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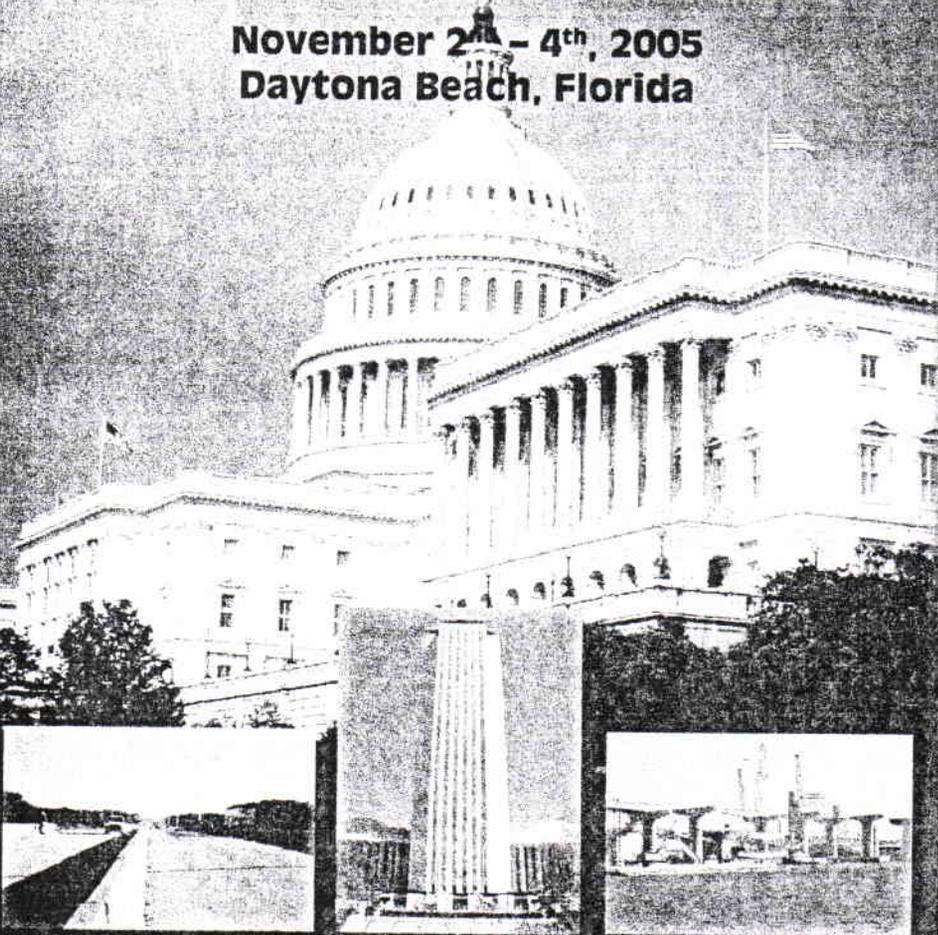


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**GETTING MONEY FOR MORE
AND GETTING MORE FOR YOUR MONEY**

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Traditional Development Trip Generation Characteristics

I. Introduction

Planned communities today are widely employing a New Urbanism approach in design. These concepts are hailed as one of the remedies to the rapid utilization of resources due to suburban sprawl. Traditional neighborhood developments incorporate a varied mixture of land uses usually within walking distance of one another. The proximity of these easily accessible facilities is intended to promote pedestrian, bicycle, and shorter internal auto trips. A large percentage of internal trips should be the result and lessen the impact of the community on the surrounding roadway network. Internal trips are defined as those that have both trip ends within the development project. Although they often utilize one or more segments of a public roadway, there is no net increase in traffic volume on the external roadway system outside the boundary of the project.

These benefits of internal capture and the level of trip reduction associated with traditional land use development, however, are supported by a minimal amount of documented research. Estimations for traffic characteristics such as trip generation and internal capture are sometimes challenged due to this lack of information. This report presents available information from the research conducted for traditional neighborhood developments and provides sources for greater inquiry.

II. Study Review

A. Celebration Monitoring & Modeling Study

Published in September 2003, the Celebration Monitoring & Modeling Study provides a quantified insight into an established traditional community. The report was mandated by the Third Amended and Restated Development Order of the Celebration Development of Regional Impact (DRI). The report contributes information on many aspects of the community. Relevant information includes the development program, traffic counts, trip generation, and internal capture percentages.

