Chairman's Message

Daniel K. Hardy, Chair, Transportation Planning Council (dan.hardy@mncppc-mc.org, 301-495-4530)

During the next year, climate change and energy issues will rise to the forefront of many ITE activities. ITE has established a multidisciplinary Climate Change and Energy Task Force that will develop a strategic approach to position ITE as a leader in addressing the transportation industry response to energy and climate change issues. I am honored to have been asked to serve as the chair of this task force and look forward to learning what resources you need from ITE to integrate transportation planning, energy and climate change paradigms into your daily work programs.

Energy and climate change issues are just two of the concerns that need to be incorporated into the next federal reauthorization bill. All ITE members are invited to submit comments on ITE's draft surface transportation reauthorization paper, available on ITE's Web site at www.ite.org/membersonly/Webdraft.081108.pdf.

If you have thoughts you would like the Transportation Planning Council (TPC) to consider for the draft, please let me know. We will be working with ITE staff on some suggested revisions. I want to thank Steve Colman for serving as the TPC representative on the ITE Policy and Legislative Committee during the past five years and welcome Jim Lee as our new Policy and Legislative Committee representative.

Trip generation is the focus of this newsletter and was also the focus of TPC activities for 2008. Thanks go to Don Samdahl for serving as the technical editor for the trip generation materials in this newsletter. In tying together trip generation and the environment, an important step is identifying and implementing land use planning and site design elements that can reduce reliance on vehicle travel, which is a key element in reducing our carbon footprint.

After ITE's publication of Trip Generation, 8th Edition, the TPC will reinitiate coordination efforts on the trip generation wiki. The initial efforts from the wiki are now available on the ITE Web site in the resources section of ITE's trip generation Web page located at www.ite.org/tripgen/otherresources.asp. After reviewing this new page, let me know if you have suggestions for additions to this resource.
I would also like to take this opportunity to introduce Aaron Zimmerman, ITE Transportation Planner. Aaron is the new Transportation Planning Council liaison at ITE Headquarters, and I look forward to working with him on many new projects. Stay tuned for our Web-based survey about how best to serve you, coming to your inbox soon. Please feel free to contact me with your questions and comments at any time.

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What's New with Trip Generation?

By: Don Samdahl, P.E., PTP

ITE is ready to release *Trip Generation*, 8th Edition. The last edition of *Trip Generation* was published in 2003. *Trip Generation* has become one of the most widely used—and often misused—ITE publications. *Trip Generation* is not a recommended practice, yet it is frequently cited by city officials, hearing examiners and judges as the "national standard for trip generation." Certainly it is the most comprehensive compilation of trip generation data and serves as an invaluable resource to many transportation professionals.

Over the years, ITE staff and other professionals have realized that the biggest limitation of trip generation data is a reflection of how the data are collected—the land uses must be stand-alone sites where traffic counts can be conducted in a way that isolates the vehicle trips associated with the applicable land use. This means that most of the sites are located in suburban areas where land uses are more dispersed.

As a result, limited data have been available for land uses within heavily developed urban areas where land uses are in close proximity, parking is shared or limited and extensive trip-chaining occurs between land uses. These mixed use developments are becoming more and more common, but their trip generation characteristics are quite different from the stand-alone sites. In response, ITE published a recommended practice, *Trip Generation Handbook*, Second Edition (2004), that provided insights into mixed use developments and the ‘internal capture’ of trips between land uses. Since that time, new research has occurred that further documents the trip generation characteristics of mixed use developments. The newest research, cited below, documents substantially lower vehicle trip generation rates for mixed use developments.

Also included in this issue of the newsletter is an international perspective on trip generation, first describing the availability of trip generation data in Australia and New Zealand. A second article compares trip and parking generation rates between New Zealand and the United Kingdom.

ITE's *Trip Generation*, 8th Edition

ITE will soon release the eighth edition of its informational report, *Trip Generation*. The three-volume report will contain updated introductory and instructional material (*User's Guide*) as well as two data volumes with revised land use descriptions, trip generation rates, equations and data plots.

