

**Attitudes Toward Transit Oriented Development:
Results of a Joint Telephone and Web-based Survey in Honolulu during Summer 2009**

by

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Dr. Sharon Miyashiro, Associate Director of the UH Manoa Public Policy Center in the College of Social Sciences, served as Principal Investigator of the SEET project. Dr. Miyashiro also serves as co-chair of the Hawaii Energy Policy Forum (HEPF). In 2007, the state legislature approved Act 254, which assigned HEPF with the task of promoting dialogue on energy issues and developing energy-efficient transportation strategies for the state. HEPF is a partnership of representatives from business, environmental organizations, energy experts and state government agencies.

As a result of a competitive bidding process, the University of Hawai'i at Manoa hired Market Trends Pacific, a professional market research firm in Honolulu to provide assistance with the following activities associated with the Task Agreement. These activities included: (a) the design and implementation of the sampling plan; (b) the formatting and programming of the telephone and Web-based survey questionnaires; and (c), the processing and tabulating of all survey data. UrbanAdvantage, Inc. of Berkeley, California, provided digital copies of the graphic images used in the Web-based survey.

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Abstract

The Honolulu high capacity transit project is a 20-mile elevated rail line that will connect West O'ahu with downtown and the Ala Moana Shopping Center. The system will feature electric, steel-wheel trains each capable of carrying more than 300 passengers. The goal of the project is to safely and reliably move thousands of people per hour between 21 stations without reducing limited highway and road space. The project is scheduled to begin construction sometime in 2010. To comply with requirements for federal funding, the city's Department of Planning and Permitting has actively supported the planning of transit-oriented development (TOD) at several stations along the transit route.

This paper presents results of a joint telephone and Web-based survey conducted during summer 2009. Although the survey population was statewide, the scope of this paper is limited to data collected on the Island of O'ahu, because the focus of the paper is on rail transit and TOD. On O'ahu, data were collected from 585 adult residents by Market Trends Pacific, Inc., a professional market research firm in Honolulu. The phone survey used random digit dialing (RDD) of both listed and unlisted household telephone numbers to ensure a representative sample. The study used several methods to publicize the Web-based survey, which was undertaken primarily to reach people without land-line phones. These methods included publication of an article in a daily newspaper and an announcement in a monthly newsletter published by the local electric utility. Despite these efforts, the authors do not view the Web sample to be representative of the island's population.

Each mode of data collection had identical questions to measure attitudes toward several features of TOD such as high-density housing, mixed land use, limited parking, and streetscapes that better serve pedestrians and bicycles. Questions about TOD features were directed only to people who said that they either would or might consider moving closer to work or school to save money, if the price of gasoline were to rise and stay above \$4 per gallon. As a result, 115 persons answered TOD questions in the telephone interviews and 53 persons did so in the Web-based survey.

In general, the results of the phone survey indicated solid support for the idea of living within walking distance of food, drug and other retail stores. Much smaller percentages of respondents to the phone survey favored the following features: having a common area for children to play, a more densely populated area, living in a building with professional offices or small retail stores, living close to a bus or potential rail transit stop, and having less space to park a personal vehicle even though one could walk or use a bicycle more often. In general, there was more support for features of TOD among those who participated in the Web-based survey, which posted graphical images to illustrate these features. Compared to the phone sample, substantially higher percentages of Web respondents were Caucasian males, who were younger in age, college graduates, and living in families with higher annual incomes. Respondents of both samples were more likely to live in a single-family dwelling unit.

Introduction

The Honolulu high capacity transit project is a 20-mile elevated rail line that will connect West O'ahu with downtown and the Ala Moana Shopping Center. The system will feature electric, steel-wheel trains each capable of carrying more than 300 passengers. The goal of the rail project is to safely and reliably move thousands of people per hour between 21 stations without reducing limited highway and road space. The project is now scheduled to begin construction sometime in 2010. Full service to Ala Moana Shopping Center may begin by the end of 2018. A final decision on federal funding is not expected until 2011. To comply with requirements for federal funding, the Department of Planning and Permitting of the City and County of Honolulu has actively supported the planning of transit-oriented development (TOD), beginning with two transit stations in the Waipahu Community in July 2007.

This paper presents results of a joint telephone and Web-based survey conducted statewide in Hawai'i during summer 2009. The survey had two main objectives. First, it attempted to determine how motorists coped with a spike in gasoline prices during 2008. Second, it measured preferences for policies to improve energy efficiency in the state's surface transportation system. These policies included: (a) increasing passenger loads of existing vehicle fleets (e.g. car and vanpooling); (2) inducing shifts to more fuel-efficient modes of transportation (e.g., bicycling, walking, and public transit); (3) providing incentives for motorists to buy more fuel-efficient vehicles (e.g., the "cash-for-clunkers" program); and (4) redistributing urban activities to reduce overall travel demand (e.g., 'smart growth' and transit-oriented development policies).

Although the survey was conducted statewide, the scope of this paper is limited to survey data collected only for the City and County of Honolulu on the Island of O'ahu. The primary purpose of the paper is to report preliminary results of those survey questions that were related to Honolulu's rail transit project and to attributes of 'smart growth' and transit-oriented development, given that TOD represents a new and different type of development for Honolulu.

