effect on the smaller data set. Having said that, should you be presented with a very large variation (say for example 30% or more), then in the interests of good practice and robustness you should carefully examine your site selections to see if all sites selected properly met your intended inclusion criteria. In such cases there may be one particular site that is so different from the rest in the selected set that it is producing a significant "weighting" effect. Where this occurs, a review of the strictness of your search criteria should be undertaken to see if your overall number of selected sites can be increased without compromising your intended criteria. This is a more desired approach than to simply remove the "rogue" site from the selected list. It is important to reiterate that the Cross-Test variation is there to provide users with quick guidance on weighting effects in a selected set, and does not justify the subsequent removal of individual sites from a selected set in order to reduce this level of variation. It should also be noted that should you end up with a very small Cross Test variation, this does not necessarily mean that all of your selections are correct and robust to a given development scenario, it just demonstrates a low level of "weighting" taking place. Care should always be taken when agreeing criteria for site selection.

11.9 TRICS® cannot provide an indication of what is an 'acceptable' mean to median variation percentage for any individual situation. As a general rule, the larger the dataset the smaller the variation will tend to be, but this may not necessarily be the case. The Cross test is intended to provide an indication only of "weighting" effects due to natural fluctuations in the survey data and influencing factors. TRICS® encourages users to follow good practice in selecting a dataset for trip rate calculation, and to achieve a balance between the strictness of selection criteria and the corresponding survey sample used in the trip rate calculation. The general rule is the more sites included the better, but not to the extent that your selection criteria is not selective enough for your particular case. Although the Cross-Test feature is a good indicator of the level of weighting taking place in a dataset, this Good Practice Guide should be TRICS® users' first point of reference in producing reliable and robust data outputs. In cases where there are significant levels of Cross Test variation TRICS® encourages scrutiny of the selection process and a more inclusive approach to selection criteria where appropriate.

Figure 11.2 "Cross-testing" of mean and median trip rate values

11.10 TRICS® will highlight the 85th and 15th percentile trip rates whenever 6 or more surveys are selected in the data set. TRICS® cannot endorse any presentations of 85th and 15th percentile trip rates by data suppliers if "cross-testing" *(see 11.7)* reveals problems with robustness and reliability. It automatically cannot endorse any 85th and 15th percentiles if there are less than 20 surveys selected (this becomes the direct responsibility of the data supplier). And as 85th and 15th percentiles are not highlighted by TRICS® for data sets of under 6 survey days, any such presentation of 85th and 15th percentile figures with such small data sets is misleading, if these figures were in any way directly obtained from TRICS®. A user with such a small data set may want to apply their own formulae to obtain 85th and 15th percentile data, but this has to be made clear in every single case (i.e., that such formulae have been applied outside of and in no way involving the TRICS® system).

11.11 It should also be noted that presenting relatively high trip rates may wrongly inflate potential parking levels, and therefore use of 85th percentile trip rate figures needs to reflect this possibility.

11.12 Users should be aware that rank order lists of trip rates can be obtained for either a stated time period, or for the "peak hour" on a site-by-site basis. The latter method selects the peak hour of activity for each individual survey in the selected set, regardless of time period. Therefore, "cross-testing" *(see 11.7)* is not applicable whenever the "peak hour" rank order list calculation method is selected, as cross-testing relies on a time period comparison between the trip rate calculation results screen and the rank order list. Users should always clearly state what methods for calculating rank order lists have been adopted in each individual case.

12 Re-surveys and multi-surveys

12.1   Often, existing sites are visited by TRICS® for a re-survey, to see how traffic and transport patterns have changed over time. Sites that have been surveyed on more than one occasion are identified clearly in TRICS®.

Select	Reference	Description	Map	Town/City	Area	Location	GFA	Status
☑	BT-01-A-02	SAINSBURYS		ALPERTON	BRENT	Suburban Area (PPS6 C	7899	One-Off
☑	BU-01-A-01	SAFEWAY		HIGH WYCOMBE	BUCKINGHAMSHIRE	Edge of Town Centre	5800	One-Off
☐	CB-01-A-04	MORRISONS		CARLISLE	CUMBRIA	Suburban Area (PPS6 C	7800	**Initial**
☑	CB-01-A-05	TESCO		CARLISLE	CUMBRIA	Edge of Town	6050	One-Off
☑	CB-01-A-06	MORRISONS		CARLISLE	CUMBRIA	Suburban Area (PPS6 C	7800	**Re-Survey**
☑	CF-01-A-01	SAINSBURYS		CARDIFF	CARDIFF	Suburban Area (PPS6 C	4500	One-Off
☑	CH-01-A-01	SAFEWAY		CHESTER	CHESHIRE	Edge of Town	4544	One-Off
☑	CN-01-A-02	SAINSBURYS		CAMDEN	CAMDEN	Edge of Town Centre	5700	**Re-Survey**
☑	CP-01-A-01	SAINSBURYS		PONTLLANFRAITH	CAERPHILLY	Edge of Town	7124	One-Off

Figure 12.1   Initial Survey and Re-Survey sites are highlighted in site lists

12.2   There are three types of site label in the database: one-off, initial survey, and re-survey. A one-off site appears only once in the database, and was surveyed on one single occasion. An initial survey represents a site that was visited at a later date for more surveys (represented by a re-survey label). To make connections between all initial surveys and re-survey sites clearer, there is a direct link within the Site Details screen of all affected individual sites.

Re-Survey history		
Previous survey	DC-01-A-12	View
Next survey	DC-01-A-20	View

Figure 12.2   Initial Survey and Re-Survey sites are linked in Site Details

12.3   It is good practice to avoid including any particular development more than once within a selected data set. This can occur if a user inadvertently includes both a re-surveyed site and its re-survey for trip rate calculation, and can lead to "weighting" of trip rate results *(see Section 13)*. Because of this, users should note the feature in TRICS® which identifies where developments have been included twice in the selected data set. Such incidences are highlighted in yellow, within the Selected Sites option in the trip rate calculation process. It should be noted that by default the system deselects sites that have been re-surveyed by others in the same dataset, but ultimately it is the user's responsibility to ensure that individual developments are included only once. If users include both the re-surveyed and the re-survey site in a selected set, the resulting trip rate calculation data cannot be endorsed as being representative by TRICS®.

