Active Adult (55+) Community Trip Generation Rates

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Delaware Center For Transportation

and

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by

David P. Racca

Center for Applied Demography & Survey Research

College of Human Services, Education, and Public Policy
University of Delaware
Newark, DE 19716

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Introduction

In response to the growing number of applications for the development of age restricted communities (55 years old and older) the Delaware Department of Transportation (DelDOT) through the Delaware Center for Transportation sponsored this study to examine trip generation characteristics and traffic impacts.   Goals of the study include:

- Identify for the general Delaware population what the household structure and travel characteristics are for people 55 and older, and examine how household structure changes with age.
- Acquire available data to describe the household structures in age-restricted communities. Compare households in age-restricted communities with similar households outside of such communities.
- Research current literature and data on travel characteristics of those in age-restricted communities across the country.
- Identify any Delaware specific information that would be available to describe travel characteristics of age-restricted communities.
- Describe the number of age-restricted communities in Delaware and features that make them different from traditional housing developments. Examine the types of facilities offered to residents and how that might affect trip generation.

National trip generation estimates as available through the Institute Of Transportation Engineers, and local traffic studies were reviewed. Current and proposed 55+ communities in Delaware were identified. The Delaware Travel Monitoring System (DTMS) Survey data were examined to provide a detailed picture of the expected travel characteristics of 55+ communities as compared with the general population. National travel data as provided by the National Personal Travel Survey was used to provide further information.

This study produced a flexible model to assist planners in judging the impacts of age restricted communities.

Age Restricted (55+) Communities

Baby boomers - Americans born between 1946 and 1964 - are aging.   Many of them plan to continue working, but want to live among people their own age and let someone else maintain the property.   The leading edge of the baby boomer generation are entering their mid 50's and are entering into retirement with fast and far reaching agendas. They are financially established and healthy, and will continue to redefine retirement.

Residential complexes for active adults (55+) are becoming more commonplace in Delaware and nationwide.   The Delaware News Journal and New Castle County Department of Land Use indicate (News Journal 12/22/2004) that eleven active adult communities are currently under construction in New Castle County and eight more are planned. Several other age restricted communities are planned in other parts of the state. Active adult communities could make up as much as 2% or more of the housing in New Castle County, if all that are planned are built. In Delaware, 101,725 people are age 65 and older, a 26 percent increase from 1990. Delaware Population Consortium figures show this group at nearly 20% of the total population of Delaware and by the year 2020 they will represent close to 30% of the population. Survey data in the years between 1995 and 2003 have shown that 29% of Delaware households are eligible to live in 55 years and older age restricted communities.

As active adult communities are proposed, there is some concern about the impacts they will have on already stretched transportation resources. There is some question as to what the traffic impact of new communities will be. Some National studies show such communities generate about one-fifth to one third as much traffic during peak hours as regular communities the same size, as most residents are considered to be retired.   But 25% of those 55 and older are still working and this number is expected to grow to 34% by 2010. What has been considered as peak morning and evening travel periods have been expanding over the years. This is partly because some commuters have chosen to leave earlier or later to avoid the center of the peak demand, but more so from the continued growth in travel demand particularly for "other" purposes. Trips that are non-work, non-shopping, and non-school have been growing at a much higher rate. Older people who are still active and healthy, who generally have more time and money at their disposal, and are less fettered by the care of a house and children, would be expected not to necessarily stay home. Some communities require only one household member to be 55 or older so it is also not clear how different household structures might be in the age restricted communities.

Older Americans enjoy a much higher mobility than in the past. This group has aged during a time where dependency on the private automobile has greatly increased and during a period where population and employment, and life in general, has spread to the suburbs demanding the use of a car for every aspect of their lives. Much of the current research on older Americans has focused on the 65+ age group. Between the years 1983 and 1995, average daily person trips for those 65 years and over have almost doubled, while trips of the population as a whole grew by about 39%. Even more dramatic, recently, between the years 1990 and 1995, the percent change in personal travel for those 65 and older increased by 37%, while travel by the overall population grew at about 14%. Average daily time spent driving went up from 24 minutes to 43 minutes, and vehicle trips per person rose from 1.8 to 2.9 for the elderly. Between the years 1969 and

Age Restricted Communities

1995 annual vehicle miles traveled for the age group 55 to 64 grew by 39% and for 65 years and older grew by 47%.[*]

Senior Housing Types

A paper by Stephen B. Corcoran outlines five types of senior housing.[**] This study would address the first two.

Senior Single Family Homes – Senior-only subdivisions typically include recreational facilities. Many of the residents are retired

Senior Apartments – Traditional apartment complexes with minimum age requirement of 55. Some amenities include recreation, security, special design. Residents are independent and may still be working.

Independent Living – Cottages or apartments where older adults live independently, but with some maintenance or housekeeping. Medical can be available.

Assisted Care - Older adults having difficulty managing in an independent living arrangement, but who do not need a nursing home.

Congregate Care Facilities- a range of housing types and programs to meet needs.

The focus of this research is on age restricted communities and on Senior Single Family Homes and Apartments where residents are not in an assisted living situation. Age restricted communities that were identified in Delaware during the course of the project are listed in Appendix A.

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[*] 1995 National Personal Transportation Survey Summary of Trends, FHWA and Bureau of Transportation Statistics.
[**] "Senior Housing Trip Generation and Parking Demand Characteristics",Stephen B. Corcoran, ITE 66th Annual Meeting

Review of Available Trip Generation and Traffic Impact Data

Summary

Available trip generation data were reviewed as a first step in this project. For easy reference, this data is summarized in Figures 1 and 2 below. For a more detailed discussion of each, refer to the rest of the chapter.   This represents what was currently available as provided by DelDOT. The daily trips per household estimate available from ITE for the Senior Housing (land use type 251) is an average of several studies that ranged as high as 5.7 trips per household. From the one measurement in Delaware, Hershey Run, and from Corcoran's study the daily rate is expected to be more in the range of 4 to 5 trips per household. From the daily rates of the general population as in figure 2, an initial look at the information would estimate age restricted housing to be about half that expected for the ITE figure for similar development with no age restrictions.   Peak hour trips for 55+ detached housing would seem to be in the range of 0.25 to 0.3 trips per household and about a third of what would be expected from the general population.   For attached housing and apartments the differences are not expected to be as great as in the single family housing category.

**Figure 1 Summary of Trips per Household data for
　　　　　　 Age Restricted Communities (55+)**

<u>55+ Weekday DailyTrips per Household , Detached Housing</u>

Institute of Transportation Engineers, Detached Housing (251)	3.7
Karens Study of Heshey Run 55+ community in Delaware	4.6
Institute of Tranportation Engineers, Attached Housing	3.5
Corcoran Study, 55+ Housing, All Housing Types Estimate	4.5 to 5.6

<u>55+ Weekday AM – PM Peak Hour , (Adjacent Street Peak)</u>

	AM - PM (trips per HH)
Institute of Transportation Engineers, Detached	0.2 – 0.26
Karins Study of Hershey Run, Detached	0.22 – 0.29
Monmouth and Ocean County, NJ, Detached	0.28 – 0.26
Traffic Planning and Design Study, Detached	0.32 – 0.35
Whitpain Farms, PA	0.32 – 0.35
Hershey's Mill, PA	0.33 – 0.35
Monmouth and Ocean County, NJ, Attached	0.17 – 0.33
Monmouth and Ocean County, NJ, Town Homes	0.25 – 0.32
Monmouth and Ocean County, NJ, Apartments/condo	0.2 – 0.26
Corcoran Study	½ to ¼ of general population peak travel

Figure 2 Summary of Trips per Household Data for General Population

Other ITE Residential Rates	Daily	AM Peak	PM Peak
ITE Single Family Homes (land use code 26)	9.5	0.74	1.01
Avg of 3 New Castle Cnty SF Developments	-	0.86	0.95
ITE Apartments (land use code 220)	6.4	0.51	0.63
ITE Condo/Townhouses (Land Use code 230)	2.2	0.44	0.55

Review of Trip Generation Data

Institute of Transportation Engineers Data

The most referenced and used data for trip generation comes from the Institute of Transportation Engineers Trip Generation Report that reference two categories that would correspond to 55+ restricted communities as summarized below.

Institute of Transportation Engineers, Trip Generation, 7ᵗʰ Edition
Senior Adult Housing-Detached Category (Land Use 251) (quoted from the report)

Description "Senior Adult housing consists of detached independent living developments, including retirement communities, age-restricted housing and active adult communities. These developments may include amenities such as golf courses, swimming pools, 24-hour security, transportation and common recreational facilities. However, they generally lack centralized dining and on-site health facilities. Detached senior adult housing communities may or may not be gated. Residents in these communities are typically active (requiring little to no medical supervision). The percentage of retired residents varies by development.

Many factors affected the trip generation rates for detached senior adult housing. Factors such as average age of residents, development location and size, affluence of residents, employment, status and vehicular access should be taken into consideration when conducting an analysis. Some developments were located within close proximity to medical facilities, restaurants, shopping centers, banks and recreational activities."