Transit-Oriented Development

In *The Next American Metropolis*, architect Peter Calthorpe (1993) describes TOD as "a mixed-use community within an average 2,000-foot walking distance of a transit stop and core commercial area. TODs mix residential, retail, office, open space, and public uses in a walkable environment, making it convenient for residents and employees to travel by transit, bicycle, foot, or car." (Calthorpe, 1993, p. 56) According to Calthorpe (1993), urban TODs should be located directly on rail transit lines and neighborhood TODs should be located along local bus lines that feed directly into rail transit lines. He describes urban TODs as denser and more focused on employment opportunities than are neighborhood TODs, which tend to emphasize housing.

According to Calthorpe (1993), the minimum residential density for TODs with a housing component should average 15 dwelling units per acre. This figure is close to the density of streetcar suburbs of the early 20th century (Warner, 1962), and significantly higher than today's typical suburban developments, which are closer to four or five dwelling units per acre (Audirac, 1999). Similarly, Bernick and Cervero (1997) prescribed 15 housing units per acre for TODs with mixtures of small-lot single-family homes and duplexes or triplexes. These density

recommendations come from the pioneering work on public transportation and land use policy by Pushkarev and Zupan (1977). Besides higher than average densities, a TOD typically will have a mixture of land uses (residential, office and retail), a defined center, and buildings whose design and orientation facilitate transit use and pedestrian activity.

While planners may agree on some basic definition of TOD, there is in reality a wide variety of transit-oriented development in the United States. Based on a survey of transit agencies and a literature review in late 2002, Cervero et al. (2004) identified 117 TODs in the United States. Although the majority of them are located in large cities with rail service, many are located in newer and older suburbs outside of central cities. Fixed rail transit systems serve most of the 117 TODs that were identified in the U.S., as shown below:

Heavy rail	37.4%
Light rail	31.3%
Commuter rail	21.8%
Bus	7.8%
Ferry	<u>1.7%</u>
	100.0%

TODs are expected to reduce the use of single-occupant motor vehicles and enhance transit investments by bringing potential riders closer to transit facilities. Newman and Kenworthy (1999) believe that TODs have great potential for reducing automobile use, increasing transit ridership, and fostering a sense of community in neighborhoods. In theory, TODs should be able to reduce personal transportation costs, motor vehicle emissions, and dependency on fossil fuels. They should also be able to promote access to local services and amenities through walking and biking activities. In suburban areas, TODs have the potential to increase transit ridership, reduce commute distances, and decrease the cost of infrastructure extensions.

The literature suggests that TOD can be viewed either as a set of policies affecting urban form near transit stations or as a type of development, as suggested by an Urban Land Institute (ULI) report titled, “Ten Principles for Successful Development Around Transit” (Dunphy et al., 2003). Although the number of TODs is growing, there are few development companies that specialize in TOD construction as a market niche. This has been attributed to transit’s inability to attract a sufficient volume of patrons to support TOD, according to a comprehensive report by the California Department of Transportation (Parker et al., 2002). However, the same report claims that there are a variety of factors still driving demand for TOD in the real estate market:

1. Escalating traffic congestion is increasing the attractiveness of inner city sites and suburban locations that are close to rail transit.
2. Rising land values in many communities are creating the economic conditions necessary to help make mixed-use compact development feasible.
3. The increased trend of Americans moving back into the core areas of cities makes them more attractive places for real estate investment.

4. Demographic changes underpin an expanding market for moderate and higher-density mixed-use communities.
5. Nationwide, support for 'smart growth' is at record levels. In a September 2000 poll, nearly 80% of Americans indicated that they support 'smart growth' and the strategies necessary to implement it.
6. There have been recent significant changes in Federal Transit Administration (FTA) policies for 'joint development', and an emphasis on transit-supportive land use in federal funding for new rail starts.
7. More transit agencies are starting to realize they are in the 'community-building' business as well as the 'people-moving' business.

In the early 1990s, surveys of 28 large-scale housing projects near California rail stations showed that residents tended to be young professionals, singles, and 'empty-nesters', with typically just one car per household. They also tended to work in downtown areas and other locations well serviced by transit (Cervero, 1994). More recent surveys show that this demographic group is growing larger. People who prefer to live in housing near transit, which includes people living in downtown locations, are more likely to be singles, childless married couples or smaller families. Increasingly, they may also include same-sex couples and the "creative" class who are interested in accessing urban amenities (Florida, 2003). Developers of TOD now target this demographic group in their advertising campaigns, which claim that TODs provide home buyers with good access to centrally located jobs, retail stores, walkable neighborhoods, museums, concert halls, theaters, and nightlife.