Select	Reference	Description	Map	Town/City	Area	Location	GFA	Status
☑	BT-01-A-02	SAINSBURYS		ALPERTON	BRENT	Suburban Area (PPS6 C	7899	One-Off
☑	BU-01-A-01	SAFEWAY		HIGH WYCOMBE	BUCKINGHAMSHIRE	Edge of Town Centre	5800	One-Off
☐	CB-01-A-04	MORRISONS		CARLISLE	CUMBRIA	Suburban Area (PPS6 C	7800	**Initial**
☑	CB-01-A-05	TESCO		CARLISLE	CUMBRIA	Edge of Town	6050	One-Off
☑	CB-01-A-06	MORRISONS		CARLISLE	CUMBRIA	Suburban Area (PPS6 C	7800	**Re-Survey**
☑	CF-01-A-01	SAINSBURYS		CARDIFF	CARDIFF	Suburban Area (PPS6 C	4500	One-Off
☑	CH-01-A-01	SAFEWAY		CHESTER	CHESHIRE	Edge of Town	4544	One-Off
☑	CN-01-A-02	SAINSBURYS		CAMDEN	CAMDEN	Edge of Town Centre	5700	**Re-Survey**
☑	CP-01-A-01	SAINSBURYS		PONTLLANFRAITH	CAERPHILLY	Edge of Town	7124	One-Off

Figure 12.3   A development appearing twice in a selected set is highlighted and is deselected by default

12.4 Often, individual sites will have more than one survey day included in their record. After all, in TRICS® version 7.3.1, there are 4,773 sites and 7,310 survey days. For example, a food superstore may include a set of Friday, Saturday and Sunday surveys in its site record, or there may be seasonal surveys covering 3 separate Saturdays at different times of the year. It is good practice to ensure that whenever trip rates are calculated, each site in the selected set is represented by only 1 survey day. By default, TRICS® selects only the most recently undertaken survey per site selected *(see 12.3)*.

12.5 If a user includes more than 1 survey day for any site within a selected set, it introduces the possibility of "weighting" *(see Section 13)* affecting the data and making it unrepresentative. All survey days used in a trip rate calculation for each site are available as part of the trip rate results output, so if a data recipient thinks that multi-surveys at individual sites were included in the data set, clarification should be sought from the data supplier.

12.6 TRICS® allows the user to ensure that only 1 survey day per selected site has been included in the data set, by selecting a tick box in the Selected Days option within the Secondary Parameters stage of the trip rate calculation process. There are two tick box options, entitled "Most Recent Survey Only" and "Busiest Survey". The former selection is the TRICS® default option, as this automatically ensures that only the most recent survey at each individual site is included in the selected data set. The second option, "Busiest Survey", is similar, although in this instance the survey day with the highest total daily vehicle activity is selected for each individual site, rather than the most recent survey. As "Busiest Survey" will tend to produce higher trip rates, it is vital that data suppliers incorporating this selection make it clear to recipients that the trip rate data produced reflects this choice, and that it is possible that the data provided is closer to a "worse case scenario" in terms of traffic generation than a true average (as will more likely be obtained by the "Most Recent Survey Only" selection). Failure to provide this information to data recipients is misleading, especially if an "average" trip rate rather than a "worse case average" has been agreed upon.

Figure 12.4   "Most Recent Survey Only" & "Busiest Survey" selections

12.7 The "All Surveys" third option includes all survey days in the selected set. However, users should be aware that use of the "All Surveys" option could result in multi-surveys being included in the data set, which would not comply with good practice.

13   Weighting factors in trip rate calculations

13.1   As discussed above *(see Section 12)* there are a number of "weighting" factors which can influence trip rates generated by TRICS®. In a selected data set, these can consist of a site with unusually high or low traffic/transport generation, a site with a trip rate calculation parameter value (e.g., Gross Floor Area or Number of Employees, etc.) which is significantly higher or lower than the majority of the sites in the selected set, or a combination of both of these factors. Users need to take care to examine their data set for such influences to prevent the generation of misleading trip rate results.

13.2   A good method for identifying the effect of weighting factors is "cross-testing" *(see 11.7)*, which can reveal weighting effects on comparisons between mean trip rates (averages produced in the main trip rate calculation results table) and median trip rates from a subsequent rank order list. However, cross-testing on its own does not prove robustness and reliability of trip rate results, and users are encouraged to examine their selected data sets in a more thorough manner. It is important to understand that cross-testing cannot be used if rank order lists are calculated by the "peak hour" method *(see 11.10)*.

13.3   A rank order list is a good place to look for weighting factors. Users should look at all rank order lists produced to see if the range of trip rates displayed rises from the bottom of the list in a steady, reasonably incremental order. If there are one or more trip rates displayed in a rank order list which seem out of place when compared to the pattern of trip rates in the list in general, this could identify a problem.

13.4   Also, if a user looks at a selected set of sites within the trip rate calculation process, and notices sites with either significantly higher or lower trip rate parameter values (e.g. GFA) than would normally be considered consistent with the general pattern of values in the list, then these sites might be considered for removal. If a data recipient suspects that there are weighting factors present in the calculation of trip rates, clarification should be sought from the data supplier. Weighting factors are never totally hidden – they can always be identified and removed from the calculation process through careful use of the system.

14 Trip rates and limits of extrapolation

14.1 TRICS® allows you to produce trip rates and then extrapolate them using an "Estimate" feature in the trip rate calculation results screen. As mentioned earlier, all trip rates are subject to a "trip rate value" factor such as "per 100m² GFA" or "per Employee" etc. *(see 6.2)*, which means that all trip rates produced represent this factor. The "Estimate" facility allows the user to extrapolate trip rates to represent the size etc. of the development being researched.

14.2 For example, if a Houses Privately Owned development of 160 dwellings is being researched, trip rates per dwelling can be extrapolated using the "Estimate" facility, with the user inputting a dwelling value of 160, to show a second column of trip rates (highlighted in grey) next to those originally calculated by TRICS®.

