

# Travel Behavior of the Aging Boomers: Evidence from Age-Restricted Communities

## Principal Investigator

P. Christopher Zegras  
Massachusetts Institute of Technology  
Department of Urban Studies and Planning  
77 Massachusetts Avenue, Room 10-403  
Cambridge, MA 02139  
617 452 2433, czegras@mit.edu

## Co-Principal Investigator

Eran Ben-Joseph  
Massachusetts Institute of Technology  
Department of Urban Studies and Planning  
77 Massachusetts Avenue, Room 10-485  
Cambridge, MA 02139  
617 253 7305, ebj@mit.edu

## Abstract

The first phase of this project has established the foundation for better understanding older adults' locational characteristics in the Boston Metro Area and is allowing us to gain preliminary insights into the relationship between the built environment and the travel behavior of older adults through the study of four different urban edge communities (two age-restricted communities, two matching non-age-restricted communities), utilizing focus groups. The second phase of this project will enable us to build upon the information gained and to develop stronger empirical evidence on how different types of community settings, particularly age-restricted, active adult communities (ARAAC), apparently influence travel and activity patterns. In this second phase, we will employ a travel survey instrument among older adults residing in two ARAACs and two non-ARAACs, in a matched pair, quasi-experimental research design. Following the state-of-the-art in this type of research, we will utilize survey questions and statistical techniques that will attempt to control for individual's travel preferences. The research design will enable stronger inference regarding the influence of the community setting on travel behavior. The results will allow us to derive specific lessons for the design of communities where older adults reside.

## **Statement of Project Objectives**

As stated in our previous (Phase I) statement our basic objective is to provide empirical evidence on the influence of the built environment and different types of community settings on travel behavior of older adults (defined as persons over 55), including trip rates, mode choices, distances traveled, etc. Through the proposed research, we intend to answer questions including:

- Do older adults living in age-restricted active adult communities (ARAAC) make different transport choices than their counterparts living in ordinary urban settings?
- Do age-restricted developments increase or decrease auto use?
- Do these settings and related local amenities increase or decrease pedestrian activity for residents?
- Do age-restricted active adult communities offer useful design lessons that can be adapted to induce certain travel behaviors in non-age restricted developments and/or vice versa?

The need for “livable communities” that provide transportation alternatives has been identified by scholars, advocates and the AARP itself as an important item on the aging community agenda. This is a global issue, not only in the aging “Old World” — but also in many parts of the developing world where life expectancies keep climbing.<sup>1</sup> At the same time, age restricted active adult housing developments have grown tremendously in recent years, including in Massachusetts, driven by demographics, local land use policies, and fiscal considerations.<sup>2</sup>

Through this research we ultimately expect to better inform relevant community design and development approaches to ensure that current and future communities can adequately meet the mobility/accessibility needs of older adults (including active-living possibilities and health benefits) and the broader community (congestion, safety, private vehicle use reduction, etc.). The importance of the latter is underscored by the suggestion, by some, that elderly mobility patterns may have disproportionately negative effects on transportation sustainability, as the elderly may be less inclined to use public transport, may make more polluting trips due to their trip characteristics (e.g., many short trips) and vehicle preferences, and also have higher accident rates.<sup>3</sup>

## **Research Contribution**

This proposal is in line-with the broad-spanning and active research base into the role of the built environment on travel behavior, including the increasing amount of interest in designing communities for more “active living.” In fact, the latter represents a critical element: the idea of “active aging” – promoting active living for older adults – to produce important health and quality of life benefits.<sup>4</sup>

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<sup>1</sup> See the *Global Report on Aging* Special Issue, 2005.

<sup>2</sup> Citizens’ Housing and Planning Association (CHAPA), *Age Restricted Active Adult Housing in Massachusetts*, June 2005.

<sup>3</sup> S Rosenbloom, *Sustainability and automobility among the elderly: An international assessment*, *Transportation*, Vol. 28, 2001, pp. 375-408.

<sup>4</sup> ICMA, *Active Living for Older Adults: Management Strategies for Healthy and Livable Communities*. September, 2003; JS Brach, JM VanSwearingen, SJ FitzGerald, KL Storti, AM Kriska, *The relationship among physical activity, obesity, and physical function in community-dwelling older women*, *Preventative Medicine*, 39, 2004, pp. 74-80.