More recently, Lund (2006) surveyed 605 people who moved into a TOD within walking distance of a light, heavy, or commuter rail station in the San Francisco Bay Area, Los Angeles, or San Diego. Each person had moved into a TOD less than five years before the survey. The purpose of the study was to determine: (1) who is locating in TODs and how do they differ from the general population; (2) what factors lead them to locate in TODs; and (3) what are the implications for transit use? Lund found that TOD residents had a higher household income and were less likely to be Hispanic. She found they were no less likely to have private cars, which suggested that limiting parking availability at TODs might not be a good idea. She also reported that individuals chose to live in TODs for a wide range of reasons. About a third of the respondents said that access to transit was one of the top three reasons for choosing to live in a TOD. However, people were equally or more likely to choose to live in a TOD because of lower housing cost or the quality of the neighborhood. Lund did not determine whether or not respondents brought their interest in transit with them, when they moved into TODs, or developed their interest in transit afterwards. Even so, Lund found that people who chose TOD were 13 to 40 times more likely to use transit than those who did not.

Based on surveys, Cervero (1994) reported that residents living within a quarter mile of a California rail station are three times as likely to commute by rail compared to the average worker living in the same city. The two most important factors determining rail transit usage were whether the trip destination was within walking distance of a rail stop and whether parking at the job site was free. Among those living near BART stations and heading to San Francisco job sites with no free parking, nearly nine out of ten work trips were by BART. For trips to secondary urban centers such as Oakland and Berkeley, half of the commutes were by BART.

For all other destinations (where workers often park free), only 6 percent of commute trips by station-area residents were by rail (Cervero, 1994).

Survey Methodology

Telephone interviews were conducted by Market Trends Pacific, a professional market research firm in Honolulu, between June 23 and August 5, 2009. Interviewers made telephone calls during daytime and evening hours. They also made up to 10 follow-up calls to working residential numbers to maximize response to the phone survey. The Web-based survey was posted online from July 1 through September 15, 2009.

To be eligible for either the telephone or Web-based survey, participants had to be adults (i.e., 18 years of age or older) and residents of the State of Hawai'i at least six months out of a year. In addition, participants must have made at least one trip from home to a destination on their island during the week prior to the interview. For the purpose of this study a "trip" was defined as traveling by any mode of transportation, including walking. Of all those people who were contacted, only eight percent refused to complete the phone survey and only five percent were considered ineligible for that survey.

The telephone survey was based on a sampling plan as shown in Table 1. The plan was designed to provide a sample for each of the four main counties of the State of Hawai'i to ensure that projections for each county fell within ± 5.0 percentage points at the 95 percent confidence level. A total of 1536 people statewide completed the telephone survey questionnaire and an additional 304 people participated in the Web-based survey. On the Island of O'ahu, a total of 401 people completed the telephone survey and an additional 184 people participated in the Web-based survey. The phone survey used random digit dialing (RDD) of both listed and unlisted household telephone numbers to increase the chances of achieving a representative sample. The study used several methods to publicize the Web-based survey, which was undertaken primarily to reach people without land-line phones. These methods included publication of an article in one of the city's daily newspapers (*The Honolulu Advertiser*) and an announcement in a monthly newsletter published by the local electric utility (Hawaiian

Table 1. The 2009 SEET Telephone Survey Sampling Plan

<i>County</i>	<i>Estimated Population 18+ years</i>	<i>Percent of State Total</i>	<i>Final Sample Size</i>	<i>Precision at 95% Confidence Level</i>
Honolulu	704,243	71.0	401	± 4.9
Hawai'i	130,886	13.2	382	± 5.0
Maui (1)	108,740	11.0	380	± 5.0
Kauai	48,054	4.8	373	± 5.1
State Total	991,923	100.0	1,536	± 3.2

(1) Include Kalawao County

Source: Estimates of population ages 18+ came from Profile of General Demographic Characteristics 2005-2007 American Community Survey 3-Year Estimates.

Electric Company, Inc.). The Web-based sample is not viewed as representative of the island's population, because survey participants were self-selected.

At the end of the telephone survey, the data were compared to population statistics based on the 2005-2007 three-year estimates provided by the American Community Survey of the U.S. Census for Hawai'i. This comparison led to a decision to weight the results of the telephone survey so that they conformed to population distributions for three variables: respondent's county of residence, age, and gender. Population estimates for each county-age-gender combination were divided by actual sample counts to obtain sample weights. Weights could not be calculated for cases for which the respondent refused to divulge their age. Such cases were not included in weighted tallies of the survey data. The results shown in this section of the paper for telephone interviews represent weighted data.

Unlike the telephone survey, the Web-based survey included seven visual images to illustrate TOD questions. The graphic images were selected from a large inventory of photo-realistic computer images sold online by UrbanAdvantage of Berkeley, California. The reason to include these images was based on a persuasive article by Malizia and Goodman (2000), who reported that consumer preferences for higher density housing tend to be underestimated by conventional opinion surveys. Their report was supported by a more comprehensive review of the literature on this subject at the Center for Urban and Regional Studies of the University of North Carolina (Malizia and Exline, 2000). That review observed that standard opinion surveys routinely report that consumers do not want to live in higher density developments. As a result, such surveys tend to understate consumer interest in higher-density areas. The study also found that when consumer opinions are measured by visual surveys using photographs, these surveys found an increase in the percentage of consumers who preferred smaller lots, smaller homes, mixed housing types, open space, narrower streets with sidewalks, and commercial development within walking distance. Malizia and Exline (2000) concluded that density is a complex concept, which is too subjective to be measured by traditional surveys. They also concluded that well designed higher density developments with a mix of housing types can and will receive higher marks than traditional single-family developments. Their advice was that local officials should not be discouraged from considering higher-density developments, because of misleading results of conventional consumer surveys.

