Data Collection in the Portland, Oregon Metropolitan Area Case Study

June 1996

TMIP

Travel Model Improvement Program

Department of Transportation
Federal Highway Administration
Federal Transit Administration
Office of the Secretary

Environmental Protection Agency

Department of Energy

U.S.Department of Transportation

U.S.Environmental Protection Agency

Travel Model Improvement Program

The Department of Transportation, in cooperation with the Environmental Protection Agency and the Department of Energy, has embarked on a research program to respond to the requirements of the Clean Air Act Amendments of 1990 and the Intermodal Surface Transportation Efficiency Act of 1991. This program addresses the linkage of transportation to air quality, energy, economic growth, land use and the overall quality of life. The program addresses both analytic tools and the integration of these tools into the planning process to better support decision makers. The program has the following objectives:

1. To increase the ability of existing travel forecasting procedures to respond to emerging issues including; environmental concerns, growth management, and lifestyle along with traditional transportation issues,

2. To redesign the travel forecasting process to reflect changes in behavior, to respond to greater information needs placed on the forecasting process and to take advantage of changes in data collection technology, and

3. To integrate the forecasting techniques into the decision making process, providing better understanding of the effects of transportation improvements and allowing decisionmakers in state governments, local governments, transit operators, metropolitan planning organizations and environmental agencies the capability of making improved transportation decisions.

This program was funded through the Travel Model Improvement Program.

Further information about the Travel Model Improvement Program may be obtained by writing to:

Planning Support Branch (HEP-22)
Federal Highway Administration
U.S. Department of Transportation
400 Seventh Street, SW
Washington, D.C. 20590

Data Collection in the Portland, Oregon Metropolitan Area: Case Study

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This case study of travel data collection practices in the Portland, Oregon metropolitan area is based on work performed by a number of individuals at the Portland Metropolitan Service District (Metro) and other agencies in the Portland region. Special appreciation is expressed to Keith Lawton, Assistant Director, as well as Kyung-Hwa Kim, Richard Walker, David Horowitz, Sonny Conder, Richard Bolen, Mike Hoglund, Steve Perone, and Nina Kramer of Metro along with Kathryn Coffel of Tri-Met for their generous provision of time and information to this effort. The report was authored by Erin Vaca, Sorin Garber, Tom Rossi, and John Suhrbier of Cambridge Systematics. These authors are fully responsible for the facts, the accuracy of the data, and the conclusions expressed herein.

1.0 Introduction

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1.1 Portland, Oregon as an Example of Innovative and Comprehensive Data Collection

Important short-term and long-range improvements to travel demand forecasting systems are being developed both nationally as part of the Travel Model Improvement Program (TMIP) and within individual urban areas. These enhancements improve the accuracy of the predicted transportation choices. Of equal importance, these enhancements also improve the sensitivity of travel demand model systems to a range of potentially important transportation, land use, air quality, and infrastructure management policies. Implementation of these model enhancements, however, requires the existence of a variety of supporting household and transportation data necessary to estimate, calibrate, validate, and apply these improved models within a given urban area.

The Portland Metropolitan Service District (Metro) has undertaken a comprehensive and innovative data collection program to support the development of an improved travel demand modeling system. As a part of this data collection effort, Portland is one of the first urban areas in this country to undertake a region-wide home interview survey that is explicitly designed to support the development of a new generation of travel demand models. This case study describes the data collection program undertaken in the Portland area and the associated travel demand modeling system improvements that these data are intended to support.

Recommendations are provided to help guide others undertaking similar data collection initiatives. Other areas can benefit from the data collection activities undertaken by Metro. It is an example of a successful program using state-of-the-art techniques. A series of coordinated surveys was conducted with the objective of supporting the region's transportation planning and travel demand modeling needs. At the same time, there are characteristics of the Portland urban area that may not be directly transferable or applicable to other regions. These include the size and attributes of the Portland metropolitan area, the responsibilities assigned to Metro, and the resources available for this work. Nevertheless, the Portland experience demonstrates the benefits that can be obtained through inter-agency cooperation and careful planning of a multifaceted travel data collection program.

The core of Portland Metro's data collection program is a regional Household Activity and Travel Behavior Survey conducted during 1994 and 1995. This effort included a two-day household activity survey, supplemented by a smaller sample stated-preference survey. The stated-preference survey was designed to analyze potential reactions of individuals to possible urban design and Travel Demand Management (TDM) actions such as

congestion pricing and the availability and price of parking. Although stated-preference modeling has been used extensively in market research and in long-distance travel demand modeling, such techniques are only now beginning to be applied for urban area travel demand analyses.

Experience has shown that case studies documenting the results of existing "good practice" are one of the best forms of transferring leading edge techniques from one agency or geographic area to other locations around the country. The 1994 collection of household activity and stated-preference data, and the associated planned model enhancements, represent the current state-of-the-art of travel demand forecasting within this country. The Portland Metro experience, therefore, constitutes an important point of reference for other urban areas and state departments of transportation. This case study provides descriptions of the data collection activities that were undertaken, including sampling, pretesting, survey design, and survey administration. Information also is provided on the estimated costs of the data collection activities and the utility of the data collection activities.

While the emphasis of this case study is on the 1994 Household Activity and Travel Behavior Survey, it is important to understand Metro's existing travel demand model system and other elements of the data collection program to put the 1994 survey in context. To this end, the case study addresses other elements of the data collection program in a separate chapter and describes the existing travel demand model system in an Appendix. The data collection program illustrates issues such as interagency coordination and combination of data from different sources as well as the breadth of information used for travel demand modeling. Also important to illustrate is the use of a Geographic Information System (GIS) as an organizing and analytical framework for the collected data.

Portland's data collection activities provide an example of a comprehensive and innovative data collection program that supports good transportation planning practice and a highly-developed travel demand model system. This model system in turn supports a variety of transportation and land use planning activities and responsibilities (Figure 1.1). Data collection and model system refinement is an on-going process and this case study provides a snapshot of this process as of the fall of 1995.

1.2 Metro: Portland's Regional Government

The Portland Metropolitan Service District (Metro) is the directly-elected regional government and designated Metropolitan Planning Organization (MPO) for the Portland, Oregon metropolitan area, home to 1.4 million residents. The district comprises three counties and 24 cities, and is governed by a seven member Metro Council representing districts within Metro's jurisdictional boundaries (Figure 1.2).

Figure 1.1 Data Collection to Support Planning Activities

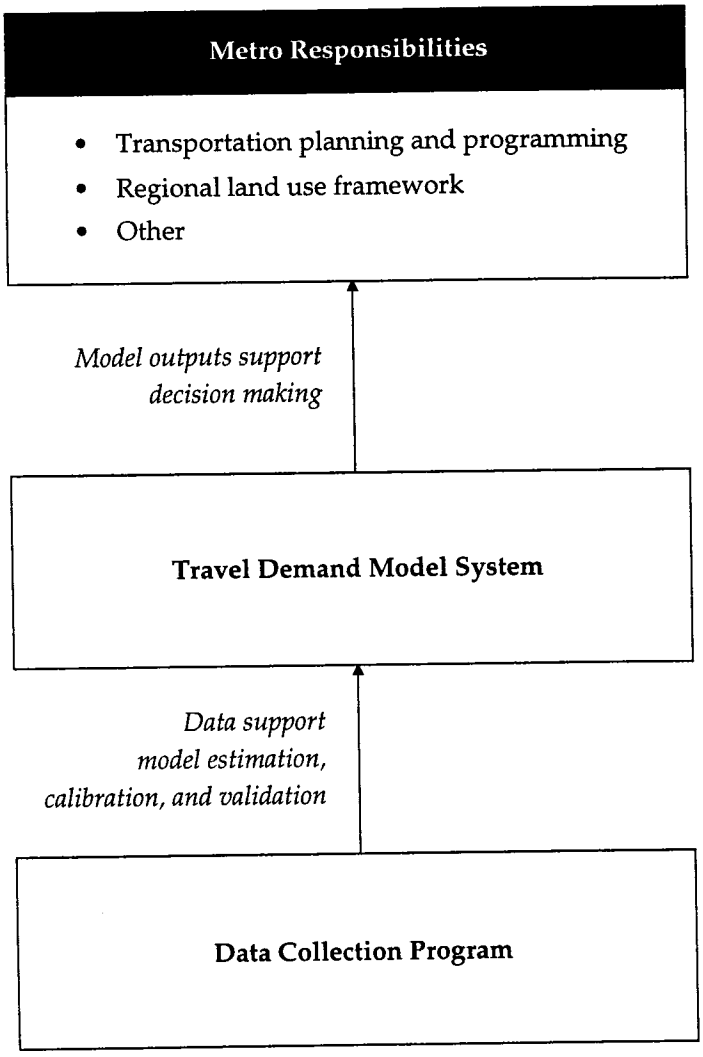
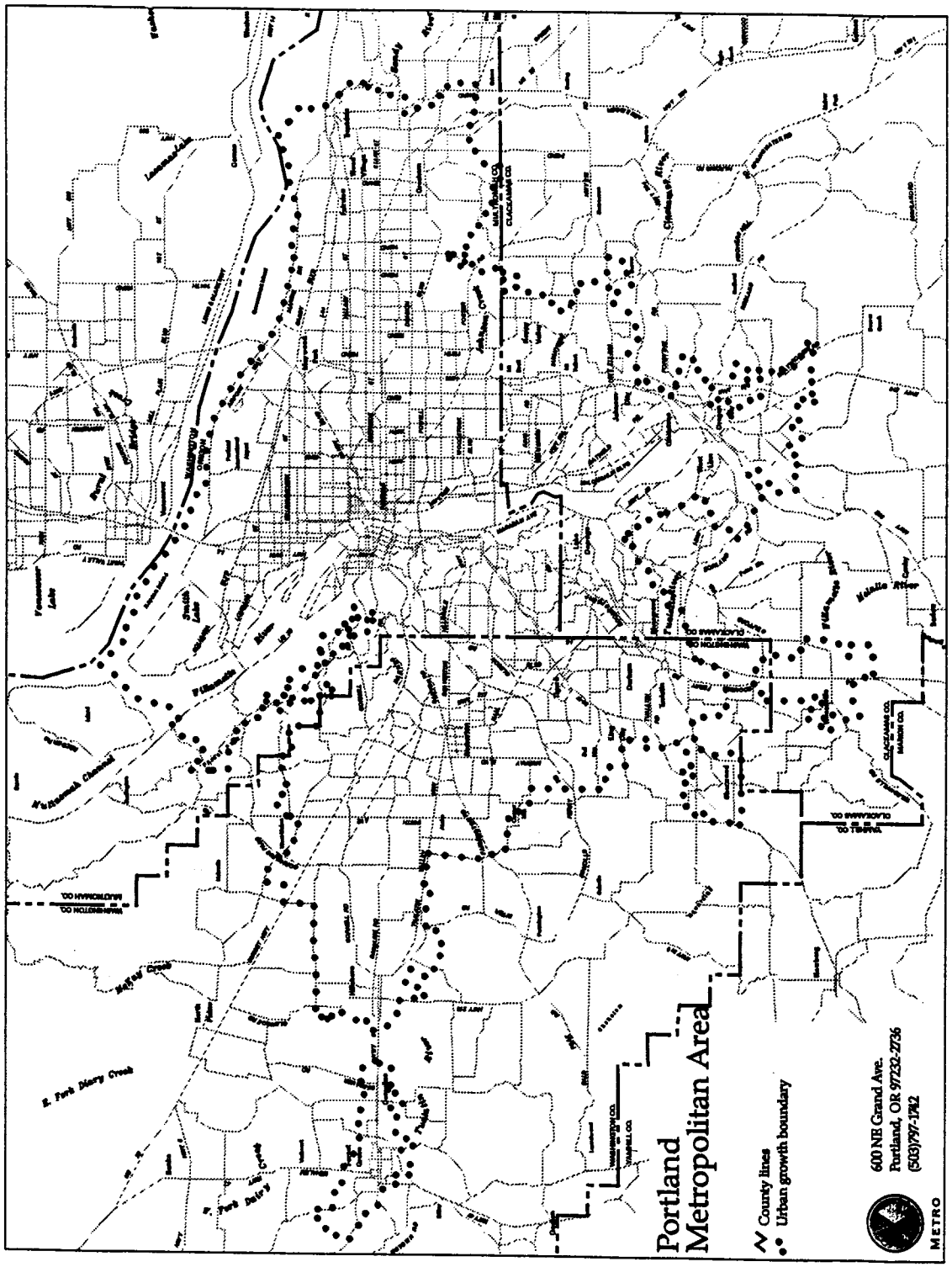


Figure 1.2 Portland Metro Area



Metro's responsibilities include preparation of the Regional Transportation Plan, the long range regional land use strategy, and the region's congestion management system. The agency is also responsible for establishing and maintaining the region's Urban Growth Boundary[1], planning metropolitan area open spaces and parks, and planning transportation projects of a regional scope, including the Westside and South/North light rail transportation projects[2]. All local jurisdictions must be consistent with the regional framework established by Metro which encompasses land use policy, designation of current and future urban centers, and regional population and employment forecasts. Metro's authority was formally granted by voter referendum through a charter amendment in 1993.

Metro maintains a regional geographic information system (GIS) and a complete travel demand forecasting system to help carry out its regional land use and transportation planning responsibilities. The travel demand model system and the GIS, known as the Regional Land Information System (RLIS) are also resources to local jurisdictions within the region. This case study focuses on data collected to support the travel demand model system. Because some of these data are stored and manipulated in RLIS, and since GIS is becoming increasingly integrated in the model system, certain aspects of the GIS are described in the case study as well.

The key philosophy in Metro's approach to planning is that transportation and land use planning are inseparable, and that to effectively forecast future demands on the transportation system one must understand the environment which generates travel and influences travel needs.

1.3 Data Collection History

The set of transportation data required to support travel demand modeling in the Portland area, as elsewhere, have not been collected either at one time or as part of a single project. Rather, a multi-year data collection program has been used where multiple efforts are coordinated to produce the desired end product. Important considerations in developing the overall data collection program have included data needs, data flexibility, costs, risks, timing, and resource availability.

[1] According to the draft Regional Transportation Plan, the Urban Growth Boundary (UGB) is the politically defined boundary around a metropolitan area outside of which no urban improvements such as sewage treatment and water supply may occur. The UGB is intended to accommodate projected population and employment growth within a 20-year planning horizon.

[2] Metro's responsibilities also include solid waste management, operation of the Washington Park Zoo, and, through the Metro Exposition-Recreation Commission, management of the region's convention and spectator facilities.

The 1994 household survey builds upon a long history of data collection and model development in the Portland region. Since the early 1960s, Metro and its predecessor, the Columbia Regional Association of Governments (CRAG), have collected survey data and developed increasingly sophisticated transportation demand models. Major data collection and transportation modeling milestones at Metro are listed in Table 1.1. Metro's evolution from aggregate models and mainframe computers to disaggregate models and workstation/micro computing parallels that of transportation modeling at many MPOs across the country. Prior to the 1994 Household Activity and Travel Behavior survey, the most recent major household survey in the Portland region was conducted in 1985. Data from the 1985 survey form the basis for the generation of travel models currently in use.

1.4 Organization of Report

Chapter 2 of this report describes the Household Activity and Travel Behavior Survey carried out in 1994–95, an example of data collection to address contemporary policy questions. Sections of Chapter 2 are referenced to relevant chapters and sections in the *Travel Survey Manual*[3] for readers wishing more background on topics such as sampling, survey design, and quality control. Both the revealed preference and stated preference components of the survey are covered. Data collected in the 1994 survey will form the foundation for future model development and transportation planning activities at Metro.

Chapter 3 presents the overall data collection program that supports Metro's travel demand modeling activities. Sources of data include transportation supply data such as parking costs, system monitoring data such as traffic counts, and basic demographic, land use, and employment inputs. Information on the scope, content, cost, and use in travel demand forecasting are provided wherever possible. Metro will continue to collect these types of data to support of its future travel demand modeling activities. Chapter 3 also discusses the use of a number of different past surveys in estimating and updating Metro's current model system. While the 1994 household survey will supersede past surveys as the source of model estimation data, the description of past practice is a good example of applying data from different sources to meet modeling needs.

Chapter 4 concludes the case study with an assessment of Metro's data collection program, recommendations to other agencies considering household survey efforts, and some general recommendations. A discussion of the applicability of the Portland experience elsewhere also is included.

[3]U.S. DOT, Federal Highway Administration, *Travel Survey Manual*, prepared by Cambridge Systematics, Inc., Cambridge, MA, April 1996.

Table 1.1 Milestones in Travel Demand Data Collection and Modeling at Metro

Year	Activity
1959-60	Columbia Regional Association of Governments (CRAG) collects aggregate data.
1970s	CRAG develops 80-zone system with UTPS on mainframe computers.
1977	CRAG conducts a 1,000 household home interview survey.
1979	Metro builds new disaggregate logit mode choice and destination choice models estimated from the 1977 data using the UTPS ULOGIT module.
1983[1]	The model zone system is expanded to 300 zones. Metro implements a beta version of EMME/2 on a workstation platform.
1985	Metro collects weekday travel data from 4,910 households with telephone survey.
1988	Model system refined to reflect the impact of light rail transit.
1988-89	Metro estimates a new set of models for six-trip purposes from the 1985 survey data. These models, with continual refinement, form the basis for the current generation travel model system.
1992	Zonal development density and pedestrian environment variables incorporated into model system along with other refinements.

Note: [1]The model system is currently at 1260 zones.

Source: Metro, 1995

2.0 1994 Household Activity and Travel Surveys

2.0 1994 Household Activity and Travel Surveys

2.1 Impetus and Objectives for New Data Collection

Portland's current travel demand system is based on a 1985 household travel survey. While data from this survey continue to be used to develop incremental model enhancements, a decision was made in 1993 that a number of factors had changed sufficiently that a new household survey was merited upon which an entirely new generation of travel demand models could be developed. These models would be oriented to analyzing individual and household activity patterns to a far greater extent than the trip-orientation of the current model system. In addition, increased attention would be given to bicycle and pedestrian travel and to the consideration of transportation system management options. Finally, a geographic information system (GIS) would form the underlying data foundation for these new travel demand models.

Several more specific objectives also guided the resulting 1994 Household Activity and Travel Survey. These included the following:

1. To respond to the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), the Clean Air Act Amendments of 1990, and Oregon's Administrative Rule for Goal 12 of the State Land Use Laws, part of which require a reduction in VMT per capita in long-range planning.

2. To capture and to more fully understand the effects that changing demographics and household structures in the Portland region are having on travel behavior.

3. To examine travel within the broader context of daily activities. Because of the tendency for survey respondents to forget or "write off" very short trips, the existing trip-based survey database lacks information explaining this type of travel behavior, especially walking and bicycle use. In contrast, with an activity-based approach, people are asked to think of travel in the context of their daily activities; thus, trips such as a walk to the corner store are recorded.

4. To collect stated preference data for analysis of previously untested policies such as pricing schemes or the introduction of new modes of travel.

5. To address air quality concerns by collecting data on vehicle acquisition and disposition in addition to traditional vehicle model, fuel type, and vehicle usage data. For example, people may hold on to older, more polluting vehicles if registration fees are increased.

6. Existing data are insufficient to model trip-chaining behavior, which is closely associated with household structure and has a significant impact on air quality.

7. To improve the manner in which the model system considers the role of the physical environment on travel behavior. The collection of more objective data would support the development of modeling approaches that do not have to rely on largely subjective surrogate factors, as is currently the case.

8. To take advantage of the increase in cheap, accessible computing power over the last decade. These new computer system capabilities permit a move away from the traditional zone-based, four-step process, the use of which was based in part on computing limitations of the 1960s and 1970s. The current and anticipated next generation of computer capabilities provide the analytical power to drive more sophisticated models without corresponding increase in cost or time.

Thus, a variety of policy related and technical issues were the impetus for the 1994 household surveys. The general objective for the 1994 survey data was the analysis of a number of interlinked factors such as household structure, transit availability, residential location, and vehicle acquisition. The activity-based approach was intended to reflect a more holistic point of view relating travel behavior to people's daily activities.

2.2 Overview

The 1994 Activity and Travel Behavior Survey was carried out in the major metropolitan areas of Oregon and southwest Washington state. Although the survey was focused around the Portland metropolitan region, data were collected in four other Metropolitan Planning Organizations (MPOs) as well. The Southwest Washington Regional Transportation Council (SWRTC), centered around Vancouver; the Mid-Willamette Valley Council of Governments (MWVCOG), centered around Salem; the Lane Council of Governments (LCOG), centered around Eugene; the Rogue Valley Council of Governments (RVCG), centered around Medford; Tri-Met, the regional transit operator; and the Oregon Department of Transportation (ODOT) were all active in implementing the survey. While the survey consultant had a separate contract with each agency, survey administration was coordinated throughout the region. The same survey methodology and questionnaires were applied throughout, with minor variations for each MPO.

This combined survey effort will have a number benefits. Given that regional travel knows no boundaries, it is advantageous for all MPOs in the area to have access to a common regional demographic and travel behavior database. The combined effort also achieves economies of scale. By pooling data as much as possible, all the MPOs gain access to observations of the full range of potential travel behavior (such as bicycling).

The overall effort included a two day household activity survey and a stated preference component administered to a subset of the activity survey respondents. The survey sample was stratified by geographic area and over-sampled in certain strata to capture significant observations of non-motorized travel. While the MPOs hired a survey firm (NuStats)

to field the survey, design of the survey and its instruments were a collaborative effort among the MPOs, a panel of transportation researchers, and the survey firm.

Survey firms responding to the request for proposals were asked to meet at least eight of the following nine specific modeling objectives for the data to be collected[1]:

1. To estimate conventional four-step disaggregate models;

2. To respond to factors in the local urban environment, including street and pedestrian continuity, land use heterogeneity, and neo-traditional design;

3. To model the substitution of in-home activities for activities requiring travel;

4. To model the substitution of non-motorized modes (walk and bicycle) for motorized modes in response to changes in household structure and the physical environment;

5. To explicitly estimate travel in linked trip chains, to identify the factors that affect this phenomenon, and to identify the link between trip-chaining, congestion, and mode choice;

6. To analyze the effect of household structure, transportation costs, and travel time on household location choice and its links to auto ownership and mode choice;

7. To estimate car ownership/acquisition/disposition models as affected by congestion, road and fuel pricing, and the cost of acquisition;

8. To address air quality and fuel use issues by modeling differential utilization of autos by households; and

9. To introduce quantitative methods to analyze Travel Demand Management (TDM) actions such as road or congestion pricing, parking supply control, and urban design.

2.3 Revealed Preference Surveys

Survey Design[2]

To ensure state of the art results, Metro invited a panel of transportation research experts to advise the survey team on technical issues. The basic approach to both the revealed preference (RP) and stated preference (SP) components of the 1994 Activity and Travel Behavior Survey was defined at a two-day meeting attended by representatives of the MPOs, Tri-Met, the survey firm, and the expert panel.

[1] The Request for Proposals scope of work may be found in Appendix A.

[2] For more information on household survey design, please refer to Section 2.2 and Section 6.3 in the Travel Survey Manual.

The RP survey was designed to collect household characteristics and vehicle information for each surveyed household, as well as personal characteristics, activity and travel data for each surveyed household member. Households were defined as "all people currently living in the same dwelling who typically share meals together as well as share at least part of their income." While this definition differs from that used by the Bureau of the Census, the survey team felt that the definition was more useful for modeling purposes.

Activity/travel data were collected for every household member, regardless of age (parents were instructed to assist children under 12 years old) over two consecutive days. The travel days assigned to households were varied to capture data representing all the days of the week. One reason for collecting two days' activity/travel data was to observe any differences in travel behavior *within* households by day of week[3]. The marginal cost of this extra day of data collection was about 30 percent. Table 2.1 lists the household, vehicle, person, and activity/travel data elements collected during the RP survey.

Sampling[4]

One of the primary objectives of the 1994 survey was to collect data which could be used to study a variety of transportation-related behavior. The relationship between the built environment and transportation behavior was of particular interest. Metro also wanted to capture enough observations of less common transportation choices to be able to understand the underlying factors. For these reasons, the sample universe in the Portland Metro area was both stratified by geographic "market area" and enriched to include sufficient numbers of transit and park-and-ride users.

By stratifying the Portland Metro area sample geographically, Metro hoped to capture higher incidences of walking, transit, and bicycle usage in pedestrian-friendly urban areas as well as to compare the subsample to less pedestrian friendly urban environments. Among the strata in Multnomah County were urban areas with good pedestrian environments and transit, urban areas with poor pedestrian environments, and the light rail corridor. The Portland area sample was enriched by intercepting users of light rail system park-and-ride lots, for whom an additional stratum was created[5]. Table 2.2 lists the sample strata for each county in the Metro area. The Multnomah County strata are mapped in Figure 2.1.

The survey firm purchased a random probability sample of telephone exchanges from a national sampling service from which to recruit households in each geographic strata (this was the sampling frame). Each household with a telephone had an equal probability of being included in the sample, whether or not the telephone number was listed.

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[3] However, some researchers have observed higher non-response rates and underreporting of trips with multi-day diaries.

[4] For more information, see the Travel Survey Manual Section 6.5.

[5] The intercept methodology was later revised to a license plate recording methodology. Once names, addresses, and phone numbers were obtained through the Department of Motor Vehicles, the sampled household was recruited in the same manner as households in other strata.