Recommendations and guidebooks in this area exist,<sup>5</sup> but the empirical evidence needed to support assumptions about the expected effects remains sparse. While there are numerous explorations into older adult travel behavior, few have focused on the specific role of the built environment and none have apparently focused on age-restricted communities.

With respect to the built environment and older adult or elderly travel behavior, several researchers have used national level survey data, including the Nationwide Personal Transportation Survey (NPTS)/National Household Travel Survey (NHTS). Bailey<sup>6</sup>, for example, carries out a descriptive statistics analysis of the 2001 NHTS, proposing a measure of elderly “isolation” – referring to people who stay at home on a given day – and suggesting auto-dependency, influenced by urban form, as a cause. Her analysis, however, suffers from the use of few controls (e.g., for variations in age, income, etc.) and very crude built environment measures (census block group population density). Several analyses carry out more detailed analytical efforts. Rosenbloom and Waldorf<sup>7</sup>, using the 1995 NPTS, include the effects of relative location (e.g., urban, suburban) on public transport and auto mode choice. They also, however, use few controls in their analysis; furthermore, the crude location measure used provides few insights into the possible influences of community design on broader indicators of older adult travel behavior.

Giuliano<sup>8</sup>, also using the 1995 NPTS, attempts to detect the effects of metropolitan-scale and “neighborhood”-scale (defined at census tract level) influences on elderly travel behavior. The “neighborhood”-scale variables used to represent the built environment included population density, employment density, a “local services index” (derived from the 1992 Economic Census zip code data), housing age as a proxy for land use dispersal, and share of homeowners as an income proxy. She finds few significant built environment effects on elderly trip rates, except for a positive effect of local access (which increases trip rate). For trip distances (for nonwork travel), she finds significant effects of local access and density, with differing effects detected between the younger elderly (65-74) and older elderly (75+). Some limitations of Giuliano’s work include: the rough proxies – measured for the census tract – used to represent the local built environment; and, the omission of walking trips from the analysis. The latter are important in understanding whether the built environment does lead to more active elderly lifestyles. A recent study for the NCHRP, using the 2001 NHTS, estimates elderly demand for public transit, but does not specifically aim to capture land use influences on elderly travel, per se.<sup>9</sup>

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<sup>5</sup> e.g., ICMA, op cit.; S Rosenbloom, Mobility of the Elderly: Good News and Bad News, in *Transportation in an Aging Society: A Decade of Experience*, Technical Papers and Reports from a Conference November 7–9, 1999, Bethesda, MD, published by TRB, Sept., 2004.

<sup>6</sup> L Bailey, Aging Americans: Stranded Without Options, Surface Transport Policy Project, 2004.

<sup>7</sup> S Rosenbloom & B Waldorf, Older Travelers: Does Place or Race Make a Difference? in *Personal Travel: The Long and the Short of It*, Conference Proceedings, Transportation Research Board (29 June-1 July, 1999), March 2001, pp. 103-120.

<sup>8</sup> G Giuliano, Land Use and Travel Patterns among the Elderly, in *Transportation in an Aging Society: A Decade of Experience*, Technical Papers and Reports from a Conference, November 7–9, 1999, Bethesda, Maryland, published by TRB, September, 2004.

<sup>9</sup> ICF Consulting, Estimating the Impacts of the Aging Population on Transit Ridership, prepared for National Cooperative Highway Research Program, Project 20-65(4), January, 2006.

Finally, the AARP implemented a national telephone survey among adults age 50+, in which respondents identified built environment-related problems with walking – e.g. lack of sidewalks – as well as non-built environment characteristics such as individual capabilities.<sup>10</sup> The survey found differences in suburb versus city travel behavior, including propensity to walk; although the differences may well arise from other correlated factors, such as income.

Beyond the national-level data analyses, several relevant local-level empirical efforts exist. Kim and Ulfarsson,<sup>11</sup> for example, use data from the Puget Sound Transportation Panel Survey to estimate a mode choice model for older adult travelers. The model suffers from limited specification – such as the lack of information (e.g., out-of-pocket costs) on the alternatives and limited built environment characteristics represented – but suggests some influence of transit proximity and neighborhood density on automobile mode choice. Smith and Sylvestre<sup>12</sup> implement a survey of elderly residents in suburban Winnipeg (Manitoba), and – similar to the Giuliano analysis reported above – find no influence of local land use characteristics (distances measured to different services and transit) on elderly trip frequencies; they do not specifically examine mode choice or travel distances.