Aside from these visuals, the telephone and Web-based surveys had identical questions to measure attitudes toward Honolulu's rail transit project and several features of TOD. These features included high-density housing, mixed land use, limited parking, and streetscapes that better serve pedestrians and bicycles. Questions about TOD features were only asked of people who said that they either would or might consider moving closer to work or school to save money, if the price of gasoline rose and stayed above \$4 per gallon. Since many people said "no" to this question, it reduced the sample size for subsequent questions on TOD to 115 persons for the telephone survey and 53 persons for the Web-based survey.

The rationale for choosing \$4 per gallon as the potential "trigger price" for measuring modifications in commuting behavior in the survey was based on several observations made in 2008. First, Hawai'i AAA reported that the price of gasoline in Honolulu had risen to over \$4 per gallon in June 2008, almost a dollar more per gallon than it was three months earlier (Pang,

2008b). Many consumers expected gas prices to continue climbing during the summer of that year. AAA also reported that high fuel costs had caused many of its members to adjust their travel behavior in various ways, based on a survey at the end of April (Arakawa, 2008). Newspaper reports by Pang (2008a) and Vorsiono (2008) indicated that use of public transit had increased on the islands of O'ahu and Kaua'i, and many commuters were beginning to use other modes of travel (e.g., biking, carpools and vanpools). There was also renewed interest in telecommuting in Honolulu (Hill, 2008).

High-fuel prices also motivated many consumers to buy more fuel-efficient cars and gas-electric hybrids and fewer large personal trucks and SUVs, which General Motors perceived to be permanent (Krisher, 2008a). These market adjustments caused U.S. automakers to make fundamental changes in their business models (Durbin and Krisher, 2008; Krisher and Durbin; Krisher, 2008b). Accordingly, the SEET survey asked several questions about fuel-efficient cars, including a question designed to determine what gasoline price would motivate consumers to buy such a car.

Besides the city's efforts to promote transit-oriented development, there were several other reasons for including TOD questions in the survey. First, there were reports at the national level of growing consumer demand to live in communities that adhered to 'new urbanist and smart growth' principles (Steuteville, 2007, 2008). Second, there were reports that homes near transit stops in urban areas were only marginally affected by the latest slump in the housing market (Langdon and Steuteville, 2007). During the run-up in gas prices in 2008, home prices in neighborhoods with short commutes were not falling as much as in neighborhoods with long commutes (Schalch, 2008). Finally, recent planning studies indicated that 'smart growth' policies would be needed to supplement improvements in vehicle and fuel technology. Some academics in the planning profession predicted that both land use planning and technological progress would be needed to offset the effects of "peak oil" and climate change (Andrews, 2008; Ewing et al., 2007).

Results of the Survey

Demographic Characteristics of Survey Participants

The demographic characteristics of people who participated in the telephone or Web-based surveys are quite different as shown in Table 2. Compared to the telephone survey, substantially higher percentages of respondents in the Web-based survey were males, adults of age 18 to 34, white, college graduates, and lived in families with annual incomes over \$100,000. The telephone sample had a higher percentage of people who lived in a single-family detached house. The telephone sample was designed to resemble the population of the City and County of Honolulu in terms of gender and age.

Table 2. Demographic Characteristics of the Telephone and Web-based Surveys

	Telephone Survey	Telephone Survey Sample Size		Web-based Survey	Web-based Survey Sample Size
Male	49.9%	1,091		57.7%	52
Adults ages 18 – 34	31.3%	1,091		41.2%	51
White	26.5%	1,060		41.5%	53
College graduate	41.8%	989		79.2%	53
Annual family incomes over \$100,000	22.9%	794		45.1%	51
Living in a single-family detached house	70.6%	1,089		60.4%	53

Attitudes toward and Preferences for Rail Transit and TOD

The results of the rail transit and TOD questions of the telephone and Web-based survey are tabulated below. As mentioned previously, the telephone survey results are based on a weighted sample to conform to population distributions for three variables: respondent’s county of residence, age, and gender. The Web survey results are not based on a weighted sample. The exact wording of the question is given below in italics.

Telephone Question 30A and Web-based Question 46: *You said earlier that you commuted from home to work or to school last week using a motor vehicle. If the price of gas were to rise and stay above \$4 per gallon, would you look for a place to live closer to work or school to save money?*

Table 3. Results for Telephone Question 30A and Web-based Question 46

	Telephone (n = 567)	Web (n = 129)
Yes	13.2%	14.7%
No	78.6%	48.1%
Maybe	7.0%	26.3%
Don’t know / refused	1.1%	10.9%

Table 3 shows that 20.2 percent of the telephone sample versus 41.0 percent of the Web-based sample, would or might look for a place to live closer to work or school to save money, if the price of gas were to rise and stay above \$4 per gallon.