Data from more than 550 sites have been added to the eighth edition, bringing the number of data points contained in the database to more than...
In addition, 12 new land use classifications are proposed to be included in the eighth edition, for a total of 162 land uses. The new proposed land uses are:

- Timeshare (265);
- Animal Hospital/Veterinary Clinic (640);
- Sporting Goods Superstore (861);
- Bed and Linen Superstore (872);
- Department Store (875);
- Hair Salon (918);
- Copy, Print and Express Ship Store (920);
- Coffee/Donut Shop without Drive-Through Window (936);
- Coffee/Donut Shop with Drive-Through Window (937);
- Coffee/Donut Shop with Drive-Through Window and No Indoor Seating (938);
- Bread/Donut/Bagel Shop without Drive-Through Window (939); and
- Bread/Donut/Bagel Shop with Drive-Through Window (940).

In addition to the new land uses, *Trip Generation* has undergone many other important updates. Several land uses were expanded significantly with the addition of new data. These land uses include: High-Cube Warehouse (152); Free-Standing Discount Superstore (813); Home Improvement Superstore (862); Discount Home Furnishing Superstore (869); and Drive-in Bank (912). Further, to reflect changes in travel patterns resulting from recent technological advances in the banking industry, data from the years prior to 2000 have been removed from the banking land uses. The elimination of these data resulted in lower trip generation rates for most time periods presented.

Users of *Trip Generation* also may benefit from the *Trip Generation Handbook*, Second Edition. This publication, released as a final ITE recommended practice in June 2004, provides instruction and guidance for the proper use of data presented in *Trip Generation*. Topics include guidance on selecting independent variables and time periods for analysis; methods for estimating trip generation and conducting a trip generation study; evaluation of pass-by/primary/diverted link trips; and estimating trip generation for generalized land uses and multi-use developments. The appendix also contains informational data on truck trip generation and discussions on the effects of transportation demand management and transit on trip generation.

Comparing Methodologies for Estimating Trip Internalization of Mixed-Use Development

Research conducted by Fehr & Peers compares the relative accuracy of five methods for estimating external trip generation of mixed use development through comparison to cordon traffic counts. The five methods include the procedure described in the ITE *Trip Generation Handbook*, state-of-practice travel forecast models, the results of research on the travel effects of the built environment (known as the 5Ds)
and combinations of these techniques. The findings, based on case studies of three mixed-use areas of varying size and mix, suggest that application of 5D adjustments improves the accuracy of both the ITE procedures and the travel forecast models when estimating external trip generation of mixed use development. The source document is www.fehrandpeers.com/ITE_papers.php.

Transportation planners and engineers are increasingly asked to evaluate the impacts of land use plans and development projects that are presented as smart growth concepts. In many cases, these projects incorporate principle #6 on the U.S. Environmental Protection Agency list of top 10 smart growth planning principles, i.e., they are mixed-use.

Evaluating such proposals places members of the transportation profession in a difficult position, regardless of their specialty:

- **Traffic engineers** often find the mixed use projects they are asked to assess too varied in scale and mix to be handled confidently with the data and approaches provided in ITE’s *Trip Generation Handbook*.

- **Travel forecasters** are challenged to represent the ability of macroscopic regional models to address the sub-TAZ and neighbor-TAZ small cluster accuracy and sensitivity of their models to handle complex, micro-scale interactions of individual projects.

- **Researchers and academics** find that the growing body of learned investigations of the relationships between travel and the built environment are not fully informing the profession in a manner that would produce adoption into daily use on practical applications and problem-solving.

- **Transportation planners** would like to rely on the wisdom of the above groups to inform their project analysis and decisions and are looking for reliable, understandable guidance and methods.