Table 2.1 Data Items Collected in the 1994 Household Activity and Travel Behavior Survey

Household Data Elements

- Address
- Activity dates
- Household size and names
- Household structure type
- Household income
- Number of phone lines
- Number of cellular or car phones
- Presence/absence of household members or visitors on activity day
- Tenure at current address
- Zip code of previous address
- Own or rent
- Number of vehicles
- Shared phone lines
- Transportation Disability

Person Data Elements

- Gender
- Race/Ethnicity
- English proficiency
- Employment status
- Age
- Household language
- Driver's license status
- Student status

If Employed:

- Occupation
- Industry
- Work at home
- Pay for parking?
- Parking cost
- Tenure at current job
- Address of primary job
- Zip code of secondary place of work
- Primary employer offers shift work or flex time?
- Primary employer offers subsidized parking or transit?
- Number of days traveled by specific modes
- Zip code of previous employer

If Student:

- Name of School
- Number of days traveled by specific modes

Activity Diary Data Elements/Questions

- What was the activity?
- Where did it take place?
- When did activity start?
- Did you have a vehicle available?
- Parking costs, if any
- How long did it take?
- Were you already there?
- How did you get there?
- Number in party
- Start/end times
- Bus trip information (e.g. route, transfer)

Vehicle Form Data Elements/Questions

- Vehicle year, make, model, type
- Year purchased
- Fuel type
- Vehicle ownership
- Purchased as replacement or add-on?
- Odometer reading on beginning of 1st day
- Odometer reading at end of 2nd day

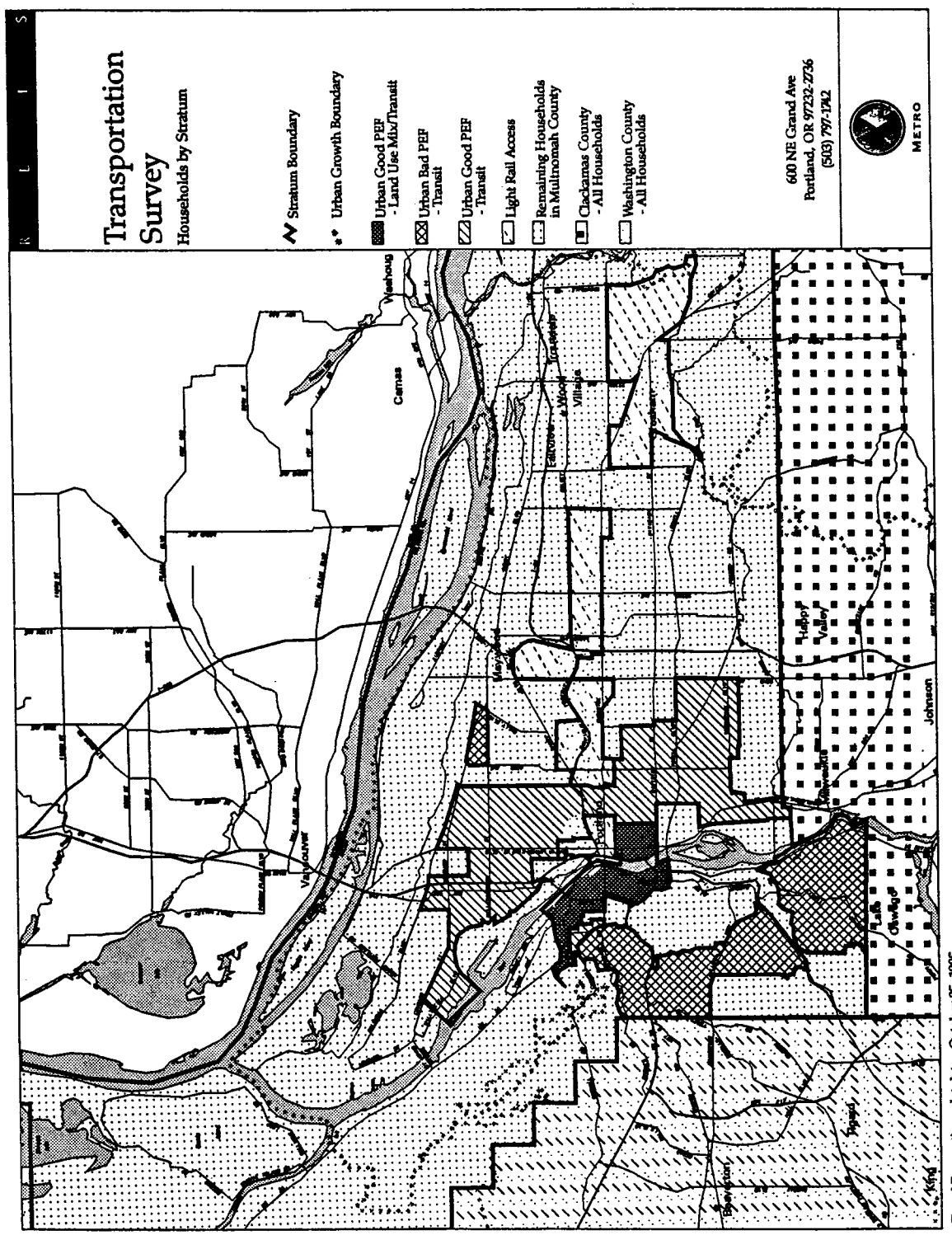
Source: NuStats International, *Oregon and Southwest Washington Household Activity and Travel Survey*, Revealed Preference Final Report, 1995.

Table 2.2 Geographic Stratification

Stratum	Sub Area
	Multnomah County:
1	Urban, good Pedestrian Environment Factor (PEF), land use mix, and transit
2	Urban, bad PEF & transit
3	Urban, good PEF & transit
4	Light Rail Corridor
5	Remainder of County
6	**Clackamas County**
7	**Washington County**
8	**Columbia County** (partial)
9	**Yamhill County** (partial)
10	**Park-n-Ride Users**

Source: NuStats, Inc., Technical Memorandum, *Sample Productivity Plan,* undated.

Figure 2.1 Survey Strata



Survey Content and Questionnaires[6]

The survey firm used several data collection instruments and questionnaires to gather the data items shown in Table 2.1. Household and personal characteristics were collected during the recruitment interview with the aid of a "recruitment" questionnaire (Appendix B). The recruitment questionnaire contained questions on the household income, size, and type as well as individual members' gender, age, ethnicity, language spoken at home, employment background, and student status.

Survey participants recorded their daily activity and travel data on memory joggers (this device was subsequently dropped after the initial spring/summer data collection phase) and in activity diaries. Household vehicle information including vehicle owner, make, model, type, year, fuel type, date of acquisition, and odometer readings, was recorded by survey participants on a vehicle information form. Copies of all these materials are contained in Appendix C. Following households' designated travel days, the activity, travel, and vehicle information was retrieved by interviewers with the aid of a retrieval questionnaire (Appendix D).

Pilot Testing[7]

The survey firm tested all aspects of the survey process by conducting two phases of pilot tests. Households in Eugene and Salem were targeted with a preliminary version of survey materials while households in Portland and Vancouver received slightly modified versions.

The pilot tests produced some important findings. For instance, the initial version of the introduction script, which contained complete information about sponsorship, anonymity, confidentiality, and survey rationale, was found to be overly long. After the first pilot study phase, the introduction was shortened, resulting in a significantly improved participation rate. The pilot tests also identified several questions whose contents or wording tended to produce "quit refusals" (i.e. interviews in progress were abruptly terminated). These questions were modified or removed from the survey instruments.

Another interesting result from the pilot tests was the interviewers' perception that the two-day activity survey would be a bigger burden on respondents than traditional one-day trip-based surveys. Interviewers were thought to be passing some of this attitude on to potential participants and lowering participation rates. To remedy this problem, interviewers received training that focused on the logic of reporting activities rather than trips, to change the perceived difficulty of the task.

[6] For more information, see the Travel Survey Manual Section 6.6.

[7] For more information, see the Travel Survey Manual Section 6.7.

Data Collection Procedures[8]

A total of 4,451 households were surveyed in the Portland Metro area using the telephone/mail/telephone method. The first data collection phase took place during the spring and summer of 1994. Following revisions to the survey instrument and interviewing procedures, additional households were surveyed in the fall and winter of 1994–95. Data collection steps included:

- Recruitment of households by telephone;
- Mailing survey materials packets to participating households;
- Reminder calls to participating households on the day before their designated travel days; and
- Retrieval of data via telephone interviews after the second designated travel day.

These procedures are summarized in Table 2.3. Up to six attempts were made to recruit each sampled household. Once the initial contact was made, recruiters asked to speak to the head of household, explained the survey, conducted a brief pre-qualifying interview, and invited the household to participate. Qualified households were assigned two travel days at this point in the process. Once households agreed to participate, the recruiter collected the household and person information and arranged for survey materials to be mailed to the participating households.

Survey materials used in the spring/summer data collection phase contained a letter of introduction, a reminder sheet, memory joggers, activity/travel diaries for each household member, a vehicle information form, and a magnet with a toll-free survey hotline number printed on it (Appendix C). The project team revised the activity/travel diary and omitted the memory joggers in the packets used for the fall data collection phase.

One day before each participating household's first designated travel day, interviewers contacted the households to remind them to record their activities and travel. Data retrieval telephone interviews began immediately after households' designated travel days. Up to nine attempts were made to complete the data retrieval for each household. Interviewers retrieved data using a form containing all the items in the activity/travel diary combined with strategic probes. Retrieval of the data took an average of 45 minutes per household.

Computer-Aided Telephone Interviewing (CATI) technology assisted recruiters and interviewers in carrying out the recruiting and reminder steps (paper and pencil were used for data retrieval). The CATI program was set up to deliver samples to interviewers, and to record and track the disposition of each call attempt. In this way, the survey firm was able to distinguish between "final" dispositions (disconnected telephone numbers, residents out of town, etc.) and "temporary" dispositions (no answer, busy signal, etc.) and to maintain the sample pool between data collection phases.

[8] For more information, see the Travel Survey Manual Section 6.9.

Table 2.3 Data Collection Procedures

Action	Household Contact	Timing[1]	Data Collection Mode	Objectives
Advance letter	Yes	0 minus 14	Mail	a) promote the survey and provide background information for listed sample
Recruitment call	Yes	0 minus 10	Phone & CATI	b) secure cooperation c) secure/ confirm address d) collect household and person data
Place diary packet	Yes	0 minus 9	Mail	e) record vehicle information f) activity checklist
Reminder call	Yes	0 minus 3	Phone	g) ensure participation
Diary day 1	No	0 minus 1	Paper & pencil	h) record activities
Diary day 2	No	0	Paper & pencil	i) record activities
Data collection	Yes	0 plus 1	Phone, CATI, paper and pencil	j) retrieve activity and travel data

Note: [1] Timing uses the activity or travel date as the base. It is identified as "day 0". All other activities were timed before or after this critical date.

Source: NuStats International, Inc., *Oregon and Southwest Washington Household Activity and Travel Surveys*, Final Report, 1995.

Geocoding[9]

Metro will geocode (attach x–y coordinates) activities and employment locations recorded in the final survey data set to an accuracy of 200 feet. Travel origins and destinations will be generated in a separate step. Sampled home addresses were also geocoded to allocate sampled households within and among geographic strata. The survey firm provided Metro with a file of sampled households and addresses. Metro then geocoded the sample, and returned it to the survey firm with stratum codes attached. While sampled households with listed telephone numbers came with the addresses already attached, the survey firm collected the addresses of households with unlisted telephone numbers during the recruitment process.

Cleaning, Editing, and Quality Control[10]

The survey team took a variety of measures at each step of the survey effort to maintain the accuracy of the data collected. At the recruitment stage, the CATI program allowed interviewers to enter only "in range" survey responses. After data retrieval, field supervisors and editors validated approximately 10 percent of the recruited and completed households. These recontacted households were asked five or six questions to ensure that the initial contact had been made and the entire set of questions asked.

As data collection proceeded, the survey team regularly reviewed descriptive statistics of the data to ensure that the survey was proceeding as planned. Among the tables generated were sample disposition outcomes for the recruitment and data collection phases, distributions of household characteristics, and reports on activity types and trip generation. Examples of tables from a biweekly data check are presented in Table 2.4.

Once data were retrieved, the survey firm converted the CATI files into a statistical tabulation software format for data cleaning. A database program was then applied to check for consistency within and among the created household, person, vehicle, and activity data files. In addition to the cleaning and editing performed by the survey firm, the data will have undergone at least two to three months of consistency and reasonableness checks by Metro staff before being used for modeling.

Results and Preliminary Findings

Table 2.5 shows the final survey execution outcomes in the Portland Metro study area. Of 20,161 contacted households, 4,451 households ultimately completed surveys. Table 2.6 provides details on the sample disposition. The recruitment rate is equivalent to the number of recruited households with complete household and person data divided by the number of households eligible for recruitment. The recruitment rate for the Portland

[9] For more information, see the Travel Survey Manual Section 6.10 and Chapter 14.0.

[10] For more information, see the Travel Survey Manual Section 6.11.

Metro area was 53 percent. The completion rate is the number of households completing the survey process divided by the number of recruited households. This rate was 63 percent in the Portland Metro area. The overall response rate is the recruitment rate multiplied by the completion rate, or 33 percent in the Portland study area.

Table 2.7 provides estimates of transportation activity volume for the study area[11]. In total, 9,471 persons reported 122,348 activities and 67,891 trips in the final random sample data set. Additional tabulations of survey respondent, activity, and travel characteristics may be found in the final revealed preference report prepared by the survey firm.

Preliminary findings tabulated from raw data collected in the spring suggest that the data collection strategy has paid off in capturing non-motorized travel and transit use. For example, the walk, bicycle, and transit mode shares have been found to be as high as 28.5, 2.5, and 8.8 percent, respectively, in pedestrian-friendly market areas with good transit. In all market areas, the mode shares for walk, bicycle, and transit were 10, 1.6, and 2.9 percent. In comparison, combined walk and bicycle mode shares observed in the 1985 survey were on the order of 3-4 percent. Metro staff emphasize that these findings are based on partial, unweighted data, and that the final cleaning, editing, and weighing processes may change the results.

2.4 Stated Preference Surveys[12]

While observed behavior typically forms the basis for travel demand modeling, this revealed preference data cannot be used to predict the effects of totally new changes to the transportation environment. The introduction of a new mode, the effect of urban design policies, and various pricing schemes are among the policy options that are difficult to address with conventional revealed preference data. In contrast to observed behavior, stated preference surveys involve the respondent in a series of hypothetical choice exercises. By varying combinations of hypothetical choice attributes (e.g. various price, time, and quality combinations), stated preference exercises can yield data on how people will react in a new situation. The stated preference component of the 1994 Household Activity and Travel Behavior Survey is described in the following sections.

Survey Design

The basic principles of the stated preference (SP) survey design, as with the revealed preference survey, were established with the input of an expert panel. Of particular importance in the SP survey design was the selection of the subject areas. The criteria applied to select SP subjects were the following two questions:

[11]Note that the statistics reported in this section reflect unweighted data.

[12]See Chapter 13 ot the Travel Survey Manual for more information on stated preference techniques.

Table 2.4 Example Bi–Weekly Data Check

Distribution of Completed Household by Sample Type

Sample Type	Cumulative
Listed Sample	43.7%
Unlisted Sample	53.1%
Intercept Sample	3.2%
Total	**3,244**

Distribution of Completed Households by Sample Stratification

Stratum	Cumulative	% Completed
1. Multnomah County - Urban, good PEF(1), LUM(2) & Transit	292	48.6%
2. Multnomah County - Urban bad PEF, & Transit	313	62.6%
3. Multnomah County - Urban, good PEF & Transit	419	83.8%
4. Multnomah County - Light Rail Corridor	428	71.3%
5. Rest of Multnomah County	608	101.3%
6. Clackamas County	416	83.2%
7. Washington County	367	73.4%
8. Yamhill County (partial)	151	75.5%
9. Columbia County (partial)	147	73.5%
10. Sample Enrichment (park-n-ride users)	103	51.5%
Total	**3,244**	**73.7%**

Notes: (1)Pedestrian Environment Factor
(2)Land Use Mix

Source: NuStats International, *Memorandum,* February 1995.

Table 2.5 Revealed Preference Survey Execution Outcomes

Number of Households		Rate	Percent
Contacted	20,161	Overall Response	33%
Recruited	7,090	Recruitment	53%
Completed Surveys	4,451	Completion	63%

Source: NuStats International, Inc., *Oregon and Southwest Washington Household Activity and Travel Surveys*, Final Report, 1995.

Table 2.6 Final Sample Dispositions

Dispositions	Frequency	Percentage
Eligible Sample		
Recruited	7,090	30.5%
Second Refusal	4,642	20.0%
Terminated in middle of interview	90	0.3%
Ineligible Sample		
Disconnected numbers	4,576	19.7%
Deaf/Language	575	2.5%
Business/Government	3,401	13.1%
Out of Area	147	0.6%
Eligibility Unknown Sample		
First Refusal	743	3.2%
No answer	951	4.1%
Busy	81	0.3%
Answering Machines	936	4.1%
Call backs	360	1.5%
Total Sample Pieces	**23,232**	**100.0%**

Source: NuStats International, Inc., *Oregon and Southwest Washington Household Activity and Travel Surveys*, Final Report, 1995.

Table 2.7 Transportation Activity Estimates

Activity or Measurement	Number or Estimate
Total Households	567,126 households
Average Household Size	2.3 persons
Average Number of Vehicles per Household	1.73 vehicles
Total Trips Recorded	67,891 trips
Average Trip Rate per Household per Day	8.04 trips
Average Activity Rate per Household per Day	14.48 activities
Total Activities Reported	122,348 activities
Travel Volume Projection	4,599,693 trips

Note: Estimate of total households is based on 1990 Census STF–3 files. All other estimates are based on data collected as part of the 1994 household survey.

Source: NuStats International, Inc., *Oregon and Southwest Washington Household Activity and Travel Surveys*, Final Report, 1995.

- "Does the topic have to be linked to the RP data and the present modeling objectives?"; and

- "Is this something that the MPOs need to know now?"

The SP subjects were narrowed to:

- Pricing effects (congestion, road, and parking);

- Residential location choice (reflecting locational, pedestrian, and mixed-use issues); and

- Automobile acquisition.

Each MPO in the survey area was given the opportunity to participate in the stated preference survey subjects of most interest to that MPO. With the exception of the Medford metropolitan area (RVCOG), which chose not to participate in the pricing survey, the five MPOs participated in the three SP subjects listed above. In addition, an SP survey on transit issues was sponsored by Tri Met and one on trans-Columbia River crossings was sponsored by the Southwest Washington Regional Transportation Council. This section will describe only the three basic SP subjects administered in the Metro area[13].

The three SP subjects surveys were treated separately and administered consecutively with pricing administered first, followed by residential choice , and auto acquisition. The SP surveys were administered in the same order as the RP surveys geographically to ensure a minimum lag between completion of RP surveys and recruitment for participation in the SP surveys.

Sampling

The SP sample was pulled from the base of individual respondents to the RP surveys distributed over the five MPOs. The survey team used the person level RP data already collected to apply subject-specific criteria for recruitment. For example, the sample for the pricing SP survey was randomly drawn from all RP respondents who reported at least one single occupancy vehicle trip, trips of specified lengths (this criterion varied by MPO), were at least 18 years old, and for whom half of all travel involved commuting. In addition, only one participant per household was allowed to participate in any SP survey.

[13]While the Tri–Met and Southwest Washington SP data sets will be made available to Metro, no firm plans for model development using this data have been set.

Focus Groups

The survey firm held two rounds of focus groups to aid in designing the content of the SP instruments. The purpose of these focus groups was to better understand the factors affecting the three SP subjects and to determine threshold points for behavioral changes. The focus groups, held in Portland and Eugene, covered pricing effects (congestion, road, parking, and fuel), residential location, automobile acquisition, and pedestrian or mixeduse design issues.

All potential participants for the focus groups were screened to ensure a good mix in terms of age, gender, income range, and residential location. Participants also could not be employed in either transportation or market research. Participants in the second round also were required to be licensed drivers and heads of household and could not be employed in state government. Additional specific criteria were applied to participants in the groups covering different topics. For example, the participants in the second round pricing group had to be full time employees who primarily commuted alone by car.

Moderators presented focus group participants with a variety of scenarios related to each topic along with descriptions of tolls, fares, travel times, congestion levels, parking costs, and other relevant attributes. Participants in the locational, pedestrian, and mixed use groups also were presented with photographs and diagrams illustrating mixed use community design concepts.

Among the findings from the focus groups:

- A parking cost of $100 per month would be the minimum required to change participants' behavior under the parking pricing scenario.

- Fuel prices would have to reach $3.00 per gallon before participants' behavior changed under the fuel pricing scenario.

- Participants were willing to walk further (up to 10-30 minutes more) to key destinations in mixed use communities.

Subsequent to the focus groups, the content of the SP surveys was further refined with the results of pilot tests.

Survey Content

The SP component of the 1994 Activity and Travel Behavior Survey ultimately consisted of three separate SP subjects: pricing effects, residential location, and vehicle acquisition. Each respondent completed one SP subject and was presented with a set of eight hypothetical scenarios, each of which was followed by several questions or choice statements. The scenarios were presented in tables that described the attributes for each option under each scenario. Respondents also received a glossary of key terms used in the surveys.

Scenarios for the pricing survey, for example, consisted of fifteen different mode and route choice combinations along with the associated price, travel time, and other attributes. The residential choice survey scenarios consisted of four rental and purchase options along with attributes such as lot size, school quality, travel time to work, and range of prices. The vehicle buying behavior survey scenarios consisted of eight different vehicle acquisition options (including three alternatives to buying a vehicle) with associated price, fuel economy, performance, and other characteristics.

The pricing survey was administered in two basic versions (Appendix E). In the "commute" version, respondents indicated how many times in a typical commute week they would choose each travel option. Respondents to this version were asked to assume that their typical commute to work currently took 15 minutes. In the "non-commute" version, respondents indicated which of the presented travel options they most preferred. Respondents to this second version were presented with the characteristics of an actual trip that they had made (observed during the RP survey), and asked to imagine that their hypothetical choices related to this particular trip.

The residential choice survey (Appendix F) asked respondents to answer three questions after evaluating each scenario. First, respondents indicated which option they would prefer if they *had* to move. Next, they indicated whether they would need more, the same number, or fewer vehicles at the hypothetical new residence. Finally, respondents indicated whether they would move to the hypothetical new residence or stay at their current residence if they had the choice. After completing the SP survey, respondents to the residential choice survey were also asked to fill out a questionnaire about the local shopping area closest to their current residences.

The vehicle acquisition (Appendix G) survey asked respondents to evaluate five vehicle acquisition options along with three options not involving a vehicle purchase. Then, respondents were asked to think about their next vehicle purchase and indicate which option would be preferred.

Sixteen different scenario sets containing different attributes and attribute levels were created for each of the three SP subjects and versions of the pricing survey. The subject, version, and exact content of the survey administered to each respondent was keyed to the RP data already collected for that individual (as previously described, SP survey participants were recruited and screened from the RP database). For example, the scenario set for the pricing survey was keyed to the trip lengths recorded in respondents' RP data. The RP data also provided the real life comparison trip for the non-commute version of the pricing survey. Once recruited, "activity labels" were automatically generated from the RP database and sent to SP participants as part of the survey materials package. Attributes and attribute levels in the scenarios were also varied by MPO. For example, the toll route option was not included in pricing surveys administered in the Salem area.

Data Collection Procedures

All households completing the RP survey received a card thanking them for their participation and informing them that a selected group would be re-contacted for some follow up questions. Interviewers administered a brief recruitment survey to sampled

respondents over the phone, explaining the purpose of the SP survey and collecting basic demographic data to verify potential participants' qualifications. For those who agreed to participate, interviewers scheduled a data retrieval call following the recruitment call by about ten days. SP recruitment efforts were tracked with pencil and paper. Up to six attempts were made to contact every sampled respondent before final disposition was assigned.

Participants in the SP surveys were mailed a packet of information including a cover letter customized for each MPO, a description of the "most recent trip" against which the scenarios were to be evaluated (for the pricing survey), directions on how to complete the survey, a description of the context to place the scenarios in, and a set of eight scenarios for the respondents' consideration.

Several days after the SP packets were mailed, participants received a reminder call. During the allotted survey completion period, a toll-free number was available for participants who required assistance. On the scheduled retrieval date, interviewers retrieved the SP data over the telephone. Interviewers recorded the SP data in notebooks containing copies of each of the sets of scenarios mailed to respondents with pen or pencil. Up to six attempts to retrieve data from each participant were made. The actual average time required to retrieve the SP data was significantly less than the 30 minutes anticipated.

Coding

The core data elements retrieved and coded varied by SP subject. For the pricing SP, the core elements included the number of times the chosen trip is made in a typical week and, for each version of the trip scenarios:

- The preferred travel time;
- The preferred mode of travel;
- The number of times the trip was likely to be made in a typical week; and
- Long term coping strategies.

2.5 Estimated Costs and Resources Required

The survey firm received $1.2 million for administering the revealed and stated preference surveys in the different metropolitan areas. Data collection for the Portland Metro area cost $603,180. As shown in Table 2.8, Metro's cost per household were in the range of other recent household surveys conducted around the country, given that two days' activities were recorded.

Table 2.8 Recent Household Survey Costs

City	Year	Sample Size (Households)	Approximate Cost ($)	Cost Per Household ($)
Atlanta	1991	2,400	225,000	94
Baltimore	1993	2,700	400,000	148
Boston	1991	3,800	360,000	94
Detroit	1994	7,500	637,500	85
Houston	1994	2,600	275,000	106
Miami	1993	2,650	150,000	57
Pittsburgh	1990	450	15,000	33
San Diego	1995	2,000	180,000	90
St. Louis	1990	1,400	150,000	107
Washington, DC	1994	4,800	585,000	122
Kansas City	1991	1,221	80,000	66
Raleigh-Durham	1994	2,000	270,000	135
Sacramento	1991	4,000	380,000	95
Salt Lake City/Provo	1993	3,082	300,000	97
Portland, OR[1]	1994/95	4,451	603,180	136

Note: [1]Includes costs for two days of revealed preference travel and activity data.

Source: Cambridge Systematics, Inc., *Scan of Recent Travel Surveys – Travel Model Improvement Program Track D. Data Research Program*, Technical Memorandum, October 1995

The survey firm's contract included data collection, basic cleaning, and basic data checking. Costs for survey supervision, additional data cleaning and checking, data analysis, and model development are being borne by Metro and the other MPOs. At Metro, overseeing the survey effort and monitoring the survey firm required at least half of a senior full-time equivalent (FTE) for over a year. Data analysis and model development, which will include tasks such as development of travel impedances from the GIS, will employ about three FTEs on an on-going basis. While Metro will perform most of this model development work in-house, the other MPOs will likely hire consultants for model development and the models will be simpler than those envisioned by Metro.

The survey was funded from a variety of sources. Survey firm costs were split among the participating MPOs on a per household basis. In this way overhead and development costs were shared and the resulting total cost was lower than had the agencies pursued surveys separately.

Survey costs at Metro were budgeted for the 1994 and 1995 fiscal years as part of travel demand forecasting activities. Funding sources included Tri-Met, the Oregon Department of Transportation, and Federal funds in support of planning.