**Figure 3   Trips Generation Data for
ITE Senior Adult Housing-Detached Category (Land Use 251)
Estimated Trips per Household**

Weekday	average 3.71	range = 2.9 to 5.7 (7 studies)
Weekday AM peak adjacent street	average = 0.20	range = 0.13 to 0.34 (10 studies)
Weekday PM peak adjacent street	average = 0.26	range = 0.17 to 0.95 (11studies)
Weekday AM peak of generator	average = 0.31	range = 0.3 to 0.4 (2 studies)
Weekday AM peak of generator	average = 0.35	range = 0.33 to 0.95 (2 studies)
Sunday	average = 2.33,	range = 2.27 to 4.77 (2 studies)
Saturday	average = 2.77	range = 2.70 – 5.53 (2 studies)
Saturday peak hour of generator	0.27 (1 study)	
Sunday peak hour of generator	0.21 (1 study)	

Institute of Transportation Engineers, Trip Generation, 7th Edition
Senior Adult Housing-Attached Category (Land Use 252)

Description: Similar to category 251, except this category contains apartment like residential units, and "row" or attached type housing

Figure 4 Trips Generation Data for ITE
Senior Adult Housing-Attached Category (Land Use 252)
Estimated Trips per Household

Weekday	average = 3.48 (1 observation)		
Saturday	average = 2.41		
Sunday	average = 2.7		
Saturday peak hour of generator	average = 0.3		
Sunday peak hour of generator	average = 0.55		
Weekday am peak adjacent street	average = 0.08	range = 0.02 to 0.27	7 studies
Weekday pm peak adjacent street	average = 0.11	range = 0.03 to 0.31	7 studies
Weekday am peak hr of generator	average = 0.06	range = 0.02 to 0.37	4 studies
Weekday pm peak hr of generator	average = 0.11	range = 0.03 to 0.25	4 studies

<u>Karins and Associates April   00 to 02</u>

Karins and Associates collected trip generation data for Hershey Run (192 units), a 55+ community in Delaware.   Results were:

Average AM Peak Adjacent Street = 0.22   (ITE code 250 rate is 0.17)
Average PM Peak Adjacent Street = 0.29   (ITE code 250 rate is 0.27)
Weekday rate = 4.57 trips per unit
Average Saturday and Sunday daily rate = 3.8 trips per unit
Peak generator hour Saturday (4 pm) rate = 0.34
Peak generator hour Sunday (10am) rate = 0.35

<u>Orth-Rodgers Associates Inc.   September 18 ,1998</u>
<u> Abbington-Ney Associates 9/27/1988</u>
<u>Schoor Depalma 5/23/2000</u>

Abbington-Ney conducted traffic counts, and Schoor Depalma and Orth-Rodgers cited several studies of 55+ communities mostly in Monmouth and Ocean Counties as summarized in the figures below.

**Figure 5 Trip Generation for 55+ Communities in
Monmouth and Ocean Counties, New Jersey
Housing Type = Detached**

Development Type	Number of Units	AM-PM peak
Leisure Knoll	1486	0.19 – 0.19
Leisure Town	1552	0.23 - 0.17
Surrey Downs	385	0.31 – 0.39
Greenbriar Woodlands	1100	0.31 – 0.22
Four Seasons at Lakewood	744	0.23 – 0.26
Four Seasons At Wall	400	0.43 – 0.33
Detached Average		0.27 – 0.27

**Figure 6 Trip Generation for 55+ Communities in New Jersey
Housing Type = (A)ttached, (Ap)artments, (T)ownhomes, (C) ondo**

Development	Number of Units	Daily Trips/ Unit	AM-PM peak
Shadow Lake (T)	720	5.22	0.37 – 0.43
GreenBriar I (T)	900	2.79	0.13 –0.21
Leisure Village (A)	2850	1.2	0.07 – 0.09
Covered Bridge (A)	1550	2.31	0.17 - 0.24
Shady Oaks	366	4.22	
Rossmoor (A)	1714		0.14 – 0.20
Daniel Towers	100		0.15 - 0.19
Cedar Street Commons (AP)	168		0.17 – 0.24
Greenbriar North (A)	760		0.22 – 0.33
Campagna Condos (C)	136		0.22 – 0.29

<u>"Senior Housing Trip Generation and Parking Demand Characteristics"</u>
<u>Stephen B. Corcoran, ITE 66th Annual Meeting</u>

Stephen Corcoran examined trip generation data for various types of senior housing. He
concluded that daily trip generation rates for senior housing were 4.52 to 5.64 trips a day. Senior
housing generates 2/3 the amount of traffic compared to a typical single-family development.
Daily rates are similar to other multi-family categories including apartments (6.47), and
condominiums/townhouses (5.86).
Trip generation rates during the peak hour of adjacent street traffic are significantly less because
most employees arrive/depart during off-peak periods and residents avoid the peak-hour
congestion. Peak hour rates are one half to one fourth that of other residential land-uses. Peak
hours of site traffic for senior housing occur in the late morning or early afternoon.

<u>Traffic Planning and Design Inc. Dec 1 1999</u>

Traffic Planning and Design Inc completed trip generation counts at two active adult communities in Pennsylvania. The first site, Hershey's Mill is a gated development in Montgomery County that consists of 1413 dwelling units with an 18 hole golf course and community center. The second site, Whitpain Farms, also in Montgomery County, is a 171 dwelling unit community. TPD provided the following trip generation table.

**Figure 7 Trip Generation Rates of
Active Adult Housing Communities**

	Whitpain Farms	**Hershey's Mill**
Weekday		2.76
Weekday am peak	0.32	0.33
Weekday pm peak	0.35	0.35

Modeling Trip Generation Using the DelDOT Trip Monitoring System and Nationwide Personal Transportation Survey

With the growing number of age restricted housing developments being proposed it is important to understand the potential traffic costs or benefits. As shown in the previous chapter, there are not many national and regional studies of age restricted housing travel. In Delaware, only one such development has had traffic counted. This project examines the issue through the use of the Delaware Department of Transportation (DelDOT) Trip Monitoring System (DTMS) survey data. The DTMS survey provides a wealth of data that can be used to examine the travel characteristics and estimate trip generation for persons 55 years and older and for the various household structures as they are found in Delaware. The DTMS survey began in 1995 and has continued to the present day. Each month, approximately 200 Delawareans over the age of 15 are surveyed each month and asked about their travel on the previous day. The data includes the location and purpose of trips made by various modes, household structure, and other demographic data about the respondents. Household trip generation estimates can be constructed from this individual based data for those qualifying for age restricted communities and for the general Delaware population.

Another useful travel survey is the Nationwide Personal Transportation Survey (NPTS) collected by the U.S. Census Bureau for the U.S. Department of Transportation. The survey was conducted in 1969, 1977, 1983, 1990, and 1995. Data from the 1995 NPTS was used in this study and includes 42,033 households and like the DTMS is a Computer-Assisted Telephone Interviewing survey. Each household in the sample was assigned a specific 24 hour travel day and a 14 day travel period for which detailed data on all travel were collected.

Considerations When Modeling Trip Generation for Persons 55 and older

When beginning to study how age may effect trip generation the following were considered:

- Persons age 55 and older are less likely to be employed. Less employment may mean less trips. On the other hand, more free time may mean more non-work trips.
- Persons age 55 and older will have different travel characteristics than the general population. For example, they may take a larger percentage of their trips during off-peak hours.
- Persons age 55 and older are less likely to have children in the household.
- Persons age 55 and older generally reside in smaller households (persons per household).
- The availability of vehicles and the number of vehicles in the household is a strong factor in estimating trip generation.
- Income may be a factor that affects trip generation, and it is generally thought that higher income households make more trips.
- Age restricted housing is generally of a smaller type, with less square footage and less upkeep necessary. Various housing types may yield significantly different trip generation rates.

The factors referenced above would seem to generally result in a population that travels less, and the general hypothesis is that indeed persons that would qualify for age restricted housing would travel less than the general population and that when a new development is proposed, an age

restricted community would produce less of an impact than a comparable unrestricted community. Such factors were used to model trip generation in comparison with the general population.

Figure 8 below is an initial tabulation of average trips per day by individuals in various age groups and shows estimates for individuals that have or don't have children present in the household. A pattern of decreased travel with age and increased travel with the presence of a child in the household is clearly seen.

Figure 8 Trips per Day (weekday) for Various Age Groups, With Children in the Household and Without.   DelDOT DTMS 1998 to 2003

Age Group	Entire Population	With Children	Without Children
18 to 21	2.6	2.9	2.5
22 to 29	2.5	2.6	2.4
30 to 39	2.6	2.8	2.3
40 to 49	2.5	2.8	2.3
50 to 54	2.5	3.1	2.4
55 to 59	2.3	2.9	2.2
60 to 64	2.1	2.6	2.1
65 to 69	2.0	2.6	2.0
70 to 74	1.7	2.2	1.7
70 +	1.5	2.9	1.4
All	2.4	2.8	2.2

Typically trip generation is viewed at the household or housing unit level. While the DTMS samples individuals, not households, the demographics of the household can be obtained and can be used to estimate household travel characteristics. Figure 9 below represents a first look at age and children factors in households in relation to trips taken per day. From this and other views it appears that 55 and older persons do make fewer trips and that there are fewer trips when there are no children present. Almost a third (29%) of the households in Delaware would qualify to live in 55 and older restricted communities. The household combinations shown in Figure 9 account for 97% of the households in Delaware.