This paper takes the initial steps toward a methodology whereby transportation planners, researchers, modelers and engineers can ground truth and operationalize their knowledge on the subject of mixed-use trip generation. When compared with methods offered in the ITE *Trip Generation* informational report and handbook and with best-practice four-step travel models, the 5D adjustments improve the ITE or model estimates by a factor of two, reducing the error by about 50 percent. In two of the three cases studied, the 5D adjustments brought the ITE-based external trip estimates to within 2 percent of counted traffic volumes. In the same two case studies, the 5D adjustment brought the model-based external trip estimates to within 8 percent of the actual traffic count.

The results suggest that additional studies of this type could provide higher levels of confidence and greater understanding of the role of 5D in influencing trip generation of mixed use developments.

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**New Procedure for Trip Capture for Mixed-Use Developments**

Brian Bochner of Texas Transportation Institute is leading NCHRP 8-51, which is intended to develop improved methods to estimate internal capture for mixed-use developments. Brian presented the project status at the ITE 2008 Annual Meeting and Exhibit in Anaheim, CA, USA. He indicated that one of the goals of the project is to develop an improved methodology that is intended to expand the ITE method to include:

- Six major land uses;
- Both a.m. and p.m. peaks;
- More data; and
- Sensitivity to proximity.
The original hope of this project was to have up to 46 studies. At this point, there are sufficient funds for three studies. These three studies have five to six land uses that include the following:

- Office
- Retail
- Restaurant
- Residential
- Hotel
- Cinema

The project review panel has expressed several concerns related to data sampling, interview method, sample expansion methods and the comprehensibility of the proposed method.

The draft report is expected at the end of 2008 and will further the knowledge of mixed-use development impacts.

### Trip Generation at Transit-Oriented Development


1. TODs behave differently in terms of trip generation and parking ratios;
2. TODs allow reductions in parking and trip generation resulting in the ability to provide greater development densities; and
3. Examples of the research findings in several TOD areas in the United States indicate the following daily vehicle trip generation patterns:
   - Philadelphia, PA, USA – 27 percent below ITE;
   - Washington, DC, USA – 60 percent below ITE;
   - Portland, OR, USA – 40 percent below ITE; and
   - San Francisco, CA, USA – 48 percent below ITE.

This research will add to the body of knowledge on mixed use effects.

### Trip Generation Rates for Urban Infill Land Uses in California

A research study is being conducted for Caltrans to document trip generation characteristics of infill development within California’s metropolitan areas. Led by the Association of Bay Area Governments and Kimley-Horn and Associates, the objectives of this research are to develop and apply a methodology for collecting trip generation data in urban infill areas, followed by a data collection effort to document the trip generation rates. The resulting method data are expected to be submitted to ITE for consideration for inclusion in a future edition of the *Trip Generation Handbook*. 
International Trip Generation

The following two articles give an international perspective on trip generation focusing on availability of trip generation data in Australia and New Zealand and comparing trip and parking generation rates between New Zealand and the United Kingdom.

Australia and New Zealand Joint Trips Database Bureau

Ian Clark’s presentation, “Trip Rate and Parking Databases in New Zealand and Australia,” presented at several conferences in 2007 in both New Zealand and Australia, resulted in a bold initiative this year. In September at the Australian Institute of Traffic Planning and Management conference in Perth, it was agreed to proceed with developing a joint Australian and New Zealand practitioner-based cooperative bureau, which would use trip survey information from both countries. The NZ Bureau was set up in 2002, following the 2001 publication of the government funded NZTA Research Report No. 209, “Trips and Parking Related to Land Use” (by Malcolm Douglass and Don McKenzie). The Trips Database Bureau (TDB) is a not-for-profit focus group of the Institution of Professional Engineers of New Zealand. Management is by a board comprising practitioners who are both consultants and local government and central government officials. The TDB Board was originally a New Zealand only affair. It has now been increased to include Australian representatives. The activities of the TDB are funded by members as a cooperative information-share club. Membership to TDB involves an annual service fee appropriate to each size of the member organization and ranges from $400 (NZ) p.a. for a sole consultant operator to $3,000 (NZ) p.a. for the largest councils and state transportation agencies.