VEHICLES				Estimate TRIP rates ☑								
Survey Start/End: 00:00-24:00				Estimated TRIP rate value per 160 DWELLS								
Trip rate parameter range available: 101 - 196 (units:)				Estimated TRIP rates shown in shaded column (for 160 DWELLS)								

TRIP RATE VALUE PER 1 DWELLS	ARRIVALS Total Rate: 3.866 Peak: 17:00-18:00			Total 618.513	DEPARTURES Total rate: 3.944 Peak: 08:00-09:00			Total 631.223	TOTALS Total rate: 7.810 Peak: 17:00-18:00			Total 1249.736
	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip rate
00:00-01:00	4	127	0.024	3.794	4	127	0.014	2.213	4	127	0.038	6.007
01:00-02:00	4	127	0.020	3.162	4	127	0.014	2.213	4	127	0.034	5.375
02:00-03:00	4	127	0.004	0.632	4	127	0.002	0.316	4	127	0.006	0.948
03:00-04:00	4	127	0.012	1.897	4	127	0.010	1.581	4	127	0.022	3.478
04:00-05:00	4	127	0.008	1.265	4	127	0.006	0.949	4	127	0.014	2.214
05:00-06:00	4	127	0.012	1.897	4	127	0.045	7.273	4	127	0.057	9.170
06:00-07:00	4	127	0.047	7.589	4	127	0.154	24.664	4	127	0.201	32.253
07:00-08:00	31	144	0.082	13.190	31	144	0.307	49.128	31	144	0.389	62.318
08:00-09:00	31	144	0.154	24.654	31	144	0.410	65.660	31	144	0.564	90.314
09:00-10:00	31	144	0.169	27.026	31	144	0.221	35.436	31	144	0.390	62.462
10:00-11:00	31	144	0.148	23.684	31	144	0.181	29.003	31	144	0.329	52.687
11:00-12:00	31	144	0.185	29.542	31	144	0.188	30.081	31	144	0.373	59.623

Figure 14.1   The "Estimate" feature produces extrapolated trip rates

14.3 Extreme care should be taken when extrapolating trip rates, as there are varying degrees of accuracy when extrapolating by different land use, survey sample size, and trip rate calculation parameter. Users are encouraged to ensure that, for example, the average trip rate parameter value of their selected surveys (as shown on the trip rate calculation results screen) is as close as possible to the corresponding size (or other value) of the development being researched (without compromising the selection criteria). The same approach should apply, regardless of the trip rate parameter being used in the calculation.

14.4 The reliability and robustness of any extrapolation can be tested by analysing the rank order list scatterplots. Take, for example, the residential land use category of 03/A – Houses Privately Owned. If the same sample of sites are calculated first by Site Area and then by Number of Dwellings, the "line of best fit" on the rank order scatterplot fits the data better when calculated by Dwellings than when calculated by Site Area. This is because the Site Area selection does not take into account the varying density of developments within the selected data set, resulting in a greater error margin displayed on the corresponding scatterplot.
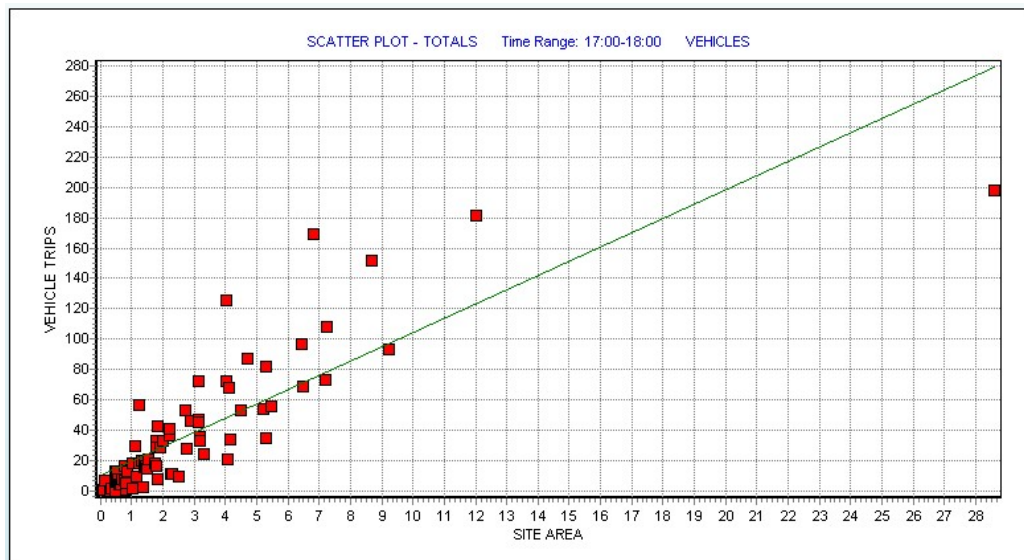
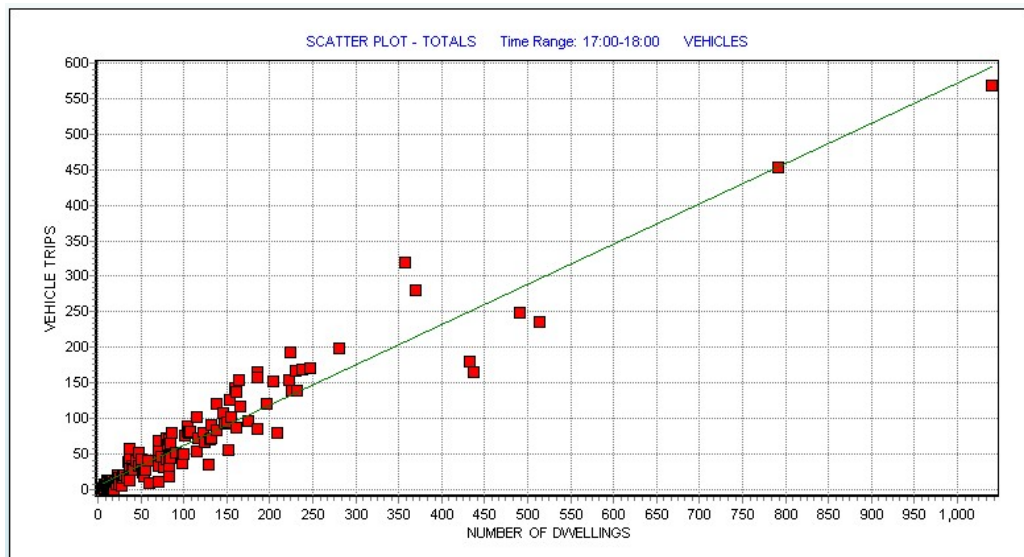**Figure 14.2(a)   Trip rates by Site Area – higher extrapolation margin of error**

Figure 14.2(b)   Trip rates by Dwellings – lower extrapolation margin of error

14.5   The above example illustrates the approach that should be adopted when extrapolating data; graphs for each possible method should be produced and the method that fits most closely (i.e., produces the least scatter) should be regarded as the most reliable. However, users should always proceed with caution in identifying what is to be considered a safe limit for extrapolating trip rates, and should use scatterplots to back up their data in cases of dispute. The amount of scatter will, of course, vary, depending on the data set and land use category selected, along with external factors which may also influence trip rates.