Within the physical activity research, King et al<sup>13</sup> use a survey of activities, destinations and perceptions of the “neighborhood environment,” together with a pedometer, to explore factors contributing to the physical activity of older women. They find statistically significant correlations between total physical activity levels and neighborhood convenience (measured by potential destinations/opportunities within walking distance) and a “walkability rating.” Belza et al,<sup>14</sup> in an ethnographic approach, used detailed interviews among the elderly of a range of ethnicities, and found that, among other factors, neighborhood safety, crime fear, and reliability of affordable transportation influenced activity levels.

Building, in part, on these analytical precedents as well as the broader built environment-travel behavior research foundation,<sup>15</sup> the proposed research aims to make several important contributions, including:

- providing a much-needed context-specificity, necessary for helping to clearly identify relevant influencing factors and thus guide practical policy design. Giuliano, for example, calls for cross-sectional studies of older adult mobility in different specific locations as well as analyses of locational preferences (who locates in development types and

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<sup>10</sup> AS Ritter, A Straight, E Evans, *Understanding Senior Transportation: Report and Analysis of a Survey of Consumers Age 50+*, AARP Public Policy Institute, 2002.

<sup>11</sup> S Kim and G Ulfarsson, Travel Mode Choice of the Elderly: Effects of Personal, Household, Neighborhood and Trip Characteristics, *Transportation Research Record 1894*, 2004, pp. 117-128.

<sup>12</sup> GC Smith and GM Sylvestre, Determinants of the Travel Behavior of the Suburban Elderly, *Growth and Change*, Vol. 32, Summer, 2001, pp.395-412.

<sup>13</sup> WC King, JS Brach, S Belle, R Killingsworth, M Fenton, A Kriska, The Relationship Between Convenience of Destinations and Walking Levels in Older Women, *American Journal of Health Promotion*, 2003, Vol. 18, No. 1, pp. 74-82.

<sup>14</sup> B Belza, J Walwick S. Shiu-Thornton, S Schwartz, M Taylor, J LoGerfo, Older adult perspectives on physical activity and exercise: voices from multiple cultures, *Preventing Chronic Disease*, Vol. 1, No. 4, October, 2004, pp. 1-12.

<sup>15</sup> Summarized in, e.g., C Zegras, Sustainable Urban Mobility: Exploring the Role of the Built Environment, PhD dissertation, Dept. of Urban Studies and Planning, MIT, September, 2005.

why?).<sup>16</sup> By focusing on specific types of older adult locations, we will be able to analyze, with more resolution (i.e., beyond gross built environment measures such as population density), the physical characteristics of communities that might influence elderly travel behavior.

- analyzing a particular development type, the age-restricted active adult community (ARAAC). Despite their continued growth as a community development type,<sup>17</sup> the influence of these communities on travel behavior and accessibility has not been studied. A focus on these community types should make an important contribution to research on older adult mobility and residential preferences.
- contributing to our understanding of the reasons for which older adults search for particular community characteristics (including accessibility-related characteristics), which is a critical element (as described further below) to rigorously carrying out this research.
- providing a focus on the New England area, which, like other states in the US, is experiencing aging of the Boomers' generation and the related community development and mobility challenges that accompany it.

We pursue this research under the basic conceptual understanding that the built environment influences travel behavior by influencing the real and perceived costs of travel by different modes for different purposes. Clearly, other factors also play an important role in travel and activity outcomes, such as attitudes and preferences (not to mention income, physical capabilities, etc.) – factors which themselves might be influenced, in time, by particular community settings. With respect to the potential role of ARAACs, we expect that people living in ARAACs will make more local trips on foot, even if their overall number of vehicle trips is not different to people living in otherwise comparable non-ARAACs, since ARAACs provide physical settings within which the older adults are more inclined to participate in “active travel.” We also expect to find that ARAACs produce different regional travel patterns (e.g., for shopping or recreation trips), in part because the ARAACs produce communities which facilitate different forms of shared rides (car-pooling or special van services). While the latter is not attributable to the built environment, per se, it is still a product of the ARAAC community type. We expect to develop and refine further testable hypotheses upon conclusion of the Focus Groups to be undertaken in Phase I of this research (funded by UTC Year 19).