The aims include improving “good practice” and further knowledge of trip-making by all modes and for all land uses. As part of that improvement process, an up-to-date database has been established, which shortly will contain 1,000 sites. Like other databases in the United States and the United Kingdom, it is dynamic and expanding every year. The data are being collected for the benefit of member councils, consultants, government agencies and professionals who have responsibility for transportation planning, road asset management, land use planning, town planning and information appropriate to integrated transportation assessments. The surveys are retained in the database at the individual site survey level so that true comparisons of equivalent sites and development proposals can be investigated with greater confidence.

Following a “One Transportation Planet” theme developed by the TDB during 2007, an agreement has been established with cooperation between New Zealand, Australia and the United Kingdom, including TRICS®. In the future, and following the election of longstanding TDB member Peter McCombs to the ITE International Board of Direction, we hope to seek a similar reciprocal arrangement with ITE and the United States. The 100 organizations and 300 associates of the Australia-New Zealand TDB are mostly professional engineers from both government and consultant organizations. Increasingly, we are encouraging town planners and other kindred professionals to join this group.

The contact person in each organization and the associate members receive e-mail newsletters and technical notes and access www.tdbonline.org. The Web site is used for background information, copies of research reports, technical notes, workshop proceedings, the exchange of data and experience between members. There is also an accord with three national institutions for exchanging data and ongoing research and increased research, and comparative assessments are encouraged.

TDB’s surveys and research have shown that travel patterns, trip generation and parking demand levels in Australia and New Zealand and the Australian experience for a group of land uses are generally similar to the equivalent New Zealand survey data. There are also many consistent similarities—especially for shopping centers, industry and residential land uses—between New Zealand and United Kingdom trip and parking rates.

TDB has just completed three major research projects again supported by NZTA dealing with:
Comparison of United Kingdom/New Zealand Trip Rates and Land Uses - LTR 0079.

National Travel Profiles Description of Daily Travel - Report NZTA 353.

A Framework for Integrated Transportation Assessments - LTR 0090.

For queries, try the Web site at www.tdbonline.org or contact:

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Comparison of New Zealand and United Kingdom Trips and Parking Rates

The TDB (formerly the New Zealand Trips and Parking Database Bureau) has made good progress in recent years in the development of a database of trip generation, parking demand and, now, mode of arrival information. The establishment of linkages with the much larger United Kingdom TRICS database created potential for significant improvements to the reliability of forecasting for the assessment of the traffic generation and parking demands associated with developments in New Zealand. The study assesses the comparability of eight land use activities from opposite sides of the world to discover how similar and consistent the vehicle trips and parking demands have become.

The TRICS database contains traffic count information for more than 2,705 sites, 5,257 days of survey counts and 110 land use subcategories. A growing number of surveys included in the database are multimodal. TRICS uses 16 land use categories to structure the data and these categories are split further into land use sub-categories. The TDB database by comparison contains 594 surveys and is sorted into nine land use groups. Currently TDB data only include vehicle trip-making and parking information; however, its focus is aimed at enhancing the database to include more surveys that include multimodal information. Both databases hold the survey information at the individual site level. This makes it possible to describe particular sites and make valid site-to-site comparisons. The study was a general comparison of average trip values for equivalent land uses; it was not an assessment for design or for estimating specific site developments or future trip assessments.

The land use descriptions and suburban or central locations were relatively easily aligned. The eight activities analyzed include: retail, commercial, industry, health, assembly, recreation, education and residential. Similar patterns of trip and parking rates were found for most of the activities. The greatest consistency between the New Zealand and United Kingdom databases was found in the retail and residential land uses, and these were well represented in each database. Here we compare, in two graphs, only the trip rate and parking demand similarities between United Kingdom and New Zealand Shopping centers.