**Figure 9 Household Trip Estimates and Percent of Delaware Households
For Various Household Configurations.   Initial Rough Estimates.**
DelDOT DTMS 1998 to 2003
 (adult = 18 to 54 years old, 55+ = 55 and older)

Household Makeup	Percent of DE Households	Household Daily Trip Estimate
1 adult	7.7	2.3
1 55+	8.6	1.3
1 adult or 55+ with children	3.3	2.9
2 adult	19.5	4.6
1 adult and 1 55+	3.9	4.4
2 55+	12.6	3.9
2 over 17 years, with children	23.1	5.8
3 adult	5.1	7.5
2 adult and 1 – 55+	1.4	6.8
2 –55+ and 1 adult	1.6	5.6
3 – 55+	0.3	5.9
3 over 17 years, with children	5.2	8.8
4 adults	2.0	9.1
3 adults and 1- 55+	0.7	8.2
2 adults and 2 – 55+	0.7	9.0
1 adult and 3 – 55+	0.1	8.1
4 – 55+	0.1	4.8
4 or more over 17 w children	2.2	11.3
5 or more adults no child	0.8	

The household trip estimate shown in the figure above only took into account daily trip averages over various age groups as shown in the DTMS. Of course, factors such as employment status, the availability of a car, and others affect the number of trips a person will take each day. The DTMS provides information about the travel characteristics of individuals and the approach taken was to develop a trip generation model for individuals rather than households.   The factors chosen for the model are shown in figure 10 below.

Figure 10   Factors Used To Model Trip Generation of Individuals.

Age Category
Number of vehicles in the household
Employment
Income
Housing Type
Owner versus Renter of home
Presence of children in the household

From a model of individual trip generation, a prediction of trip generation for various household configurations can be generated. This approach not only predicts trip generation for those 55 years and older but also for the entire population and allows different populations within Delaware to be compared.

Development of the Models For Trip Generation

DelDOT Trip Monitoring System (DTMS) Model of Trip Generation

The Delaware Trip Monitoring System (DTMS) measures trip activity for a random set of individuals throughout the State of Delaware. For this effort, 17,604 respondents were included in the study. The data were drawn from surveys conducted 1995-2003.

The data includes information on the respondent, the respondent's household, and the trip activity. The modeling deals with individuals rather than households as is common for many trip studies that use household diaries. The focus is on individual behavior as opposed to household behavior. At the root, individuals make trips, not households. However, an individual's behavior is influenced by features of the household. If there is another adult in the household, the possibility for trip sharing/splitting exists in contrast with a single person household. Children in the household also have an impact on the number of trips required of an individual. One of the key variables affecting trip generation is the number of vehicles. The absence of a vehicle or even a single vehicle when it's shared among adults reduces the trip possibilities. Labor market activity has an immediate impact since work trips are going to be required. Higher incomes to some extent open the possibilities for more trips; more dining out, for example, or trips to the ball park.

The typical analysis at the household level uses essentially the same variables described above. Here in addition, the data is expanded to include the type of housing unit in which the respondent lives, tenure status (owner/renter), and age of the respondent since that is a principal area of concern.

The model is constructed using a series of dummy variables that take on a value of one if the person or the household the person lives in has the characteristic, and zero otherwise. For example, the age variable is represented by three variables, namely one for those in the age group of 18-39, a second for those in ages 40-54, and finally one for the target group ages 55 and older. Only two of the three variables are included since the omitted group forms the base from which the other two are measured, and is included in the estimated constant term. If the coefficient for age55ov is -0.5 then people 55 and older take on the average 0.5 trips per day less than those in the base group age18-39. In the model, we expect the coefficient on the age variables to be negative and declining.

The number of adults in the household is represented by three dummy variables namely one adult, two adults, and three or more adults. The omitted group is one adult. It is likely that the number of trips for the individual will fall as the number of adults increases. The coefficients for variables representing more adults should be negative and significant.

The presence of children in the household (17 and under) is represented by a single variable taking on the value of one if there are children present, and zero otherwise. The trip rate should increase with the presence of children, so we would expect the coefficient to be positive and significant.

Trips are influenced by the presence of a vehicle or vehicles. In this instance this attribute is represented by five dummy variables, namely zero vehicles, one vehicle, two vehicles, three vehicles or more and a catch all category for those that did not report the number of available vehicles. The omitted variable is that representing zero vehicles. As the number of vehicles increases, the coefficients are most likely to be positive since the possibility of making a trip is facilitated by vehicle availability.

Employment is coded as a single variable. It is coded one if the person is employed (part-time or full-time) and zero otherwise. This is a particularly important variable in the model because labor force participation decreases with age, particularly after age 64, and work trips are an important component of the total trip rate. The coefficient should be positive and significant.

Income is a more complex concept to represent than the others. For those respondents that provided a definitive answer, five dummy variables were constructed: 1) $0-$24,999 2) $25,000-$49,999 3) $50,000-$74,999 4) $75,000-$99,999 and 5) $100,000 and above. Category one became the omitted variable. In addition, two additional variables were constructed to represent "don't know" and "refused". Overall it is expected that the trip rate will increase with income but that increase may not be linear.

Since the 55 and older communities may have a particular structure in terms of the type of housing being provided, a series of five dummy variables were constructed based on housing type. The omitted variable was "apartment." Variables were constructed for single family detached, single family attached, mobile home, hotel, and type unknown. The direction and significance of the coefficients is not suggested by any past research. These are intended primarily as control variables.

The last variables are related to housing tenure. It is possible that home ownership may be an issue in these stratified communities. Adding a tenure variable (owner or renter) will allow the eventual predicted values to include consideration for different settings. The omitted variable is renter. The other two variables include one for owner and another for tenure unknown. It was suspected that the coefficient on owner will be positive. However, housing tenure is also correlated with other variables like income, number of vehicles, and type of housing.

The descriptive statistics for the model are found below. The overall number of observations (N) of 8,881 reflects the fact that years 2000 through 2003 were used for estimation since some of the variables were not collected in prior years. The original sample was also weighted to reflect the State's current distribution by age, gender, and county. This was done separately for each of the years.

In Figure 11 below, we see that just about 34% of the respondents had children in the household. This is very close to the current state distribution. Looking at the age variables we see a category for "Age other". These are people who were either uncooperative or were under the age of 18. If you add the three age variables together they account for 58.5 % of the respondents. The balance (41.5%) of the respondents are in the omitted variable Age1839. Approximately 61% of the respondents are employed and 70% own their home. The income variables are also worth reviewing. Almost 49% of the income data is missing, falling into the "don't know" or "refused" categories. However, the distribution of income excluding these responses is closely correlated with other estimates of the State's income distribution.

Figure 11 Descriptive Statistics For Variables In The Trip Generation Model

Variable	Mean	Std. Deviation
Total Trips	2.3	1.5
Kids	.34	.47
Age4054	.29	.45
Age55over	.24	.43
Ageoth	.055	.23
Adult2	.60	.49
Adult3	.21	.41
Veh1	.26	.43
Veh2	.47	.5
Veh3	.25	.43
Vehdk	.005	.07
Emp	.61	.49
Inc50	.19	.39
Inc75	.13	.34
Inc100	.08	.27
Incup	.06	.23
Incdk	.23	.42
Incrf	.26	.44
Sfamdet	.62	.48
Sfamatt	.155	.36
Mobile .	08	.28
Hotel	.0001	.009
Typehuk	.0015	.04
Owner	.70	.46
Tenureuk	.01	.11

The model was estimated using linear regression with total trips as the dependent variable. The dependent variable was approximately normal although the data are skewed slightly to the right, which represents the 1% that took more than 8 trips in a given day.

The regression itself was significant with an F-statistic of 33.6 although the Adjusted R Square is only 8.1%. This suggests that there is a lot of random variation governing a typical day of trips, or that there are variables other than those typically included in transportation modeling that are not included. Variables such as the weather, time of year, and fuel prices might be of interest. Approximately 1.8% of the observations were considered outliers with residuals greater than 3 standard deviations. All had more than 7 trips on the target day. The colinearity statistics were within the reasonable range.

The basic model is found in the Figure below.

Figure 12 Model Based On DTMS, Coefficients and Statistics

Variable	Coefficient	Std.Error	Sig. of t-statistic
Constant	1.974	.127	.000
Kids	.243	.036	.000
Age40-54	-.103	.040	.009
Age55ov	-.269	.050	.000
Ageoth	.208	.081	.010
Adult2	.149	.050	.003
Adult3	-.029	.063	.648
Veh1	.138	.112	.217
Veh2	.235	.116	.042
Veh3	.466	.120	.000
Vehdk	.198	.261	.447
Emp	.166	.039	.000
Inc50	-.109	.080	.174
Inc75	-.055	.087	.525
Inc100	-.015	.094	.876
Incup	.469	.100	.000
Incdk	-.547	.080	.000
Incrf	-.316	.079	.000
Sfamdet	-.087	.068	.203
Sfamatt	.018	.064	.780
Mobile	-.191	.076	.012
Hotel	-.970	1.7	.572
Typehuk	-.954	.421	.023
Owner	.210	.053	.000
Tenureuk	.808	.160	.000

The presence of children (Kids) has the predicted positive coefficient relative to households without children (.243) and the coefficient is significant.

The age of the respondent variables also has coefficients with the predicted direction, as people get older they take fewer trips. Relative to the omitted group (those in the 18-39 age group) both the age4054 and age55ov coefficients are negative and significant. The coefficient also gets more negative as age increases.

The number of adults in the household produces a more complex result. First the addition of the second adult does not produce the expected negative coefficient, as was expected with the idea that with two adults some household trips might be shared. However the presence of the third adult does show the expected negative sign but it is not significantly different from the omitted group.

The number of vehicles variable does produce the expected positive and increasing coefficients, the more vehicles, the more trips. One interesting finding is that having one vehicle is marginally different from having none. This may seem counterintuitive except that the person without a

vehicle is likely to be using more transit or riding as a passenger. The availability of the first vehicle is simply a substitute.

The impact of employment on the trip rate is positive and significant as expected. It is perhaps surprising that the coefficient is not larger. Respondents who are not working apparently are quite capable of substituting other types of trips to make up for the 61% who do make work trips.