### **Technical Approach or Methodology**

The project takes a multi-stage approach to studying this issue. The first Phase of the research (currently in-progress), modified from the original proposal upon further discussions with researchers at the MIT AgeLab, has included an inventory of relevant community types in the Boston Metropolitan Area, an ongoing review of the relevant research and available data sources, including the 1991 Metropolitan Boston Area household travel survey and 2006 proprietary data derived from the US Census.<sup>18</sup> The former enables a general (albeit outdated) travel portrait of older adults in the area of study and the Census data provide a more detailed view of elderly community concentrations (Figure 1). We are also currently developing more precise measures of regional and local level accessibility for candidate communities in the Boston Metropolitan Area, utilizing

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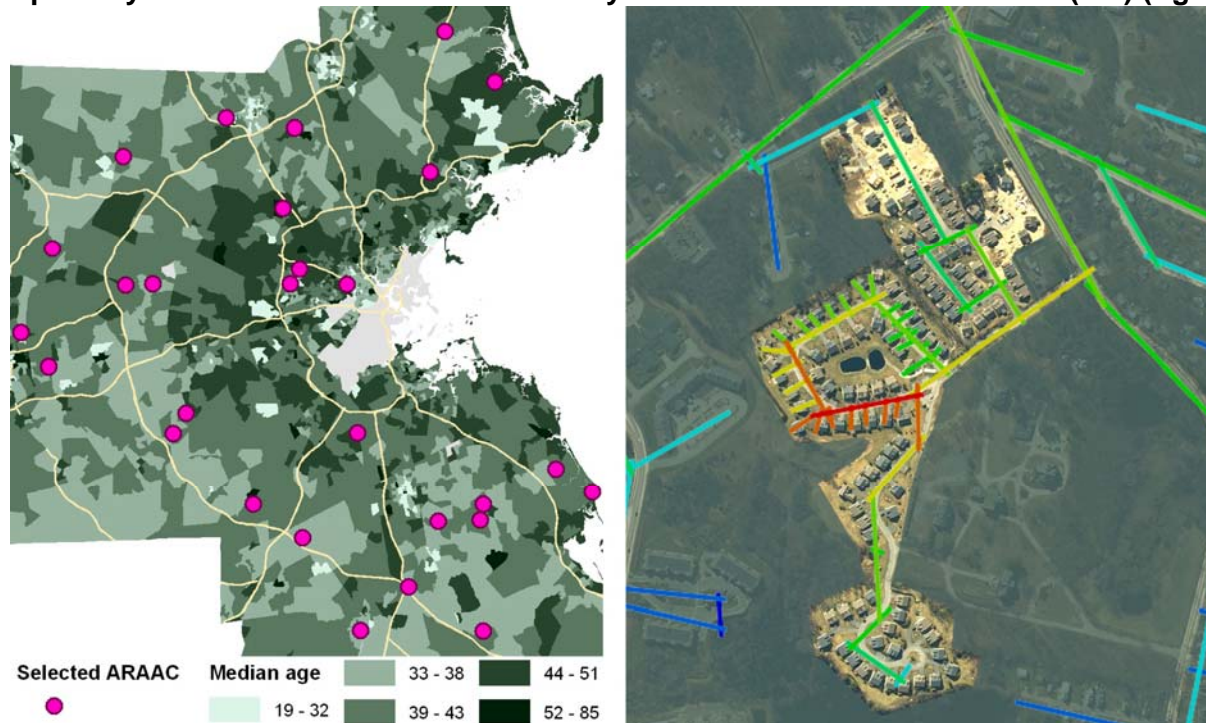
<sup>16</sup> Giuliano, 2004, op cit.

<sup>17</sup> e.g., CHAPA, 2005, op cit.

<sup>18</sup> Claritas 2006, Demographic Data

transportation system levels of service (from TransCAD and the Boston MPO model), data on commercial establishments<sup>19</sup> and other potential destinations, and measures of urban design, development size and morphology (Figure 1). These measures will allow us to identify matching communities for the analysis.