Celebration is located in Osceola County, Florida. Interstate 4 (I-4) and US 192 form the community's north and west borders, respectively. Other communities in the area include Lake Buena Vista at approximately 7 miles, and Kissimmee at approximately 10 miles away.

B. Traditional Neighborhood Development Trip Generation Study

Traditional Neighborhood Development Trip Generation Study was prepared by Dr. Asad J. Khattak, Dr. John R. Stone, William E. Letchworth, Ben K. Rasmussen and Bastian J. Schroeder in February 2005. The report was completed for the North Carolina Department of Transportation by the Department of City and Regional Planning of the University of North Carolina in Chapel Hill and the Department of Civil, Construction, and Environmental Engineering at North Carolina State. The report uses local traffic impact analysis methods to estimate trip generation rates. These estimated trip generation rates were compared with actual traffic counts produced by the existing developments.

The Traditional Neighborhood Development surveyed for this study is Southern Village, which is located within the city limits of the City of Chapel Hill. The other suburban development surveyed is located within the Northern Carrboro area. The developments are approximately 7 miles apart. The nearest commercial district is Franklin Street of Chapel Hill and the University of North Carolina and both developments are located equal distances away.

C. Haile Plantation Traffic Study

The Haile Plantation Traffic Study was prepared in November 15, 1996 by Buckholz Traffic. The study was completed to monitor the effect of changes to the Haile Plantation Master Plan and to document the actual project traffic characteristics. Both machine and manual intersection turning movement counts were conducted for the study. The manual counts were conducted at the intersection of SW 46th Boulevard and SW 75th Street, and SW 91st Street and Archer Road. The machine counts were taken at SW 46th Boulevard and SW 91st Street. These locations were determined sufficient to record all traffic movements from the traditional project elements.

Haile Plantation Village is located in Alachua County, FL. The development is approximately 7 miles from the commercial district of the City of Gainesville.

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D. Internalizing Travel by Mixing Land Uses: A Study of Master-Planned Communities in South Florida

Internalizing Travel by Mixing Land Uses: A Study of Master-Planned Communities in South Florida, a study completed by Reid Ewing, Eric Dumbaugh, and Mike Brown, was presented at the 80th Transportation Research Board Conference in Washington D.C. The travel data originated from the Southeast Florida Travel 2000 Survey conducted by the Florida Department of Transportation. The land use data originated from metropolitan planning organizations and the Florida Department of Transportation. The information for Palm Beach and Broward counties was updated in 1999; the information for Dade County in 1996. Land use measures employed in the study were size, density, entropy, balance and accessibility.

Twenty different neighborhood developments from Palm Beach, Broward and Dade counties are included in this study. These communities were built over the last 40 years, and were both family and retirement oriented. The land uses included in each development included "housing, shopping, services, and recreational facilities."

E. Other Traditional Neighborhood Development Resources

Using the New Urban News' list of traditional neighborhood communities as a starting point, a list of additional nearly or recently completed developments was compiled. Local jurisdictions and development companies were contacted in reference to traffic studies for each of these projects but no usable information was available. These communities could provide opportunities for study in the future.

- Seaside, Walton County, FL. 350 Single Family (SF), 60 ksf commercial, charter school, chapel
- Kentlands, Gaithersburg, MD. 520 SF, 1539 Multi Family (MF), 1,000 ksf commercial & office, elementary school, convenience store/gas station/car wash
- Birkdale Village, Huntersville, NC. 230 SF, 360 MF, 234,921 sf Specialty Retail, 52,202 sf Office
- Daniel Island, Charleston, SC. 10,000 seat Tennis Stadium, 16 tennis courts, 5,100 seat Soccer Stadium, Private High School, K-8 Public, Preschool/Daycare
- I'ON, Mt. Pleasant, SC. 762 SF, 30,000 sf Commercial
- Harbor Town, Memphis, TN. 550 SF, 345 MF, 43 ksf commercial
- Middleton Hills, Middleton, WI. 327 SF, 87 MF, 150 ksf commercial

III. Traffic Generation & Internal Capture

A. Celebration, Osceola County, FL

The land use composition at the time of the Monitoring & Modeling (M&M) study is listed below. In keeping with the traditional community philosophy, the development program is quite diverse. Since Celebration development is still under way, this mixture of uses will change with time.