2.6 Problem Solving

Although Metro had anticipated completing the data collection during the spring and summer of 1994, some problems were encountered by mid-summer. These included a higher than anticipated cost for the effort, longer than anticipated RP data retrieval, an insufficient number of completed households in each stratum, and a high refusal rate for the household question pertaining to income.

In response to the cost problem, Metro reduced the scope of the survey by 15 percent, reducing the goal of 5,000 completed households to 4,250 completed households. To address the retrieval, completion and non-response problems, the survey team made changes to the recruitment and data collection procedures and conducted another wave of data collection during the fall and winter of 1994–95.

For the fall data collection, the survey firm directed its efforts towards households already contacted but reluctant to participate, towards recruited households that they had not successfully retrieved data from, and towards previously unused sample households. Specialized letters were mailed to each category of households encouraging their participation. Senior interviewers experienced in handling refusals were assigned to re-contact the reluctant households and to recommit those previously recruited.

Changes also were made to the organization and flow of the recruitment questionnaire. The introduction was shortened and reworded to highlight the importance of the project and the need for the household's participation. These changes helped hold people's interest and lessened the incidence of recruitment interviews being terminated midway. For participating households, the household income question was moved to the end of the collection of household data. This re-ordering lowered the refusal rate on the income question from approximately 40 percent to approximately 20 percent. In addition, the

order of person data collection was reversed, with interviewers beginning with the youngest household member and collecting data on the household spokesperson last. This last change helped establish a rapport with the spokesperson and contributed to higher participation rates.

The survey team also took this opportunity to improve the activity/travel diary and vehicle information forms. The activity diary was expanded to include all the data items asked for by interviewers during the process and revised to be more graphically attractive. Because of this expansion, the memory jogger was not included in the packet sent to households in the fall in order to ease the burden on respondents. A key consideration in these revisions was maintaining the comparability of the spring/summer data to the fall data.

2.7 Data Application and Future Plans

Metro has ambitious plans for the 1994 data. Initially, Metro had planned to first update the current model system with the new data, retaining the existing model system structure and process. Now, however, Metro plans to estimate new trip generation, destination choice, and mode choice models. The 1994 survey data collection effort was designed to support five interrelated types of enhancements to Metro's current set of travel demand models. These are described in the following sections.

Shift to Activity-Based from Trip-Based Model System

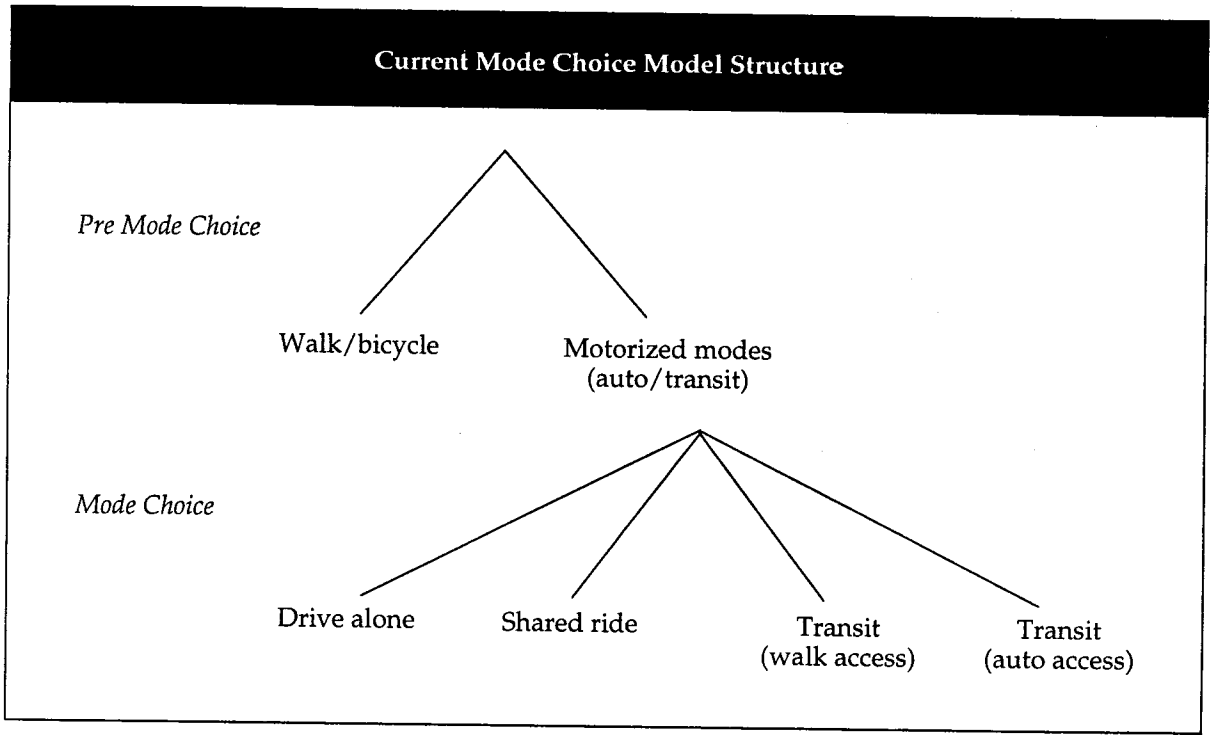
This approach recognizes that travel is a derived demand, and that activities not requiring travel may be substituted for those which do involve travel. Activity-based modeling will enhance the treatment of trip chaining and the treatment of interrelated household activities. Metro hopes to model the complete tour of travel derived from daily activities in the trip generation step. A tour, for example, could involve travel from home, to a daycare center, to the workplace, back to the daycare center, and back home. The modeled tours will not likely include extremely short trips. Also, because the survey collected the time of day that activities took place, Metro plans to estimate separate coefficients for work trips and non-work trips under peak-hour and off-peak impedance conditions.

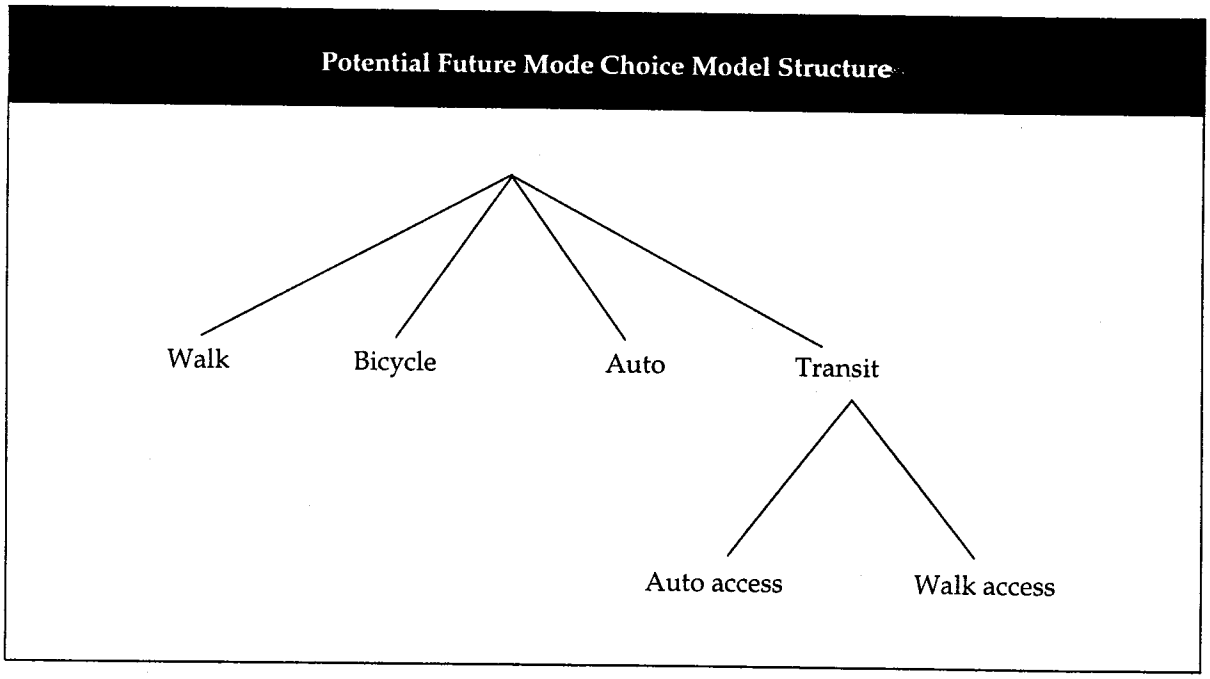
Enhanced Modeling of Non-Motorized Travel

This includes the potential for bicycling and walking as substitutes for auto and transit travel, the use of walking and biking as a means for accessing line haul transit services, and the effect of bicycling and walking facilities on both the frequency and destination of trips.

Although specific model forms have not been chosen, Metro will explore the use of the nested logit model for mode choice. Currently, trips made by non-motorized modes are separated out with a pre-mode choice model and the remaining motorized trips divided between auto and transit. Metro aims to bring in walking and bicycling as mode choices at the same level as transit and auto. The mode of access to transit could then be a lower nest in the model hierarchy (Figure 2.2).

Figure 2.2 Potential Mode Choice Model Structure





Source: Cambridge Systematics, Inc.
For illustrative purposes only. Does not show actual planned model structures at Metro.

Improved Integration of Transportation and Land Use Modeling

Closely related to the enhanced application of Geographic Information Systems, this includes the ability to analyze the effects of pedestrian and transit-friendly environments at either the origin or destination end of a trip. This also includes the ability to analyze the effects that various forms of highway and transit capital investments may have on long-range land use patterns within the Portland region.

Use of Stated-Preference Modeling Techniques

Certain transportation and policy options are sufficiently different from those already existing within the Portland region that their behavioral response can not be captured through the use of traditional revealed preference surveys. Metro hopes to use the stated preference data collected in the 1994 survey to analyze such transportation and policy options. Although stated-preference modeling has been used extensively in market research and in long-distance travel demand modeling, such techniques are only now beginning to be applied for urban area travel demand analyses.

Enhanced Application of GIS

In model estimation, GIS will permit the use of more disaggregate data. For example, instead of representing the walk distance of a survey respondent as a zone centroid-to-centroid estimation, the GIS can accurately measure the distance over a detailed network that could even include features such as sidewalk continuity (see Figure 2.3)[14]. As another example, accessibility characteristics (such as the number of retail employees within a quarter mile of a survey respondent's home) could be calculated in reference to any address on a basemap rather than by Traffic Analysis Zone (TAZ) (this concept is illustrated by Figure 2.4. In essence, GIS allows the transportation model to use an infinitely fine-grained zone system. The result will be a more accurate representation of variables influencing travel behavior and better modeling, especially for the non-motorized travel modes.

For model application, GIS may be used more extensively to directly generate zonal variables with a spatial component. Examples of these include the percentage of households in a TAZ with walk access to transit and residential density. GIS may also allow the current Pedestrian Environment Factor (PEF) variable to be dispensed with, replaced by actual measurements of topography, parcel size, number of intersections, and so forth. The GIS network will also be very useful for producing some travel impedances such as walk distance.

[14]Whenever possible, however, impedances collected in the survey will be used in model estimation. For example, models will be estimated with the parking cost reported by survey respondents rather than using the average parking cost of an area.

Figure 2.3 Example Walk Trip Analysis

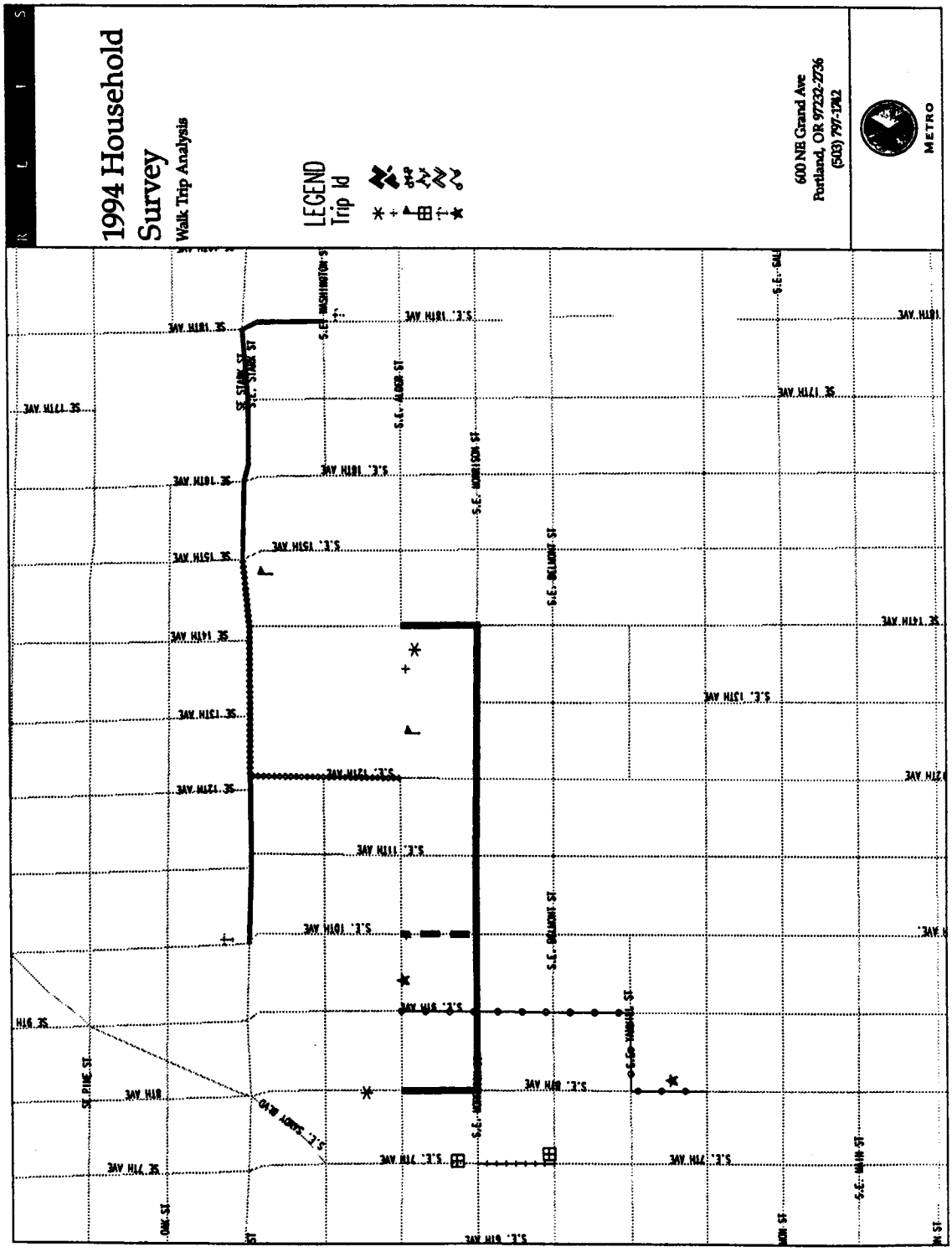
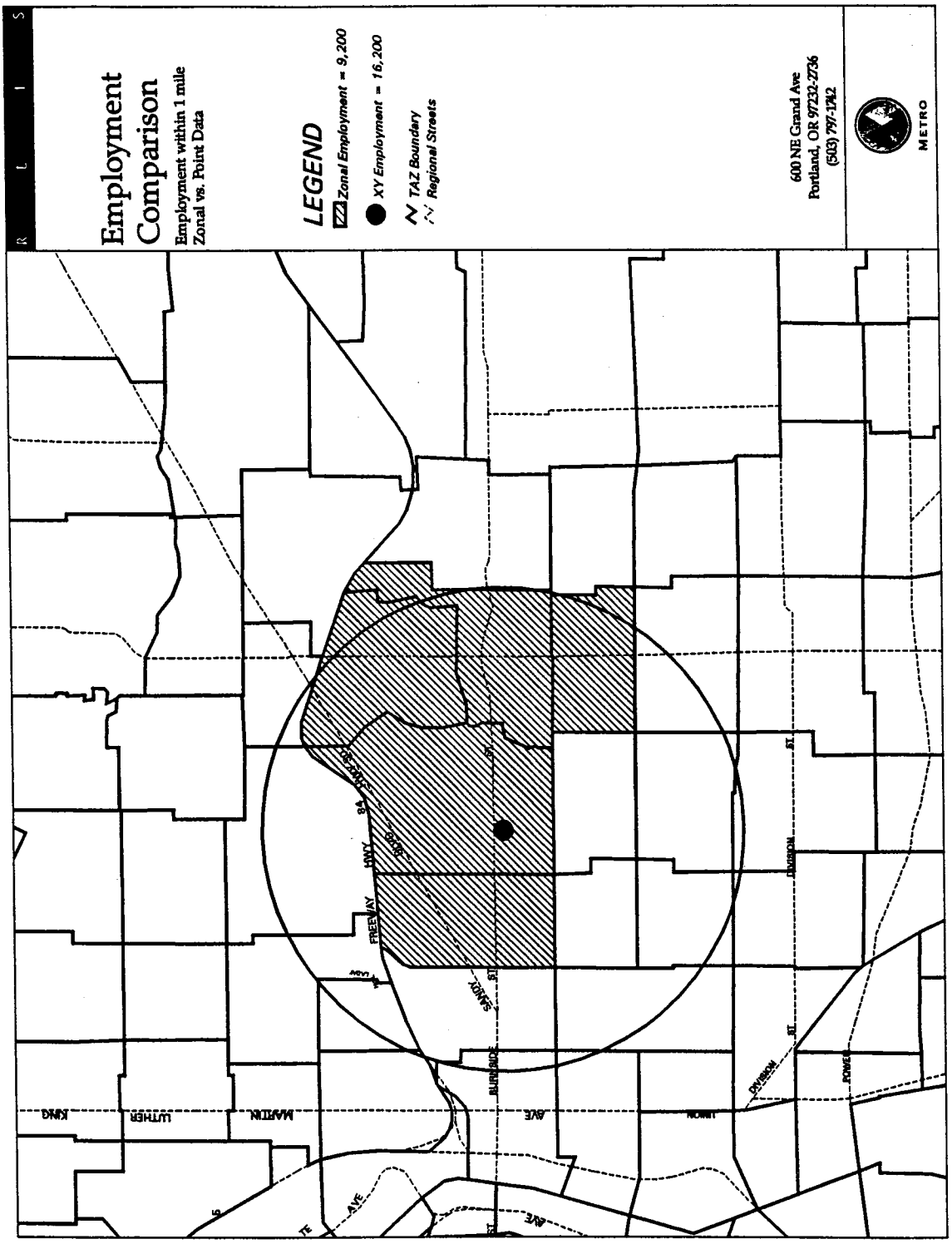


Figure 2.4 Zonal vs. Point Data



3.0 Other Data Collection

3.0 Other Data Collection

A transportation model system such as Portland Metro's uses a wide variety of data for model estimation, validation, and application[1] (Figure 3.1). Data for estimation of model coefficients is collected primarily through household, transit on-board, and other types of travel surveys. Validation data are used to adjust estimated models to fit observed travel patterns. Validation data consist of traffic volume counts and transit patronage, but often survey data are used well. Application of the models requires collecting and forecasting the input variables for each traffic analysis zone (TAZ).

Some of the data collection activities, in particular major travel surveys, are one-time or occasional efforts. Other data collection activities, such as traffic screenline counts, occur on a regular basis. The focus of this chapter is the ongoing data collection activity. The use of data from different surveys to update the models based on 1985 data will also be described, however, even though the 1994 household survey data will supplant earlier surveys as the primary data source. This description is included as an example of how model systems may be updated with supplementary survey data and how various data sources are used for validation.

Metro acquires data from and shares data with several agencies and jurisdictions. The main elements of Metro's data collection program that support its travel demand model system are described in the following subsections.

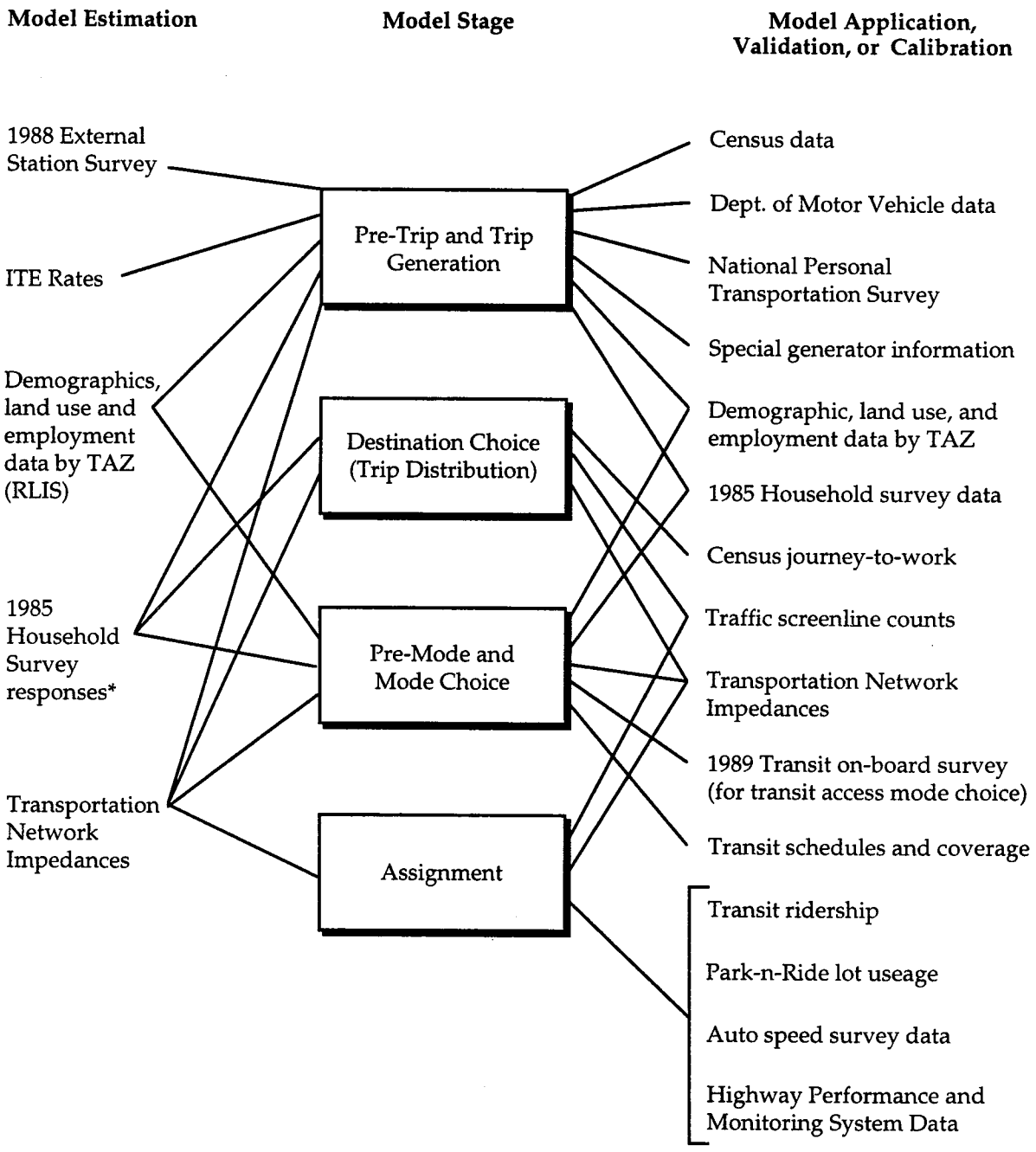
3.1 Land Use, Demographic, and Employment Data

The basic data underlying travel demand model systems are the demographic, employment, and land use data driving the trip generation models and entering other model components. Data on these variables must be gathered, forecasts of variables made, and the results tabulated at TAZ level. At Metro, demographic, employment, and land use data for travel modeling are developed within the Data Resources Center. The Data Resources Center is an in-house department responsible for gathering base year data, producing forecasts, and managing the data with an integrated database and geographic information system (GIS)[2].

[1] Refer to Appendix H for a description of the current model system.

[2] The Data Resource Center also provides data and mapping services to a variety of users within Metro, at local public agencies, and to the general public. Data services provided outside Metro are funded with user fees.

Figure 3.1 Data Inputs and Current Model System



* The 1994 Household Activity and Travel Survey will supplant the 1985 survey as the primary data source for model calibration.

The GIS is known as the Regional Land Information System (RLIS). RLIS is essentially a system of regionwide basemaps and associated databases maintained on a workstation platform using ArcInfo GIS software. Land use, undeveloped land, zoning, comprehensive plans, transportation data, and political boundaries are among the data layers registered to a basemap which reflects the counties' tax assessor parcels. A number of environmental data layers, including topography, are registered to a single-line street basemap. RLIS also stores demographic and employment information by census geography. There is also a street address map based on a much-enhanced[3] version of the Census Bureau's TIGER files. RLIS is a resource available to local jurisdictions and private citizens.[4]

There are three categories of demographic, economic and land use data which enter the model system for each TAZ:

- The total number of households and the distribution by income, household size, and age of the household head;
- Total and retail employment; and
- Residential acres and industrial acres.

RLIS is used to store and manipulate this zonal data and facilitates the calculation of zonal accessibility variables (e.g. the number of employees within thirty minutes of each TAZ). Relevant data are output from RLIS in vector or matrix format and the new variables are calculated with a special computer program within the travel demand model system. The results may be fed back into RLIS for mapping and display (Figure 3.2 shows transit accessibility).

The following sections describe in more detail the processes for collecting data and producing forecasts of demographic, employment, and land use variables.