14.6   There are sometimes clear correlations shown on scatterplots between trip rate parameter (x axis) and level of trips (y axis), an example being shown in Figure 14.2(b) above. However, there are often no clear correlations evident, depending on the land use and trip rate parameter selected. In such cases, use of the Estimate feature to extrapolate trip rates might not be appropriate, or if is to be used, the large error margins evident on the scatterplot should be taken into account when providing results. Figure 14.3 (below) appears to show that food superstores do not display any relationship between GFA and vehicle trips, therefore giving a big error margin and

limiting the accurate use of the Estimate feature. However, this does not necessarily tell the whole story. It is known that there is in fact a relationship between GFA and level of trips for food superstores, but that other, external factors have such an influence on trip generation, that they influence the scatterplot accordingly. Such influential factors may be local competition and demographic/economic considerations. The thing to remember is that TRICS® is designed to provide guidance on a range of potential trip generations, rather than an absolute prediction for any specific scenario. This is because there are many factors that can affect trip rates, both internal and external to the selection parameters available within TRICS®.
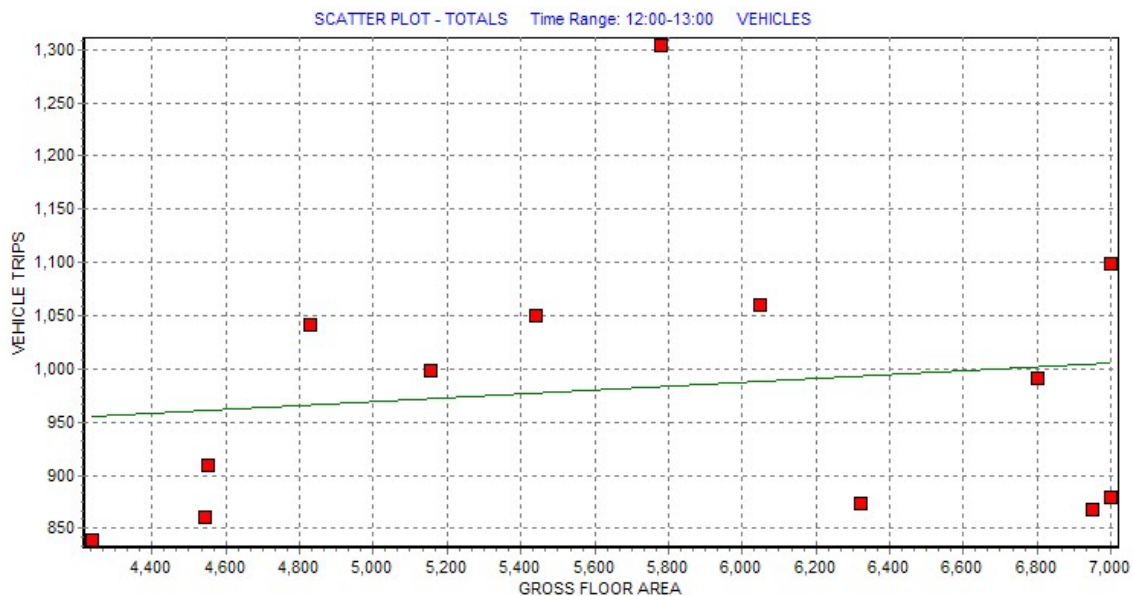
Figure 14.3   Lack of an apparent visual correlation between GFA and trips at food superstores (manufactured sample for illustrative purposes)

14.7   Figure 14.3 (above) shows that when a relatively small data sample for food superstores is displayed in a rank order list, it can appear that there is no clear, visual relationship between GFA (x axis) and vehicle trips (y axis). However, if we use a larger data set, such as that shown in Figure 14.4 (below), we can see that there are indications that there is indeed a relationship. The relationships for some land use categories and trip rate parameters are more obvious than others, and may be affected more or less by external factors outside of TRICS®, such as demographic considerations. Therefore, you cannot say that Figure 14.3 shows a lack of a relationship between GFA and vehicle trips. Instead, you would need to say that there is no obvious visual correlation, but that this may be due to factors external to TRICS® having a greater influence on trip rates than for other land use category and trip rate parameter combinations. Of course, in some cases there may not be a direct relationship between the trip rate parameter level and the level of trips. Current research into economic factors which influence trip rates may provide further assistance in this area. It is advised that whenever a scatterplot appears to show a non-relationship, that a larger data set is also provided as evidence that a relationship does or does not exist, and if it does, that it is heavily influenced by external factors (like the example of the two Figures 14.3 and 14.4).
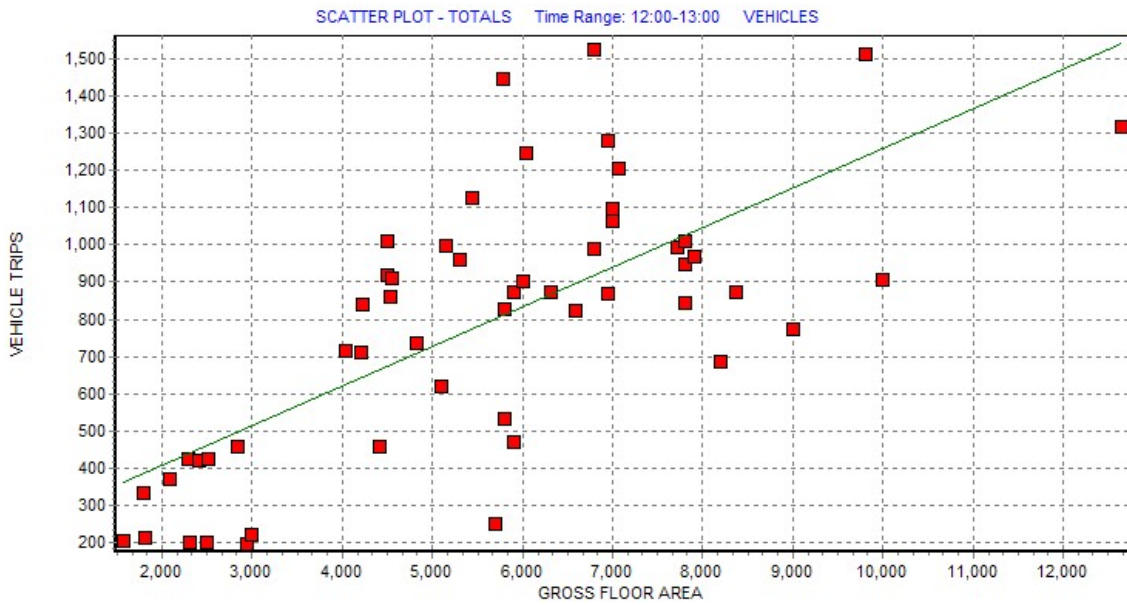
SCATTER PLOT - TOTALS   Time Range: 12:00-13:00   VEHICLES