Increasing income does have a positive impact on the trip rate, however the impact is greatest for those with incomes over $100,000. All of the coefficients below $100,000 were essentially the same as the omitted group (under $25,000). The respondents in the don't know and refused categories are different from the others. Both take significantly fewer trips than the known income categories. This may be worth exploring further.

The only category within the set of housing type variables that had a significant result was for mobile homes. Respondents who live in mobile homes tend to take fewer trips even after adjusting for all other variables in the model.

Finally, the tenure variable (home ownership) has a positive and significant coefficient relative to the omitted group (renters). Perhaps this is the impact of home maintenance.

Nationwide Personal Transportation Survey Model Of Trip Generation

To further investigate factors associated with trip generation, a model was built using the Nationwide Personal Transportation Survey (NPTS) collected by the U.S. Census Bureau for the U.S. Department of Transportation. The survey was conducted in 1969, 1977, 1983, 1990, and 1995. Data from the 1995 NPTS was used in this study and includes 42,033 households and like the DTMS is a Computer-Assisted Telephone Interviewing survey. Each household in the sample was assigned a specific 24-hour travel day and a 14 day travel period for which detailed data on all travel were collected. The basic model is found in the figure below.
As with the DTMS, increasing age is associated with less trips, and more vehicles in a household, the presence of children in the household, and higher household income are associated with more trip taking.

The NPTS model and data most notably show more trips per day for all individuals. The constant term is about 50% higher in the NPTS model. Over the years the methodology of the DTMS has been scrutinized to understand why consistently Delawareans are shown to make less trips than the national average. One idea was that perhaps the survey reported a larger portion of respondents saying they made no trips on the survey day, that perhaps respondents needed to be asked again about trips they may have made. Or perhaps, respondents were forgetful about incidental trips they were making as part of trip chains. Measures that were put into place to discover types of trips that were previously unreported during the survey showed only minor increases in the number of trips reported. The populations surveyed in the NPTS, that include very high density large metropolitan areas as well as the most rural and sparse areas around the country, are expected to be different from what is seen in Delaware, though it is not clear how that would result in a greater average trips per day per individual. A big difference in the NPTS and the DTMS surveys is that the NPTS surveys 7 days a week and the DTMS only surveys Monday thru Friday. As might be expected, if people in general make a larger number of trips on Saturday and Sunday, then they would on a weekday, this could account for the difference, though the data shows roughly the same amount or less travel on weekend days than on a typical weekday. One thing that can be shown is that work trips account for about twice the percentage

of daily trips than as shown in the national data, so the difference could probably be found by examining non-work trips.

There may be various reasons why the absolute number of trips reported is greater in the NPTS data, though the focus in analyzing the NPTS data and for the project in general was primarily in the relative differences in trip generation between the general population and the age 55 and older group. Relative comparisons between trip generation of various individuals and groups show a great similarity in estimates from the NPTS and DTMS models.

Figure 13 Model Based On NPTS, Coefficients and Statistics

Variable	Coefficient	Std.Error	Sig. of t-statistic
Constant	3.279	.059	.000
Kids	.440	.026	.000
Age4054	-.015	.028	.589
Age55ov	-.351	.035	.000
Adult2	-.475	.039	.000
Adult3	-.949	.046	.000
Veh1	1.037	.053	.000
Veh2	1.272	.056	.000
Veh3	1.433	.061	.000
Emp	.488	.028	.000
Inc50	.184	.029	.000
Inc75	.170	.032	.000
Inc100	.271	.050	.000
Incup	.368	.058	.000
Incdk	-.100	.047	.034
Incrf	-.262	.043	.000
Sfamdet	.030	.045	.505
Sfamatt	-.099	.052	.055
Mobile	-.441	.071	.000
Hotel	.117	.418	.780
Typehuk	.559	.483	.248
Owner	-.002	.037	.947
Tenureuk	-.104	.31	.738

The next section shows the application of the trip generation models created.

Trip Generation Model Application

The models created using the DTMS prove to be a powerful tool to examine and compare trip generation rates of various populations. Figure 14 below, shows predicted rates for individuals in Delaware with various age and household characteristics. Numbers shown in the figure use Delaware population averages for income, number of vehicles, employment, and housing type. These other factors could be specified to provide other individual and household trip generation rate estimates, for instance, if an estimate was needed for a single family detached development targeting a specific income group. The household types represented are 96% of the households in Delaware. The trip generation rates for 55+ individuals are less than the state average for individuals, and the 55+ household trip rates are less than the state average household rates.

**Figure 14 Application of the Model Based on the DTMS,
Daily trip generation rate estimates for each household type tabulated with
the percentage of each type in Delaware.**
**(WC = with children in household, NC =no children, Over 17 =over 17 years of age,
  YA = younger adult,
  HH Est. = Estimated Household trip generation for this household type)**

Individual Age – HH Type	Individual	HH Est.	% of the HH in DE
55+ living alone	1.7	1.7	8.6
55+ living with 55+, NC	2.0	4.0	12.6
55+ living with YA, NC	2.2	4.3	3.9
Single adult < 55, NC	2.2	2.2	7.7
Over 17 with over 17, WC	2.7	5.4	23.1
Two adult < 55, NC	2.3	4.6	19.5
One > 17, WC	2.4	2.4	3.3
3 or more > 17 WC	2.5	7.4+[*]	5.2
3 or more > 17 , no 55+, NC	2.2	6.6+[*]	7.1
3 or more > 17, one 55+, NC	2.2	6.7+[*]	2.7
3 or more > 17, two/more 55+ , NC	2.0	6.1+[*]	2.1
Delaware Population Overall	2.3	4.7	

[*] Calculated for 3 adults in household, multiply by number of adults for other estimates

A similar tabulation as Figure 14 can be produced using the trip generation model as developed from the National Personal Transportation Survey. Using coefficents from the national model and the distribution of factors as seen in Delaware the table in Figure 15 was created.

Figure 15   Application of the Model Based on the NPTS.
Daily trip generation rate estimates for each household type tabulated with
the percentage of each type in Delaware.
(WC = with children in household, NC =no children, Over 17 =over 17
years of age, YA = younger adult
HH Est. = Estimated Household trip generation for this household type)

Individual Age – HH Type	Individual	HH Est.	% of the HH in DE
55+ living alone	3.9	3.9	8.6
55+ living with 55+, NC	3.7	7.4	12.6
55+ living with YA, NC	3.8	7.6	3.9
Single adult < 55, NC	4.7	4.7	7.7
Two of 17, WC	4.9	9.7	23.1
Two adult < 55, NC	4.4	8.7	19.5
One > 17, WC	5.1	5.1	3.3
3 or more > 17 WC	4.3	13.0+	5.2
3 or more > 17 , no 55+, NC	3.9	11.7	7.1
3 or more > 17, one 55+, NC	3.9	11.7+	2.7
3 or more > 17, two/more 55+ , NC	3.6	10.8+	2.1
Delaware Population Overall	4.3	8.6	

* Calculated for 3 adults in household, multilply by number of adults for other estimates

The number of daily trips estimated by the NPTS model is always higher. NPTS survey data
shows almost twice as many trips per person for the national population than the DTMS indicates
for Delaware. One reason for this is that the surveys are different in that the NPTS survey looks
at every day of the week. The DTMS measures weekday travel, Monday thru Friday. Also the
NPTS includes an individuals work trips during the day and also tabulates travel by those 16
years and younger. Travel by children is included in DTMS estimates if it is with a driving age
member of the household but otherwise it is not. So, for a member of the household younger than
16, school bus trips, a bicycle trip to school, and car pool trips with someone who is not a
member of the household are examples of travel that is not captured in the DTMS survey but is
estimated by the NPTS. Why the NPTS data shows more trips is of interest, but this research
focused on the <u>relative differences</u> between rates of 55 years and older populations and the
general population within each data set.

To compare the estimates from the two models, the percentage difference between the estimate
for individual daily trip generation for a particular population subgroup and the entire population
was tabulated for the NPTS and the DTMS models, as shown in Figure 16.

Looking at Figure 16, there is a generally good agreement as to the direction and sign of trip rate
differences that might be expected.   In the DTMS model, there is a more pronounced decrease in
trips associated with apartment living, and also a larger decrease in trip rate for 55+ individuals
living alone. An adult living alone in the DTMS model is estimated with a lower trip rate than
the overall population where in the NPTS model an adult living alone travels more than the
population average. Other than these differences the two models show similar results.

Figure 16   Comparison of DTMS and NPTS Models of Trip Generation Estimates. Comparison of the percentage difference from the population average estimates.