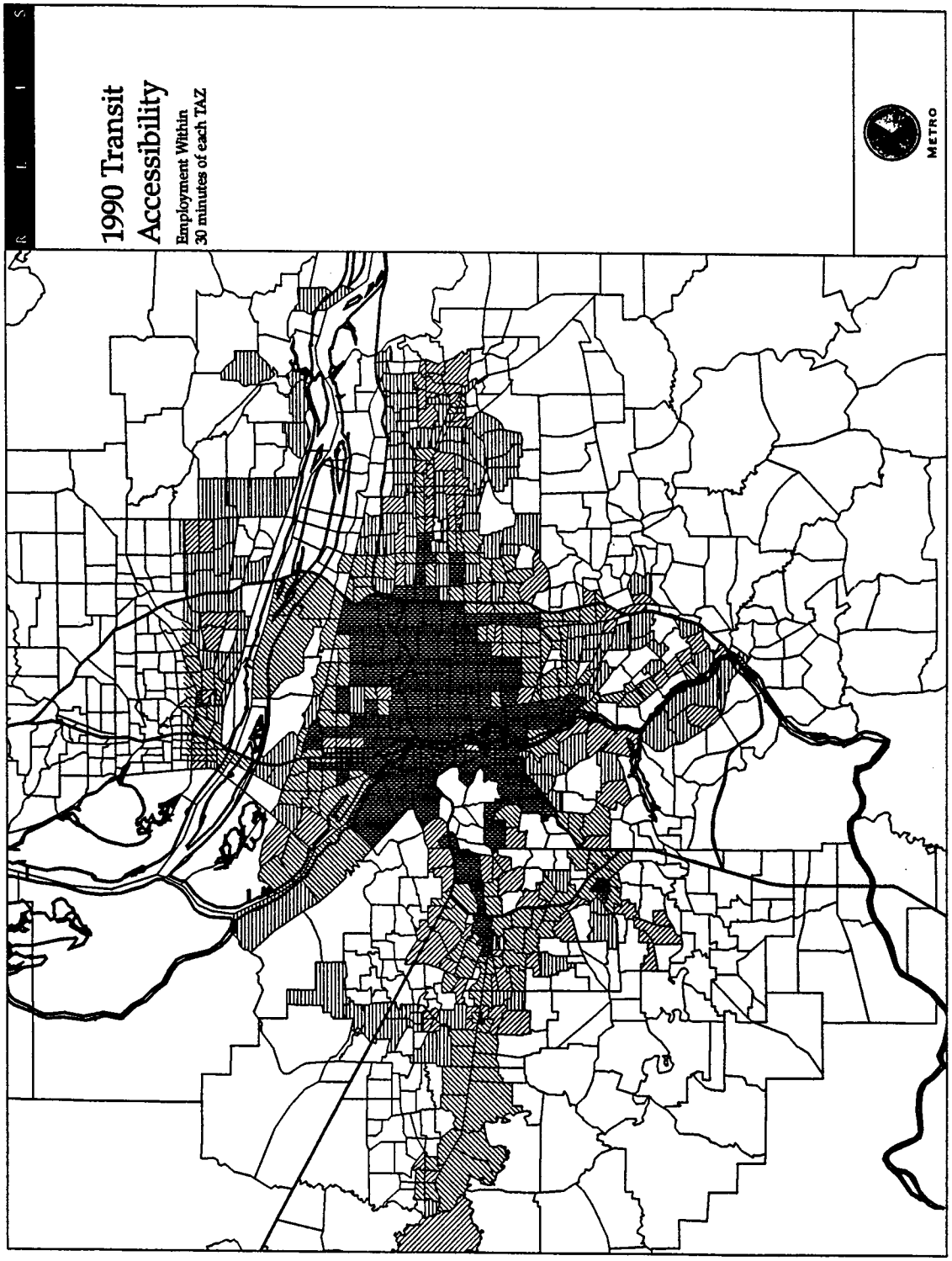
Land Use Data

Metro maintains three types of land use-related data in the RLIS GIS. These include an existing land use layer, a layer of local zoning classifications, and a land use planning layer which represents a standardized version of local zoning classifications. Metro is also currently developing a layer reflecting the region's long-term conceptual plan, the 2040 Framework.

[3]Metro has cleaned and edited the TIGER files as received from the Census Bureau to remove inaccuracies in the street network and address ranges. Keeping the street network and address ranges up-to-date is an ongoing process.

[4]RLIS is available to local jurisdictions on a subscription basis and to individuals on a fee basis. Metro operates a storefront center which sells preprinted maps and consults on specific data requests.

Figure 3.2 Transit Accessibility by TAZ



The land use classification system is based on the assessor's property classification codes. The land use classification codes include:

- Single-family residential;
- Multifamily residential;
- Commercial
- Industrial;
- Agricultural;
- Forest/farm;
- Public/semi-public; and
- Undeveloped land.

Metro keeps the existing land use layer up-to-date by tracking building permits and property reappraisals along with annual aerial photography. A consultant collects building permit and subdivision plat information from the local jurisdictions at an annual consultant contract cost on the order of $40-50,000. A staff of four at Metro then devotes approximately 40-50 percent of their time to geocoding this information and maintaining an up-to-date inventory of available land.

As described in the next subsection, the inventory of undeveloped land is a critical input to forecasting demographic and economic variables at the TAZ level. The travel demand model system also requires the number of residential and industrial acres in each TAZ. Forecasts of future land uses are developed concurrently with the allocation of population and employment growth forecasts to undeveloped land. The allocations are made based on density assumptions and are consistent with local zoning and the regional land use framework.

Demographic and Employment Data

Several model components require the number of households in each of sixty-four categories as inputs. The categories are a cross classification by four groups of three household variables including household size (4 groups), household income class (4 groups), and age of household head (4 groups). Also required are retail employment, other employment, and total employment by TAZ. Zonal accessibility characteristics used in the pre-generation, pre-mode choice, and mode choice steps are calculated from these socioeconomic and land use data.

Metro economists follow five general steps to arrive at projections and forecasts of these variables by TAZ.

1. An econometric model is used to produce regional control totals for forecasts of population, households, employment by 20 SIC sectors, personal income, and wage rates.

2. The outputs of the regional econometric model are allocated to six land market areas using a modified Delphi process. Metro allocates forecast growth to the areas based on historical growth trends and an analysis of available land capacity in each area. Representatives of business, academia, and the local jurisdictions review the results until consensus on control totals for the six areas is reached.

3. The control totals for the six land markets are then distributed among twenty smaller districts using a similar modified Delphi process.

4. A final allocation of households and employment forecasts to the TAZ level is made using the control totals for the twenty districts and an inventory of available land. The allocation is performed with the GIS (RLIS) at a quarter acre grid scale and then reallocated to the TAZ geography. Metro sends the resulting forecasts by TAZ to local jurisdictions for review and refinement.

5. Concurrently with the first four steps, Metro's economists develop a distribution or model of the relationships among household size, income, and age groups. This distribution is applied to forecasts and projections of households and employment to produce the required model inputs.

Metro's Data Resource Center gathers data from a variety of sources to support this process. The starting point is data collected by the U.S. Census. The Data Resource Center is a designated state data center affiliate with the U.S. Bureau of the Census and a source for census data for the Portland-Vancouver metropolitan area.

To update Census data, Metro acquires local building permit data, information from the Oregon State Employment Division, county-level employment estimates from the U.S. Bureau of Economic Analysis (BEA) and projections produced by local jurisdictions:

- The building permit and subdivision plat data collected on a monthly basis by a consultant (see previous subsection) is used to maintain an up-to-date inventory of dwelling units and undeveloped land.

- Metro acquires wage and salary employment data for the state from the Oregon State Employment Division every two years. This data is subject to confidentiality rules and costs approximately $200 in magnetic tape format.

- County-level employment estimates are issued quarterly by the BEA. However, Metro acquires this data only about every two years. The data is free of charge and available in electronic format.

A staff of three within the Data Resources Center is responsible for providing these demographic and employment data and forecasts to the travel modeling group. Of this group, one person is devoted full time to the related data acquisition, formatting, and computer tasks.

3.2 Transportation System Monitoring Data

Metro conducts an ongoing data collection program to monitor trends in the transportation system and to periodically validate and update components of the model system. The main elements of this data collection program include auto traffic counts, public transit patronage, parking costs, and auto ownership costs.

Traffic Counts

In addition to being used for validating model outputs, automobile traffic count data measured across predetermined cutlines and screenlines are an important component of Metro's transportation system monitoring effort. Metro collects traffic count data every two years for 52 designated screenlines and cutlines in the Portland region (the most recent data compiled is for 1994). Screenlines cross the entire study area and correspond to physical barriers such as rivers. Cutlines are artificial boundaries which intercept major traffic flows along selected axes. The traffic counts measure flows among outlying commercial districts, suburban areas, and the downtown.

Metro obtains the traffic count data from five jurisdictions including the Counties of Washington, Clackamas, and Multnomah; the City of Portland; and the Oregon Department of Transportation. Metro requests that each agency report counts at certain locations to avoid overlaps and gaps, and that data be collected during the spring or fall. Metro also requests that the data be tabulated by one and two hour a.m. and p.m. peak periods, for the average weekday, and by direction of travel. The two hour peak period is requested for analysis of the spread in peak period observed in recent years.

Despite the coordination effort, Metro has experienced some difficulties with inconsistencies in the traffic data from different sources. Different jurisdictions collect traffic count data for their own purposes and are subject to varying budget limitations. Therefore, data are not available for all locations in which Metro is interested. There are also issues concerning seasonal adjustments and the different time periods used (e.g. 24 hour, average weekday, a.m./p.m. peak).

Thus far, screenline traffic count data have been sent as hard copy and must be re-entered into a spreadsheet format by Metro staff. However, because some jurisdictions collect far more detailed data than required by Metro (e.g. 15 minute interval counts), the amount of data entry is not prohibitive. In total, collecting, formatting, and entering traffic count data consumes approximately two months of one full-time equivalent (FTE) employee every two years.

Patronage and Other Transit Data

Metro collects current public transit patronage data not only to use in the modeling process but to track trends in transit usage over time. Metro automatically receives monthly (12 month rolling average), quarterly, and annual (Section 15) performance reports from

Tri-Met, the regional transit provider, which have been compiled since 1971. Tri-Met uses a model relating total passenger revenue to average daily revenue service hours and average weekday, Saturday, and Sunday patronage. Monthly estimates are reported on a systemwide basis while quarterly reports are line-by-line. Metro uses the transit patronage data both to validate model outputs (assigned transit trips) and to relate patronage trends to demographic data.

The Tri-Met performance reports and patronage data are in hard copy format. Selected data from the reports are entered by hand into spreadsheets for analysis as necessary. Metro staff spend approximately 2-3 weeks of one FTE each year in analyzing transit patronage data.

Metro also collects information on transit schedules, fares, and routes to develop transit impedances and coverage factors for the model system. The information collection includes detailed printed schedules, maps, and copies of the route directions given to transit drivers. An average fare is calculated from the full fare pricing structure. Metro also receives and codes into a simulation network detailed engineering information for proposed light rail alternatives. In addition, Metro receives coded transit networks from the transit operator in Clark County, Washington. The staff time devoted to processing and coding transit schedule, route, and fare information varies according to the number of special studies or alternatives analyses underway.

Parking Costs

Parking costs are a prime determinant of travel behavior to the Central Business District (CBD) area in Portland. The parking costs enter mode choice models for home-based work, home-based other, and home-based college trips in the current model system. Metro staff gather parking cost data every year, building upon data collected by the City of Portland. Metro calculates an average daily parking cost, based on monthly rates at a sample of parking garages and lots open to the public. On-street parking costs are not collected since the limited amount of on-street parking that is available is short term. The main purpose of the parking cost data is to develop a representative out-of-pocket cost paid by commuters to CBD areas and to acquire historical data for trend analysis.

The City of Portland's Parking Patrol Division gathered parking cost data between 1983 and 1985. Data were collected for the different parking zones or patrol beats in the CBD. Average daily costs at each site were weighted by the number of spaces to produce aggregate parking cost averages for two districts. Metro staff later converted these data to constant 1985 dollars using the appropriate Consumer Price Index (CPI) figures.

The City of Portland's Office of Transportation also collected parking cost data in 1987 and 1990 for a grid system of eleven zones in the CBD. Extensive detailed information, including rate structures, were collected for every garage and lot for a total of about 43,000 spaces. From these data, Metro staff selected a sample of approximately half the total parking spaces to calculate average monthly and daily parking costs. Sample sites were carefully selected as the basis for future parking data collection to be conducted by

Metro. The sample included only sites for which 1987 and 1990 data were available. A key consideration in setting the sample size was the amount of effort required to acquire, tabulate and analyze the data on an ongoing basis. Ultimately, 25 sample sites were designated.

Starting in 1991, Metro staff have collected parking cost data for the sample sites via telephone over a three day period every May. While the City of Portland periodically collects its own detailed parking data, Metro no longer acquires this detailed information. Collecting and analyzing the parking data requires 2-3 weeks of an FTE's time every year.

Auto Ownership Costs

Automobile ownership costs are divided into fixed costs such as license and registration fees and operating costs such as gas, oil, and tire wear. Automobile operating costs enter the mode choice models for home-based work and college trips in Metro's current model system. However, Metro also tracks fixed auto ownership costs as a matter of interest.

The main source for auto operating costs is an annual publication from the American Automobile Association entitled, *Your Driving Costs*. Based on data from the management consulting firm Runzheimer International, this publication provides a composite national average cost per mile based on standard vehicles and 10,000 miles per year. Metro converts the auto ownership costs to constant 1985 dollars using the appropriate Consumer Price Index figures.

Other Validation and Calibration Data

Metro also makes use of a number of commonly-available data resources in validating its transportation planning models. For example, pre-trip generation models that predict household workers, children, and auto ownership are checked against U.S. Census and Department of Motor Vehicle data. The National Personal Transportation Survey (NPTS) is used as a source to validate trip generation rates. Destination choice model outputs are compared to U.S. Census Journey-to-Work information.

Outputs from the assignment stage of the modeling process are compared to data gathered for the Highway Performance Monitoring System (HPMS). HPMS is an integrated database providing information on the extent, use, condition, performance, and operating characteristics of the nation's highways. Its development is a cooperative effort among the FHWA, state DOTs, metropolitan planning organizations, and local jurisdictions. Metro uses calculations of vehicle miles traveled (VMT) from HPMS data as a validation source of VMT estimates generated by the model system.

Metro obtains HPMS data from the Oregon Department of Transportation (ODOT). In addition to the standard HPMS data set, Metro receives permanent traffic count recorder data every month for 12 sites. The data are being collected for longitudinal studies of VMT. Metro also receives vehicle classification counts from ODOT.

Special Generator Information

Special generators are locations of regional significance which require special treatment in the trip generation step of the modeling process. Metro collects information on the Washington Zoo, Washington County Fairgrounds, World Forestry Center, Portland International Airport, major shopping centers, colleges, universities, and hospitals. The data required includes shopping center square footage, institution staff size, Portland Airport enplanement data, and weekday Zoo and Forestry Center attendance.

3.3 Travel Survey Data

This section on survey data primarily describes survey data sources used in the original 1985 model estimation and in updating the model system after construction of the LRT. Also described are the use of data from an external intercept survey and a transit on-board survey in the modeling process.

1985 Household Survey

Metro's current generation travel demand models were estimated with data collected from a 1985 household survey of about 7,000 households in the Portland and Vancouver regions. Although sponsored by Tri-Met, the objective of the survey was to gather data for developing models. Administered in May and June of 1985, trips for each household member over five years old were recorded via retrospective telephone interviews (i.e. interviewers asked respondents what they did the previous day). All household members over 15 years of age were interviewed directly.

Although data were collected for all seven days of the week, only about 4,900 households provided the weekday travel records from which Metro's current model system is estimated. The 1985 weekend data have not yet been used for model development. Metro intends to compare the 1985 weekend data to similar data from the 1994 survey (all the 1985 transit trip records and approximately half of the auto trip records were geocoded). Making meaningful comparisons between the 1985 and 1994 data sets will be complicated, however, by the different approaches taken by the two surveys. The 1985 survey, for example, likely did not capture very short trips to the same extent that the 1994 survey did.

1988 "After-MAX" Household Survey

The completion of Portland's light rail transit (LRT) line, "MAX" or "Metropolitan Area Express", in 1986 significantly changed the transportation supply in parts of the city. While the 1985-based mode choice models continued to work well in areas served only by local bus, modeled LRT forecasts differed significantly from observed passenger counts. Also, the use of park-and-ride lots at LRT stations was not well reflected. To remedy the

situation, Metro developed calibration factors for home-based work and other trips to the central business district and within the MAX corridor. These factors were based on differences between a supplemental household survey conducted in 1988 and the original raw model outputs. Other data sources provided additional model calibration and validation information. These data sources and their use are briefly described in the following sections.

Tri-Met sponsored this 1988 survey to supplement the 1985 household survey with data reflecting LRT impacts as well as changes in the economy. This and the 1985 household survey were implemented by Metro using a similar instrument and data collection method but different sampling techniques. In this case, only households on the east side of Portland and served by the LRT were contacted. Half the sample of 2,000 households was randomly chosen and half was pre-screened to include transit users (i.e. a two stage sampling process was used).

Trip variables recorded included the trip purpose from and to, transit stop on/off location, census tract of trip origin and destination, the start time of the trip, route information, and mode of access and egress for transit trips. The age, sex, and household income of respondents also were recorded. Metro noted a marked increase in the refusal rate (25 percent) compared to the 1985 survey (5 percent). This was attributed to a combination of a well-publicized increase in the crime rate and the general increase in use of telemarketing surveys. A consultant was retained for this survey at a cost of approximately $40,000.

Using these household survey data, factors were developed to adjust the 1985-based models. Factors were applied to trips from the LRT corridor to the CBD and for trips made within the LRT corridor. For example, one factor shifted transit trips with walk access to transit trips with auto access (i.e. park-and-ride) for home-based work trips to the CBD. As shown in the Table 3.1, application of factors improved the accuracy of the base year model outputs:

Table 3.1 Comparison of Total LRT Ridership (Average Weekday Boardings Excluding Intra-CBD Trips)

1989 Transit Census Survey	1987 Raw Model	1987 Survey Factored Model
16,764	12,953	15,651

Source: Metro, 1990.

1987 Park–and–Ride Lot Survey

Tri-Met measured LRT park-and-ride usage in 1987 by counting vehicles present in LRT parking lots. Metro used this information to validate original and revised model outputs. Observed lot counts were increased by 15 percent, a factor derived from the 1988 supplemental household survey to account for kiss-and-ride trips. Table 3.2 below compares

observed 1987 park-and-ride lot counts with original and revised model outputs. As shown, the factored model produced estimates of LRT park–and–ride trips which more closely matched observed parking lot counts. A consultant provided field–work assistance for this one–time effort.

Table 3.2 Comparison of Actual and Modeled Park-&-Ride Lot Usage

1987 Lot Count (plus 15% Kiss & Ride)	Original Model One-Way Park & Ride Person Trips	Survey-Factored Model One-Way Park & Ride Person Trips
1,450	544	1,496

Source: Metro, 1990.

1989 MAX Ridership Census

Tri–Met collects ridership census information for MAX every few years. The ridership census conducted by Tri-Met in April 1989 was another source of information used by Metro in the process of updating its 1985-based model system. The data collected included daily and p.m. peak hour boardings by inbound and outbound directions as well as daily and p.m. peak ons and offs for each station in the MAX LRT system. Total ridership and ridership across cutlines was compared to monthly MAX ridership estimates to further validate base year models.

External Surveys[5]

Metro relies on data from an external travel survey to model trips with origins or destinations external to the Metro model study area. This intercept survey was conducted in 1988 at external highway station locations using a license plate capture and mailback method[6]. The survey recorded the number of passengers in each vehicle, the presence of child passengers, and gender of the driver as well as trip origin, destination, length, and purpose. A consultant was used to collect the 3,393 responses.

The external survey data were used to develop trip purpose percentages for use in the trip generation step. Target volumes (forecasts) at external stations are based on a time series linear regression of historical traffic count data at those sites. The trip purpose percentages derived from the external survey are then applied. These percentages also enter the

[5]See Chapter 7.0 in the *Travel Survey Manual* for more information on external station surveys.

[6]This method is described in Section 7.2 of the *Travel Survey Manual.*

destination choice step for trips with external origins and destinations. In the future, Metro may acquire updated external station information from upcoming external surveys to be conducted by ODOT.

1988 Transit On-board Origin-Destination Survey[7]

Tri-Met periodically conducts on-board surveys of transit users, the most recent being conducted in the spring of 1988. Mail–back questionnaires were distributed to the population of transit users by sampling transit routes by time of day. The information collected via mail-back questionnaires included trip origin, boarding point, transfer activity, alighting point, and final trip destination as well as access and egress modes, trip start times, age, gender, and household income. This survey cost approximately $110,000, with $100,000 for consultant fieldwork and $10,000 for data entry. The survey data have been used by Tri–Met as a source for a variety of ad–hoc, in–house analyses such as demographic profiles. Metro has used the transit on–board data for validation of transit access mode choice.

3.4 Resources Required

The planning budget at Metro has ranged from $12.9 to $13.8 million over the fiscal years 1993 to 1995, allocated as shown in Table 3.3. For the fiscal year 1995, Metro had a staff of 78 planners and a budget of $13.4 million dedicated to management and completion of its transportation and land use planning activities.[8] These figures include staff costs, computer equipment, consultant fees, and other overhead.

The work of a typical MPO represents about $5-6 million of Metro's budget. Travel demand forecasting, regional transportation planning and about half the resources devoted to the Data Resource Center and administration correspond to more typical MPO budgets and responsibilities. In addition to these activities, Metro funds environmental work, and land use planning activities typically performed by agencies outside of an MPO.

Of the 78 staff in the planning division, 25 work with transportation data and on travel demand modeling. In addition to staff resources, there is also an investment in computer hardware, which Metro rolls over every three years, including two Unix-based workstation systems and substantial data storage capacity.

[7] See Chapter 8.0 in the *Travel Survey Manual* for more information on transit on-board surveys.

[8] Consultant costs for the 1994-95 Household Activity and Travel Behavior Survey were spread over fiscal years 1994 and 1995 in the travel demand forecasting budget.

Table 3.3 Metro Planning Department Resources and Budget

Activity	Annual Budget ($000s)		
	FY 1993	FY 1994[1]	FY 1995[1]
Data Resources Center (17 staff)	$2.200	$1.346	$1.325
Administration	$0.970	$0.521	$0.898
Travel demand forecasting	$1.400	$1.929	$1.470
Regional transportation planning	$1.800	$1.866	$2.050
High capacity transit projects (light rail)	$5.000	$3.404	$4.362
Growth management (12 staff)	$2.400	$3.901	$3.270
Total	$13.770	$12.967	$13.375

Note: [1]Household Activity and Travel Behavior Survey

Source: Metro, 1995

The Metro transportation and land use models and databases are available to all local and regional jurisdictions, including the transit service provider, Tri-Met, and the Southwest Washington Regional Transportation Commission. Currently, data resources (i.e. RLIS) are funded by local subscriptions and a portion of the state excise tax. In the future, the RLIS program will be mostly funded by local subscriptions and user fees. Local subscribers, which may include the local jurisdictions or other parties, will become co-owners of the data and subscription fees will include a retainage for analysis and map production. Metro will also maintain a walk-up counter, funded by user fees, for individual data and mapping requests.

4.0 Recommendations and Conclusions

4.0 Recommendations and Conclusions

The data activities undertaken by Portland Metro illustrate one agency's approach to the collection and processing of land use, household, and transportation data that are desirable to support a contemporary transportation planning process. As increased emphasis is placed on multimodal considerations, intermodal connectivity, the efficient utilization of existing transportation infrastructure, and the interrelationships between transportation and land use; corresponding changes in the data used to support a travel demand model system also are appropriate. Data collected by a variety of local, regional, and state agencies can be assembled into a larger coordinated and comprehensive database. Information on individual activity patterns and preferences can be used to forecast consumer response to a broad base of policy and market-based measures.

This examination of data collection at Portland Metro illustrates both the breadth and depth of information needed to support a modern travel demand forecasting system. Data sources which support the model system range from traditional traffic counts and transit patronage to innovative stated preference data. A number of lessons and recommendations can be drawn from Portland Metro's data collection experience. Some of these pertain specifically to household surveys. Others relate to data collection in general.

4.1 Household Travel Survey Recommendations

1. The structure of an existing model system should not necessarily dictate the design of data collection efforts. Metro recommends that jurisdictions acquire as much data as they can possibly afford and more than is currently required. In the same vein, maximum data should be obtained for the dollars expended. Metro's 1994 Household Activity and Travel Behavior Survey was designed to handle anything from traditional trip-based modeling to activity duration modeling. The flexibility and quality of the collected data are key. Of course, it is important to keep in mind that the ultimate measure of the success of Portland's household survey will be the quality of the travel models that are developed from the data.

2. In developing models from household survey data, the importance of exploring the data should not be overlooked. For instance, preliminary analysis of the 1994 data has revealed that accessibility is more important than parking cost in explaining trip chaining. This result emphasizes the need to avoid pre-conceived model structures and specifications and to not let existing models dictate data collection.

3. Training of the interviewing personnel is critical. Because surveys are becoming increasingly difficult to administer, polite and well-trained interviewers can make a significant difference in response rates. Also, it would be desirable to use survey personnel who are local or familiar with the area if possible. The survey firm that administered Metro's 1994 survey is based in Austin, Texas. Metro received negative feedback from survey respondents who were put off by the interviewers' lack of local knowledge. For example, interviewers had to ask for the location of the Lloyd Center, a popular shopping location, when retrieving activity data. This lack of local knowledge could conceivably contribute to lower participation rates or inaccurate data retrieval. Ultimately, however, it may be difficult in most areas to find interviewers who are both local and well trained in transportation surveys.

4. The exact wording of interview scripts and survey questions can have a significant effect on response and participation rates and should be refined with pretest results. Metro found that shorter interview introductions are preferable to longer ones. Also, the income question is quite sensitive. This question should be asked last to avoid abrupt termination of interviews.

5. Collecting flexible survey data does not necessarily cost much more than collecting limited data. Metro's cost per survey was in the range of $135 per completed household. Given that $100 per household is a typical cost for a one day survey and that Metro estimated about a 30 percent cost increase due to a two day format, Metro's costs were in line with experience in other areas.

4.2 General Recommendations

1. The use of GIS in the travel demand modeling process helps coordinate land use and transportation planning. Metro's travel demand modeling group obtains forecasts of household categories and employment from its own Data Resource Center. These forecasts are based on inventories of developable land stored in the GIS and consistent with regional land use policy. Strengthened links between the GIS and the travel demand model system will allow planners to reflect land use policy (changes in densities, etc.) with increasing accuracy and ease.

2. Careful planning of some types of household surveys can reduce or eliminate the need for other types of surveys. For example, Metro does not believe that a new transit onboard survey will be needed to estimate models using the 1994 household survey because that survey was designed to ensure a sufficient sample of transit trips.