- Single Family 2,232 DU
- Retail 65,687 square feet
- Multi-Family 1,868 DU
- Hospital 100 beds
- Hotel 90 rooms
- Medical Office 204,940 square feet
- Office 922,857 square feet
- Golf Course 18 holes

Data was collected for the Celebration M&M during 72-hour machine cordon line counts. These counts revealed a significant difference from the internal trip values predicted by the ITE Trip Generation Handbook 6th Edition. This difference was evident in both the peak hour and daily trips and created significant internal capture percentages.

- Total Peak Hour Project Trips (actual counts): 3,458
- Total Peak Hour Project Trips (ITE, 6th Edition): 5,044
- Total Daily Project Trips (actual counts): 40,912
- Total Daily Project Trips (ITE, 6th Edition): 56,544
- Calculated Peak Hour Internal Capture: 31.8%
- Calculated Daily Internal Capture: 27.7%

B. Southern Village, Chapel Hill, NC

The study of Southern Village compares the development to a similar conventional neighborhood. Both development programs are depicted below and the multi-use housing is included for Southern Village.

Southern Village:

- Single Family 611 DU
- Church 27,000 square feet
- Multi-family 309 DU
- Retail 30,000 square feet
- School 90,000 square feet
- Office 95,000 square feet
- Day Care Center 6,000 square feet

Northern Carrboro:

- Single Family 891 DU

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Traditional Development Trip Generation

Characteristics, *continued from page 17*

Traffic counts for Southern Village single-family households recorded a value of 1,336 for the PM peak-hour and a value of 12,609 for the daily period. Using ITE trip generation methods, estimated trip generation values were calculated at 1,363 for the PM peak and 12,250 for the daily. The percent difference between actual and estimated is negligible. Thus, the findings confirm that the ITE trip generation methods were very reasonable for Southern Village.

The authors concluded that the residents of Southern Village did not make significantly fewer trips than residents of the conventional neighborhood. However, the trips by residents of Southern Village were shorter in time and distances, used different modes, and were less frequently external. For instance, each household in Southern Village was responsible for 7.7 auto trips per day. A single-family household in the conventional neighborhood created approximately 10 auto trips per day. The study also found that Southern Village residents traveled 28 fewer miles per day. In Southern Village, 78.4% of all trips were made by automobile. This compares favorably with an average of 89.9% for the Northern Carrboro suburbs, a 92.4% regional average, and a national average of 87%. The internal capture percentage for Southern Village was calculated to be 20.2%. Southern Village residents also produced 25.8% fewer external trips and 30.3% fewer regional trips.

The intent of this study was to produce a comparison of traffic studies for traditional neighborhood development and conventional communities. The report suggests that no matter the type of residential use, traditional neighborhood developments produce different traffic behaviors than the conventional community and that those behaviors include fewer external and long distance trips.

C. Haile Village Plantation Center, Alachua County, FL

The development program for Haile Plantation is listed below. The community was not complete when the study was conducted, however, a variety of land uses were represented to a large extent.

• Single Family	1,070 DU
• Multi Family	2,460 DU
• Retail	175,000 square feet
• Office	175,000 square feet
• Church	18,000 square feet
• Church/School	12,000 square feet & 600 Students
• School Elementary/Middle	1,650 Students

The traffic study conducted in 1996 concluded that Haile Village Plantation Center is exhibiting an internal capture rate of 24% of the daily trips, and 28% during the PM peak hour. The ITE trip generation manual estimated that a traditional neighborhood project like Haile Plantation would have an internal capture rate of approximately 32% of daily trips and 36% of PM peak hour trips. Based upon the comparison of these two sets of internal capture percentages, it was determined that due to the existing mixture and density of development, the percentages of 24% for the daily and 28% of the PM peak hour were an appropriate expectation for the project at its current state of completion.

D. Southern Florida – Palm Beach, Broward, and Dade Counties

The 20 Traditional Neighborhood Developments for this study were chosen based upon the mix of land uses. Each development was required to have housing, shopping, services, and recreational facilities. All were constructed after 1965. The size of the developments, in population and acreage, ranged significantly. Each of the developments was analyzed according to its gross acreage, population, and employment.