Next, the respondent was asked a series of eight questions about TOD, if they said either “yes” or “maybe” to telephone Question 30A or Web-based Question 46. In other words, these questions were asked of those who either would or might look for a place to live closer to work or school, if the price of gas were to rise and stay above \$4 per gallon. The premise or stem of each TOD question was the same: *Suppose that you found a new place to live with a shorter commute that satisfied you. Let’s also suppose that your new place differs from your present home in some respects. Would you still be willing to live in this new place if it...*

Telephone Question 31A and Web-based Question 47: *... has less space than your present home?*

Table 4. Results for Telephone Question 31A and Web-based Question 47

	Telephone (n = 115)	Web (n = 53)
Yes	8.7%	35.9%
No	60.3%	24.5%
Maybe	18.7%	39.6%
Don't know / refused	12.3%	0%

Table 4 shows that 35.9 percent of the Web-based sample versus only 8.7 percent of the telephone sample, would be willing to live in a new place with a shorter commute to work or school, and would still be willing to live there if it has less space than their present home.

If the respondent said “yes” or “maybe” to the question above, then he or she was asked the following question:

Telephone Question 31a_1 and Web-based Question 48: *How much interior living space does your present home have?*

Table 5. Results for Telephone Question 31a_1 and Web-based Question 48

	Telephone (n = 31)	Web (n = 53)
< 1000 square feet	39.4%	9.5%
1000 – 1500 square feet	46.8%	26.4%
> 1500 square feet	4.8%	39.6%
Don't know / refused	9.0%	24.5%

Table 5 shows that 39.6 percent of the Web-based sample, versus only 4.8 percent of the telephone sample, have more than 1,500 square feet of living space. In other words, a much higher percentage of telephone respondents (compared to those in the Web survey) lived in relatively small homes. This result may explain why participants in the telephone survey were less willing than those of the Web survey to move to an even smaller home with a shorter commute to work or school, as shown by results to the previous question.

Telephone Question 31B and Web-based Question 49: ... *has a common area for children to play?* The Web-based survey had this additional sentence: *The image below shows an illustration.*



Table 6. Results for Telephone Question 31B and Web-based Question 49

	Telephone (n = 115)	Web (n = 53)
Yes	24.4%	71.7%
No	51.6%	11.3%
Maybe	20.2%	17.0%
Don't know / refused	3.8%	0%

Table 6 shows that 71.7 percent of the Web-based sample, versus 24.4 percent of the telephone sample, would be willing to live in a new place with a shorter commute to work or school, and would still be willing to live there if the new place has a common area for children to play. Neither survey determined whether a children's play area was viewed as a positive or negative feature of the neighborhood.

Telephone Question 31C and Web-based Question 50: ... is located in a more densely populated area? The Web-based survey had this additional sentence: *The image below shows an illustration.*

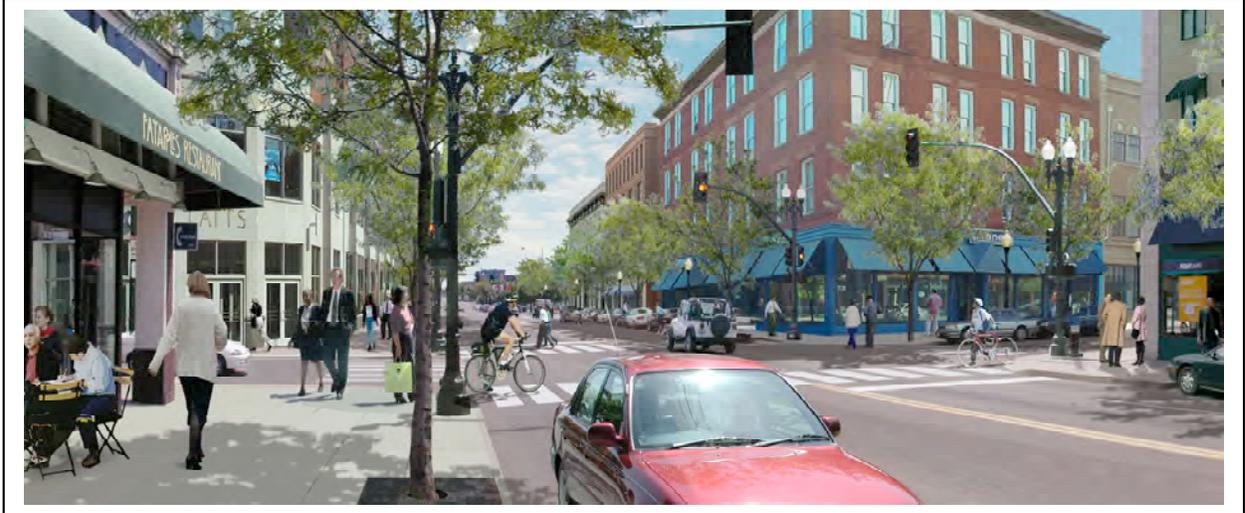


Table 7. Results for Telephone Question 31C and Web-based Question 50

	Telephone (n = 115)	Web (n = 53)
Yes	29.8%	64.2%
No	55.2%	11.3%
Maybe	15.0%	24.5%
Don't know / refused	0%	0%

Table 7 shows that 64.2 percent of the Web-based sample, versus 29.8 percent of the telephone sample, would be willing to live in a new place with a shorter commute to work or school, and would still be willing to live there if it is located in a more densely populated area.