3. Inter-agency coordination can greatly enhance the quality and quantity of data available in a given region. For example, Tri-Met commissioned a stated preference survey on transit-related subjects as part of the overall 1994 survey effort. Also, the 1994 household survey was administered simultaneously in several MPOs. This arrangement resulted in economies of scale while allowing different jurisdictions and agencies to pay for customized data. At the same time, Metro's efforts to coordinate

collection of traffic count data point out the difficulties of inter-agency coordination. Nonetheless, there is much to be gained from improved inter-agency coordination in data collection in most regions.

4. Plans for major new data collection efforts should be carefully thought through so as not to waste what may be a rare opportunity since survey administration is becoming increasingly difficult due to privacy and security concerns. Metro staff members feel that it would not be feasible to repeat a survey similar to the 1994 Household Activity and Travel Behavior Survey in the next few years.

5. Results from major data collection efforts can be updated with smaller, focused supplemental surveys. This principal was illustrated by Metro's use of the 1988 "After-MAX" Household Survey to update the travel models estimated from 1985 household survey data.

4.3 Conclusions

The Portland area provides an example of a successful data collection program for transportation planning and travel demand modeling. The program is designed to provide the specific data needed for the planning and modeling efforts and provides a level of detail that is not often found in U.S. urban areas. While as this report is being prepared travel demand models have not yet been developed from the 1994 survey data, the earlier data collection efforts, which focused around the 1985 household survey, produced a travel model system often cited as one of the most innovative in the U.S.

Besides the high quality household survey efforts, another feature of the Portland area data collection program that stands out is the level of effort devoted to, and the corresponding high quality outputs of, the demographic and land use data development process. In particular, the use of GIS has produced detailed data that are more precise than commonly available in U.S. urban areas.

When assessing the transferability of Portland Metro experience, it is important to recognize the region's special characteristics. First, the region served by Portland Metro is a relatively small and highly cohesive metropolitan area. The success of the 1994 survey may be partly attributed to this factor. Second, the Portland area is viewed by many to be a relatively progressive area. As such, it may be easier to obtain cooperation from individuals for participation in what can be perceived as time-consuming and intrusive survey research efforts. Finally, Metro is one of the few Metropolitan Planning Organizations with the legal mandate and resources to put the philosophy of integrated land use and transportation planning into practice. This situation contributes to the impressive array of geographic data collected by Metro and the advanced use of environmental factors in its models. This effort is made possible by the high level of resources devoted by Metro to these activities.

Other jurisdictions clearly can benefit from the Metro experience in a number of ways. GIS technology is becoming more affordable and accessible and can provide a spatial framework for organizing related land use, demographic, employment, and transportation data. Improved cooperation among different agencies and jurisdictions in regions can enhance the quality and quantity of transportation data. Finally, very careful planning of data collection programs, in particular major household survey efforts will conserve scarce data collection resources and ensure that the data can meet a variety of needs.

There are a few cautionary points that should be made when considering the applicability of Portland's data collection program to other areas. The first is the issue of resources. Many areas have fewer available staff and financial resources available for detailed data analysis, especially in the areas of household travel surveys and GIS. While consultants could, to some extent, help with the issue of staff expertise, the budget issue must be dealt with by every agency. A second issue is that some data collection efforts, especially the household survey, can place a heavy burden on respondents in terms of both time commitment and willingness to reveal what some might consider private information. Not only might potential respondents in some areas be less willing to make the necessary commitment, but the political will needed to oversee such efforts might not exist. This may be particularly true in areas where decision makers are not familiar with transportation planning and modeling needs.

In summary, answers to today's policy questions require the breadth and depth of data collected by Metro. While some jurisdictions may not be able to perform all aspects of Portland's program at the same level, Metro's program of data collection and transportation modeling offers much to be emulated.

Appendix A

Household Activity and Travel Behavior Survey Request for Proposals – Scope of Work

HOUSEHOLD ACTIVITY AND TRAVEL BEHAVIOR SURVEY:

REQUEST FOR PROPOSAL
November 15, 1993

Metro in association with the Southwest Washington Regional Transportation Council, Mid-Willamette Valley Council of Governments, Lane Council of Governments, Rogue Valley Council of Governments and the Oregon Department of Transportation.

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1. INVITATION

To propose the conduct of a major activity, travel behavior and time use survey in the major metropolitan areas of the Willamette Valley and Southwest Washington and to field the survey(s). To design and test the survey instruments, with the help of the client(s) and an expert panel of transportation and activity researchers.

This project will involve a two day survey of daily activities and travel of all members of the household for approximately 10,000 households, dependent on the final per-household cost and the limitations of the available budget. This is the revealed preference or revealed behavior portion of the study.

The project will also involve the re-contact of each household to administer a custom stated preference survey, usually to one family member only, with 6 to 10 subset samples being drawn to explore the probable effect of specific transportation or land use policy or infrastructure investment options. These exploratory instruments will address the probable behavioral effects of actions which are outside the current experience of the respondents and which cannot be analyzed using revealed behavior. Examples are congestion pricing, widespread parking pricing, road and vehicle pricing, non-priced transportation control measures, neo-traditional urban design (pedestrian and transit supportive), bicycle paths, ubiquitous pedestrian accessibility, demand responsive transit and high speed inter-city rail.

2. PROJECT SCOPE:

A. Revealed Preference Survey Questionnaire: Fine tune design and layout prepared by client, there will be two basically different designs to pretest with response rate being important in the final choice. Pretest, choose and redesign.

B. Stated Preference Questionnaires: There will be four to ten "attitudinal" questions to be probed. These will be mailed out in a second wave to the original respondents, each respondent will get only one SP instrument for which the sample size will be of the order of 500. Which respondent gets which questionnaire will be determined by responses or situational variables uncovered in the RP response and by their willingness to be re-contacted. For example respondents with activities in areas where parking charges are levied will be probed for both perceived/actual costs and for response to cost or availability changes. Each of the SP instruments may be customized and the responses must be linked to the actual instrument used for orderly reassembly.

C. Callbacks/Re-contacts: Each sample must be re-contacted at least six times, on different days in the event of no contact/no one at home, before a replacement household is drawn.

D. Survey Retrieval: Mail-back with telephone backup where necessary.

E. Portland Metro Coverage: Clackamas, Clark, Columbia, Multnomah, Washington and Yamhill counties should form the basis for sampling.

F. Other MPO area Coverages: Lane, Marion and Jackson counties.

G. Geocoding: All households, workplaces defined by these households, and location of each of the out of home activities will be digitized to local map coordinates, by another group. This is particularly important for distance sensitive trips such as walk access to transit, walk and bicycle trips. It is important therefore that locations of activities be given adequate address description to identify the location to within 200 feet (one downtown city block). Please address this in your response.

H. Survey records/coding: For the purposes of supervision, control and response check-coding, surveys must be made available in hard copy. If a CATI system is used, this will still be necessary. Respondents must be explicit about their quality control measures as a part of the response.

l. Respondents must detail their proposed scheme to maximize the number of responses from the initially chosen sample. They must include the expected costs of over sampling and measures to maximize response.

3. SURVEY PURPOSE

The purpose of the survey is to provide information suitable for gaining an in-depth understanding of activity and travel behavior of households and individuals within the households. This data must be sufficient to form the basis for a robust and rigorously developed set of activity/travel behavior models with which to conduct policy analysis and forecast future travel under a variety of scenarios. It is proposed to do a combination of revealed and stated preference (or choice). It must be emphasized that this survey is not being fielded to get descriptive statistics for which a random sample would be needed, but to investigate and understand travel behavior.

4. MODEL BUILDING OBJECTIVES

The objectives for the models are essentially driven by the new ISTEA and CAAA requirements as well as the Oregon Land Conservation and Development Commission's Administrative Rule for Goal 12 of the State Land Use Laws, which requires a reduction in VMT per capita for long range planning.

In the long term, there is a need to consider personal trip-making as a whole in response to daily household activity needs, the constraints of time and income for the individuals within it and the disposition of shared resources. This means a paradigm of travel modeling that is different from the 4-step process established 40 years ago. In the short term the data will be used to enhance the 4-step process and need to make it as responsive possible (either through nested or iterative models, or a combination). The data gathered in a large behavioral survey of usually have a 10- to 15-year life, it is important therefore that both short and long term needs be considered in the design and conduct of this survey.

In particular, the survey will have to be designed with at least eight modeling objectives:

4.1. Conventional Models:

Estimate conventional "4-step" disaggregate models.

4.2. Urban Environment:

Respond to differences in the local urban environment, including design for street

and pedestrian continuity, heterogeneity of land use, and schemes referred to as neo-traditional.

4.3. Activity Substitution:

Respond to the needs to address substitution of in-home activities for activities requiring travel, this leads to the need for the ability to respond to the direct modeling of the activities of each member of the household.

4.4. Walk and Bicycle:

Respond to the need to consider substitution of pedestrian (walk and bicycle) modes for motorized modes in response to changes in household situation (e.g., socio-demographic, economic, pedestrian environment/design, provision of bicycling facilities, heterogeneity of land use).

4.5. Trip Chains:

Respond to the need to explicitly estimate travel in linked trip chains, and the identify the factors that affect this phenomenon. The link between this phenomenon, congestion and modal choice needs to be developed.

4.6. Household Location:

Respond to the question of household location choice and its links with car ownership and choice of mode for various activities. This as affected by socio-demographic changes of the household (life cycle, changes in structure, new household formation), and the exogenous effects of transport cost changes and travel time effects (e.g., from increasing congestion).

4.7. Car Ownership:

Car ownership/acquisition/disposition models as affected by mobility/congestion, road and fuel pricing, and cost of acquisition.

4.8. Car Utilization:

Differential utilization of the cars held by the household (air quality and fuel use issues).

4.9. Travel Demand Management:

There is a need to introduce, as far as is possible, quantitative methods to respond to Travel Demand Management (TDM) actions such as road pricing, congestion pricing, and parking supply control. Issues of the effect of urban design and the

provision of positive pedestrian and bicycle use environments will also need to be addressed by the models.

5. GEOGRAPHIC EXTENT

This request for proposals is for the design and fielding of a survey of household activity and travel for four Metropolitan Planning Organizations (MPOs) within Oregon and one in the state of Washington. The Portland, Oregon -Vancouver, Washington metropolitan area (Metro and Southwest Washington RTC), which has a population of 1.5 million requires a single instrument, while the other three areas, 100,000 to 200,000 population each, may require customized versions of the same instrument. There are many similarities in the basic needs of each of the areas, all of which will use the survey as a major input to the development of travel models which need to reproduce the complex multi-modal choice-based travel behavior of individuals in households. There is also an intent to combine the survey data from each of the MPO areas to the greatest extent possible and thereby increase the representation of rare cases (e.g. bicycle travel for work, personal business and recreation). The funding dictates that the three smaller metropolitan areas will require pooled data and a common model set.

6. SAMPLE SIZE AND CHOICE

6.1. Estimated Sample Size:

The total sample size is expected to include 9,000 -13,000 households with a Portland area range of 5,500 - 7,500 and the balance of the study areas between 3,500 - 5,500 in aggregate (equally taken from each).

6.2. Sampling Method:

Sampling should be conducted primarily by phone number, taking account of unlisted numbers and mechanisms to include people who do not have phone numbers. *Each MPO is to provide statistics on non-phone owning households for its area.*

6.3. Sample Stratification:

The sampling strategy will be a stratified sample based on 8 to 10 location categories of the immediate environment or situation, such as: traditional mixed use neighborhoods, households with immediate environments that have good pedestrian and bicycle infrastructure, households with good transit environments, and households that have only an auto infrastructure. There is also the need to deal with ex urban location, particularly in the Salem (Mid-Willamette) and Portland areas where satellite cities exist which will be affected by urban growth management and urban growth boundaries in the central part of the metropolis.

Universities that are primarily residential should be included as a geographical stratum. The intention is to be able to evaluate different household and travel environments for a range of socio-economic and life-cycle households with a multivariate technique that essentially controls for effects of life cycle and socio-economic classification. This procedure will be aimed at getting a reasonable number of cases of households that use transit, and households that use non motorized means of travel through a random sample in each of the target locations. This will of necessity lead to a relatively higher sample within the central urban areas than in the more numerous auto captive areas. In Portland it will be necessary to enrich the sample for park and ride usage by sampling households from an intercept at the lots. It may also be necessary to enrich the transit-using households by identifying riders as a sample frame for Eugene and Salem and the Clark County part of the Portland Region.

6.3.1. Location Categories Draft List:

1. Inner urban with good ped/bike/transit.
2 Urban - significant heterogeneity of use.
3. Outer urban with poor ped/bike/transit.
4. Light Rail accessible (Portland).
5. Suburban - some ped/bike/transit.
6. Suburban - no ped/bike/transit.
7. Ex urban - rural.
8. Satellite city.
9. University residence.

Not all categories will be found in each MPO area.

Sampling need not be stratified by household life cycle stages.

6.4. Transit User Subsample:

The sample will need enrichment by a transit user subsample in the Clark County (Washington) portion of the Portland area, and the Salem and Eugene areas. It is probable that 400 to 600 transit using households will need to be identified from a random sampling of riders in each area, with the aim of obtaining 300 to 400 completed household surveys from this group. The same will be true for a park and ride lot user subsample in the Oregon portion of the Portland area. The transit using subsample shall complete the same survey instrument as the main household sample.

6.5. Household Definition:

The household should be defined as follows: "all people currently living with you in the same dwelling who typically share meals together as well as share at least part

of their income." This definition would define roommates, who only share expenses, or children away at college, as separate households.

6.6. Completed Household Response Definition:

Completed household response will be defined as completed travel diaries for all persons, for all days of the implied survey.

6.7. Household Mode Definition:

Transit, pedestrian or bicycle using household means: any household that had any trips by these modes for either of the survey days.

7. PROPOSED SURVEY METHODOLOGY

The following is a guide to clarify our intent, proposers are at liberty to expand upon this proposal or to suggest a different methodology which will accomplish the objectives.

Draw a random digit dialing sample for specific prefixes covering areas selected for stratification. Obtain addresses from a reverse directory for those listed. Geocode (client or client's contractor) and choose initial sample based on actual location. Determine the percentage of locational "hits" for each prefix.

Using the above hit rate as a guide, recruit unlisted households or ones without known addresses. The recruitment of unlisted households will require address information. Geocode recruited unlisted households (client or clients contractor) and choose initial sample based on location.

Mail introductory letters to all randomly selected telephone numbers with known addresses.

Conduct phone recruitment within two days of expected receipt of introductory mailing; socio-demographic information should be obtained at initial contact as well as limited travel information to set the tone for the survey and to provide data to correct for non-response bias.

Households not using telephone services should be identified. STF3 block group data may be used to target neighborhoods with low phone ownership. Additionally, Non-phone-using households may be recruited by asking households if another household shares their phone.

The publicity plan should be addressed by the contractor (e.g., contact public safety officials, radio stations, and other points of contact to inform them that the

survey is taking place). A "1-800" number should be provided for return calls from households with answering machines as well as to verify survey authenticity.

Call-backs should amount to at least six calls before drawing a replacement sample.

Survey diaries should be mailed to respondents at preferred address prior to assigned travel days and returned by mail. Follow up phone calls and mail-out reminders should be used to elicit response.

Activity and travel diaries should be completed for all members of the household.

The activity and travel diaries will be for two consecutive days, equally distributed over the seven day week.

An appropriate incentive to improve response rate may be used (e.g., cash (Puget Sound used a new $2 bill), basketball tickets, lottery tickets etc.). To be tested during the pretest.

8. SURVEY INSTRUMENT(S)

8.1. Activity Diary (Revealed Preference):

Survey diary should focus on activities. Open descriptions of activities should be elicited from individuals and subsequently coded.

A question should be asked whether the survey respondents are willing to participate in a follow-up questionnaire (a stated preference survey).

A pretest survey should include a focus group which examines alternative survey instrument formats (e.g., single sheet versus booklet).

Contractor should address item non-response (e.g., on income, vehicle ownership levels, household life cycle stage). Household income should be addressed in initial phone contact as well as in the mail out survey.

8.2. Stated Preference/Choice:

Stated preference surveys will be administered to sub samples defined on the basis of existing residential location and travel patterns. These mail out surveys will be customized based on the information previously collected and may be retrieved by mail back or phone, to be specified in the proposal and during the design phase. These surveys should include the following issues: residential location design characteristics, non-traditional transit improvements (e.g. demand

responsive transit) and new technology, parking availability and cost, road pricing and tolls, issues of telecommuting and flexible work schedules, and the possible effects of the provision of bicycle path/route infrastructure.

Previous SP studies of traveler behavior (refs.) have shown that customized SP choice designs are effective in eliciting realistic responses and provide data that can be analyzed in a variety of ways. In such choice designs respondents are asked to choose one alternative from a set of two (preferably more) alternatives; each alternative is defined in terms of levels of attributes according to an experimental design. Alternative specification will be provided to the contractor. Due to customization and experimental design considerations, it may be anticipated that a respondent from each household will receive a unique SP survey.

9. DATA ENTRY

All information obtained from the survey shall be coded and entered on electronic medium. Address/location information to be entered in full with careful supervision and editing to ensure completeness for later geocoding.

Forms received shall be coded and entered within 24 hours of receipt. Checking for completeness, consistency and accuracy shall be complete within 48 hours of receipt. This will be necessary in order to complete geocoding and prepare the stated preference mail-out within two weeks of receipt.

The task of designing the editing and consistency checks is the responsibility of the proposer, subject to review and approval by the client.

Geocoding of household and activity locations to map coordinates (i.e., lat/long) will be completed by separate contract, probably using the client's GIS facilities.

Data entry for the SP will include a record of responses together with specification of the customized design.

10. TIME FRAME

It is our intention to let the contract by January 1, 1993.

The instrument design, sampling strategy and method, and finalization of the survey conduct will take place during January - February of 1994. This will entail close cooperation with the client and an expert panel that will be in place by January.

The revealed preference survey must be fielded during March through May and be completed before the schools break for summer.

The stated preference surveys may be lagged by one month, so that there will be overlap between the two survey phases.

The survey will be implemented prior to the spring of 1994 and will take at least 3 months to collect data. The SP can spill into the early summer.

Deliverable (i.e., clean) data files should be available three months after completion of survey.

11. SURVEY CONTENT (Revealed Preference Portion)

A. Household data

Number of persons in household
Dwelling/structure unit type
Length of residence at present address
Previous residence address
Owner/renter tenure
Household income
Household location
Person roster
Vehicle roster (i.e., cars, trucks, bikes) in phone contact
Detailed vehicle information (mail out)
Number of phone lines at household

B. Person Data

Name and relationship to head of household
Gender, age
Driver's license
Employment status (allow multiple responses)
School status (allow multiple resdponses)

Location of work and school place(s)
Mode to work (usual/previous week)
Mode to School (usual/previous week)
Disability (open ended)
Occupation of worker - open ended - code to SOC.
Industry of worker - open ended - code to SIC.
Duration of current employment
Previous employment location

C. Activity and travel data (for each person)

Activity type (includes major in-home activities)(open ended collection)
Activity location
Time start/finish
Travel to Activity? - Yes go to travel description, no go to next activity.
Estimated duration of travel
Perceived cost of parking at activity
Means of travel (All modes including bike and walk)

Car: Driver/rider
Carpool
Number of people in vehicle
Actual cost of parking (note subsidy via employer or purchase)
Vehicle used (if from household)

Transit: Mode of access/ location of access
Line(s) used (open ended)
Transfer locations (open ended)
Mode of egress/ location of egress
Transit fare/type

12. QUALIFICATIONS:

The proposer will have to meet the following basic requirements in terms of experience and skills.

12.1. Experience:

12.1.1. Revealed Preference:

Have demonstrated experience in fielding multi-day travel diaries, household activity diaries (for all members of the household) or time use surveys. Experience with fielding multi-wave panel surveys will be an added recommendation.

12.1.2. Stated Preference:

Have knowledge and experience in fielding sophisticated stated preference and/or stated choice surveys. This would include respondent customization and question rotation.

12.2. Resources/Capability:

The proposer(s) must be prepared to demonstrate their ability to complete a fielding project of this size in the time specified.

13. ESTIMATED COST

Cost estimates must be broken down by the basic project phases. There are two basic classifications, but a breakdown below this level to tasks will be required:

A. Instrument development and design, including determining the sampling technique and preparation for the survey.

B. Survey fielding, retrieval, checking and coding.

It is the intention at present, to choose the contractor as a group of MPOs. The contract will at that point be broken up into 5 contracts with the legal contracts for each MPO being entered into. The development costs will at that stage be pro-rated (based on sample size) to each of the participants, in essence as a per completed household overhead rate. In the event that any one of the participants withdraws at that stage, it is important that there is a mechanism for re-allocating the shared development costs.

14. PROJECT RESOURCES:

A. Metro: approximately $550,000
B. State of Oregon (Statewide) approximately $ 500,000
C. Southwest Washington RTC approximately $ 200,000

Appendix B

CATI Recruitment Questionnaire (Revised Version)

OREGON CATI QUESTIONNAIRE VERSION #2

QA. INTRODUCTION

PHONE NUMBER: [SHOWN] TIME ZONE: [SHOWN]
MARKET DIALED: [SHOWN]

"Hello, my name is (NAME OF INTERVIEWER), and I am calling on behalf of (NAME OF AGENCY).

"May I please speak to the female/male head of the house?"

IF NECESSARY, REINTRODUCE YOURSELF AND VERIFY: "Just to check, are you the female/male head of the house?"

"Today I'm getting information for a study about transportation. As you may have seen in the news recently, the (NAME OF AGENCY) is conducting a very important study to help plan for your area's long-term transportation and air quality needs. As a part of this study, we are interviewing thousands of households in the (MARKET) area, and your household has been selected to participate."

1 HAVE FHH--SKIP TO QE
2 HAVE MHH--SKIP TO QE
3 FHH OR MHH NOT AVAILABLE--GO TO STATUS SCREEN QB

QB. STATUS SCREEN

RECORD THE STATUS OF PHONE NUMBER

REASON TO CALL BACK

1 NO ANSWER
2 BUSY
3 CALLBACK SCHEDULED
4 ANSWERING MACHINE

REASON NOT TO CALL BACK

5 DISCONNECTED NUMBER
7 DEAF/LANGUAGE
8 BUSINESS/GOVERNMENT
9 OUT OF AREA
10 SECOND REFUSAL

SUPERVISOR HANDLING
6 FIRST REFUSAL
19 MID-TERM

IF '3' AT QB, ASK QC; ELSE DIAL NEXT NUMBER

QC KNOW WHEN AVAILABLE?

"Do you know when would be a better time to call you/her/him?"

1 YES
2 NO

IF '1' AT QC, ASK QD; ELSE DIAL NEXT NUMBER

QD SCHEDULE CALL BACK TIME

ARRANGE A TIME TO CALL THE RESPONDENT AGAIN AND RECORD IT BELOW

QE RECRUITMENT LEAD-IN

"Your participation is very important. Let me describe what's involved. I need to ask you and all persons in your household to keep track of your local trips for a couple of days. We will be mailing you a packet of materials, which will include diaries and instructions. Your household will be assigned 2 specific days for which each person should record activities and trips using the diaries we provide. Then, I will call you to collect this information."

"So that we can prepare your household's diaries, I need to ask you for some background information."

Q 1 HOUSEHOLD SIZE

"First, including yourself, how many people are currently living in your household?

(SELECT ONLY ONE. DO NOT READ LIST)

1 ONE
2 TWO
3 THREE
4 FOUR
5 FIVE
6 SIX
7 SEVEN OR MORE
9 DK/REFUSE

Q 2 # OF SEPARATE PHONE LINES

"How many separate phone numbers are connected to your house and used for talking?"

(SELECT ONLY ONE. DO NOT READ LIST)

1 ONE
2 TWO
3 THREE
4 FOUR OR MORE
9 DK/REFUSE

Q 3 SHARE PHONE LINE?

"Does your household share a phone line with another household?"

(SELECT ONLY ONE. DO NOT READ LIST)

1 YES
2 NO
9 DK/REFUSE

Q 4 # OF CAR/CELLULAR PHONES

"How many functioning car phones or cellular phones are owned by the household?"

(SELECT ONLY ONE. DO NOT READ LIST)

0 NONE
1 ONE
2 TWO
3 THREE OR MORE
9 DK/ REFUSE

Q 5 # OF HOUSEHOLD VEHICLES

"How many vehicles, including cars, trucks, vans, and motorcycles, are available for use by you and other members of your household? Please include company cars and rental vehicles that are available for use by you and other members of your household."

(SELECT ONLY ONE. DO NOT READ LIST)

0 NONE
1 ONE
2 TWO
3 THREE
4 FOUR
5 FIVE
6 SIX
7 SEVEN
8 EIGHT OR MORE
9 DK/REFUSE

Q 6 OWN/BUY/RENT HOME

"Do you own, are you buying or do you rent your home?"

(SELECT ONLY ONE. DO NOT READ LIST)

1 OWN/BUYING
2 RENT
9 DK/REFUSE

Q 7 LENGTH OF RESIDENCE--CURRENT HOME

"How long have you lived in your current home?"

IF NECESSARY, READ CATEGORIES. SELECT ONLY ONE.)

1 LESS THAN 6 MONTHS
2 MORE THAN 6 MONTHS, BUT LESS THAN 1 YEAR
3 1 YEAR TO 5 YEARS (12 MONTHS TO 60 MONTHS)
4 MORE THAN 5 YEARS BUT LESS THAN 10 YEARS
5 10 YEARS TO 20 YEARS

6 MORE THAN 20 YEARS
9 DK/REFUSE (DO NOT READ)

Q 8 TYPE OF DWELLING

"In what type of dwelling do you live? Do you live in a: (READ LIST)?"

(SELECT ONLY ONE.)

