

*final report*

# **PSRC 2006 Household Activity Survey Analysis Report**

*prepared for*

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# Executive Summary

## OVERVIEW

The 2006 PSRC Household Activity Survey of more than 4,700 was conducted in Spring of 2006 in partnership with WSDOT's Office of Transit Mobility. It consisted of household and person characteristics, a 2-day travel and activity diary, attitude questions, and a stated preference/choice experiment survey.

## PURPOSE

The purpose of 2006 PSRC Household Activity Survey project is to provide data for the Puget Sound Region travel demand models, for the assessment of the current activity and travel patterns, and for the estimation of future activity and travel within the region under various policy scenarios. It is a goal of this project to improve planners' ability to evaluate impacts of future policies and actions on travel patterns and transportation facility use through the development of a database that not only captures the current status of activity and travel in the region but also includes attitudes, preferences, and choices with respect to activities and travel. Such data can support analyses that help understand why persons and households make certain travel choices, and can be used in activity choice models to predict the effects of changes in land uses, policies, demographic, or economic standing on travel behavior in the region.

The objectives of the 2006 PSRC Household Activity Survey project were to:

- Develop an assessment of current travel times and costs, both actual and perceived, facing users in the region, through the collection of Global Positioning System (GPS) and pertinent revealed-preference data, and choice experiments.
- Establish the foundation for building better "choice" models that predict what impacts residential location choice, policies, demographic or economic standing, etc. will have on travel behavior. This included incorporating both attitudinal and choice experiment exercises into the

survey data collection and analysis process to identify motivators of travel mode choice.

- Distinguish between “captive/choice” or “routine/periodic” transit users and enumerate their unique characteristics. This included identifying the current and potential key drivers (predictors) for transit use among current and potential (perhaps neighborhood-based) transit users.
- Identify the demographic, neighborhood, and trip-making characteristics to define a “Transit Market.” This included identifying the next steps in supporting the development of a regional “Transit Market Study.”

## OVERVIEW OF SURVEYS

There were three major component data collection activities in 2006 RSRC Household Activity Survey to support the analysis objectives cited above:

1. The first component was an activity and travel survey of a representative sample of households in the Puget Sound region. The survey methods are documented in Appendix A. This survey collected basic demographics, activities, and tour and travel characteristics from all members of respondent households on all out-of-home and certain in-home activities using a 48-hour diary. The final dataset contained information on 4,746 households. These data were expanded to describe the travel in the region, and can provide input for travel demand models. These data were also used to examine aspects of travel behavior such as trip chaining, and to identify the characteristics of transit users.
2. The second component was a GPS tracking of a representative subset of households participating in the diary portion of the study. The final GPS tracking data contained detailed information on the travel paths of 220 households with two vehicles in the same 48-hour period recorded in the diaries. Up to three vehicles per household were equipped with GPS units. Analysis of the GPS tracking data has contributed to the understanding of underreporting of trips, and provides insight into potential biases in the data. Comparison of the GPS data and reported diary data with GPS trips will provide input for the calibration of activity choice models.

3. The third component was a stated-preference (SP) survey of a subset of adult (age 16+) respondents participating in the diary portion of the survey, whose revealed trips fit criteria of interest for possible public transit and highway toll alternatives. 916 SP surveys were completed. The SP instrument included a short series of attitudinal statements, with stated-preference exercises consisting of mode and service choices, as well as toll choices, individually customized to the travel patterns of interest revealed by the respondent as a part of the initial household activity survey. Data from the SP survey will provide input to activity choice models, and were used to better understand the market for transit services.

The survey forms used in the main survey are included in Appendix B. The survey forms used in the stated-preference survey are included in Appendix C. Finally, the code book used in the survey is included in Appendix D.

## KEY FINDINGS

In preparation for future travel demand forecasting processes, the 2006 household activity survey was processed to identify person and household tours, in addition to trips. Tours are defined as a series of trips that begin and end at home. Tours that begin and end at work (i.e. tours that leave work in the middle of the day and return to work before heading home) are also separated for analysis purposes. This survey was also expanded to represent the full population in the Puget Sound region (described in Appendix E). The results of this data processing is that on average there are 3.6 trips per person from the 2006 survey, which matches the same statistic from the 1999 survey (3.6 trips per person). In addition, there was a GPS survey conducted to assess to potential under-reporting of trips in main survey. An analysis of this resulted in a potential 27 percent under-reporting of auto trips and 20 percent under-reporting of vehicle miles traveled.

The other summaries of the trips and tours by mode, destination, length, purpose, etc. are provided to demonstrate the results of the survey as well as to evaluate the reliability of the data for the purposes of estimating future travel demand forecasting models. To that end, the data does provide

reliable and reasonable summaries as provided herein. That said, there are potential geocoding and data logic checks that can and should be completed to refine and improve the data prior to model estimation. Some of these checks are described in this report.

The household survey provided many insights into the nature of transit usage in the Puget Sound region. Chapter 2.0 compares the region's transit users to non-transit users. Eight percent of survey respondents used public transit during the 48-hour survey diary period, and 27 percent of respondents reported using public transit at least once in the past 30 days. Transit trips made up about four percent of the region's trips during the travel diary periods.

Location characteristics are important in explaining transit usage. Transit usage is significantly higher for:

- City of Seattle residents, as opposed to other area residents,
- Urban area residents,
- Residents of areas with higher household densities, and
- Residents of areas with more multifamily dwelling units.

Respondents' household characteristics also affect transit usage rates. On a percentage basis, transit usage is significantly higher for respondents that:

- Live in multifamily dwelling units,
- Rent their homes,
- Live by themselves,
- Have limited auto availability,
- Have household incomes under \$50,000 per year,
- Are 25 to 34 years old, and
- Are currently employed or are adult students.

Availability of transit options and workplace area employment density are also related to higher transit usage, though the direction of the association is unclear.

To further understand transit ridership, we asked a series of attitudinal questions as part of the stated preference survey. Respondents rated their level of agreement to the attitudinal statements on a one to ten scale. Based on the attitudinal statement ratings, we developed attitudinal market

segments for travelers in transit corridors, as described in Chapter 3.0. These market segments may be helpful in transit service planning and in marketing and positioning efforts.

## CONTENTS OF THIS REPORT

This report contains five sections. The first section describes the trip and tour characteristics of the surveys collected on the primary survey of households in the Puget Sound region. The second section presents the transit market characteristics of the same primary survey. The third section describes the attitudinal data collected regarding modal characteristics in the smaller subset of the stated-preference survey. The fourth section describes the choice experiment portion of the stated-preference survey, as it relates to transit mode choices and toll/no-toll choices. The final section describes the GPS survey and the analysis of these data.

The report also contains six appendices. The first appendix (Appendix A) presents the survey methods report prepared by Morpace International. The second appendix contains the survey forms from the main survey and the third appendix contains the survey forms for the stated-preference survey. The fourth appendix contains the code book used to develop the survey databases. Appendices B, C, and D are the same as those contained in the main survey report, *PSRC 2006 Household Activity Survey: Appendix A Survey Methods*, by Morpace International. The fifth appendix (Appendix E) documents the expansion process, which allows us to summarize the survey for the full population in the Puget Sound region. The sixth appendix (Appendix F) contains the codes used to develop the travel activity files, which were used in the subsequent analysis contained in this report. The seventh and last appendix (Appendix G) documents the methods and results of the GPS survey.