**Figure 1. Older Adult Concentrations in Boston Metro Area and Identified ARAACs (left); Space Syntax-Derived Street Network Analysis of an ARAAC in Chelmsford (MA) (right)**



In the ongoing Phase I of the research, we have made one main modification, entailing a shift from the originally proposed household travel survey to a focus group approach. While such a qualitative approach cannot allow for statistical inference, it is well-suited to the exploratory research underway.<sup>20</sup> Handy et al, for example, used a focus group research technique to examine initial evidence for tendencies towards “excess travel,” test alternative ways of asking about the phenomenon, and identify other related issues and themes.<sup>21</sup> In our Phase I research the focus group approach has several benefits, including: (1) allowing for a calibration of the original, and possible generation of additional, research questions before embarking on the household survey; (2) enabling a more precise understanding of the types of questions to be ultimately asked in the household survey; and, (3) possibly helping to attract additional support for the Phase II research (proposed here). We are currently identifying the candidate communities and plan on carrying out the Focus Groups in March-April, 2007. We have already identified candidate ARAACs in Plymouth, Chelmsford, and Ipswich (all urban-edge/suburban locations) and will more precisely identify the candidate non-ARAACs upon completing the analysis of local and regional

<sup>19</sup> InfoUSA 2000, ReferenceUSA database

<sup>20</sup> K Clifton and S Handy, Qualitative methods in travel behaviour research, In *Transport Survey Quality and Innovation* (Jones and Stopher, Eds.), Elsevier, Oxford.

<sup>21</sup> S Handy, L Weston, P Mokhtarian, Driving by choice or necessity? *Transportation Research A*, 39, 2005, pp. 183-203.

accessibility and development characteristics. The focus groups will probe attitudes towards residential choice and travel behavior and ask about actual travel behavior and physical activity. The focus groups will be carried out in close cooperation with researchers from the MIT AgeLab, who have considerable relevant experience.

Building on the Phase I research foundation, Phase II (for which, with this proposal, we are requesting UTC Year 20 support) will implement the travel survey and related analyses. The survey results will enable a more detailed analysis, allowing for statistical association, if not causality, to be established. Specifically, we are requesting support to implement and analyze household surveys in otherwise matching ARAAC and non-ARAAC communities, following a quasi-experimental research design. The specific communities may be the same ones for which the Phase I focus groups were carried out, though this need not necessarily be the case. The sampling unit will be older adult households (head of household aged 55+) and the travel behavior of their respective members. The data to be collected in the household survey include:

1. Socioeconomic and Demographic Characteristics: including household size, ages, income levels, tenure status, education levels, physical capabilities, etc.
2. Travel and Activity Characteristics: including trip purpose, time, origin and destination, mode(s), cost and distances.
3. Attitudinal Characteristics: including variables – such as attitudes towards residential spaces and personal security – aiming to explain neighborhood choice.

Extending beyond the traditional household travel survey, we expect to include questions regarding physical activity (mentioned in point 2, above), to shed light on “active living” patterns and thus links to health preservation/enhancement.<sup>22</sup> In addition, the attitudinal characteristics<sup>23</sup> (point 3, above) also expand upon the typical travel survey. The purpose of gathering information on the latter is twofold. First, and primarily, the inclusion of attitudinal variables provides one means of potential statistical control for household self-selection, which can confound inference in the analytical approach to measuring the possible influence of ARAACs on older adult travel behavior. Second, the inclusion of such variables provides additional attitudinal and taste information regarding residential choices of older adults.<sup>24</sup>

The final survey implementation technique will be specified during the course of the research, again in close collaboration with MIT’s Age Lab and, ideally, the AARP. While recognizing the limitations of self-response, mail-back surveys, we expect to use this survey approach – with a participant incentive – for a randomly generated sample of older adult households within each of the community types. As discussed, the built environment characteristics of the communities and their surroundings are currently being compiled

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<sup>22</sup> See, eg, D Rodríguez, AJ Khattak, KR Evenson, Can New Urbanism Encourage Physical Activity? Comparing a New Urbanist Neighborhood with Conventional Suburbs, *Journal of the American Planning Association*, vol 72, no 1, Winter, 2006, pp. 43-54.

<sup>23</sup> Following, e.g., AJ Khattak and D. Rodríguez, Travel behavior in neo-traditional neighborhood developments: A case study in USA, *Transportation Research A*, Vol, 39, 2005, pp. 481-500.

<sup>24</sup> Sweaney et al, for example, find that elderly movers are more likely to have been happier with their new home due to consideration of accessibility-related characteristics (proximity to work, family, services, public transportation); AL Sweaney, Y Mimura, CB Meeks, Changes in Perceived Housing Quality Among Elderly Movers: Does Neighborhood Tenure Matter? *Journal of Housing for the Elderly*, Vol. 18 (2), 2004, pp. 3-16.

during the Phase I research by site visits, satellite imagery, GIS resources, community plans, and interviews with planners and developers.