	Estimated Individual Rates		% Difference From Population Average	
	DE	NPTS	DE	NPTS
Population Average	2.3	4.3	-	-
55+ alone	1.7	3.9	-26.1	-10.0
2 55+ nc	2.0	3.7	-13.5	-14.6
1 55+ and younger adult nc	2.2	3.8	-10.9	-12.3
1 adult living alone	2.2	4.7	-5.7	8.3
2 over 17 with kids	2.7	4.9	16.5	12.7
2 adult nc	2.3	4.4	0.9	0.9
one over 17 with kids	2.4	5.1	3.5	17.4
3 adults , nc no 55+	2.2	3.9	-3.9	-10.0
3 or more over 17 with kids	2.5	4.3	7.0	0.0
3 or more over 17, 2 55+ nc	2.0	3.6	-11.7	-16.7
3 or more over 17, 1 55+ nc	2.2	3.9	-3.0	-10.0
55+ alone apt	1.5	3.8	-32.6	-12.0
55+ and younger adult apt,	1.8	3.8	-20.9	-12.7
55+ and 55+ apt	1.7	3.4	-27.4	-22.0
55+ alone detached	1.8	4.1	-21.3	-6.0
55+ and younger detached	2.2	4.1	-3.5	-5.1
55+ and 55+ detached	2.0	3.8	-11.3	-12.3
population detached	2.4	4.4	4.3	2.3
1 55+ to 64 alone	1.8	4.1	-20.4	-5.6
1 55+ to 64 , add. adult nc,	2.1	3.9	-8.3	-10.9
1 65 and older alone nc	1.6	3.8	-29.1	-12.0
1 65+ and 1 65+ nc	1.99	3.7	-13.5	-14.6
1 65+ and younger adult nc	2.1	3.8	-10.9	-12.3
apartment population	2.0	4.2	-13.9	-3.5

The models produce estimates for trip generation of individuals with various characteristics for various types of households. An estimate of trip generation for a household is more commonly used when considering new development. Developers of 55+ communities point out that such housing has less of an impact because residents take less trips and take their trips more during the day. A comparison at the household level can be made by examining estimates for those households that qualify for age restricted developments as shown in Figure 17, below.

Figure 17   DTMS Model Estimate of Household Trip Generation By Those Qualifying For Age Restricted Housing. From trip generation data based on the DTMS 2000 to 2003. Trips per day. Weekday travel.
(Mix is how households on average are distributed in Delaware.)

Individual/HH	Indiv rate	HH rate	Mix
55+ person living alone	1.7	1.7	34%
55+ person living with 55+	2.0	4.0	50%
55+ person living with a younger adult	2.2	4.3	16%

Weighted Trips per Household Estimate for 55+ = 3.3
Estimated Average Trips per Household in Delaware = 4.7

The figure above shows that the estimated average trips per household per day for 55+ households is about 3.3 where the estimated average trip rate per household per day is about 4.7 for all of Delaware. Using the trip generation model that was based on the National Personal Transportation Survey, a similar table and estimate can be made for households qualifying for age restricted housing as shown in Figure 18. For the DTMS model, those households that qualify for age restricted communities are expected to be 69% of the rate of the general population. Using the model based on NPTS data, households qualifying for age restricted communities in Delaware would be expected to be 71% of the rate of the households of the population overall, which is a very similar result.

Figure 18   NPTS Model Estimate of Household Trip Generation By Those Qualifying For Age Restricted Housing. From trip generation data based on the DTMS 2000 to 2003. Trips per day
(Mix is how households on average are distributed in Delaware.)

Individual/HH	Indiv rate	HH rate	DE Mix
55+ person living alone	3.9	3.9	34%
55+ person living with 55+	3.7	7.4	50%
55+ person living with a younger adult	3.8	7.6	16%

Weighted Trips per Household Estimate for 55+ = 6.22
Estimated Average Trips per Household in Delaware = 8.62

Age Distribution Within Age Restricted Communities

 Figures above are for percentage of each household type as they exist in the overall Delaware population. But what if a larger or smaller percentage of persons in the age restricted communities was retirement age (65) or older?   For those 55 years or older in Delaware, about 45% are between the ages of 55 and 64, and 55% are 65 years or older.   The question is whether age restricted communities attract a different age distribution than exists in the general population. One rough estimate of the age distribution of 55+ communities was obtained by taking three age restricted communities in Delaware and determining what percentage of the housing had owners declaring the tax reduction for those 65 years in older.

Figure 19   Three Age Restricted Developments in New Castle County, Delaware and Retirement Age Status.

Development	Est. Occupied HU	# declaring 65+ Tax Break	
Spring Mill, Middletown	241	58	(24%)
Little Falls Village I, Hockessin	91	10	(11%)
Adaire Village	40	11	(27%)
		Unweighted Avg about 21% for 65+ households	

The percentages in the figure above then would indicate that perhaps active adult populations could consist of a mix of 20% 65years and older persons, rather than 55% as seen in the entire population of those 55years and older. In that sense the term "Active Adult" for these communities may be appropriate in that there is a relatively higher percentage of 55 to 64 year olds that may be more active than exist in the overall 55 and over population. Each development would of course have a different draw from the population based on its character and features though. For instance, "retirement" communities near the beach that are smaller modular units might have more 65 and older persons than those not in a resort community. A larger proportion of 55 to 64 year olds, relative to retirement age and above, in an age restricted community would be expected to yield more trips as a larger percentage of this age group is working and are more mobile.

Figure 20 investigates this idea by looking at those 55 years and over as two separate populations and presenting estimated individual and household daily trip rates. Trip rates do differ between the two groups but not by much.   A household estimate for the 55 to 64 year old group is 3.7 trips per day ,where the household estimate for the 65 and over group is 3.4 trips per day, a little less than half a trip difference.   If one assumed an age restricted community where 55 to 64 year olds made up 80% of the housing, the weighted average for the community would be 3.6 trips per household per day. If the 55 to 64 year olds made up 20% of the community, then the community average is estimated at 3.4 trips per household per day. There is not that much difference.   Using the model based on the national data, the result is similar; only about a half trip difference per household between an 80% mix or a 20% mix of 55 to 64 year olds.

Figure 20   Trip Generation Rate Estimates for Another View of 55+ Qualifying Households. Estimates from the DTMS model and data. Trips per day. Weekday travel. (P% = percentages as exist in Delaware population Ind Rate = Individual daily trip generation rate estimate HHRate = Household daily trip generation rate estimate)

Household Type	P%	Ind Rate	HHRate
55 – 64 living alone	23	1.8	1.8
55 –64 living with another adult < 65	77	2.1	4.2
weighted HH average = 3.67			
65 and over living alone	26	1.6	1.6
65 and over with 65+	66	2.0	4.0
65 and over living with a younger adult	8	2.1	4.2
weighted HH average = 3.37			

Employment

Employment is a factor of interest to investigate. Perhaps persons 55 years and older that are employed travel more than those who are retired. Figure 21 below shows employment status as reported in the DTMS survey.

Figure 21, Employment Status – Percentages of Those 16 Years and Older
DTMS Data, Year 2000 to 2003
(HM = Homemaker, %P = percentage of population 16 years and older)

	Emp	UnEmp	Student	Retired	HM	Self Emp	%P
55 to 64	39.1	3.8	0.1	44.8	6.6	5.5	12
65 and older	8.2	0.8	0	88.3	1.4	1.1	12.5
55 and older	23.4	2.3	0.1	66.9	4	3.3	25
16 to 54	74.8	4.3	11.3	0.8	5.5	3.2	75
16 and older	61.2	3.8	8.3	17.1	5.1	3.1	100

Figure 22 below shows the travel differences between 55 years and older employed versus unemployed and there is estimated to be a one trip per day difference. Of course, only in a very special unheard of circumstance would a community be populated with 100% employed 55+ households. What would be more likely is to see a 25% employment percentage among households, as seen in the general population. On the other hand, some communities may attract almost exclusively retirees in which case a household estimate (depending on housing type as discussed later) may be more around 3 trips per day.

Figure 22, Comparison of Daily Trip Generation Estimates With Respect to
Employment Status For Those Qualifying for Age Restricted Housing,
DTMS Data Years 2000 to 2003
(Ind Rate = Individual estimate, %P = percentage of population 16 years and older)

Unemployed	**Ind Rate**	**Household Rate**	**%P**
55 + living alone	1.6	1.6	6
55 + living with another 55+	1.9	3.8	9
55 + living with a younger adult	2.0	4.0	2
	weighted HH average = 3.1		

Employed	**Ind Rate**	**Household Rate**	**%P**
55 + living alone	2.0	2.0	1
55 + living with another 55+	2.3	4.6	2
55 + living with a younger adult	2.3	4.6	2
	weighted HH average = 4.1		

There is expected to be relatively small differences between total household trips per day with regards solely to employment. 100% retired is estimated to be 3.1 trips per day per household. 80% retired is estimated at 3.3 and 70% is estimated at 3.4. The real impact of employment status in an age restricted community is when during the day the trips occur, not how many trips per day are taken. Retired persons travel less during peak travel periods of the day as discussed later in this section.

Income

Trip generation estimates are generally higher for higher income groups in a population. For example:

Average individual trips per day in Delaware is 2.3
Average individual trips per day in Delaware, household income >= $100,000 is 2.9
Person 55 or older no children with household income less < $75,000 is 2.0
Person 55 or older no children with household income = > $75,000 is 2.4

Income is correlated with other factors though, including higher employment, more vehicles in the household, home ownership, presence of children in the household.

Apartment Living and Detached Housing

When examining trip generation for groups living in single family detached homes versus apartments for the 55+ age groups, it is clear that one is dealing with considerably different populations. For apartment dwellers, vehicles per household are lower, employment rates are much lower, trips taken are lower, persons per household is less, and the percentage of trips taken where the person is a passenger is much greater.

Figure 23   Comparison Of Factors for 55+ Populations.
DTMS Year 2000 to 20003
(VEH=average vehicles per household EMP = Percentage employed PPH = Persons per Household, DRIVE = %trips as the driver, PASS = %trips as the passenger, INC = Average Income level where 5 = "$25k to 29k+", 6 ="$30k to 34k+ , 7 = "$35k to 40k+"And 8 = "$40k to 49K+")

Individual Type	VEH	AGE	EMP	INC	PPH	DRIVE	PASS
55+	1.7	66	23%	7	1.86	75%	22%
55+ Apartment dwellers	1.0	71	8%	5	1.4	60	33
55+ Single Family Detached	2.0	65	26%	7	2.0	78	21
55 to 64	2.0	59	39%	8	2.0	75	22
65 and over	1.4	74	7%	6	1.7	75	23
55+ single family attached	1.4	66	30%	6	1.9	74	20

For 55+ apartment households the trip generation estimate is 2.7. The estimate for 55+ households over all housing types was calculated as 3.22, about 20% more trips.