Figure 14.4   Indication of a visual correlation between GFA and trips at food superstores, albeit heavily influenced by external factors

14.8   Whenever extrapolated trip rates produced by the "Estimate" feature are quoted, it should be made clear by the data supplier that this feature has been used, and that the trip rates quoted have not been directly taken from the original trip rate calculation results, before the extrapolation took place.

15   Mixed use sites and TRICS®

15.1   Users often require trip rates for a site constituting a number of different types of development (for example, employment land uses mixed with leisure, etc). There are a number of mixed use or "multi-use" sites within TRICS®, but due to the nature of sites being researched, users may need to investigate the individual components where insufficient sites within the "Mixed Use" land use category are considered to be compatible. It should also be noted that due to their diverse nature, mixed use" surveys cannot be used to calculate trip rates in TRICS®.

15.2   When compiling trip rates for individual components making up a mixed use site, users need to be aware that any cross-visitation activity between individual components will not be present within the trip rate results, and should be noted appropriately. Users should inform data recipients that the trip rates presented are for the individual components within the site, and that the sum of all trip rates does not constitute the mixed use site as a whole. Stating that the trip rates of constituent developments represent the site as a whole could be misleading and unrepresentative. The only exception is when a site or sites within the Mixed Use land use category have been used to produce trip rates manually (i.e. outside of TRICS®). Trip rates should be presented in line with the results of mixed use research undertaken by TRICS® (see Trip attraction rates of developments with multiple retail and leisure uses – TRICS® research report 05/1, available within the TRICS® Library module from the main menu). Other reports that may be of interest include 97/1 ("Transport Characteristics of Non-Food Retail Parks" – JMP Consultants Limited) and 99/1 ("Transport Characteristics of Foodstores at Retail Parks" – JMP Consultants Limited).

15.3   If users decide that they want to apply any factors to the results of trip rates derived from individual mixed use site components, to take into account assumed levels of cross-visitation etc., it should be made clear what the original trip rates provided by TRICS® are, and what factors have been applied. It should also be made clear that the role of TRICS® ended when the original trip rates were calculated, before any factoring took place. TRICS® does not endorse any factoring methods that users may apply to data. It is the user's responsibility to provide evidence in support of any factoring applied.

16 Understanding count type definitions

16.1 It is important that users fully understand the definitions of the many count types present within TRICS®. The number of count types have increased in recent years to allow greater detail within survey results, and definitions of all count types can be found within the Help section of TRICS®, which can be accessed by selecting the Help icon at any stage during use of the system.
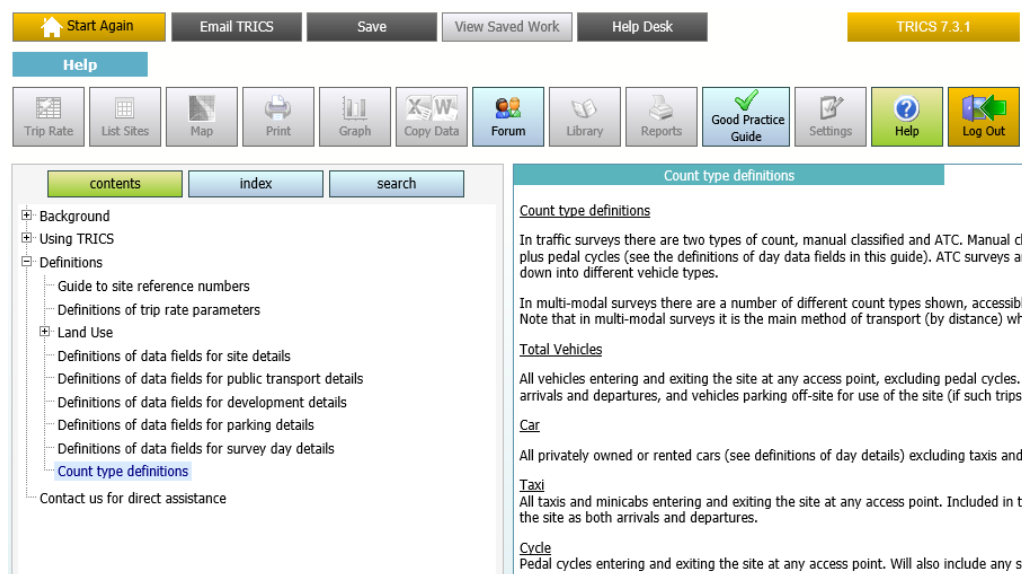

Figure 16.1   Count type definitions are available within "Help"

16.2 Users should ensure that they correctly present all trip rate and count data as defined by TRICS®, using the TRICS® count type names in each case so that trip rates can be audited by a third party. If, for example, users supply data stating that "this is the trip rate for cars", this would be incorrect and misleading, as there is no such count type ("cars" makes up one of 7 vehicle types within the Total Vehicles count, and do not have separate hourly figures available). All count types (as at TRICS® 7.3.1) are displayed in the figure below. Note that a new count type "taxis" was added to TRICS® in 2006, along with counts for bus passengers, train passengers and coach passengers. It should also be noted that PSV, OGV and pedal cycle counts were introduced in 1998, with all count data in the system prior to this enhancement not containing these count splits. Also note that Car, Motorcycle and LGV counts were introduced in 2013, with all surveys undertaken in 2013 onwards containing this additional survey count breakdown. Note that from 2015 onwards, multi-modal surveys in Greater London also included the modes of Docklands Light Rail, Overground, National Rail and Underground.