The analysis will include basic descriptive statistics (including total trips, trips by different modes, travel distances, etc.) from older adult households in the community types as well as application of various econometric models of trip-making behavior. As mentioned, self-selection – the premise that households, in part, choose their residential setting because of their preferred travel behaviors – presents a potentially confounding factor in the proposed research. In this case, attributing travel behavior to the built environment implies a false association, as the travel behavior derives from individual preferences not the built environment, per se. A recent, comprehensive review of approaches for addressing the self-selection issue in this type of research suggests several possible methodologies.<sup>25</sup> The survey design will be such that an instrumental variable approach or a sample selection approach can be used for statistical control, although we recognize that both of these approaches still have their limitations. Using such an approach will strengthen the argument for implied causality when demonstrating whether a statistically significant association between the built environment and travel behavior (e.g., number of pedestrian trips, total household automobile travel) exists. Based on the analysis, we expect to derive design, planning and policy lessons to guide future older adult community developments, both ARAAC and otherwise.

We recognize several important challenges which will need to be resolved in the course of the research. One relates to the differences in older adult cohorts – e.g., “pre-elderly”, younger elderly, older elderly – and their respective behavioral variations. Given the constraints of survey sample size, we may need to focus on one of these cohorts, if possible. Also, we expect challenges to isolating the “built environment” influences, as these may tightly interact with the natural *and* the social environments. The latter is particularly relevant, as age-restricted communities produce specific social settings. The sample generation, particularly the matched-community approach, and survey implementation will also pose non-trivial challenges. Beyond the analytical challenges, we also recognize the underlying policy challenges, which will also have to be analyzed in the course of the research, including: the apparent desire to age in place and the subsequent challenges to inducing moves to different communities and the difficulties in retrofitting/changing the built environment of existing communities.

### **Anticipated Results**

The investigation should offer new insights into the relationship between neighborhood types and older adult travel. We expect the results to produce guidance for community development approaches and prospective policies that can be adapted to accommodate older adults in both age restricted and non-age restricted developments. Based on the analytical approach described above, we expect to produce:

- an assessment of the relationship between community types and older adult travel behavior,
- identification of the types of communities associated with variations in travel outcomes,

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<sup>25</sup> X Cao, P Mokhtarian, S Handy, Examining the Impacts of Residential Self-Selection on Travel Behavior: Methodologies and Empirical Findings, UCD-ITS-RR-06-18, Institute of Transportation Studies, University of California, Davis, November 2006.



- characterization of specific neighborhood-level designs associated with desired outcomes.

We do foresee challenges regarding the viability of the results for producing change. For example, the research design cannot directly answer the question of whether older adults will change their travel behaviors if their community settings change. This is a particularly relevant question given the evidence of inertial behaviors – that is, for a generation to “carry” its travel behaviors with it as it advances in age.<sup>26</sup>

Despite the inevitable limitations, we expect that this research will lay the groundwork for further investigations and funding. In this respect, as the project advances we will explore additional support possibilities from relevant organizations and foundations, such as the Robert Wood Johnson Foundation, the AARP, and possibly even the National Institute of Health (NIH), where one of the PIs has a current pending research grant on the relationship between the built environment and health.

### **Technology Transfer**

Technology transfer for this project will involve:

- Integrating the research into the classroom. One of the PIs teaches a course on land use-transportation planning, cross-listed between City Planning and Civil & Environmental Engineering. The other PI teaches a course on Land Use & Community Development and a course on Site & Urban Systems Planning (both cross-listed between Real Estate and City Planning). The research progress and results will be incorporated into those classes, directly educating future practitioners on this topic.
- Disseminating results to other scholars, researchers, government officials, and developers/practitioners via presentations and publishing. The PIs will present at at least one transportation conference (e.g., Annual Meeting of the Transportation Research Board), one Planning Conference (e.g., Annual Meeting of the American Planning Association), and one real estate development conference (e.g., Annual Meeting of the Urban Land Institute). We will aim to publish *at least* one peer-reviewed journal article and one piece in the related popular press (e.g., Urban Land Magazine, AARP-The Magazine). Finally, we expect that the project will produce at least one MIT Masters Thesis.
- Utilizing web-based information resources. We expect to make the research results available through existing on-line information clearinghouses, such as US HUD’s HUD USER.

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<sup>26</sup> e.g., S Bush, Forecasting 65+ Travel: An Integration of Cohort Analysis and Travel Demand Modeling, Phd Dissertation submitted to the Dept of Civil and Environmental Engineering, MIT, 2003.