Telephone Question 31D and Web-based Question 51: ... is located in an apartment within walking distance of food, drug and other retail stores? The Web-based survey had this additional sentence: *The image below shows an illustration.*



Table 8. Results for Telephone Question 31D and Web-based Question 51

	Telephone (n = 115)	Web (n = 53)
Yes	66.3%	71.7%
No	27.9%	11.3%
Maybe	5.8%	17.0%
Don't know / refused	0%	0%

Table 8 shows that a slightly higher percentage of the Web-based sample (71.7 percent), compared to that of the telephone sample (66.3 percent), would be willing to live in a new place with a shorter commute to work or school, and would still be willing to live there if it is located in an apartment within walking distance of food, drug and other retail stores.

Telephone Question 31E and Web-based Question 52: ... is located in a building that has professional offices or small retail stores? The Web-based survey had this additional sentence: The image below shows an illustration.



Table 9. Results for Telephone Question 31E and Web-based Question 52

	Telephone (n = 115)	Web (n = 53)
Yes	34.8%	64.2%
No	54.8%	13.2%
Maybe	10.4%	20.8%
Don't know / refused	0%	1.8%

Table 9 shows that 64.2 percent of the Web-based sample, versus 34.8 percent of the telephone sample, would be willing to live in a new place with a shorter commute to work or school, and would still be willing to live there if it is located in a building that has professional offices or small retail stores. Neither survey determined whether this living arrangement was viewed as a positive or negative feature.

The results for Telephone Question 31F and Web-based Question 53 are not reported in this paper, because these questions were not asked of O’ahu residents; these questions were asked of ‘neighbor island’ residents.”

Telephone Question 31G and Web-based Question 54: ... *is close to a bus or potential rail transit stop?* The Web-based survey had this additional sentence: *The image below shows an illustration.*



Table 10. Results for Telephone Question 31G and Web-based Question 54

	Telephone (n = 115)	Web (n = 53)
Yes	26.3%	47.2%
No	41.9%	5.6%
Maybe	19.5%	32.1%
Don't know / refused	12.3%	0%

Table 10 shows that 47.2 percent of the Web-based sample, versus 26.3 percent of the telephone sample, would be willing to live in a new place with a shorter commute to work or school, and would still be willing to live there if it is close to a bus or potential rail transit stop. It should be noted that this is the first question in the series of eight questions about TOD features to mention the phrase “rail transit stop.” None of the previous questions in this series actually mention the phrase “rail transit stop”.

Telephone Question 31H and Web-based Question 55: ... *has less space to park your vehicle, but you could walk or ride your bicycle more often?* The Web-based survey had this additional sentence: *The image below shows an illustration.*



Table 11. Results for Telephone Question 31H and Web-based Question 55

	Telephone (n = 115)	Web (n = 53)
Yes	38.3%	56.6%
No	49.6%	17.0%
Maybe	12.1%	26.4%
Don't know / refused	0%	0%

Table 11 shows that 56.6 percent of the Web-based sample, versus 38.3 percent of the telephone sample, would be willing to live in a new place with a shorter commute to work or school, and would still be willing to live there if it has less space to park a vehicle, but one could walk or ride a bicycle more often.

Results for Telephone Questions 32 through 34 and Web-based questions 58 through 60 are not presented in this paper, because they were not about rail transit or TOD.

Telephone Question 35 and Web-based Question 61: *The City and County of Honolulu is planning to build a rail transit system from Kapolei to the Ala Moana Shopping Center. The city expects to complete construction of this system in 2018. Will this transit system provide service to your community or the general area where you live?*

Table 12. Results for Telephone Question 35 and Web-based Question 61

	Telephone (n = 1091)	Web (n = 53)
Yes	26.5%	37.8%
No	57.0%	52.8%
Maybe	14.9%	9.4%
Don't know / refused	1.6%	0%

Table 12 shows that 37.8 percent of Web respondents, versus 26.5 percent of telephone respondents, believe that the city's rail transit system will provide service to their community or the general area where they live.

The next question was asked if the respondent answered "yes" or "not sure" to the question above.

Telephone Question 36 and Web-based Question 62: *Suppose the rail transit system was in operation now and that the price of gasoline was and stayed above \$4 per gallon. Do you think you would use the rail system for some of the trips you make?*

Table 13. Results for Telephone Question 36 and Web-based Question 62

	Telephone (n = 1091)	Web (n = 53)
Yes	66.2%	72.0%
No	14.2%	4.0%
Maybe	19.6%	24.0%
Don't know / refused	0%	0%

Table 13 shows that a large majority of respondents in both the telephone and Web surveys would use Honolulu's planned rail transit system for some of the trips they make, if the price of gasoline was and stayed above \$4 per gallon.