1 SINGLE FAMILY HOME/ATTACHED OR DETACHED
2 APARTMENT
3 HOTEL
4 MOBILE HOME OR TRAILER, OR
5 IN SOME OTHER TYPE OF DWELLING
9 DK/REFUSE (DO NOT READ)

ASK Q 9 FOR LISTED SAMPLE ONLY; ALL OTHER SAMPLE SKIP TO Q 10

Q 9 ADDRESS VERIFICATION

"Let me verify your home mailing address so I can send your activity diaries.
Is your address (READ ADDRESS):] "

STREET #	[SHOWN]
STREET NA	[SHOWN]
STREET TY	[SHOWN]
CITY	[SHOWN]
STATE	[SHOWN]
ZIP	[SHOWN]

1 ADDRESS IS IDENTICAL
2 ADDRESS IS DIFFERENT

IF '1' AT Q 9. SKIP TO Q 11; IF '2' ASK Q 9.5

Q 9.5 LISTED SAMPLE CURRENT MAILING/HOME ADDRESS

"Let me update your current home mailing address. What is your (READ EACH CATEGORY)?"

IF CATEGORY 'DOES NOT APPLY", ENTER 'NA'

P.O. BOX	_____
STREET #	_____
DIRECTION	_____
STREET NAME	_____
STREET TYPE	_____
SUITE/APT#	_____
XSTREET	_____
CITY	_____
COUNTY	_____
STATE	_____
ZIP	_____

Q 9.6 PRESS "1" IF P.O. BOX, PRESS "2" IF PHYSICAL ADDRESS

Q 10 UNLISTED SAMPLE CURRENT MAILING/HOME ADDRESS

"What is your current home mailing address?"

IF CATEGORY 'DOES NOT APPLY", ENTER 'NA'

P.O. BOX _____
STREET # _____
DIRECTION _____
STREET NAME _____
STREET TYPE _____
QUADRANT _____
SUITE/APT# _____
XSTREET _____
CITY _____
COUNTY _____
STATE _____
ZIP _____

Q 10.1 PRESS "1" IF P.O. BOX, PRESS "2" IF PHYSICAL ADDRESS

Q 10.2 GEOGRAPHIC ADDRESS FOR P.O. BOX ADDRESS

"Because your address is a P.O. Box, I also need a physical address for you. "

IF CATEGORY 'DOES NOT APPLY", ENTER 'NA'

P.O. BOX _____
STREET # _____
DIRECTION _____
STREET NAME _____
STREET TYPE _____
QUADRANT _____
SUITE/APT# _____
XSTREET _____
CITY _____
COUNTY _____
STATE _____
ZIP _____

IF '1', '2', OR '3' AT Q 7, ASK Q 11A; ELSE SKIP TO Q 12

Q 11A PREVIOUS RESIDENCE--LOCATION

"Thinking about your previous residence, did you live in the [Portland/Vancouver] [Medford] [Eugene/Springfield] [Salem] Metropolitan area?"

(SELECT ONLY ONE. DO NOT READ LIST)

1 LIVED IN AREA

2 DID NOT LIVE IN AREA
9 DK/REFUSE

IF '1' AT Q 11A, ASK Q 11B AND Q 11C;
IF '2', SKIP TO Q 11C; IF '9', SKIP TO Q 12

Q 11B PREVIOUS RESIDENCE INTERSECTION/CROSS STREETS

"As best as you can remember, what was the intersection or the nearest cross streets to your previous residence?"

IF 'DOES NOT KNOW/REMEMBER', RECORD AS "DK".

Q 11C PREVIOUS RESIDENCE CITY/STATE

"What is the name of the city and the state where you previously lived"

IF 'DOES NOT KNOW/REMEMBER', RECORD AS "DK".

CITY:
STATE:

IF '1' AT Q 1, SKIP TO Q12J; ELSE CONTINUE

Q 12A - 12H OTHER HOUSEHOLD MEMBER--FIRST NAME

"Now I would like to get some information about the rest of the people currently living in your household. Earlier you mentioned that there are (RESPONSE FROM Q 1) persons living in your household. "

IF 3 OR MORE PERSONS IN THE HOUSEHOLD AT Q 1, ASK: Q12B - Q12H;
IF 2 PERSONS IN THE HOUSEHOLD AT Q 1, ASK Q 12I

Q 12B "Let's start with the youngest person, other than yourself. What is the first name of the youngest person currently living in your household?"

IF NECESSARY, ASK: "What is his or her first name initial?"

Q 12C "What is the first name of the next youngest person currently living in your household?

IF NECESSARY, ASK: "What is his or her first name initial?"

ASK Q 12D - 12H FOR EACH PERSON MENTIONED AT Q 1, NOT INCLUDING
THE RESPONDENT OR THE PERSON MENTIONED AT Q 12B OR Q 12C

Q 12D - Q 12H "What is the first name of the next person currently living in your household"

IF NECESSARY, ASK: "What is his or her first name initial?"

Q 12I "What is the first name of the other person currently living in your household?"

IF NECESSARY, ASK: "What is his or her first name initial?"

Q 12J "And what is your first name?"

IF NECESSARY, ASK: "What is your first name initial?"

Q 13-55 SERIES SHOULD BE ASKED FOR ALL OTHER PERSONS IN THE HOUSEHOLD. THE ENTIRE SERIES WILL BE ASKED OF EACH PERSON BEFORE GOING TO THE NEXT PERSON. IF '1' AT Q1. SKIP TO Q56.

Q 13A - 13F OTHER HOUSEHOLD MEMBER--RELATION

"Now let me ask you a few questions about (NAME OF OTHER PERSON 1/2/3/ETC.). What is his/her relation to you?"

(SELECT ONLY ONE. DO NOT READ LIST)

1 HUSBAND/WIFE/UNMARRIED PARTNER
2 MOTHER/FATHER/INLAW
3 BROTHER/SISTER
4 GRANDFATHER/GRANDMOTHER
5 SON/DAUGHTER
6 AUNT/UNCLE
7 OTHER
9 DK/REFUSE

Q 14A - 14F OTHER HOUSEHOLD MEMBER--GENDER

"Is (NAME OF OTHER PERSON 1) male or female?"

(SELECT ONLY ONE. DO NOT READ LIST)

1 Male
2 Female

Q 15A - 15F OTHER HOUSEHOLD MEMBER--AGE

"How old is (NAME OF OTHER PERSON 1)?"

(SELECT ONLY ONE. DO NOT READ LIST)

IF 'DK/REFUSE' RECORD AS '99'

ASK Q 15.5A - 15.5F IF '99' AT CORRESPONDING Q 15A - 15F; ELSE SKIP TO Q 29

Q 15.5A - 15.5F OTHER HOUSEHOLD MEMBER--OLDER/YOUNGER THAN 16

"Is (NAME OF OTHER PERSON 1) 16 years of age or older or is he/she less than 16 years old?"

(SELECT ONLY ONE. DO NOT READ LIST)

1 SIXTEEN OR OLDER
2 LESS THAN SIXTEEN
9 DK/REFUSE

Q 29A - 29F OTHER HOUSEHOLD MEMBER--RACE/ETHNICITY

"What is (NAME OF OTHER PERSON 1)'s race or ethnicity? That is, is he/she . . (READ LIST)"

(SELECT ONLY ONE. READ LIST)

1 WHITE/CAUCASIAN
2 BLACK/AFRICAN AMERICAN
3 HISPANIC/MEXICAN AMERICAN
4 ASIAN/PACIFIC ISLANDER
5 NATIVE AMERICAN, OR
6 OTHER
9 DK/REFUSE (DO NOT READ)

Q 30A - 30F OTHER HOUSEHOLD MEMBER--SPEAK OTHER LANGUAGE?

"Does (NAME OF OTHER PERSON 1) speak a language other than English at home?

(SELECT ONLY ONE. DO NOT READ LIST)

1 YES
2 NO--SKIP TO Q 32
9 DK/REFUSE--SKIP TO Q 32

Q 31A - 31F OTHER HOUSEHOLD MEMBER--OTHER LANGUAGE SPOKEN

What other language does he/she speak?"

1 SPANISH
2 ITALIAN
3 POLISH
4 CHINESE (CANTONESE/MANDARIN)
5 KOREAN
6 CAMBODIAN
7 RUSSIAN
8 JAPANESE
9 VIETNAMESE
10 FRENCH
11 OTHER
99 DK/REFUSE

Q 32A - 32F OTHER HOUSEHOLD MEMBER--ENGLISH ABILITY

"How well does (NAME OF OTHER PERSON 1) speak English? That is, extremely well, well, not well, or not at all?"

(SELECT ONLY ONE. DO NOT READ LIST)

1 EXTREMELY WELL
2 WELL
3 NOT WELL OR NOT AT ALL
9 DK/REFUSE

IF "16+" AT Q 15, ASK Q 33; ELSE SKIP TO Q 50

Q 33A - 33F OTHER HOUSEHOLD MEMBER--LICENSED TO DRIVE?

"Is (NAME OF OTHER PERSON 1) licensed to drive?

(SELECT ONLY ONE. DO NOT READ LIST)

1 YES
2 NO
9 DK/REFUSE

Q 34A - 34F OTHER HOUSEHOLD MEMBER--EMPLOYMENT STATUS

"What is (NAME OF OTHER PERSON 1)'s employment status? Is he/she.(READ LIST)?"

(SELECT ONLY ONE. READ LIST)

1 EMPLOYED FULL-TIME (30 HOURS OR MORE PER WEEK)
2 EMPLOYED PART-TIME (LESS THAN 30 HOURS PER WEEK)
3 SELF-EMPLOYED FULL-TIME (30 HOURS OR MORE PER WEEK)
4 SELF-EMPLOYED PART-TIME (LESS THAN 30 HOURS PER WEEK)
5 UNEMPLOYED, BUT LOOKING FOR WORK
6 RETIRED
7 A FULL-TIME HOMEMAKER, OR
8 NOT EMPLOYED
9 DK/REFUSE (DO NOT READ)

IF '1-4' AT Q 34, ASK Q 35; ELSE SKIP TO Q 50

Q 35A - 35F OTHER HOUSEHOLD MEMBER--HOURS WORKED

"In a typical week, how many hours does [NAME OF OTHER PERSON 1] work?"

IF 'DK/REFUSE' RECORD AS '99

Q 36A - 36F OTHER HOUSEHOLD MEMBER--OCCUPATION

"What is (NAME OF OTHER PERSON 1)'s occupation? Is he/she (READ LIST)?"

(SELECT ONLY ONE. READ LIST)

1 MANAGERIAL/PROFESSIONAL
2 TECHNICAL/SALES AND ADMINISTRATIVE SUPPORT
3 SERVICE
4 FARMING, FORESTRY, FISHING
5 PRECISION PRODUCTION, CRAFT AND REPAIR
6 OPERATORS, FABRICATORS AND LABORERS
7 MILITARY, OR A
8 HOMEMAKER
9 DK/REFUSE (DO NOT READ)

Q 37A - 37F OTHER HOUSEHOLD MEMBER--INDUSTRY

"In what industry does (NAME OF OTHER PERSON 1) work? Is he/she in .(READ LIST)?"

(SELECT ONLY ONE. READ LIST)

1 CONSTRUCTION
2 MINING
3 AGRICULTURE
4 MANUFACTURING
5 TRANSPORTATION/COMMUNICATION/PUBLIC UTILITIES
6 WHOLESALE TRADE
7 RETAIL TRADE
8 FINANCE/INSURANCE
9 BUSINESS AND REPAIR SERVICES
10 PERSONAL SERVICES
11 ENTERTAINMENT
12 PROFESSIONAL
13 PUBLIC ADMINISTRATION, OR
14 MILITARY
99 DK/REFUSE (DO NOT READ)

Q 38A - 38F OTHER HOUSEHOLD MEMBER--ADDRESS OF PRIMARY JOB

"What is the address of (NAME OF OTHER PERSON 1)'s primary job?"

(ENTER "DK" FOR DON'T KNOW)

STREET # _____
DIRECTION _____
STREET NAME _____
STREET TYPE _____
QUADRANT _____
SUITE/APT# _____
XSTREET _____
CITY _____
COUNTY _____
STATE _____
ZIP _____

Q 39A - 39F OTHER HOUSEHOLD MEMBER--WORK AT HOME?

"Does (NAME OF OTHER PERSON 1) work at home?"

(SELECT ONLY ONE. DO NOT READ LIST)

1 YES
2 NO
9 DK/REFUSE

Q 40A - 40F OTHER HOUSEHOLD MEMBER--TELECOMMUTE?

"Of the [# HRS FROM Q35] hours (NAME OF OTHER PERSON 1) works in a typical week, how many hours are worked at home?"

(ENTER "99" FOR DON'T KNOW)

Q 41A - 41F OTHER HOUSEHOLD MEMBER--SUBSIDIZED PARKING?

"Does (NAME OF OTHER PERSON 1)'s employer offer subsidized parking or transit pass discounts?"

(SELECT ONLY ONE. DO NOT READ LIST)

1 YES
2 NO
9 DK/REFUSE

Q 42A - 42F OTHER HOUSEHOLD MEMBER--SHIFT WORK?

"Does (NAME OF OTHER PERSON 1)'s employer offer shift work or flex-time?"

(SELECT ONLY ONE. DO NOT READ LIST)

1 YES
2 NO
9 DK/REFUSE

Q 43A - 43F OTHER HOUSEHOLD MEMBER--PAY FOR PARKING?

"Does (NAME OF OTHER PERSON 1) have to pay for parking at his/her primary place of work?"

(SELECT ONLY ONE. DO NOT READ LIST)

1 YES
2 NO--SKIP TO Q 45
9 DK/REFUSE--SKIP TO Q 45

Q 44A - 44F OTHER HOUSEHOLD MEMBER--HOW MUCH PAY FOR PARKING

"How much does (NAME OF OTHER PERSON 1) have to pay per month? [IN DOLLARS]

IF 'DK/REFUSE', RECORD AS '99'

Q 45A - 45F OTHER HOUSEHOLD MEMBER--# OF DAYS TRAVEL TO WORK BY

"In the past five work days, how many days did (NAME OF OTHER PERSON 1) travel to work by:

READ EACH CATEGORY ONE AT A TIME, WAIT FOR A RESPONSE BEFORE GOING TO THE NEXT CATEGORY.

(READ LIST. MUST SUM TO "5".)
(ENTER "5" IN "DK" IF DON'T KNOW)
1_____ CAR (DROVE ALONE)
2_____ CARPOOL
3_____ PUBLIC TRANSIT (SCHOOL BUS/ TRAIN)
4_____ OTHER
5_____ NOT TRAVEL TO WORK DURING PAST 5 DAYS
8_____ DK/REFUSE (DO NOT READ)

Q 46A - 46F OTHER HOUSEHOLD MEMBER--# OF YEARS AT CURRENT EMPLOYMENT

"How long has (NAME OF OTHER PERSON 1) been employed at his/her current place of employment?"

(SELECT ONLY ONE. DO NOT READ LIST)

1 LESS THAN 1 YEAR
2 1-1.9 YEARS
3 2-2.9 YEARS
4 3-3.9 YEARS
5 4-4.9 YEARS
6 5 YEARS OR MORE
9 DK/REFUSE

Q 47A - 47F 'OTHER HOUSEHOLD MEMBER--# OF JOBS

"Does (NAME OF OTHER PERSON) have more than one job?"

(SELECT ONLY ONE. DO NOT READ LIST)

1 YES
2 NO--SKIP TO Q 47
9 DK/REFUSE--SKIP TO Q 47

ASK Q48 IF Q47='1'. ELSE SKIP TO Q49

Q 48A - 48F OTHER HOUSEHOLD MEMBER--X STREETS SECONDARY PLACE OF WORK

"What are the names of the cross streets or nearest intersection of (NAME OF PERSON 1)'s secondary place of work?"

IF 'DOES NOT KNOW/REMEMBER', RECORD AS "DK"'

ASK Q46=1-5; ELSE SKIP TO Q50

Q 49A - 49F OTHER HOUSEHOLD MEMBER--WORK IN AREA?

"Thinking about (NAME OF OTHER PERSON 1)'s last place of employment, did he/she work in [Portland/Vancouver] [Medford] [Eugene/Springfield] [Salem]?"

(SELECT ONLY ONE. DO NOT READ LIST)

1 WORKED IN AREA
2 DID NOT WORK IN AREA
3 HAS NEVER WORKED
9 DK/REFUSE

IF '1' AT Q 49A-49F, ASK Q 49.5A - 49.5F AND Q 49.6A - 49.6F;
IF '2', SKIP TO Q 49.6A - 49.6F; IF '3' OR '9', SKIP TO Q 50A - 50F

Q 49.5A - 49.5F OTHER HOUSEHOLD MEMBER--X STREETS PREVIOUS PLACE OF WORK

"As best as you can remember, what are the names of the cross streets or nearest intersection to (NAME OF OTHER PERSON 1)'s previous place of work?"

IF 'DOES NOT KNOW/REMEMBER', RECORD AS "DK"

Q 49.6A - 49.6F OTHER HOUSEHOLD MEMBER--PREVIOUS PLACE OF WORK CITY/STATE

"What is the name of the city and the state where (NAME OF OTHER PERSON 1) worked previously?"

IF 'DOES NOT KNOW/REMEMBER', RECORD AS "DK"

CITY:
STATE:

ASK OF ALL RESPONDENTS

Q 50A - 50F OTHER HOUSEHOLD MEMBER--STUDENT?

"Is (NAME OF OTHER PERSON 1) attending classes as a student at any level?"

(SELECT ONLY ONE. READ LIST)

1 FULL-TIME STUDENT

2 PART-TIME STUDENT
3 NOT A STUDENT--SKIP TO Q 54
9 DK/REFUSE--SKIP TO Q 54

Q 51A - 51F OTHER HOUSEHOLD MEMBER--STUDENT STATUS

"What is (NAME OF OTHER PERSON 1)'s student status? Is he/she in.(READ LIST)?"

(SELECT ONLY ONE. READ LIST)

1 DAYCARE
2 PRESCHOOL
3 ELEMENTARY SCHOOL (GRADES K-6)
4 SECONDARY SCHOOL (INCLUDES GRADES 7-12)
5 VOCATIONAL / TECHNICAL SCHOOL
6 COLLEGE, OR
7 POST-GRADUATE
9 DK/REFUSE (DO NOT READ)

IF 9 "DK" SKIP TO Q 54A - 54F

Q 52A - 52F OTHER HOUSEHOLD MEMBER--NAME OF COLLEGE/CITY

"What is the name of the school/college and in what city?"

IF 'DOES NOT KNOW/REMEMBER', RECORD AS "DK"

NAME OF SCHOOL:
CITY:

Q 53A - 53F OTHER HOUSEHOLD MEMBER--# OF DAYS TRAVEL TO SCHOOL BY

"Of the past five days, how many days did (NAME OF PERSON 1) travel to school by : ?"

READ EACH CATEGORY ONE AT A TIME, WAIT FOR A RESPONSE BEFORE GOING TO THE NEXT CATEGORY.

(READ LIST. MUST SUM TO "5". ENTER "5" IN "DK/REFUSE" IF DON'T KNOW)

1_____ CAR (DROVE ALONE)
2_____ CARPOOL(PARENT WITH CHILD TOO)
3_____ PUBLIC TRANSIT (SCHOOL BUS/TRAIN)
4_____ OTHER
5_____ NOT TRAVEL TO SCHOOL DURING PAST 5 DAYS
9_____ DK/REFUSE (DO NOT READ)

Q 54A - 54F OTHER HOUSEHOLD MEMBER--DISABILITY ?

"Does (NAME OF OTHER PERSON 1) have any disability that makes it difficult to travel outside the home without assistance from anyone?"

(SELECT ONLY ONE. DO NOT READ LIST.)

1 YES
2 NO--SKIP TO NEXT PERSON OR Q 56
9 DK/REFUSE--SKIP TO NEXT PERSON OR Q 56

Q 55A - 55F OTHER HOUSEHOLD MEMBER--TYPE OF DISABILITY

"What type of disability does (NAME OF OTHER PERSON 1) have?"

1 BLIND/VISUAL
2 WHEELCHAIR/TRANSFERABLE
3 WHEELCHAIR/NON-TRANSFERABLE
4 DEAF/HEARING IMPAIRED
5 MENTALLY DISABLED
6 CANE/WALKER
7 OTHER
9 DK/REFUSE

Q 56 RESPONDENT INFORMATION--LEAD-IN

"Now I would like to get some information about you."

Q 57 RESPONDENT--GENDER

[CODE GENDER BY OBSERVATION ONLY]

1 MALE
2 FEMALE

Q 58 RESPONDENT--AGE

"How old are you?"

IF 'DK/REFUSE', RECORD AS '99'

Q 59 RESPONDENT--RACE/ETHNICITY

"What is your race or ethnicity?"

IF NECESSARY, READ CATEGORIES

1 WHITE/CAUCASIAN
2 BLACK/AFRICAN AMERICAN

3 HISPANIC/MEXICAN AMERICAN
4 ASIAN/PACIFIC ISLANDER
5 NATIVE AMERICAN
6 OTHER
9 DK/REFUSE

Q 60 RESPONDENT--SPEAK OTHER LANGUAGE?

"Do you speak a language other than English at home?"

1 YES
2 NO--SKIP TO Q 63
9 DK/REFUSE--SKIP TO Q 63

Q 61 RESPONDENT--OTHER LANGUAGE SPOKEN

"What other language do you speak?"
(RECORD ALL THAT APPLY)

1 SPANISH
2 ITALIAN
3 POLISH
4 CHINESE (CANTONESE/MANDARIN)
5 KOREAN
6 CAMBODIAN
7 RUSSIAN
8 JAPANESE
9 VIETNAMESE
10 FRENCH
11 OTHER
99 DK/REFUSE

Q 62 RESPONDENT--ENGLISH ABILITY

"How well do you speak English? That is, extremely well, well, not well or not at all?"

1 EXTREMELY WELL
2 WELL
3 NOT WELL
4 NOT AT ALL
9 DK/REFUSE

Q 63 RESPONDENT--LICENSED TO DRIVE?

"Are you licensed to drive?"

1 YES
2 NO
9 DK/REFUSE

Q 64 RESPONDENT--EMPLOYMENT STATUS

"What is your employment status? Are you (READ LIST)?"

1 EMPLOYED FULL-TIME (30 HOURS OR MORE PER WEEK)
2 EMPLOYED PART-TIME (LESS THAN 30 HOURS PER WEEK)
3 SELF-EMPLOYED FULL-TIME (30 HOURS OR MORE PER WEEK)
4 SELF-EMPLOYED PART-TIME (LESS THAN 30 HOURS PER WEEK)
5 UNEMPLOYED, BUT LOOKING FOR WORK
6 RETIRED
7 FULL-TIME HOMEMAKER, OR
8 NOT EMPLOYED
9 DK/REFUSE (DO NOT READ)

IF '1 - 4' AT Q 64, ASK Q 65; ELSE SKIP TO Q 82

Q 65 RESPONDENT--HOURS WORKED

"In a typical week, how many hours do you work?"

IF 'DK/REFUSE' RECORD AS '99

Q 66 RESPONDENT--OCCUPATION

"What is your occupation? Are you. (READ LIST)?"

1 MANAGERIAL/PROFESSIONAL
2 TECHNICAL/SALES AND ADMINISTRATIVE SUPPORT
3 SERVICE
4 FARMING, FORESTRY, FISHING
5 PRECISION PRODUCTION, CRAFT AND REPAIR
6 OPERATORS, FABRICATORS AND LABORERS
7 MILITARY, OR A
8 HOMEMAKER
9 DK/REFUSE

Q 67 RESPONDENT--INDUSTRY

"In what industry do you work? Are you in (READ LIST)?"

1 CONSTRUCTION
2 MINING
3 AGRICULTURE
4 MANUFACTURING
5 TRANSPORTATION/COMMUNICATION/PUBLIC UTILITIES
6 WHOLESALE TRADE
7 RETAIL TRADE
8 FINANCE/INSURANCE

9 BUSINESS AND REPAIR SERVICES
10 PERSONAL SERVICES
11 ENTERTAINMENT
12 PROFESSIONAL
13 PUBLIC ADMINISTRATION, OR
14 MILITARY
99 DK/REFUSE (DO NOT READ)

Q 68 RESPONDENT--ADDRESS OF PRIMARY JOB

"What is the address of your primary job?"

STREET # _____
DIRECTION _____
STREET NAME _____
STREET TYPE _____
QUADRANT _____
SUITE/APT# _____
XSTREET _____
CITY _____
COUNTY _____
STATE _____
ZIP _____

Q 69 RESPONDENT--WORK AT HOME?

"Do you work at home?"

1 YES
2 NO
9 DK/REFUSE

Q 70 RESPONDENT--TELECOMMUTE?

"Of the [# HRS FROM Q65] hours you work in a typical week, how many hours are worked at home?"

IF 'DK/REFUSE' RECORD AS '99

Q 71 RESPONDENT--SUBSIDIZED PARKING?

"Does your employer offer subsidized parking or transit pass discounts?"

1 YES
2 NO
9 DK/REFUSE

Q 72 RESPONDENT--SHIFT WORK?"

"Does your employer offer shift work or flex-time?

1 YES
2 NO
9 DK/REFUSE

Q 73 RESPONDENT--PAY FOR PARKING?

"Do you have to pay for parking at your primary place of work?"

1 YES
2 NO--SKIP TO Q 75
9 DK/REFUSE--SKIP TO Q 75

Q 74 RESPONDENT--HOW MUCH PAY FOR PARKING

"How much do you have to pay per month?" [IN DOLLARS]

IF 'DK/REFUSE', RECORD AS '99'

Q 75 RESPONDENT--# OF DAYS TRAVEL TO WORK BY

"In the past five work days, how many days did you travel to work by: ?"

READ EACH CATEGORY ONE AT A TIME, WAIT FOR A RESPONSE BEFORE GOING TO THE NEXT CATEGORY.

1____ CAR (DROVE ALONE)
2____ CARPOOL
3____ PUBLIC TRANSIT (SCHOOL BUS/ TRAIN)
4____ OTHER
5____ NOT TRAVEL TO WORK DURING PAST 5 DAYS
8____ DK/REFUSE (DO NOT READ)

Q 76 RESPONDENT--# OF YEARS AT CURRENT EMPLOYMENT

"How long have you been employed at your current place of employment?"

1 LESS THAN 1 YEAR
2 1-1.9 YEARS
3 2-2.9 YEARS
4 3-3.9 YEARS
5 4-4.9 YEARS
6 MORE THAN 5 YEARS
9 DK/REFUSE

Q 77 RESPONDENT--# OF JOBS

"Do you have more than one job?"