16.3 The methodology of obtaining count types within surveys should also be understood. Definitions of each count type are available within the Help module (as shown above). Users may be aware that it is sometimes the case that the number of vehicles exceeds the number of vehicle occupants for a given time period in a survey count. This can be explained by the fact that drivers of vehicles picking up/dropping off people at a site are excluded from the vehicle occupants count. Auditors of TRICS® data should be aware of this – the data in the system is correct, it is just a matter of understanding the count type definitions correctly.

16.4 It is also important, in the case of multi-modal surveys, to understand that modal split pie charts represent the split of total trips throughout the survey duration. For example, if we look at an office site near a town centre, there may be a significant number of pedestrian trips at lunchtime to and from the town centre, and of course TRICS® will

record these. In the example shown below, the percentage of total people trips that were pedestrians is shown in the modal split pie chart as 40.3%. It would be misleading for a data supplier to claim, from viewing the pie chart for this site, that 40.3% of employees walk to work, as this is clearly not the case. It would be correct to state that 40.3% of all recorded trips to and from the site were on foot, covering all journey purposes.

Modal Split Percentages for CA-02-A-05 Surveyed: 16/12/14 Tuesday
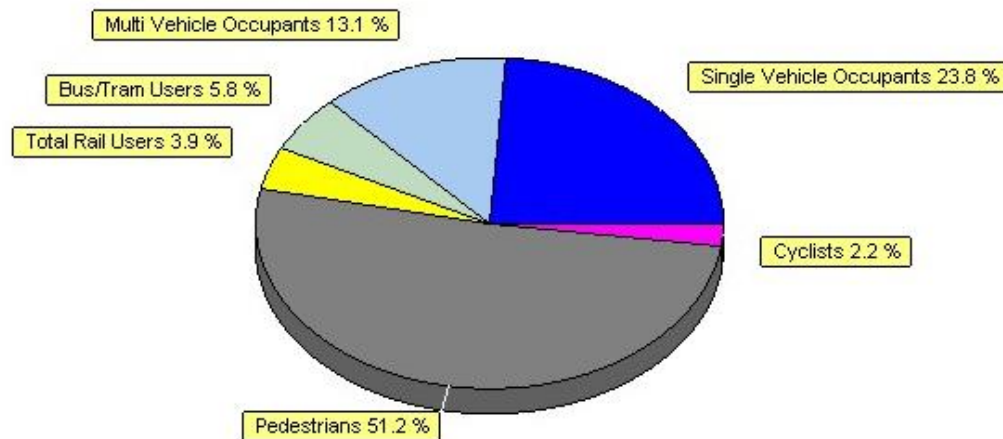
Figure 16.2   Modal Split pie charts represent total trips per mode

Figure 16.3   Multi-modal count types in TRICS® 7.3.1

17 Correct presentation of trip rates and methods

17.1 It is vitally important that all data obtained from TRICS® is presented in the correct manner that in no way misleads the recipient. Data producers have a responsibility to ensure that all TRICS® data generated has met the standards as outlined in this document.

17.2 All data obtained through the use of TRICS® must be re-traceable by a third party auditing the data. Any third party with use of the system should be able to examine the data provided and be able to re-create all procedures used in the production of that data. For example, if a data supplier states that "a trip rate of 2.34 arrival trips for the hour 1700-1800 per 100m² of Gross Floor Area was generated", this cannot be taken as proven unless the methods used to produce this figure are included in the report, in either the main body of the report or as an appendix.

17.3 If an attempt at auditing TRICS® data fails due to lack of supporting information provided by the original data supplier, the auditor should request the missing information from the data supplier. This information is always available, and there is no acceptable technical reason in TRICS® why this should not be the case.

17.4 If full procedures as to how TRICS® data has been obtained are supplied to an auditor, but the trip rates originally generated are different to those generated by the auditor, both parties must work together to ensure that replication of trip rates is completed successfully. The best approach to avoid such differences in trip rates is for the data supplier to include in the report TRICS®-generated information stating the procedures used in the production of the original trip rates. If this information is supplied in full, sufficient for the auditor to trace how the trip rates were generated, there should not be any differences in the trip rates calculated by the data supplier and the auditor. If, however, the procedural information has been written in a non-TRICS® format, errors can occur.

17.5 In the main body of a report, trip rates generated by TRICS® should always be presented in their full and correct context. It should be made clear in each instance what exactly is represented by the trip rates quoted. For example, a statement saying "trip rates of 3.26 were generated by TRICS®" is insufficient, not containing enough information for the recipient to successfully audit the data. All trip rates quoted must display the relevant time period, direction, and trip rate calculation factor *(see 6.2)*, for the trip rates to be fully understandable. A correct version of the above statement would be "trip rates of 3.26 trips per 100m² GFA, for the arrivals period 1700-1800, were generated by TRICS®".

17.6 The version of TRICS® used to obtain data should also be stated, either in every case of a trip rate being presented, or at the beginning of the section of the report containing trip rate data.

17.7 In each case where trip rates are presented, the land use category used to obtain the data should also be made clear. It is quite incorrect to state, for example, that "residential trip rate arrivals were 4.11 per household for the 1700-1800 time period", if the type of residential land use category is not made clear. As there are 111 separate land use categories within TRICS®, confusion can easily arise if the relevant land use sub-categories used in the production of trip rates are not clearly indicated.

17.8 Although TRICS® can provide information showing the site selection criteria applied when calculating trip rates, it does not show the reasons why such criteria were applied. This is the sole responsibility of the data supplier, who must ensure that the reasons behind all selections made using TRICS® are explained in full to the data recipient throughout the report. Failure to provide such reasons might be regarded as an attempt to mislead the data recipient.