Telephone Question 37 and Web-based Question 63: *Does the idea of living in a neighborhood within convenient walking distance of a rail transit stop appeal to you?*

Table 14. Results for Telephone Question 37 and Web-based Question 63

	Telephone (n = 1091)	Web (n = 53)
Yes	49.4%	73.6%
No	34.0%	11.3%
Maybe	13.1%	13.2%
Don't know / refused	3.5%	1.9%

Table 14 shows that living in a neighborhood within convenient walking distance of a rail transit stop appealed to 73.6 percent of Web respondents, versus 49.4 percent of telephone respondents. By comparison, Table 10 showed that only 47.2 percent of respondents in the Web survey would be willing to live in a new place with a shorter commute to work or school, and would still be willing to live there if it is close to a bus or potential rail transit stop. Ostensibly, the results of Tables 10 and 14 appear to be inconsistent. On the one hand, a large majority of Web respondents liked the idea of living in a neighborhood within convenient walking distance of a rail transit stop; but slightly less than a majority of them liked the illustration of that concept.

Summary of Results

The 2009 SEET study showed that if the price of gas were to rise and stay above \$4 per gallon, then a substantial percentage of adults living on the Island of O’ahu (20.2 percent of the telephone sample versus 41.0 percent of the Web-based sample) would or might look for a place to live closer to work or school to save money. These people were then asked a series of hypothetical questions related to features of transit-oriented development:

Suppose that you found a new place to live with a shorter commute that satisfied you. Let’s also suppose that your new place differs from your present home in some respects. Would you still be willing to live in this new place if it...

Table 15. Percentage of Respondents Who Said “Yes”: They would be willing to live in this new place if it had these features.

Feature	Telephone Sample (n = 115)	Web-based Sample (n = 53)
<i>... has less space than your present home</i>	8.7 %	35.9 %
<i>... has a common area for children to play</i>	24.4 %	71.7 %
<i>... is located in a more densely populated area</i>	29.8 %	64.2 %
<i>... is located in an apartment within walking distance of food, drug and other retail stores</i>	66.3 %	71.7 %
<i>... is located in a building that has professional offices or small retail stores</i>	34.8 %	64.2 %
<i>... is close to a bus or potential rail transit stop</i>	26.3 %	47.2 %
<i>... has less space to park your vehicle, but you could walk or use your bicycle more often</i>	38.3 %	56.6 %

Many of the features mentioned in Table 15 are attributes of transit-oriented development, especially those TODs that have a residential component. However, the phrase “transit-oriented development” was not mentioned in either the telephone or Web-based questionnaire.

The SEET survey on O’ahu revealed several findings about attitudes toward the Honolulu’s rail transit project and preferences for features or attributes of TOD. First, greater percentages of people in the Web-based survey, compared to those in the telephone survey, were willing to live in places that had these features. The only two features not chosen by a clear majority of the Web sample were: (a) less space than your present home, and (b) close to a bus or potential rail transit stop. The latter finding is puzzling, because living close to a bus or rail transit stop is an essential ingredient of transit-oriented development. Thus, a majority of people in the Web survey liked many features of TOD, but most of them disliked having less interior living space and actually living close to a bus or rail transit stop. Nevertheless, a large majority of them found the idea of living in a neighborhood within convenient walking distance of a rail transit stop appealing.

Unlike the telephone survey, which was based on a random sample, participants in the Web-based survey represented a self-selected sample. Compared to the phone survey, substantially higher percentages of respondents in the Web-based survey were males, people of age 18 to 34, white, college graduates, and lived in families with annual incomes over \$100,000. A majority of respondents in each sample lived in a single-family detached house, but the percentage of people in such housing units was slightly lower in the Web-based survey. Of these variables, age was significantly correlated with two features of TOD in the telephone survey. All of the young adults (ages 18 to 24) said that they preferred living in locations within walking distance of food, drug and other retail stores and living in a building that has professional offices or small retail stores.

Approximately one in four respondents (26.4%) believed that their community or residential area would be served by the planned rail transit system for Honolulu. Assuming that gas prices were to rise and stay above \$4 per gallon, two thirds of residents in likely service areas (66.2%) said that they would use the rail system. Almost half (49.4%) of all O’ahu residents stated that living in a neighborhood within walking distance of a rail transit stop appealed to them.

Conclusion

The initial results of the SEETS survey during the summer of 2009 appear to support the efforts of the City and County of Honolulu to develop new zoning policies to encourage mixed-use, transit-oriented development. Results showed that a substantial percentage of Honolulu residents are likely to accept attributes of transit-oriented developments to achieve a shorter commute from home to work or school. Residents particularly want more convenient access to neighborhood stores and services, family-friendly public spaces, and other modes of mobility besides automobiles. If TOD is well planned and designed, some residents are also likely to accept the idea of living in smaller homes in more densely settled areas. The study thus found that there is definite consumer interest in TOD concepts. The study therefore recommends that local land-use planning and zoning laws encourage and foster this type of development, and

focus some of those efforts on in-fill development within existing urban areas. Those efforts would contribute toward the broader goal of achieving greater energy efficiency in the city's surface transportation system.

This paper could not explain why relatively more Web-based participants showed greater interest in TOD features compared to people who completed the telephone survey. One plausible explanation is the use of graphic images, which were a unique feature of the Web-based questionnaire in this study. A second plausible explanation is that the Web-based sample in this study was self-selected. This study showed that the Web-based sample had demographic characteristics that were different than those of the telephone sample. We recommend that future surveys make use of graphic images to illustrate different attributes of TOD, and analytically test whether these images affect consumer preferences for these attributes. To overcome self-selection bias, we recommend that future studies first derive a random sample of people, by any means possible, and then direct all qualified respondents to visit a Web-site, where they could participate in an online questionnaire that used graphics.