Figure 24 Age Restricted Community Daily Trip Generation Rate Estimate For Apartments. DTMS model and data

Individual/HH	Indiv rate	HH rate	Mix
55+ person living alone	1.6	1.6	35%
55+ person living with 55+	1.7	3.3	60%
55+ person living with a younger adult	1.8	3.6	5%

HHrate weighted estimate = 2.7

Many of the new, age restricted communities are detached housing and often the trip generation impact of an age restricted community is compared with a typical single family detached development, so estimates for detached housing were examined.

Estimates for trip generation for 55+ households living in detached housing were developed from the DTMS data and are tabulated in Figure 25.

Figure 25   Age Restricted Community Daily Trip Generation Rate Estimate for Detached Housing. DTMS model and data.

Individual/HH	Indiv rate	HH rate	Mix
55+ person living alone	1.8	1.8	21%
55+ person living with 55+	2.0	4.1	58%
55+ person living with a younger adult	2.2	4.4	21%

HH weight estimate overall = 3.7
Delaware Population Detached HH est = 5.1

Figure 26   Age Restricted Community Daily Trip Generation Estimate for Detached Housing.   Model based on NPTS data

Individual/HH	Indiv rate	HH rate	Mix
55+ person living alone	4.1	4.1	21%
55+ person living with 55+	3.8	7.6	58%
55+ person living with a younger adult	4.1	8.2	21%

HH weight estimate overall = 7.0
Delaware Population Detached HH est = 9.3

To generate the overall population trip generation estimate for detached housing it was necessary to first generate estimates for most housing types and then produce a weighted average based on the percentages of each type in the Delaware population as shown in the following two figures.

Figure 27   Daily Trip Generation Rate Profile for Delaware Detached Housing. DTMS model and data.
(NC = no children WC=with children, adult = greater than 17 and less than 55, ind rate = individual rate, hhrate = household estimate,)

	pop%	ind rat	hhrate
55+ alone	5	1.8	1.8
55+ and adult	5	2.2	4.4
55+ and 55+	14	2.0	4.1
single adult nc	6	2.3	2.3
two over 17 wc	26	2.7	5.5
two adult nc	17	2.4	4.9
3 adults or gtr no 55+ nc	10	2.3	6.9+
3 or more over 17 wc	9	2.6	7.7+
3 or more over 17 1-55+nc	2	2.3	6.9+
1 over 17 wc	2	2.4	2.4
3 or more over 17 2-55+ or more,nc	3	2.1	6.2+

Population weighted average   5.1

Figure 28 Daily Trip Generation Rate Profile for Delaware Detached Housing. NPTS model using DTMS data.
(NC = no children WC=with children, adult = greater than 17 and less than 55, ind rate = individual rate, hhrate = household estimate,)

Household Type	pop%	ind rat	hhrate
55+ alone	5	4.1	4.1
55+ and younger adult	5	4.1	8.2
55+ and 55+ d	14	3.8	7.6
single adult nc	6	4.8	4.8
two over 17 wc	26	5.0	9.9
two adult no children	17	4.5	9
3 adults or more no 55+ nc	10	4.0	12.0
3 or more over 17 wc	9	4.5	13.4
3 or more over 17 1-55+nc	2	4.0	11.9
1 over 17 wc	2	5.2	5.2
3 or more over 17 2-55+ or more,nc	3	3.7	11.0

Population weighted average   9.3

Trip Time of Day

Developers of age restricted communities argue that these communities have relatively less impact on traffic for two primary reasons. First, older persons as a group tend to make less trips than younger persons, and second, older persons tend to make more trips during non-peak traffic times. The previously reviewed traffic count data and the trip generation model developed, speak well to the first point. To address the second point, the DTMS study was used to examine what time of day trips were being made. As shown in the figures below it appears that those 55 years

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and older as a percentage of trips taken, make about 50% less trips during the morning peak as the general population. Less trips are taken during the evening peak as well, and more than half of the trips are taken during the day between the peaks.

Figure 29   Percentage Of Trips Taken At Various Periods During The Day.
Entire Delaware Population Estimate from DTMS Years 2000 to 2003

TIME OF DAY	%Trips
Midnight to 3AM	2.9
3AM to 6:30 AM	12.6
6:30AM to 8:30 AM 2 hours	**21.4**
8:30AM to 4PM (7.5 hours)	37.8
4PM to 6PM	**15**
6PM to midnight	10.5

Figure 30   Percentage Of Trips Taken At Various Periods During The Day.
For 55+ households, DTMS

TIME OF DAY	%Trips
Midnight to 3AM	3.9
3AM to 6:30 AM	10
6:30AM to 8:30 AM 2 hours	**11.4**
8:30AM to 4PM (7.5 hours)	55.7
4PM to 6PM	**10.6**
6PM to midnight	8.4

Figure 32   Percentage Of Trips Taken At Various Periods During The Day.
Entire Delaware Population Estimate from DTMS Years 2000 to 2003
Single Family Detached

TIME OF DAY	%Trips
Midnight to 3AM	2.9
3AM to 6:30 AM	12
6:30AM to 8:30 AM 2 hours	**20.7**
8:30AM to 4PM (7.5 hours)	39.2
4PM to 6PM	**14.7**
6PM to midnight	10.6

Figure 31 Percentage Of Trips Taken At Various Periods During The Day
Households 55+ Single Family Detached
from DTMS Years 2000 to 2003

TIME OF DAY	%Trips
Midnight to 3AM	3.9
3AM to 6:30 AM	10
6:30AM to 8:30 AM 2 hours	**11.4**
8:30AM to 4PM (7.5 hours)	54.8
4PM to 6PM	**10.7**
6PM to midnight	9.1

As Figure 33 and Figure 34 below show, the distribution of work trips through the day are very similar between the entire Delaware population and the 55 year and older group.

Figure 33   Percentage Of Work Trips Taken At Various Periods During The Day For Entire Delaware Population. From DTMS Years 2000-2003

TIME OF DAY		%Trips
Midnight to 3AM		1
3AM to 6:30 AM		16
6:30AM to 8:30 AM	2 hours	**35.1**
8:30AM to 4PM (7.5 hours)		19.5
4PM to 6PM		**19.3**
6PM to midnight		8.2

Figure 34   Percentage Of Work Trips Taken At Various Periods During The Day. Workers 55 years old and over. From DTMS Years 2000-2003.

TIME OF DAY		%Trips
Midnight to 3AM		1.7
3AM to 6:30 AM		17.1
6:30AM to 8:30 AM	2 hours	**32.8**
8:30AM to 4PM (7.5 hours)		21.7
4PM to 6PM		**18.7**
6PM to midnight		8.0

The similarity in trip distribution for the whole population of workers and 55 years and older workers in the NPTS national data is also evident as shown in the two figures below. However, National figures show a larger percentage of trips between the peak travel times.

Figure 35   Percentage Of Work Trips Taken At Various Periods During The Day, From NPTS 1995, individuals trip start, weekday, > 15yrs

TIME OF DAY		%Trips
Midnight to 3AM		1.6
3AM to 6:30 AM		10.9
6:30AM to 8:30 AM	2 hours	**30.7**
8:30AM to 4PM (7.5 hours)		27.0
4PM to 6PM		**17.2**
6PM to midnight		12.7

Figure 36   Percentage Of Work Trips By 55 Years And Older Workers At Various Periods During The Day, National data from NPTS 1995, individuals trip start

TIME OF DAY		%Trips	.
Midnight to 3AM		1.3	
3AM to 6:30 AM		11.6	
6:30AM to 8:30 AM	2 hours	**28.5**	
8:30AM to 4PM (7.5 hours)		32.5	
4PM to 6PM		**16.7**	
6PM to midnight		9.4	

Examining the national data for distribution of trips during the day, it is shown that the 55 and older group do make less trips during the peak hours but the difference is not as great as with the Delaware data as seen in Figures 37 and 38 below.   A larger percentage of trips are taken between the morning and evening peaks in the national data than shown in Delaware data. Another noteworthy difference is that the DTMS indicates that about 40% of trips are for work, where nationally work trips at about 14%.

Figure 37   Percentage of trips taken at various periods during the day. National population estimate from NPTS 1995

TIME OF DAY		%Trips	.
Midnight to 3AM		0.8	
3AM to 6:30 AM		2.6	
6:30AM to 8:30 AM	2 hours	**11.7**	
8:30AM to 4PM (7.5 hours)		48.2	
4PM to 6PM		**16.3**	
6PM to midnight		20.3	

Figure 38   Percentage of trips taken at various periods during the day. National 55 years and over population estimate from NPTS 1995, weekday

TIME OF DAY		%Trips	.
Midnight to 3AM		0.3	
3AM to 6:30 AM		1.8	
6:30AM to 8:30 AM	2 hours	**7.9**	
8:30AM to 4PM (7.5 hours)		61.9	
4PM to 6PM		**13.9**	
6PM to midnight		14.2	

Non-Household Trips

The approach taken in this project involved a study of individuals, their characteristics and the characteristics of households, and the trips they take as indicated by surveys. Travel for those that are 16 years and older is surveyed in the DTMS. If those in the household under 16 years of age are traveling with a member of their household, these household trips are accounted for with DTMS models. Travel by those under 16 that is not with a household member is not surveyed, and school bus trips, a commute to school or an activity by a driver outside of the household, or a bicycle or walk trip to school are examples of household travel that is not surveyed. From NPTS data this travel by those under 16 years of age that is not with an accompanying household member can be estimated. Roughly 6% of daily travel of an average single family household is by those less that 16 years of age either alone, or with a non-household member. Figures for this type of travel were also tabulated for morning and evening peak times, and household travel numbers shown in the rest of this report have been adjusted to account for this.