1 YES
2 NO--SKIP TO Q 73
9 DK/REFUSE--SKIP TO Q 73

ASK Q78 IF Q77=1; ELSE SKIP TO Q79

Q 78 RESPONDENT--X STREETS SECONDARY PLACE OF EMPLOYMENT

"What are the names of the cross streets or nearest intersection of your secondary place of work?"

IF 'DOES NOT KNOW/REMEMBER', RECORD AS '99'

ASK IF Q76=1-5; ELSE SKIP TO Q82

Q 79 RESPONDENT--WORK IN AREA?

"Thinking about your last place of employment, did you work in [Portland/Vancouver] [Medford] [Eugene/Springfield] [Salme]?"

1 WORKED IN AREA
2 DID NOT WORK IN AREA
3 HAS NEVER WORKED--SKIP TO Q 82
9 DK/REFUSE--SKIP TO Q 82

IF '1' AT Q 79, ASK Q 80 AND Q 81;
IF '2', SKIP TO Q 82; IF '3' OR '9', SKIP TO Q 82

Q 80 RESPONDENT-- X STREETS PREVIOUS PLACE OF WORK

"What are the names of the cross streets or nearest intersection to your previous place of work?"

IF 'DOES NOT KNOW/REMEMBER', RECORD AS '99'

Q 81 RESPONDENT--PREVIOUS PLACE OF WORK CITY/STATE

"What is the name of the city and the state where you worked previously"

IF 'DOES NOT KNOW/REMEMBER', RECORD AS '99'

CITY:
STATE:

ASK OF ALL RESPONDENTS

Q 82 RESPONDENT--STUDENT?

"Are you attending classes as a student at any level?"

1 FULL-TIME
2 PART-TIME
3 NOT A STUDENT--SKIP TO Q 86
9 DK/REFUSE--SKIP TO Q 86

Q 83 RESPONDENT--STUDENT STATUS

"What is your student status? Are you (READ LIST)?"

1 POST-GRADUATE
2 COLLEGE
3 VOCATIONAL / TECHNICAL SCHOOL, OR IN
4 SECONDARY SCHOOL (INCLUDES GRADES 7-12)
8 DK/REFUSE (DO NOT READ)

Q 84 RESPONDENT--NAME OF COLLEGE/CITY

"What is the name of the school/college and in what city?"

IF 'DOES NOT KNOW/REMEMBER', RECORD AS '99'

NAME OF SCHOOL:
CITY:

Q 85 RESPONDENT--# OF DAYS TRAVEL TO SCHOOL BY

"Of the past five days, how many days did you travel to school by : ?"

READ EACH CATEGORY ONE AT A TIME, WAIT FOR A RESPONSE BEFORE GOING TO THE NEXT CATEGORY.

1____ CAR (DROVE ALONE)
2____ CARPOOL (PARENT WITH CHILD TOO)
3____ PUBLIC TRANSIT (SCHOOL BUS/TRAIN)
4____ OTHER
5____ NOT TRAVEL TO SCHOOL DURING PAST 5 DAYS (DO NOT READ)
9____ DK/REFUSE(DO NOT READ)

Q 86 RESPONDENT--DISABILITY?

"Do you have any disability that makes it difficult to travel outside the home without assistance from anyone?"

1 YES
2 NO--SKIP TO Q 88
9 DK/REFUSE--SKIP TO Q 88

Q 87 RESPONDENT--TYPE OF DISABILITY

"What type of disability do you have?"

1 BLIND/VISUAL
2 WHEELCHAIR/TRANSFERABLE
3 WHEELCHAIR/NON-TRANSFERABLE
4 DEAF/HEARING IMPAIRED
5 MENTALLY DISABLED
6 CANE/WALKER
7 OTHER
9 DK/REFUSE

Q 88 HOUSEHOLD INCOME

" What was your total annual household income from all sources in 1993?"
[DO NOT READ THESE CATEGORIES!, CODE ACCORDING TO ANSWER]

01 $0 - $4,999
02 $5,000 - $9,999
03 $10,000 - $14,999
04 $15,000 - $19,999
05 $20,000 - $24,999
06 $25,000 - $29,999
07 $30,000 - $34,999
08 $35,000 - $39,999
09 $40,000 - $44,999
10 $45,000 - $49,999
11 $50,000 - $54,999
12 $55,000 - $59,999
13 $60,000 or more
99 DK/REFUSE

IF 'DK/REFUSE' AT Q 88, ASK Q 89; ELSE SKIP TO Q 90

Q 89 HOUSEHOLD INCOME FLEX

"I don't need to know an exact amount. Let me read you a list of categories and you can just stop me when I read the one that best represents you total annual household income from all sources in 1993. Was it...(READ LIST)?"

01 LESS THAN $5,000
02 $5,000 BUT LESS THAN $10,000
03 $10,000 BUT LESS THAN $15,000
04 $15,000 BUT LESS THAN $20,000
05 $20,000 BUT LESS THAN $25,000
06 $25,000 BUT LESS THAN $30,000
07 $30,000 BUT LESS THAN $35,000
08 $35,000 BUT LESS THAN $40,000
09 $40,000 BUT LESS THAN $45,000
10 $45,000 BUT LESS THAN $50,000

11 $50,000 BUT LESS THAN $55,000
12 $55,000 BUT LESS THAN $60,000
13 OR, $60,000 OR MORE
99 DK/REFUSE (DO NOT READ)

Q 90 ACTIVITY DAY ASSIGNMENT

"The dates for keeping your activity diary are [DAYS OF THE WEEK AND DATES]."

Q 91 THANK RESPONDENT

"Thank you very much for agreeing to participate in this study. It is because of the cooperation of households like yours that city planners are able to obtain the detailed information necessary to design cities and transportation systems that improve our quality-of-life. If you have any questions, comments, or need any clarifications at any time, please feel free to call our toll-free survey hotline. The number is 1-800-619-3601. Thank you very much and have a nice day. "

Appendix C

Revealed Preference Survey Materials Packet

- Spring 1994 Survey Transmittal Letter
- Revised Survey Transmittal Letter
- Activity Diary (Original Version)(1)
- Memory Jogger
- Activity Diary (Revised Version)(1)
- Vehicle Information Form

Note: (1) As distributed, the diaries were folded in half (51/2 x 81/2" format) and stapled. The diaries are only partially reproduced here.

600 NORTHEAST GRAND AVENUE | PORTLAND, OREGON 97232 2736
TEL 503 797 1700 | FAX 503 797 1797

Spring

METRO

Dear survey participant:

Thank you for participating in the 1994 Activity and Travel Survey. Your household's cooperation is essential for Metro to effectively plan your area's future.

Your part is really very simple. Each person in your household keeps track of activities for two consecutive days. Childrens' activities are important, and their diaries should be completed by adults.

Inside this packet are Memory Joggers and Activity Diaries — similar to the Nielsen television viewing diaries — for everyone in your household. The Memory Jogger is a simple pocket card that you carry to keep track of your activities. The notes in your Memory Jogger will help you fill out your Activity Diaries at the end of each day. To remind you of your assigned diary days, we have enclosed a reminder notice. Place it in a spot that everyone will see, like on the refrigerator.

We have retained NuStats, experts in activity and travel surveys, to collect the data. So if anyone in your household has questions about what to do on their diary days, call Jesse Casas at 1-800-

We want to assure you that any information your household shares with NuStats will be kept strictly confidential. We respect your privacy and understand your concerns about security.

If you have any other questions or comments about the project, please call one of the undersigned at Metro.

Thanks again for your help and have fun tracking your activities.

Sincerely,

Keith Lawton
Assistant Director

Jean Sumida
Associate Transportation Planner

Dick Walker
Travel Forecasting Manager

Fall/Winter

600 NORTHEAST GRAND AVENUE | PORTLAND, OREGON 97232 2736
TEL 503 797 1700 | FAX 503 797 1797

METRO

Dear Portland Resident:

Metro would like to thank you for agreeing to participate in the **1994 Activity and Travel Survey** being conducted in Portland. Your household's commitment is essential to plan your area's future effectively. In doing so, you are joining the nearly 2,500 fellow Portland citizens who have already participated and are contributing to a better tomorrow.

The results on household travel behavior collected from this survey will help us predict future travel patterns and affect the policy we develop. Like most people, you probably would like to do your part, especially if it means helping us help you get to where you want to go more easily.

Transportation planning relies on data about travel and trips. It is also important to know how people make travel decisions as part of their daily activities. Each person in your household keeps track of activities for two consecutive days. Children's activities are important, and their diaries should be completed by parents.

Inside this packet are Activity diaries --similar to the Nielsen television viewing diaries-- for everyone in your household. These should be easy to use, and as an extra reminder, we have added a kitchen magnet for you to post on your refrigerator.

We have retained NuStats, Inc., experts in activity and travel surveys, to conduct the survey. They will be calling you after your assigned activity days to collect your information. If anyone in your household has questions about what to do on their activity days, please call the Travel Survey hotline at 1-800-619-3601.

We assure you that all information your household shares with NuStats will be kept strictly confidential. We respect your privacy and understand your concerns about security.

If you have any questions or comments about the project, please feel free to call me at (503) 797-1764.

Thanks again for your help.

Sincerely,

Keith Lawton
Metro

Day One Activity Diary

for

THANKS for agreeing to record your activities for two consecutive days.

The next page lists the activities you should record. The basic rule is to record activities that require travel OR that last longer than 30 minutes.

This diary is for the first of your two activity days. A day - 24 hours - begins at 3:00 a.m. We need to know: What you did, How long it took, and Where you did it. Be sure to write the names of places (schools, restaurants, video stores, etc.) and as complete an address as possible for each place.

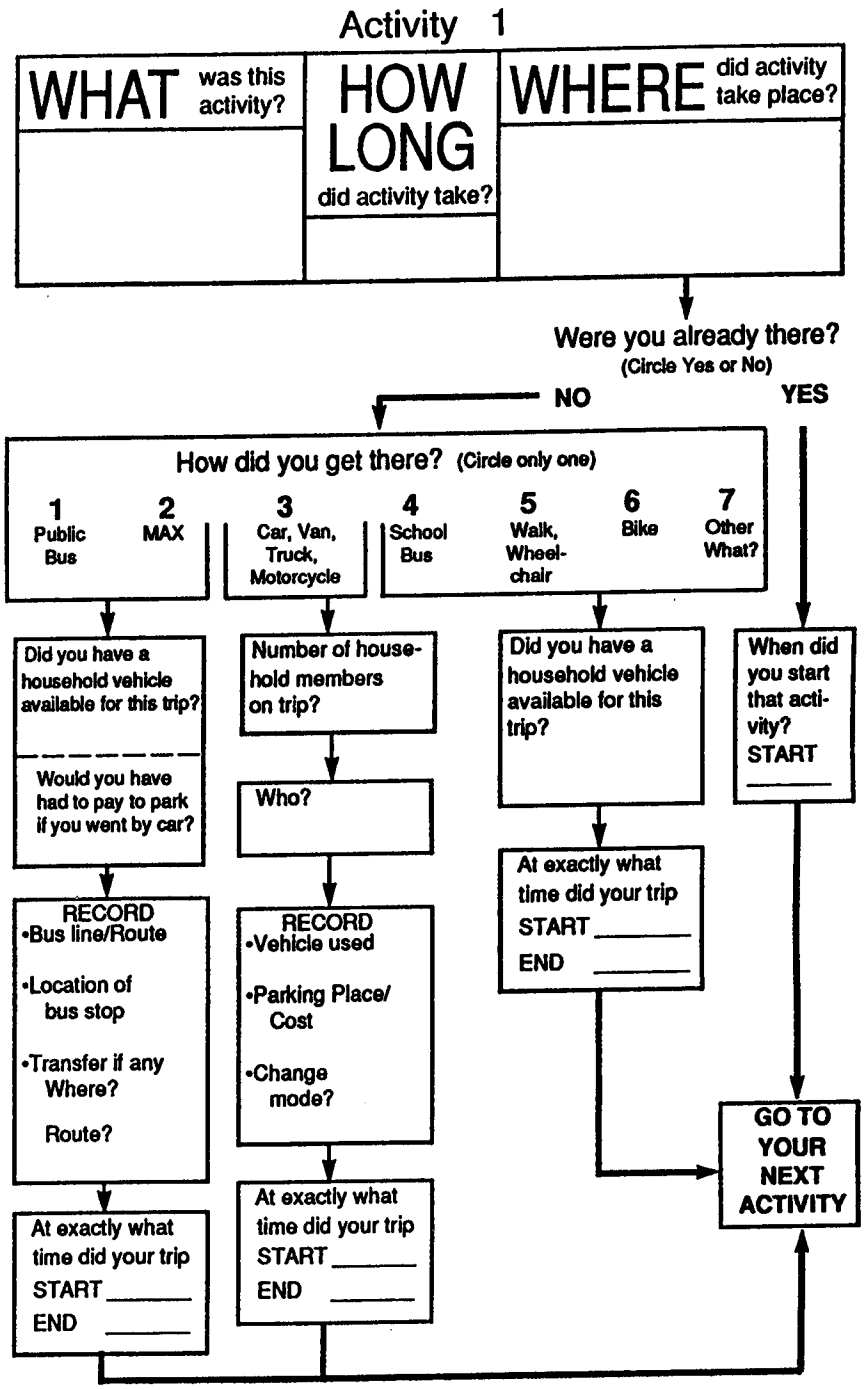
Please carry your Memory Jogger around with you during the day. Then, use your notes in it to carefully fill out your diaries.

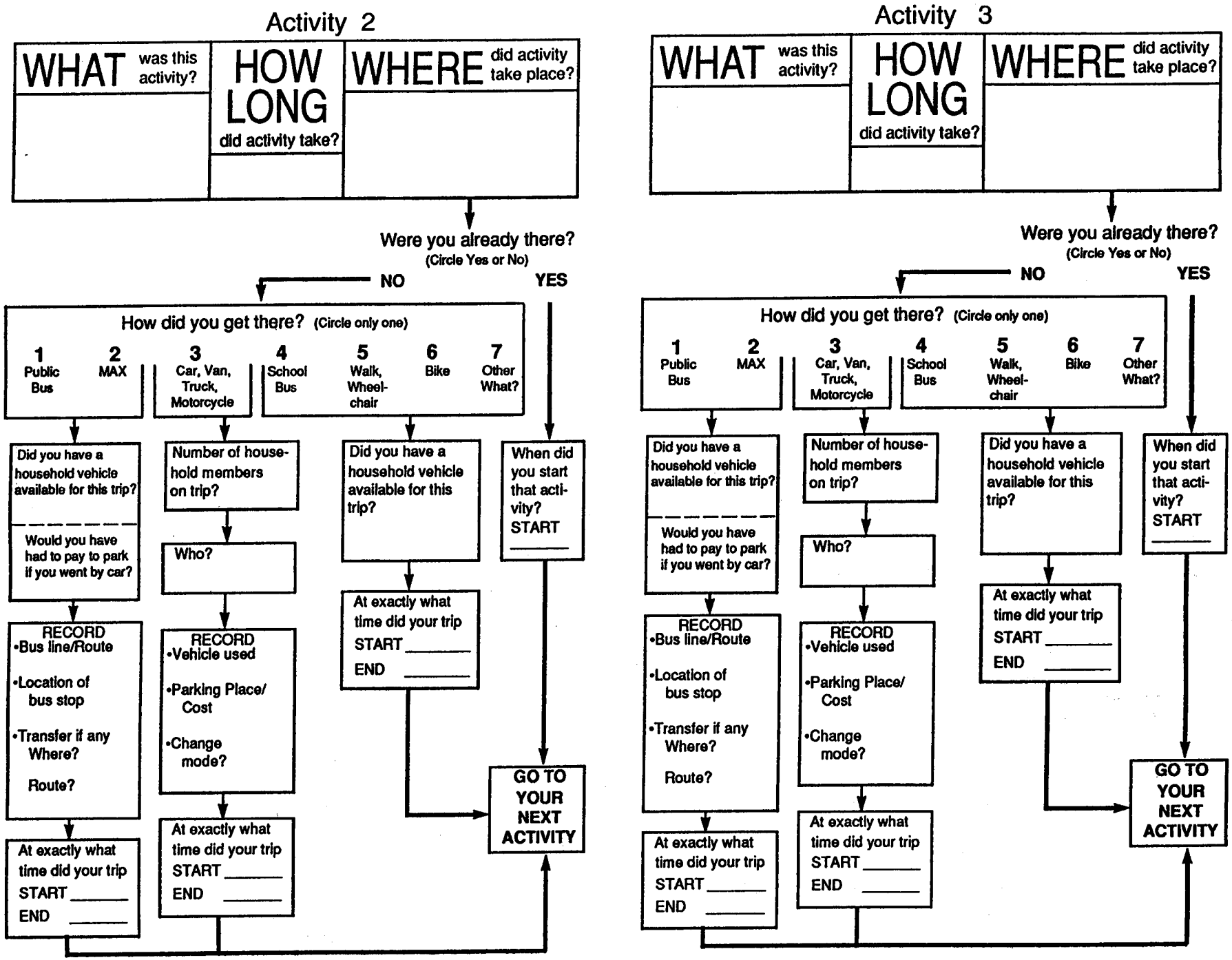
Before you start, please take a look at the sample diary included in this package. If you have any questions, call Melissa Valerio or Eric McKinney at 1-800-447-8287.

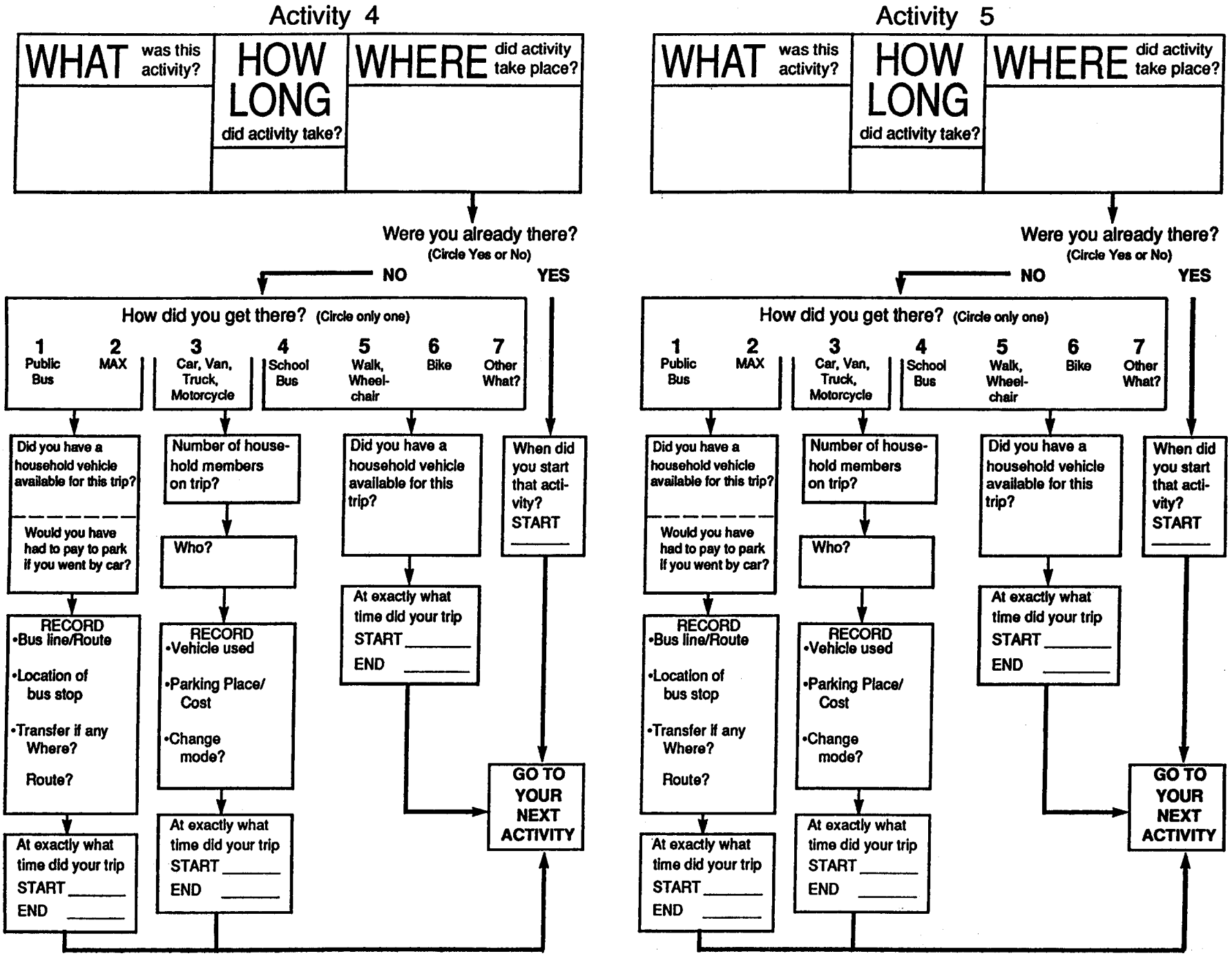
What is an Activity?

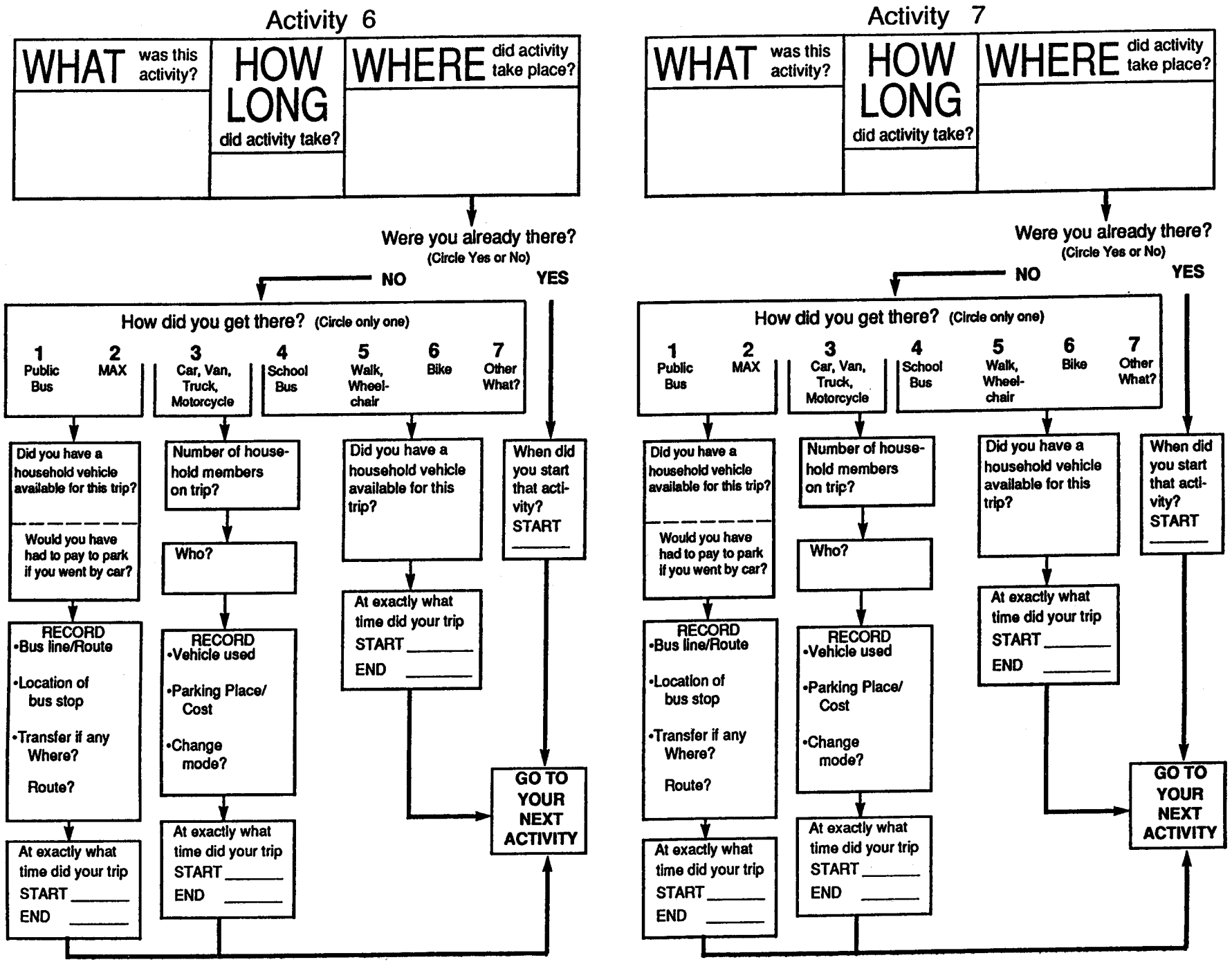
Simply, how you spend your time. We don't want to know everything you do for two days, only those types of things listed below. Record any of these that required travel OR that lasted longer than 30 minutes.