References

Andrews, Clinton J. 2008. Energy conversion goes local: Implications for planners, *Journal of the American Planning Association* 74 (2): 231-254.

Arakawa, Lynda. 2008. Drivers adjust habits to combat pump prices: Survey finds local residents making lifestyle changes in response to rising fuel costs, *The Honolulu Advertiser*. May 30. pp. C1, C2.

Audirac, Ivonne. 1999. Stated preference for pedestrian proximity: An assessment of new urbanist sense of community, *Journal of Planning Education and Research* 19 (1): 53-66.

Bernick, Michael and Robert Cervero. 1997. *Transit Villages for the 21st Century*. McGraw-Hill, New York.

Calthorpe, Peter. 1993. *The Next American Metropolis: Ecology, Community, and the American Dream*. Princeton Architectural Press, Princeton, New Jersey.

Cervero, Robert. 1994. Transit villages: from idea to implementation, *Access* 5: 8-13.

Cervero, Robert et al. 2004. Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects. Transit Cooperative Research Program Report No. 102, Transportation Research Board, Washington, D.C.

Dunphy, Robert, Deborah Myerson, and Michael Pawlukiewicz. 2003. Ten Principles for Successful Development Around Transit. The Urban Land Institute, Washington, D.C.

Durbin, Dee-Ann and Tom Krisher. 2008. U.S. automakers hit hard by sudden consumer shift, *The Honolulu Advertiser*. May 31. p. C8.

- Ewing, Reid, Keith Bartholomew, Steve Winkelman, Jerry Walters, Don Chen, with Barbara McCann and David Goldberg. 2007. *Growing Cooler: The Evidence on Urban Development and Climate Change*. Urban Land Institute, Washington, D.C.
- Florida, Richard. 2003. *The Rise of the Creative Class*. Basic Books, New York.
- Hill, Michael. 2008. Telecommuting gets a new boost, *The Honolulu Advertiser*. June 9. pp. C1, C2.
- Krisher, Tom. 2008a. Demand for used small cars reflects escalating gas prices, *The Honolulu Advertiser*. May 24. p. C7.
- Krisher, Tom. 2008b. GM to close 4 factories in swing to small cars, *The Honolulu Advertiser*. June 4. pp. C1, C4.
- Krisher, Tom and Dee-Ann Durbin. 2008. Honda hybrids pose threat to Detroit 3, *The Honolulu Advertiser*. May 27. p. C11.
- Langdon, Phillip and Robert Steuteville. 2007. So far, new urban projects weather downturn better, *New Urban News* 12 (7) October/November.
- Lund, Hollie. 2006. Reasons for living in a transit-oriented development, and associated transit use, *Journal of the American Planning Association* 72 (3): 357-366.
- Malizia, Emil E. and Susan Exline. 2000. Consumer Preferences for Residential Development Alternatives, Working Paper 2000-02. Center for Urban and Regional Studies, University of North Carolina, Chapel Hill, North Carolina.
- Malizia, Emil E. and Jack Goodman. 2000. Mixed picture: Are higher-density developments being shortchanged by opinion surveys? *Urban Land* (July) 12.
- Newman, Peter and Jeffrey Kenworthy. 1999. *Sustainability and Cities: Overcoming Automobile Dependence*. Island Press, Washington, D.C.
- Pang, Gordon Y. K. 2008a. Drivers ditch cars to board TheBus: Cheaper commute into town wins over riders as gas prices keep rising, *The Honolulu Advertiser*. June 7. pp. A1, A5.
- Pang, Gordon Y. K. 2008b. Hawai'i gas price sets record at \$4.17, *The Honolulu Advertiser*. June 7. pp. A1, A5.
- Parker, Terry, Mike McKeever, G. B. Arrington, Janet Smith-Heimer, et al. 2002. Statewide Transit-Oriented Development Study: Factors for Success in California, Final Report. California Department of Transportation, Business, Transportation and Housing Agency, Sacramento, California.

Pushkarev, Boris S. and Jeffrey M. Zupan. 1977. *Public Transportation and Land Use Policy*. Indiana University Press, Bloomington, Indiana.

Schalch, Kathleen. 2008. Home prices drop most in areas with long commutes, NPR. www.npr.org/templates/story/story.php?storyId=89803663 accessed on April 22, 2008.

Steuteville, Robert. 2007. Market trends favor NU, *New Urban News* 12 (3) April/May.

Steuteville, Robert. 2008. Surviving the market turmoil, *New Urban News* 13 (3) April/May.

Vorsiono, Mary. 2008. Drivers near 'tipping point' as Hawaii gas prices climb: Dramatic shift seen in budget-friendly ways to commute, *The Honolulu Advertiser*. May 9. pp. A1, A2.

Warner, Sam Bass. 1962. *Streetcar Suburbs: The Process of Growth in Boston, 1870-1900*. Atheneum, New York.