Community	Gross Acreage	Population	Employment
Aventura	692	8,303	5,965
California Club	1,234	13,649	1,869
Century Village	934	12,781	534
Century Village North	716	10,246	331
The Crossings	662	6,036	965
The Hammocks	863	13,801	1,338
Jonathan's Landing	1,205	4,211	3,127
Kendale Lakes	985	12,207	2,588
Kings Point	845	12,523	771
Miami Lakes	2,541	12,918	17,862
Mission Bay	3,851	10,598	7,869
Pembroke Meadows	1,687	5,638	1,032
PGA National	2,421	9,178	2,324
Sabel Chase	325	4,984	1,120
Silver Lakes	3,210	11,329	1,593
The Township	715	4,267	556
Village of Palm Beach Lakes	1,475	8,215	1,818
Wellington	10,727	34,267	5,220
Weston	15,517	44,199	9,206
Winston Park	1,464	8,017	440

The focus of this paper was to evaluate and report internal capture rates from a multitude of traditional neighborhood developments. The land use measures considered in calculations were size, density, entropy, balance, and accessibility. The scale of the development was directly related to capture levels and regional accessibility was inversely related to internal capture rates.

The internal capture percentages for the twenty "traditional" neighborhood developments varied greatly. However, the authors highlighted the trend of the largest traditional neighborhood developments also employing the largest

internal capture percentages.

• Wellington, Palm Beach County	57 %
• Weston, Broward County	52 %
• Century Village Broward, Broward County	43 %
• The Township, Broward County	41 %
• Century Village North, Palm Beach County	40 %
• Village of Palm Beach Lakes, Palm Beach County	34 %
• Winston Park, Broward County	30 %
• The Hammocks, Dade County	28 %
• Silver Lakes, Broward County	27 %
• Miami Lakes, Dade County	25 %
• Mission Bay, Palm Beach County	18 %
• PGA National, Palm Beach County	17 %
• Aventura, Dade County	17 %
• Jonathan's Landing, Palm Beach County	13 %
• Sabel Chase, Dade County	13 %
• Kendale Lakes, Dade County	12 %
• Kings Point, Palm Beach County	10 %
• Pembroke Meadows, Broward County	9 %
• The Crossings, Dade County	6 %
• California Club, Dade County	0 %

The mean internal capture percentage was 25% and the median was 22%. The authors concluded that the traditional neighborhood developments most successful in obtaining increased internal capture were large in size and distant from similar regional trip attractions.

IV. Summary

Most of the studies reviewed in this report indicated support for more research into the effect of traditional neighborhood developments. The studies confirm that while traditional neighborhood developments lower trip distances and encourage other modes, the actual number of total trips produced does not decrease but the net number that reach the external roadway network are reduced by up to over 50% with an average of between 25% and 30%. Each of the studies supports the trend of increasing internal capture with increasing size and diversity of land uses. Many questions still remain regarding the effects on trip length and geographic effect on trip production, but the majority of researchers agree that the ITE trip generation estimates and the results produced using the methodologies are reasonably accurate for these communities.

In conclusion, the data available for use in the development of this paper supports the use of internal capture estimates

produced using the ITE Trip Generation Handbook methodologies and that results ranging between 25% and 50% should not be questioned if the land use composition is favorable in size and diversity to supporting the estimated capture rate. Therefore, placing a cap on the level of internal capture that can be assumed for purposes of development planning, a common approach in some jurisdictions due to limited documented data, is not a practice that can be supported by this research.

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Case Study – From ITE Website

ITE Journal - Surface Transportation Security Lessons Learned from 9/11

The terrorist attacks of Sept. 11, 2001 exacted a terrible toll on the United States and fundamentally changed the way of life in America. Surface transportation has changed and continues to change in response to the attack. Agencies that own and operate surface transportation systems must understand the relevant lessons from the 9/11 experience and respond accordingly so that we as a nation are well prepared should we be attacked again. The U.S. Federal Highway Administration (FHWA) commissioned the John A. Volpe National Transportation Systems Center (Cambridge, MA, USA) and Science Applications International Corporation (SAIC) to prepare detailed case studies of surface transportation in the New York City (NYC) and Washington, DC metro areas on the day of and in the days and weeks following the attacks. Published material was reviewed, participants were interviewed and internal agency working documents were analyzed. Extensive chronologies of actions were prepared for each study and impacts of the actions were identified whenever possible. The final two case studies total more than 150 pages. A panel of participants in the actual events have reviewed and approved the studies. The following material summarizes the lessons learned, exploring what did and did not work. This article synthesizes the findings from both studies and presents lessons that can be made available to the transportation profession as a whole. <http://www.ite.org/membersonly/itejournal/itejournal/pdf/2002/JB02IA38.pdf>