17.9   Auditors of TRICS® data should take care to check that the name of an organisation shown at the top of TRICS® printouts matches the name of the organisation who have produced the overall document in which the TRICS® data is contained. This is another good reason to request that all TRICS® outputs are supplied in full for auditing. There have been occasions when trip rate calculations have been undertaken in unlicensed conditions, and such calculations are not considered valid by TRICS®. Other than when the TRICS® Bureau Service has been used to produce data, the organisation names should always match. If any auditors are in doubt about the licensing status of an organisation presenting TRICS® results they should contact a member of the TRICS® team immediately for clarification.

18 The Standardised Assessment Methodology (SAM)

18.1   In 2005 TRICS® introduced a national standard methodology for assessing the effect of travel plans, known as SAM. It is designed to monitor the influence of travel plans on trip generation and mode choice behaviour.

18.2   A Number of local authorities have introduced the need for SAM surveys into planning agreements for new developments, so that travel plan targets can be measured against actual trip activity. For this purpose, a "Travel Plan" data section has been introduced into TRICS®, which contains comprehensive information on a site's travel plan measures, dates of their implementation, and their costs. As shown in Figure 18.1 below, surveys undertaken for the SAM project can be easily identified within the database. Surveys with Travel Plan data sections within them are known as Level 3 Surveys, with traffic surveys being Level 1 and standard multi-modal surveys being Level 2.

Figure 18.1   SAM surveys can be identified when viewing site lists and using the "Additional Columns" feature to add the SAM column

18.3   Many of the Local Highway Authorities within the South East of England and London recommend that TRICS® Level 3 surveys are undertaken to monitor the effectiveness of travel plans. They also often recommend that the surveys are undertaken in years 1, 3 and 5 of the operation of the site's travel plan, as a minimum. This enables sufficient monitoring over time, including the effect evident by changes in the travel plan over this period.

18.4   It is highly recommended that SAM surveys are undertaken using TRICS®-approved data collection contractors, with the surveys project-managed by the TRICS® team.

18.5   As all SAM surveys are undertaken to the standard TRICS® data collection methodology, they are fully compatible for inclusion in standard TRICS® trip rate calculations, subject of course to the usual criteria for selection. There is no fundamental reason why any sites highlighted as SAM should be excluded from selected sets for calculation.

18.6   As with all types of survey, there may be factors external to a site's travel plan that influence trip rates. For example, these can include weather and economic conditions. Users should not claim that a specific element of a site's travel plan has directly influenced trip activity, unless this can be independently proven to be the case.

18.7   If providing trip rate generation data from an individual SAM site, it is good practice to include the Travel Plan data section in reports, as this will provide the data recipient with additional, descriptive information about the organisation of the site's travel plan.

18.8   In December 2012 a new feature, the Travel Plan Monitoring Report (TPMR) Generator, was made available to all users. This facility allows users to generate a report that provides a summary of trip generation and modal split, along with travel plan measures, for any individual site surveyed with a Travel Plan data section. This is a very handy facility for monitoring the effect of individual development travel plans. Users are encouraged to present TPMR reports in line with the Good Practice Guide, in that they should explain to recipients of reports what is being presented in a clear manner, providing additional commentary should this be requested by report recipients.
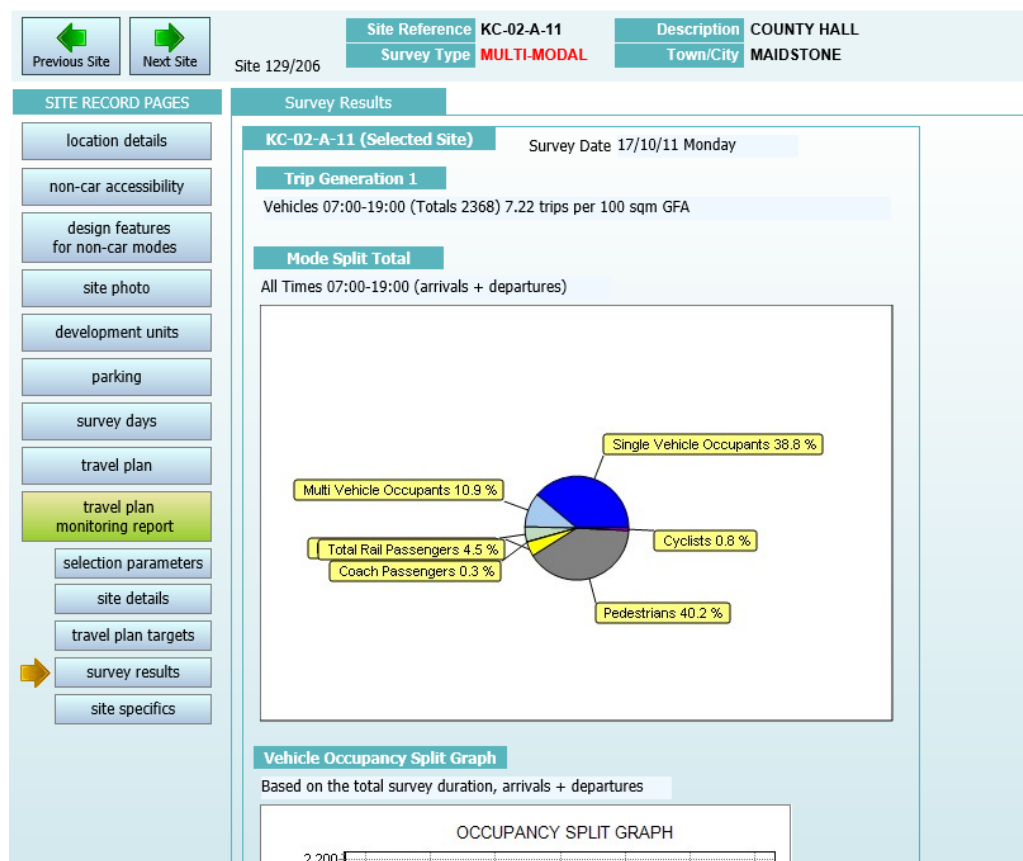

Figure 18.2   The Travel Plan Monitoring Report facility can provide instant reports complete with explanatory commentary on the monitoring of a site's travel plan

19 Summary

19.1 The TRICS® Good Practice Guide 2016 is endorsed by TRICS® Consortium Limited and its shareholders as the best approach for the production of trip rates, to ensure robustness and reliability, and the best approach to the presentation of TRICS® data.

19.2 The most up-to-date version of TRICS® is made clear by the system. It is recommended that the current version of the system is used in all cases. However, there may be circumstances in which use of an earlier version of the system is justified.