There is another element of trip generation that would show up on a traffic count that is not addressed in the household travel models produced in this project. When a traffic counter is placed at the access points of neighborhoods, trips taken by those in the household will be counted but there will be other trips as well, trips made by others not living in the neighborhood that are "induced" by the residents. Examples of these types of trips are shown in Figure 39.

Figure 39 Examples of Non-Household Trips

Mail Delivery
Utilities (Gas, Electric, Telephone, Cable TV, Water, etc)
Construction, Home Improvement
Lawn Services
Parcel Delivery
Real Estate Sales
Laundry Service
Food Delivery
Medical Services
Security
Other Commercial Services
Visitors
Child care drop offs
Garbage pickup

The demographic data discussed so far provides a good foundation to compare trip generation of age restricted communities with traditional communities in regards to those **in the household**, but the types of travel shown in the figure above, to be referred to as "non-household travel" here, have not been addressed. The question is, "Would there be any difference between age restricted communities and unrestricted communities in regards to non-household travel?" and also, "What is the relative magnitude of non-household travel?"

Discussions with transportation professionals and an examination of existing research did not identify any source of information on non-household trips. There were no references found that would even suggest the relative magnitude of non-household travel with respect to travel by members of the household. Typically trips are measured by traffic counters, or are modeled based on household characteristics as trip productions. Commercial development, job centers and the like are modeled in terms of the number of trips they attract. In this case the residential

development can be seen as an attractor for trips like those shown in Figure 39 above, and no discussion or estimates of this type of travel were found.

One facet of non-household travel would be that much of it is not based so much on household individuals' behavior but more on the residence itself. Trips associated with utilities, lawn services, construction, and the like, are services to the residence and would not seem to be different depending on the individuals that make up the household. Do older persons require more professional services coming to their house? Do they have food delivered more or less than younger households? Do they have more or less visitors? Answers to these questions are unknown and may vary considerably depending on the type of housing development.

Estimating the magnitude of non-household travel would seem to be difficult without direct survey of drivers at the entrances to residential communities. Commercial vehicles are easy to identify from the road but whether someone in a car going into the community is a resident or not would be unknown.

One method of estimating the magnitude of non-household travel would be to compare a traffic count measure with the modeled household trip estimate. The household travel plus the non-household travel should equal the traffic count measure. The estimate for an age restricted detached housing community in Delaware as modeled is about 3.7 trips per household per day. A traffic count for the Hershey Run age restricted community in Delaware was about 4.6 trips per household per day. That would then suggest from this one case that the non-household value would be about 25% of the daily trips, or close to one trip per day per household. This sounds reasonable, using this estimate on average there is about one round trip every two days from a non-household source to each household.

Peak Period Traffic Generation Rates

Traffic peaks, rather than daily traffic estimates, are of most concern when examining traffic impacts in an area. Traffic count studies most often tabulate the trip rate during the morning and evening peak hours. The distributions of trips during the day as shown in previous figures provide a means of estimating peak period rates as presented in figure 40. The estimates of the DTMS and NPTS trip generation models show that 55+ households are expected to take a bit more than a third as many trips during the morning peak as the general population takes, and about half of the trips in the evening peak.

**Figure 40 Peak Hour Weekday Trip Generation Rates estimated from DTMS and NPTS models.
Data source is DelDOT Household Survey Years 2000 to 2003.
(MPH = Morning Peak Hour Trips per Household Generation Rate Estimate)
(EPH = Evening Peak Hour Trips per Household Generation Rate Estimate)
(adjusted for children trips individually or with a non-household member)**

Source	Total daily Trips/HH	% Daily trips 6:30-8:30am	% Daily trips 4pm-6pm	MPH	EPH
DTMS Population	5.0	21.4	15	0.54	0.36
DTMS 55+	3.2	11.4	10.6	0.18	0.17
DTMS Single Fam	5.4	20.7	14.7	0.57	0.38
DTMS 55+ Single Fam	3.7	11.4	10.7	0.21	0.20
NPTS Population	8.62	11.7	16.3	0.55	0.72
NPTS 55+	6.22	7.9	13.9	0.25	0.43
NPTS SF	9.2	11.7	16.3	0.55	0.78
NPTS SF 55+	6.97	7.9	13.9	0.28	0.48

Trip Generation Model Application

The figures shown above are trips taken by members of the household. There are expected to be additional trips per household that are non-household trips as discussed in the preceding section. They would not include commercial traffic, a portion of carpooling trips, visitors, a daycare provider going to a household, a maid, or any trip that was to or from the house not made by a member of the household.   Peak hour trip generation numbers shown above would be expected to be lower than what a traffic count measure would indicate. Figure 41 below shows trip counts of three suburban single family detached developments in New Castle County.   The measurements for three developments are only what were currently available for this study from the Delaware Department of Transportation but they do show a consistency with each other.

Figure 41, Three Single Family Developments in New Castle County
Trips per Household During AM and PM Peak Hours.

Development	Leaving AM	Going In AM	Tot AM	Going In PM	Leaving PM	TotPM
Mount Hope	0.72	0.17	0.89	0.50	0.31	0.81
Chestnut Valley	0.74	0.16	0.9	0.67	0.49	1.15
Hockessin Greene	0.67	0.11 .	0.78	0.61	0.29	0.9

Note:(ITE Single Family prediction is Daily = 9.55, AM Peak hour = 0.74, PM Peak hour = 0.63)

The numbers above are interesting when considering household versus non-household trip generation. The peak morning hour for the data occurred between 6:30 and 7:30AM. These three developments consist entirely of residential development. What is seen is that about 20% of the total trips (in and out) are going into the development at this early hour. Of course some of these trips going into the development may be trips from household members accounted for in models and survey data, such as return home from a night work shift (only about 2% of workers return from work at this time), a return from an early morning shopping trip, or a return from an early drop off at school. At that peak hour though it would seem just as likely, or more so, that the traffic going in is non-household travel such as a vehicle coming to pick someone up, deliveries, a construction crew beginning work on a home improvement project, a school bus, or a day care provider. Any type of trip that would be one that went into the development and out again within the hour would register two trips on the counter. If all of the trips going into the development during the morning peak hour left during the peak hour then the range for this data would be 0.54 to 0.56 net trips which is in line with the 0.55 peak hour trips per household (by members of the household) estimated by DTMS and NPTS models for general single family structures.   The estimate trip rate from models for the morning peak is about 2/3 of the total traffic count that would be expected. One third of the total trips are expected to be non-household trips. An adjustment to the modeled figure to account for non-household trips would then be to increase the modeled rate by 50%.

For a few communities, peak hour trips per household data for age restricted communities was obtained in this study as discussed in a previous section and shown in Figure 42 below. From this and other information found in this study, traffic counts of age restricted communities show an average of about 0.28 trips per household during the morning peak hour and 0.31 trips per household in the evening peak hour of adjacent traffic.   Estimates for peak hour trips per household for age restricted single family households were 0.21 for the morning peak and 0.20 for the evening peak as estimated by the DTMS model. Just as with the daily rates for the population, the modeled estimate is expected to be about 2/3 of the value obtained from a traffic counter.

Figure 42,   Peak Hour Information for 55+ commities

	Daily	AM Peak Hour	PM Peak Hour
Hershey Run 55+ community	4.57	0.22	0.29
55+ communities in PA	2.76	0.33	0.35
Monmouth/Ocean counties 55+	na	0.27	0.27

Models of household trip generation during the morning peak hour indicate that per household trip rates for 55+ single family are 0.21 and the estimate for the single family unrestricted household is 0.57. Available traffic count data indicates on average about 0.28 trips per household for single family age restricted housing and 0.85 trips per household for unrestricted households. **The models and the available traffic count data both indicate that for the morning peak hour, age restricted housing generates very close to one third of that for non-restricted housing.** Not surprisingly the employment rate of those 55 years and older in Delaware (23.4%) calculated from the survey data is a little over a third of the general population employment rate (61.2%).

The evening peak would be expected to be more complicated as it involves more diverse trip purposes and is less dominated by work trips.   Work trips are more highly concentrated in the morning peak hours as can be seen in Figures 43 and 44 below.   Delaware models for the evening peak hour for age restricted households show a similar rate as the morning peak at 0.20 trips per single family household.   Traffic counts for the evening peak that are available for age restricted as well as unrestricted communities sometimes show a 10% to 20% increase in trips per household over the morning peak hour.   Models based on national survey data show evening peak hour trips per household for the entire population as well as age restricted households significantly higher than the morning peak in some cases nearly double. Based on the data available and models for this region, a value of around 0.3 trips per single family household is an estimate of the rate for age restricted communities with 0.9 being around the rate for unrestricted communities. **Like the morning peak, the trip rate for age restricted communities during the evening peak is expected to be about one third the rate for unrestricted communities.**

Figure 43, Percentage of Home to Work Trips in Delaware by time of day

TIME OF DAY	%Trips .
Midnight to 3AM	0.8
3AM to 6:30 AM	16.4
6:30AM to 8:30 AM	**64.9**
8:30AM to 4PM (7.5 hours)	17.7
4PM to 6PM	**1.1**
6PM to midnight	1.2

Figure 44, Percentage of Work to Home Trips in Delaware by time of day

TIME OF DAY	%Trips .
Midnight to 3AM	1.1
3AM to 6:30 AM	17.4
6:30AM to 8:30 AM	**4.1**
8:30AM to 4PM (7.5 hours)	18.7
4PM to 6PM	**41.8**
6PM to midnight	16.9

Daily Trip Rates

There was very little traffic count data available for the entire day to determine an appropriate adjustment to modeled rates. The DTMS model estimated a daily rate of 3.7 trips per household for age restricted single family housing which is the same for ITE's Land Use 251 for Senior detached housing.   Traffic count measures at one 55+ single family community in Delaware was 4.6 trips per household per day and the DTMS model estimate did not include non-household trips, so the ITE value is expected to be low and 4.6 trips per day for age restricted single family household is expected to be about right and is about a 25% adjustment to the modeled estimate. A 25% adjustment to the DTMS modeled estimate for unrestricted single family housing (5.4 trips per household per day) would provide an estimate close to 7 trips per household per day for single family unrestricted communities.   Viewed another way, the models indicate that the ratio of age restricted daily trip rate to unrestricted daily trip rate is about 2/3. If that ratio hold over all trips and the figure of 4.6 trips per household per day is used for age restricted households then that would suggest an estimate of about 7 trips per household per day for unrestricted single family housing.