Retail Data

The retail data sample was enlarged by combining shopping centers and supermarkets into a single data set. It was found that both activities follow the same general pattern of trip rates including a reduction in trip rates with increasing floor area. The low data samples in the extreme floor area ranges, at both ends of the spectrum, may explain the higher variance in trip rates between the two data sets. However, the general trend is similar and coupled with the strong overlap of trip generation rates, particularly for retail outlets between 2,000–6,000 square meters gross floor area (GFA), the comparison indicates that the two retail activities can be combined to form a single data set. This process was repeated for both the United Kingdom and the New Zealand data set, which also showed a high degree of overlap between supermarkets and shopping centers.

In some circumstances, practitioners are required to design for 85th-percentile trip and parking rates. For this summary we have only shown this
higher design curve. The 85th-percentile trip rate and parking rate for both the United Kingdom and New Zealand data have here been established using log regression curves as illustrated in Figures A and B.

Figure A. Comparisons of UK and NZ 85th -Percentile Vehicle Trip Rates - Retail
It can be seen in both the trip and parking rate comparisons that a clear relationship can be defined, albeit that the variability above and below the parking curves are such that the correlation is not as persuasive as the trip rate relationships between New Zealand and the United Kingdom.

Other findings of the retail element of the study show that in general, United Kingdom sites in large conurbations, which are typically associated with denser population catchments and higher public transport accessibility, generate only marginally lesser vehicle trip rates than retail sites located elsewhere in the United Kingdom.

The United Kingdom retail outlets that include a petrol filling station (PFS) display trip generation rates that are between 2–5 trips per 100 square meters GFA higher than those outlets that do not have a PFS on site. (Note: this is not illustrated in the above graphs) Some New Zealand retail outlets are now adopting a retail plus PFS format. With little existing New Zealand data on such formats, practitioners may find benefit in applying an adjustment to the New Zealand trip rate values to reflect the difference observed in the United Kingdom.

Conclusions
The eight land uses compared in two years of research had the following conclusions:

a. The comparison of New Zealand and United Kingdom trip making and parking demands by different land uses has been tested successfully and shows significant consistency in the results.

b. Comparison and analysis of land uses in the United Kingdom and New Zealand have shown that for similar sizes and land use descriptions of
retail shopping centres the average, and the 85th percentile, trip generation and parking demand rates are consistent.

c. There are also similar and consistent trip making patterns for residential activities with New Zealand dwellings generating slightly higher trip rates than the United Kingdom equivalent dwelling.

d. The analysis shows that for half of the land uses that were analyzed there appears to be consistent relationships between trip generation rates and gross floor area for New Zealand and the United Kingdom data, meaning that where similarities exist, practitioners may find use in examining the TRICS database to support New Zealand trip and parking rate predictions.

e. Future sharing and exchange of basic data on traffic generation, parking and travel information, both within each country, as well as internationally, could be increased to an advantage.

f. Similar trip and parking rate trends were not established, this was mainly attributed to lack of New Zealand data. However land use definition issues also contributed to a lack of synergy for some land use activities.

The results of the research and the comparisons give confidence that transportation professionals should seek to gain access to both the New Zealand and the United Kingdom (and United States) databases so as to broaden the basis of comparison and judgment when making decisions about existing and future land use trip generation and parking demand levels.

It is recommended that this work should be ongoing as the clearer the land use definitions, the measurement parameters and the larger the databases become, the greater the value in making appropriate transportation assessments of existing and future developments.

For a 6-page summary report, go to www.tdbonline.org or www.ipenz.org.nz/ipenztg/archives.htm

For the 120-page full report, go to www.landtransport.govt.nz/research/reports

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**Trip Generation, 8th Edition Now Available for Pre-Sale**

ITE's *Trip Generation*, 8th Edition (IR-016F) is now available for pre-sale in the ITE Bookstore. This book is currently in the final stages of production and will be shipped in December 2008. ITE is offering a $35 pre-sale discount for purchases made prior to November 14.

*Trip Generation*, 8th Edition includes updated introductory material and an updated User's Guide, as well as two data volumes with revised land use descriptions, trip generation rates, equations and data plots.

This report is a must have for transportation professionals conducting site impact studies, determining on-site circulation patterns, performing...

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