19.3 It is important for users of the system to understand land use definitions, to ensure that the correct types of site are used in individual projects. The TRICS® Help system defines all of the 110 land use categories in the database.

19.4 Location type, both main category and sub-category, is a very important factor in the selection of sites for trip rate calculation. There is no clear evidence to suggest that users should select sites by regional category; it is more appropriate to select sites which meet similar local environmental and location-type conditions, within agreed criteria.

19.5 Comment boxes are a very useful part of individual TRICS® site records, often revealing important information not covered by fixed-fields in the database. They allow the user to understand individual sites and their surveys in more detail, and should not be overlooked.

19.6 There are many different data fields used to calculate trip rates (known as Trip Rate Parameters), which vary by land use category. Full definitions of these fields are found within the system's Help section, and it is very important that users understand them.

19.7 There is no fixed rule on the use of older TRICS® data. A default data cut-off of 8 years is in place, but users may amend this if they wish. Helpful research into the use of older TRICS® data is available within the TRICS® Library module. As a result, some useful factors which may influence trip rates by land use category can now be viewed within the system.

19.8 Trip rates can vary significantly by the time of the year, although this varies by land use category. Users are encouraged to ensure that they take into account seasonal variation when producing and presenting their results. Research into Seasonal Variation is also available within the TRICS® Library module.

19.9 Peak hour trip rates need to be clearly defined by the user, as there is sometimes confusion between "road peak hours" and "site activity peak hours". Care also needs to be taken when selecting survey days, as certain types of site tend to operate differently on weekdays than at weekends. Mixing these two types of day in selected sets of surveys results in misleading and unrepresentative trip rates.

19.10 Users should not use TRICS® in order to try to "fit" trip rates into pre-determined preferred levels. TRICS® allows users to provide a model of potential traffic and transport generation – it is not to be misused in a way that is designed to mislead a data recipient. There are methods which data auditors can use to test the robustness of the data supplier's approach. Users should always follow the First Principle of Good Practice, known as ADD.

19.11 The general rule for representative sample sizes in TRICS® is "the more the better". However, this is not always an option. Users are encouraged to find a balance between the strictness of their selection criteria and the level of data available. The method of "cross-testing" is a valuable tool in establishing basic robustness of data, although a more thorough audit is highly recommended, especially when 85th and 15th percentile trip rates are presented for a selected time period.

19.12   A number of sites are re-surveyed within TRICS® at a later date. To avoid "weighting" in the data sample, users should ensure that only 1 record of an individual site is included in a data set at any one time. The same applies to survey days – users are given the default option to include only 1 survey day from each site selected.

19.13   "Weighting" factors can influence trip rates, as the main trip rate calculation consists of an "average" of all site surveys in the final selected set. Users can use "cross testing" to identify any weighting that takes place, but there is also the need for closer scrutiny of the data set to identify any sites with unusual trip rates and/or development data which may be disproportionately influencing the data set.

19.14   The limits by which users can extrapolate trip rates using the system's "Estimate" feature vary according to the survey sample size, land use category, and trip rate calculation parameter. By testing a rank order "scatterplot", users can determine a reasonable level of reliability for trip rate extrapolation or "fine tuning", to closer represent a development being researched.

19.15   External demographic and economic factors not present in TRICS® may influence trip rates by varying degrees across land use categories and trip rate calculation parameters. A rank order scatterplot for a survey sample may appear to show a lack of correlation between trip rate parameter and trip generation, but this does not necessarily prove that no relationship exists. In such cases, users should produce a comparative scatterplot for a larger data set, to see if the relationship between the trip rate parameter and trip generation has been "masked" by external factors, with reports taking this into account whenever necessary. Some land use/trip rate parameter combinations may not have a direct relationship, whilst others clearly will have, with any external factors varying in their influence. Users should present their findings in their reports, including any uncertainty from their analysis.

19.16   Users often need to research "mixed use" or "multi-use" developments. There are some developments of this nature in TRICS®, but users need to be aware that, if using individual sites to make up components of a mixed use development, any cross-visitation trips are not taken into account by the system. This needs to be made clear in reports to data recipients. Research into multi-use sites can be found within the TRICS® Library module.

19.17   It is important that users understand the types of count which are present within the TRICS® database. These need to be accurately presented in any data reports submitted. All definitions can be found within the Help section of the system.

19.18   When presenting data to a recipient, users need to use the correct and full terminology for trip rates, so that they can be fully understood. Not clarifying trip rate calculation factors, time periods, trip direction and count type can mislead and/or confuse data recipients, who should always be provided with sufficient information to fully audit the data, and trace the procedures and methods used to obtain it.

19.19   The Standardised Assessment Methodology (SAM) is an integral part of the TRICS® database, and will provide users with information on the effect of travel plans at developments. It is recommended that local authorities use this national standard to assess the performance of travel plans implemented as planning consent conditions, and use SAM data within the TRICS® database alongside its standard data as both types are fully compatible in the system, all SAM surveys being undertaken using the standard TRICS® data collection methodology. The production of Travel Plan Monitoring Reports (TPMR) should be accompanied with explanatory commentary where appropriate.

19.20   Overall TRICS® is an information service. It does not provide direct answers to transport assessment questions. Instead, it provides its users with a system of trip generation ranges, with users needing to take into account all appropriate error margins when

presenting their findings. The careful use of TRICS®, in line with this guidance, will help practitioners make better informed judgements.

19.21   The TRICS® team can manage surveys for client organisations, from the first enquiry through to a site visit, the production of a detailed survey specification following a long established methodology, the actual survey itself (working with our TRICS®-approved data collection partners), and the data input and validation process, right up to the point when the data is fully validated and the finalised results forwarded to the client. By commissioning TRICS® to undertake surveys client organisations can be assured that best practice will be involved right through the process by a team that have vast experience in managing such surveys.

19.22   Any organisation can also undertake their own TRICS®-compliant surveys, by following the established methodology themselves, should they wish to keep the management of a survey in-house. However, for sites to be fully classified as TRICS®-compliant, data needs to be supplied in full to the TRICS® standard to the TRICS® team, who will then put it through rigorous validation testing (at a charge stated on the TRICS® website), before it can be fully considered TRICS®-compliant and a certificate issued to that effect.