Estimates of Traffic Counts Using The Delaware Trip Generation Model

The effects of age, employment, income, housing type, household structure and other factors are shown well by the model, as are the relative magnitudes of age restricted trip generation to unrestricted trip generation. Modeled trip generation yield values that are always less than what would be expected by a traffic counter since the models only address household travel. From an examination of the data available, adjustments to the modeled figures could be suggested. An estimate of what a traffic counter would yield during a peak hour would be to multiply the modeled estimates by 1.5, a 50% increase to account for non-household travel. A daily trips per household figure would be to take the modeled estimate and multiply by 1.25, a 25% adjustment to account for non-household travel through the day.

As an example, apartment trip rates for age restricted communities could be examined using the models. The DTMS model estimates about 0.15 trips per household during morning and peak hours for age restricted apartments. Increasing this peak period model estimate by 50% would yield an adjusted estimate of 0.22 trips per household expected from a traffic counter. In line with this adjusted estimate, the traffic count for age restricted apartments in New Jersey counties was 0.2 trip per household during the morning peak hour and 0.26 during the evening peak hour.

Summary and Conclusions

- Survey data in the years between 1995 and 2003 have shown that 29% of the Delaware households are eligible to live in 55 years and older age restricted communities. This represents a large and growing market for such communities.

- The models created in this project have the ability to predict the effects of age, income, vehicle availability, housing type, children in the household, employment, and home ownership on trip generation. With the various plans that are proposed for age restricted housing, and the relatively low amount of data available on trip generation for these facilities, the model has the ability to estimate the effects of a variety of factors that may come into play when examining the impacts of new housing developments.

- Delaware data and National Personal Travel Survey (NPTS) data both show a decrease of trips with age. From models built on the DelDOT Trip Monitoring System (DTMS) data, it was estimated that 55 years and older households take about 2/3 of the daily trips that average households in Delaware take. From models built on the NPTS using Delaware data, it was estimated that 55 years and older households also take about 2/3 of the daily trips that average households in Delaware take. These results correspond well with Corcoran's study that indicates that senior housing generates about 2/3 the amount of traffic as typical single family development. From the modeling work done in this study and the examination of other sources of information, this appears to be the best relative estimate of senior housing to the general population for total weekday travel.

- Analysis of available data and trip generation model estimates indicate that values of trips per peak hour of adjacent traffic (AM and PM) for age restricted housing are 1/3 that of similar unrestricted housing. This would seem to be largely due to the percentages of each population that are employed. Those 55 years and older take a larger percentage of trips during the off peak hours than the average person over 17 years of age. This difference is due to when non-work trips occur. When viewing the distribution of work trips throughout the day, 55+ workers show a very similar trip distribution as the working population as a whole.

- Trip generation models based on household travel surveys only estimate the trip rates of those in the household. There is apparently a considerable amount of non-household travel induced in neighborhoods. Non-household travel would include visitors, utilities, trash, lawn and other home services, mail and parcel delivery, and variety of other types of travel. Estimates of the magnitude of this non-household travel are 25% of the total daily trips. Using model estimates, an estimate of what a traffic counter would yield during a peak hour would be to multiply the modeled estimates by 1.5, a 50% increase to account for non-household travel. An estimate of what a traffic counter would yield for daily trips per household figure would be produced by multiplying the modeled estimate by 1.33, for a 25% adjustment to account for non-household travel through the day. These corrections to adjust modeled rates to correspond to what would be expected to be produced from traffic counts, are based on a comparison of modeled trip generation rates and traffic counts available.

Summary and Conclusions

- Based on data available and trip generation models created, average rates for single family detached housing during peak hours are estimated as follows:

	AMpeakhour	PMpeakHour	Daily
Age Restricted (55+)	0.28	0.3	4.6
Not Restricted	0.85	0.9	7.0

- Analysis was done using current population averages in Delaware. The question was though, whether or not there was something particularly different about the 55+ populations that live in restricted communities and those of similar age in the general population. One consideration was whether a younger mix was present in the age restricted communities and whether that would make a difference. Trip generation for households with persons age 55 to 64 were studied and it was found that estimates for age restricted communities would not be much different with a younger mix. Whether life styles of those living in age restricted communities were such that residents were more "active" in terms of taking more trips is not known but there was no evidence found of this.

- Housing type is a factor in the models. Individuals living in apartments are shown in general to make less trips, and persons living in detached housing make more than the average number of trips per day.

- Data estimates in this project were only focused on weekday travel. Weekend travel is expected to show differences.

- Figures for trip generation for age 55 and over households as modeled and presented in this report were generated for households with no children. To use these estimates to evaluate a particular residential development plan, one must consider factors in addition to age such as income and housing type that were included in the models. Also many age restricted communities allow for a certain percentage of units permitting residence of individuals under 18 years of age, so there would be a mix of restricted and unrestricted housing to be accounted for. While a development may be initially age restricted, over a period of time and unforeseen demographic or economic changes in a locale, residence rules may be altered. Modeling trip generation allows for the estimation of impacts under various scenarios and changing circumstances.

References

Footnotes were provided for references in the report.

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2) "Senior Housing Trip Generation and Parking Demand Characteristics"
   Stephen B. Corcoran, ITE 66th Annual Meeting

3) 1995 National Personal Transportation Survey Summary of Trends, FHWA and
   Bureau of Transportation Statistics.

4) 1995 National Personal Transportation Survey Data, FHWA and
   Bureau of Transportation Statistics.

5) Institute of Transportation Engineers, Trip Generation, 7th Edition

6) Delaware Department of Transportation Trip Monitoring System data, survey years
2001 thru 2003. Dover, Delaware. As conducted and compiled by the Center for
Applied Demography and Survey Research, University of Delaware.

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7) Traffic Planning and Design Inc. Dec 1 1999

8) Orth-Rodgers Associates Inc.   September 18 ,1998

9) Abbington-Ney Associates 9/27/1988

10) Schoor Depalma 5/23/2000

11) Karins and Associates April   00 to 02

12) Karins and Associates collected trip generation data for Hershey Run

Age Restricted Communities in Delaware

The following is a list of age-restricted communities in Delaware that were identified. This is not necessarily a complete list but is what could be found in a first pass
by contacting government offices and realtors.

New Castle County

SpringMill, Middletown, McKee Group, http://mckeebuilders.com/springmill/
362 Ranch Homes from Mid $200,000
Clubhouse, pool, bocce, tennis courts, walking trails
$140 per month community fee includes all exterior maintenance on home and yard.
Eighty percent of the homes must have one person in the household be 55, but federal law permits a limited number of homeowners under the age of 55.

Spring Arbor, Middletown, Mckee Group
317 homes,   ½ towns ½ singles

Spring Meadow, Smyrna, McKee Group
246 homes,   ½ towns ½ singles

Little Falls Village, Hockessin, Benchmark Builders
107 detached , 2 bedroom, sold out
clubhouse, next to golf course,

Little Falls Village II
36 townhouses

Meridian Crossing
127 detached, 314 townhouses, 220 apartments

Village of Red Lion Creek, Pencader, rt40/rt1, Benchmark Builders
2 bedroom, 2 story, detached, $226 to $227
club house, exterior maintenance

Crossings At Christiana, Bear/Glasgow Benchmark Builders
140 detached, 2 bedroom, 2 story, , $218 to $250
club house, exterior maintenance

Village At Rocky Run, Rt. 202 near PA border, Benchmark Builders
2 bedroom, 2 story, detached, sold out
club house, exterior maintenance, near park

Hershey Run, Newport, Eastern States Development Company

Paper Mill Falls, Newark

Adaire Village, Paper Mill/Limestone Rd, Benchmark Builders
Upper 200's

New Castle County (continued)

White Chapel, Newark

Traditions of Red Lion

Cloutier Court, Weldin Prop.
15 townhoues

Churchman's Meadows
145 units

Village of Brandywine
184 detached

Traditions at Jester Crossing
54 detached

Kent County

Spring Meadow
246 lots

Village of Nobles Pond
1,021 lots

Champions Club
338 Lots

Sussex County

Central Park, Milford

Bay Crossing

Bridgeville Crossing

Laurel Senior Housing

Cadbury

The Peninsula

Sussex East Mobile home development

Sussex West, 30769 Lewes Georgetown Hwy, Lewes, DE, 2 and 3 bedroom, Manor House