Activity	Example
Meals	At home, take-out, restaurant, tavern
Work	Office/plant, at-home, on-site, driving-around
Work-related	Job hunting, meetings, training
Shopping (incidental)	Gas, groceries, drugs, variety
Shopping (major)	Clothes, shoes, furniture, cars
Using services	Barber, beauty, shoe repair, laundry, cleaning
Medical care	Visits to health center, doctor, clinic, dentist, hospital
Other professional services	Lawyer, real estate agent, broker
Household business	Paying bills, banking, post office
School attendance	School, college, adult classes
Cultural activities	Concert, theater, ballet, museum, zoo, lecture
Church activities	Atending religious services, retreats, meetings, christenings, weddings, funerals
Civic activities	Political, fraternal/veteran, public meetings
Drop-in visits	To or by family, friends, neighbors
Entertaining	At home, in restaurants, or at others' homes
Attending social events	Community, family reunions, banquets
Amusements (at-home)	TV, radio, video movies, video games
Amusements (out-of-home)	Movies, carnival, circus, nightclubs, bars
Spectator sports	Football, baseball, basketball, fights, races
Participatory, recreational sports	Golf, swimming, boating, skiing, tennis, baseball, picnicking, hiking, fishing, lessons in any sport
Hobbies	Music, sewing, gardening, photography




Activity 2
WHAT was this activity?
HOW LONG did activity take?
WHERE did activity take place?
Were you already there?
(Circle Yes or No)
NO
YES
How did you get there? (Circle only one)
1 Public Bus
2 MAX
3 Car, Van, Truck, Motorcycle
4 School Bus
5 Walk, Wheel-chair
6 Bike
7 Other What?
Did you have a household vehicle available for this trip?
Would you have had to pay to park if you went by car?
RECORD
•Bus line/Route
•Location of bus stop
•Transfer if any Where?
Route?
At exactly what time did your trip
START
END
Number of house-hold members on trip?
Who?
RECORD
•Vehicle used
•Parking Place/ Cost
•Change mode?
At exactly what time did your trip
START
END
Did you have a household vehicle available for this trip?
At exactly what time did your trip
START
END
When did you start that acti-vity?
START
GO TO YOUR NEXT ACTIVITY
Activity 3
WHAT was this activity?
HOW LONG did activity take?
WHERE did activity take place?
Were you already there?
(Circle Yes or No)
NO
YES
How did you get there? (Circle only one)
1 Public Bus
2 MAX
3 Car, Van, Truck, Motorcycle
4 School Bus
5 Walk, Wheel-chair
6 Bike
7 Other What?
Did you have a household vehicle available for this trip?
Would you have had to pay to park if you went by car?
RECORD
•Bus line/Route
•Location of bus stop
•Transfer if any Where?
Route?
At exactly what time did your trip
START
END
Number of house-hold members on trip?
Who?
RECORD
•Vehicle used
•Parking Place/ Cost
•Change mode?
At exactly what time did your trip
START
END
Did you have a household vehicle available for this trip?
At exactly what time did your trip
START
END
When did you start that acti-vity?
START
GO TO YOUR NEXT ACTIVITY


Activity 4
WHAT was this activity?
HOW LONG did activity take?
WHERE did activity take place?
Were you already there?
(Circle Yes or No)
NO
YES
How did you get there? (Circle only one)
1 Public Bus
2 MAX
3 Car, Van, Truck, Motorcycle
4 School Bus
5 Walk, Wheel-chair
6 Bike
7 Other What?
Did you have a household vehicle available for this trip?
Would you have had to pay to park if you went by car?
RECORD
•Bus line/Route
•Location of bus stop
•Transfer if any Where?
Route?
At exactly what time did your trip
START _____
END _____
Number of house-hold members on trip?
Who?
RECORD
•Vehicle used
•Parking Place/ Cost
•Change mode?
At exactly what time did your trip
START _____
END _____
Did you have a household vehicle available for this trip?
At exactly what time did your trip
START _____
END _____
When did you start that acti-vity?
START _____
GO TO YOUR NEXT ACTIVITY
Activity 5
WHAT was this activity?
HOW LONG did activity take?
WHERE did activity take place?
Were you already there?
(Circle Yes or No)
NO
YES
How did you get there? (Circle only one)
1 Public Bus
2 MAX
3 Car, Van, Truck, Motorcycle
4 School Bus
5 Walk, Wheel-chair
6 Bike
7 Other What?
Did you have a household vehicle available for this trip?
Would you have had to pay to park if you went by car?
RECORD
•Bus line/Route
•Location of bus stop
•Transfer if any Where?
Route?
At exactly what time did your trip
START _____
END _____
Number of house-hold members on trip?
Who?
RECORD
•Vehicle used
•Parking Place/ Cost
•Change mode?
At exactly what time did your trip
START _____
END _____
Did you have a household vehicle available for this trip?
At exactly what time did your trip
START _____
END _____
When did you start that acti-vity?
START _____
GO TO YOUR NEXT ACTIVITY


Activity 6
WHAT was this activity?
HOW LONG did activity take?
WHERE did activity take place?
Were you already there?
(Circle Yes or No)
NO
YES
How did you get there? (Circle only one)
1 Public Bus
2 MAX
3 Car, Van, Truck, Motorcycle
4 School Bus
5 Walk, Wheel-chair
6 Bike
7 Other What?
Did you have a household vehicle available for this trip?
Would you have had to pay to park if you went by car?
RECORD
•Bus line/Route
•Location of bus stop
•Transfer if any Where?
Route?
At exactly what time did your trip
START
END
Number of house-hold members on trip?
Who?
RECORD
•Vehicle used
•Parking Place/ Cost
•Change mode?
At exactly what time did your trip
START
END
Did you have a household vehicle available for this trip?
At exactly what time did your trip
START
END
When did you start that acti-vity?
START
GO TO YOUR NEXT ACTIVITY
Activity 7
WHAT was this activity?
HOW LONG did activity take?
WHERE did activity take place?
Were you already there?
(Circle Yes or No)
NO
YES
How did you get there? (Circle only one)
1 Public Bus
2 MAX
3 Car, Van, Truck, Motorcycle
4 School Bus
5 Walk, Wheel-chair
6 Bike
7 Other What?
Did you have a household vehicle available for this trip?
Would you have had to pay to park if you went by car?
RECORD
•Bus line/Route
•Location of bus stop
•Transfer if any Where?
Route?
At exactly what time did your trip
START
END
Number of house-hold members on trip?
Who?
RECORD
•Vehicle used
•Parking Place/ Cost
•Change mode?
At exactly what time did your trip
START
END
Did you have a household vehicle available for this trip?
At exactly what time did your trip
START
END
When did you start that acti-vity?
START
GO TO YOUR NEXT ACTIVITY

Activity 8

WHAT was this activity?	HOW LONG did activity take?	WHERE did activity take place?

Were you already there? (Circle Yes or No)

NO — YES

How did you get there? (Circle only one)

1 Public Bus; 2 MAX; 3 Car, Van, Truck, Motorcycle; 4 School Bus; 5 Walk, Wheel-chair; 6 Bike; 7 Other What?

- 1 Public Bus / 2 MAX: Did you have a household vehicle available for this trip? / Would you have had to pay to park if you went by car? → RECORD •Bus line/Route •Location of bus stop •Transfer if any Where? Route? → At exactly what time did your trip START _____ END _____
- 3 Car, Van, Truck, Motorcycle: Number of household members on trip? → Who? → RECORD •Vehicle used •Parking Place/ Cost •Change mode? → At exactly what time did your trip START _____ END _____
- 4 School Bus / 5 Walk, Wheel-chair / 6 Bike / 7 Other What?: Did you have a household vehicle available for this trip? → At exactly what time did your trip START _____ END _____
- YES: When did you start that activity? START _____

All paths → GO TO YOUR NEXT ACTIVITY

Activity 9

WHAT was this activity?	HOW LONG did activity take?	WHERE did activity take place?

Were you already there? (Circle Yes or No)

NO — YES

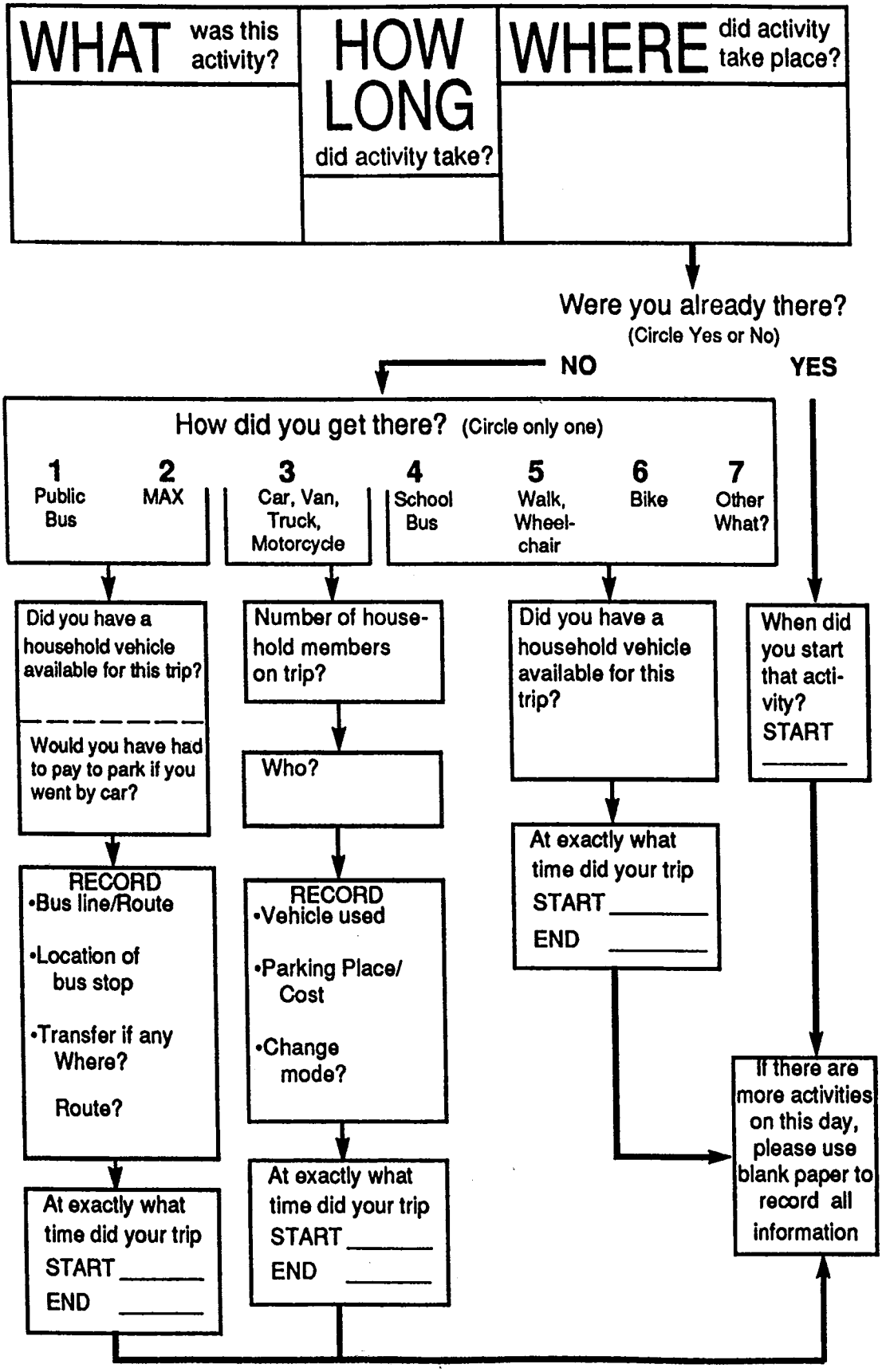
How did you get there? (Circle only one)

1 Public Bus; 2 MAX; 3 Car, Van, Truck, Motorcycle; 4 School Bus; 5 Walk, Wheel-chair; 6 Bike; 7 Other What?

- 1 Public Bus / 2 MAX: Did you have a household vehicle available for this trip? / Would you have had to pay to park if you went by car? → RECORD •Bus line/Route •Location of bus stop •Transfer if any Where? Route? → At exactly what time did your trip START _____ END _____
- 3 Car, Van, Truck, Motorcycle: Number of household members on trip? → Who? → RECORD •Vehicle used •Parking Place/ Cost •Change mode? → At exactly what time did your trip START _____ END _____
- 4 School Bus / 5 Walk, Wheel-chair / 6 Bike / 7 Other What?: Did you have a household vehicle available for this trip? → At exactly what time did your trip START _____ END _____
- YES: When did you start that activity? START _____

All paths → GO TO YOUR NEXT ACTIVITY

Activity 10


WHAT was this activity?
HOW LONG did activity take?
WHERE did activity take place?
Were you already there?
(Circle Yes or No)
NO
YES
How did you get there? (Circle only one)
1 Public Bus
2 MAX
3 Car, Van, Truck, Motorcycle
4 School Bus
5 Walk, Wheel-chair
6 Bike
7 Other What?
Did you have a household vehicle available for this trip?
Would you have had to pay to park if you went by car?
Number of house-hold members on trip?
Who?
Did you have a household vehicle available for this trip?
When did you start that acti-vity? START
RECORD
•Bus line/Route
•Location of bus stop
•Transfer if any Where?
Route?
RECORD
•Vehicle used
•Parking Place/ Cost
•Change mode?
At exactly what time did your trip
START
END
At exactly what time did your trip
START
END
At exactly what time did your trip
START
END
If there are more activities on this day, please use blank paper to record all information

This is a list of activities you need to record. Fill in the boxes for activities done on your assigned day 1 and day 2.

DAY 1	DAY 2	ACTIVITIES TO SUSTAIN YOUR HOUSEHOLD
☐	☐	**Meals:** at home, take-out, in restaurant, tavern, etc.
☐	☐	**Work:** at office/plant, at home, on site, driving around, etc.
☐	☐	**Work-related:** job hunting, meetings, training, etc.
☐	☐	**Shopping (incidental):** gas, groceries, drugs, variety, etc.
☐	☐	**Shopping (major):** clothes, shoes, furniture, cars, etc.
☐	☐	**Using services:** barber, beauty, shop, shoe repair, cleaners.
☐	☐	**Medical care:** clinic or health center, doctor or dentist, etc.
☐	☐	**Other professional services:** lawyer, broker, real state, etc.
☐	☐	**Household business:** banking, post office, paying bills, etc.
☐	☐	**Household maintenance:** fixing, cleaning, laundry, etc.
☐	☐	**Household obligations:** childcare, baby needs, helping with home-work for kids, etc.
☐	☐	_____
		SOCIAL ACTIVITIES OF YOUR HOUSEHOLD
☐	☐	Drop-in visits to your home or visits to others' homes.
☐	☐	Entertaining at your home or being entertained by others. Attending social events, church socials, reunions, bingo, etc.
☐	☐	_____

CONTINUED ON OTHER SIDE

MEMORY JOGGER: DAY 1

USE THIS TO LIST YOUR ACTIVITIES FOR DAY ONE TO HELP YOU COMPLETE THE DIARY BOOKLET BEFORE OUR PHONE CALL

WHAT DID YOU DO?	HOW LONG?	WHERE DID YOU DO IT?
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		

MEMORY JOGGER: DAY 1

This is a list of activities you need to record. Fill in the boxes for activities done on your assigned Day 1 and Day 2.

DAY 1	DAY 2	PERSONAL ENRICHMENT ACTIVITIES
☐	☐	School attendance: college, adult classes, etc.
☐	☐	Cultural: going to concert, zoo, theater, museum, lecture, etc.
☐	☐	Church activities: religious, attending services, prayer meetings, retreats, weddings, funerals, christenings, etc.
☐	☐	Civic: political, fraternal/veteran meetings, public meetings.
☐	☐	Other: _____
		RECREATIONAL ACTIVITIES
☐	☐	Watching: TV, video movies, other video, etc.
☐	☐	Amusements out of home: circus, fair, movies, nightclubs.
☐	☐	Hobbies: music, writing, sewing, gardening, collecting.
☐	☐	Recreations: golf, beach, skiing, boating, horseback riding, tennis, pool, bowling, ball, games, hiking, picnicking, fishing, etc.
☐	☐	Rest & relaxation: bike ride, a stroll, out for a ride, etc.
☐	☐	_____

CONTINUED ON OTHER SIDE

MEMORY JOGGER: DAY 2

USE THIS TO LIST YOUR ACTIVITIES FOR DAY TWO TO HELP YOU COMPLETE THE DIARY BOOKLET BEFORE OUR PHONE CALL

WHAT DID YOU DO?	HOW LONG?	WHERE DID YOU DO IT?
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		

MEMORY JOGGER: DAY 2

Oregon and Southwest Washington

1994 Activity and Travel Behavior Survey

Two-Day Diary for:

Label here

Your assigned travel days are:

You count in transportation planning!

No matter how much or how little you travel, you're important! You're one of the few people picked in your area to have the chance to tell your local government what your transportation needs might be.

This is *your* activity and travel diary. Please make sure you fill it out yourself. Parents should help children under age 12.

Be sure to record your beginning odometer reading on your vehicle form on the first activity day and record the ending odometer reading at the end of the second activity day.

Why the diary?

This packet is a diary that records information about your activities and travel for two days. The diary reduces mistakes because people record their activities and travel on the same days on which the travel takes place. People don't have to try to remember what they did.

Why activities and travel?

Transportation planning relies on data about travel and trips. It is also important to know how people make travel decisions as a part of their daily activities.

Why two days of diarykeeping?

The reliability of travel or trip estimates is determined by not only the total number of people in the sample but also the number of trips made. With two days, twice as many trips can be recorded by each person in the sample.

Why all the people in the household?

It is important to know how people make travel decisions as a part of a family with various travel and transportation needs.

Here's what we mean by "activity":

An activity is how you spend your time. You should record anything you do for your assigned two days that required travel OR that lasted more than 30 minutes. For the diary, a day begins and ends at 3am.

Here's what we mean by "travel":

Travel is how you got to an activity. Record all travel whether you drove, walked, took a bus, or used any other means to get from one place to another.

Examples of activities

- ✔ Meals at home, take-out, restaurant, tavern
- ✔ Work at office/plant, at-home, on-site, driving around
- ✔ Job hunting, meetings, training
- ✔ Shopping for gas, groceries, drugs, variety, clothes, shoes, furniture, cars
- ✔ Barber, beauty shop, shoe repair, laundry, cleaning
- ✔ Visits to health center, doctor, clinic, dentist, hospital
- ✔ Meeting with lawyer, real estate agent, or broker
- ✔ Paying bills, banking, post office
- ✔ Attending school, college, adult classes
- ✔ Attending concert, theater, ballet, museum, zoo, lecture
- ✔ Attending religious services, retreats, meetings, christenings, weddings, funerals
- ✔ Political activities, fraternal/veteran, public meetings
- ✔ Drop-in visits to or by family, friends, neighbors
- ✔ Entertaining at home, in restaurants, or being entertained at others' homes
- ✔ Attending community events, family reunions, banquets
- ✔ Watching TV, listening to the radio, watching video movies, playing video games
- ✔ Movies, carnival, circus, nightclubs, bars
- ✔ Football, baseball, basketball, fights, races, golf, swimming, boating, skiing, tennis, baseball, picniking, hiking, fishing, lessons in any sport
- ✔ Listening to music, sewing, gardening, photography
- ✔ Sleep, rest and relaxation
- ✔ Picking up/dropping off someone

Example

1 What was your activity?

Work

2 Where did your activity take place?

Name of place: NuStats

Address: 901 Main St.

City: Anytown, OR 99999

3 What time did your activity start?

8:00 (am) / pm

4 What time did your activity end?

11:30 (am) / pm

5 Did you have to travel to get to this activity?

☒ Yes → **Continue with Question 6**

☐ No → **Go to Next Activity**

6 What time did your travel start?

7:40 (am) / pm

7 What time did your travel end?

7:59 (am) / pm

8 How did you travel to the activity? **(Circle one and follow instructions)**

Private Vehicle → Answer Questions 9-16

Public Bus / Max → Answer Questions 17-28

Walk / Bicycle / School Bus / Other → Answer Questions 29-32

If you traveled by private vehicle, answer Questions 9-16, then 33-34

9 Which vehicle did you use? (Make/Model)

Household: Mazda 323

Other: _____

10 Were you the . . .

☒ Driver ☐ Passenger

11 How many people were in the vehicle? (including driver)

1

12 Where did you park? ☐ Did not park

☐ Street ☐ Drive-through ☐ Driveway

☒ Parking lot/garage ☐ Other

13 How did you pay for parking?

☒ Did not pay

☐ Hourly ☐ Weekly ☐ Semesterly

☐ Daily ☐ Monthly ☐ Other

14 How much did you pay for parking?

$ _____

15 Who subsidized your parking?

☒ No one ☐ Employer

☐ Business/store ☐ Other

16 What was the full unsubsidized price to park? $ _____

If you traveled by public bus or Max, answer Questions 17-28, then 33-34

17 Did you have a vehicle available?

❑ Yes ❑ No

18 How would you have paid for parking if you went by car?

❑ Would not pay
❑ Hourly ❑ Weekly ❑ Semesterly
❑ Daily ❑ Monthly ❑ Other

19 How much would you have had to pay for parking if you went by car?

$ _____

20 What was the first transit route taken?

21 Where did you board?

Address/place: _____
Cross streets: _____
City: _____

22 How did you get to the stop?

❑ Drove & parked ❑ Dropped off
❑ Carpooled ❑ Walked ❑ Other

23 How did you get from the stop to your destination?

❑ Drove & parked ❑ Picked up
❑ Carpooled ❑ Walked ❑ Other

24 How did you pay for the trip?

❑ Cash ❑ Fareless square
❑ Ticket ❑ Transfer
❑ Pass ❑ Other

25 Who subsidized your transit fare?

❑ No one ❑ Employer
❑ Business/store ❑ Other

26 Did you transfer to another bus or Max?

❑ Yes ❑ No

27 To what line did you transfer?

28 How many people were in your party?

If you traveled by walking, biking, school bus or other non-private vehicle, answer Questions 29-22, then 33-34

29 Did you have a vehicle available?

❑ Yes ❑ No

30 How would you have paid for parking if you went by car?

❑ Would not pay
❑ Hourly ❑ Weekly ❑ Semesterly
❑ Daily ❑ Monthly ❑ Other

31 How much would you have had to pay for parking if you went by car?

$ _____

32 How many people were in your party?

If your travel mode changed during this trip (even to walking), answer Questions 33-34

33 To what did you change?

❑ Walk ❑ Public bus
❑ Max ❑ Private vehicle
❑ Bicycle ❑ School bus
❑ Other

34 Where did you change travel modes?

Address/place: _____
Cross streets: _____
City: _____

Vehicle Information

Please list all vehicles available for use by members of your household. Vehicles include cars, trucks, vans, and motorcycles. Also include any company vehicles available for personal use and garaged at your home. Also include any vehicles belonging to and garaged at your house of out-of-town guests who stayed overnight on your assigned survey dates. (Note: The beginning odometer reading for each vehicle is the reading on the first assigned activity day and the ending odometer reading is the reading at the end of the second assigned activity day.)

	VEHICLE OWNER	YEAR	WHEN ACQUIRED (Month/Year)	When acquired, did this vehicle replace an existing one or is it an additional vehicle?	MAKE	MODEL	TYPE	FUEL TYPE	BEGINNING OF FIRST DAY ODOMETER READING	END OF SECOND DAY ODOMETER READING
0	☒ Personal ☐ Employer ☐ Rental ☐ Other	93	3/93	☒ Replacement ☐ Added	FORD	TAURUS	LX (4-door)	☒ Gas ☐ Diesel ☐ Other	12,295	12,382
1	☐ Personal ☐ Employer ☐ Rental ☐ Other			☐ Replacement ☐ Added				☐ Gas ☐ Diesel ☐ Other		
2	☐ Personal ☐ Employer ☐ Rental ☐ Other			☐ Replacement ☐ Added				☐ Gas ☐ Diesel ☐ Other		
3	☐ Personal ☐ Employer ☐ Rental ☐ Other			☐ Replacement ☐ Added				☐ Gas ☐ Diesel ☐ Other		
4	☐ Personal ☐ Employer ☐ Rental ☐ Other			☐ Replacement ☐ Added				☐ Gas ☐ Diesel ☐ Other		
5	☐ Personal ☐ Employer ☐ Rental ☐ Other			☐ Replacement ☐ Added				☐ Gas ☐ Diesel ☐ Other		
6	☐ Personal ☐ Employer ☐ Rental ☐ Other			☐ Replacement ☐ Added				☐ Gas ☐ Diesel ☐ Other		
7	☐ Personal ☐ Employer ☐ Rental ☐ Other			☐ Replacement ☐ Added				☐ Gas ☐ Diesel ☐ Other		

Appendix D

Retrieval Questionnaire

#1 Name: _____

S#: _____ P#: ____

Record activities that require travel or that last longer than 30 minutes

ACTIVITY DAY 1 / SIDE 1

Attachment 5

		Activity 1	Activity 2	Activity 3	Activity 4	Activity 5	Activity 6
1	What was your (first/next) activity?						
2	Where did you do that? Loc. Name: Address:						
3	Were you already there?	1 2	1 2	1 2	1 2	1 2	1 2
4	At what time did you start [Q1]? (Military Time)						
5	For how long did you do that activity?						
6	Did you make any trips during those [Q5 response]?	1 2	1 2	1 2	1 2	1 2	1 2
7	[Q3=No] How did you get to the activity?	Oth 1 Wlk 2 Bik 3 Schl 4	Oth 1 Wlk 2 Bik 3 Schl 4	Oth 1 Wlk 2 Bik 3 Schl 4	Oth 1 Wlk 2 Bik 3 Schl 4	Oth 1 Wlk 2 Bik 3 Schl 4	Oth 1 Wlk 2 Bik 3 Schl 4
8	Did you have a vehicle available?	1 2	1 2	1 2	1 2	1 2	1 2
9	How many people were in your party?						
7	[Q3=No] How did you get to the activity?	Public Bus 5 MAX 6	Public Bus 5 MAX 6	Public Bus 5 MAX 6	Public Bus 5 MAX 6	Public Bus 5 MAX 6	Public Bus 5 MAX 6
10	Did you have a vehicle available?	1 2	1 2	1 2	1 2	1 2	1 2
11	Would you have had to pay to park if you went by car?	1 2	1 2	1 2	1 2	1 2	1 2
12	What was the first route taken?						
13	Where did you board? Address/Inter. Str.						
14	How did you get to the stop?	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
15	How did you pay for the trip?	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
16	Who subsidized your fare?	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
17	Did you transfer to another bus?	1 2	1 2	1 2	1 2	1 2	1 2
18	[Q17=Yes] To what line did you transfer?						
19	[Q17=Yes] Did you transfer again?	1 2	1 2	1 2	1 2	1 2	1 2
7	[Q3=No] How did you get to the activity?	Personal Vehicle 7	Personal Vehicle 7	Personal Vehicle 7	Personal Vehicle 7	Personal Vehicle 7	Personal Vehicle 7
20	Which vehicle did you use?						
21	Were you the driver or passenger?	1 2	1 2	1 2	1 2	1 2	1 2
22	Number in vehicle						
23	Where did you park?	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
24	Did you pay for parking?	1 2	1 2	1 2	1 2	1 2	1 2
25	[If "yes" to 24] How much did you pay for parking?	$	$	$	$	$	$
26	Who subsidized your parking?	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
27	What was the full unsubsidized price to park?	$	$	$	$	$	$
Questions 28 through 32 are asked for all modes of travel.							
28	What time did the trip start? (Military Time)						
29	What time did the trip end? (Military Time)						
30	Did you change modes?	1 2	1 2	1 2	1 2	1 2	1 2
31	[Q30=Yes] Where did you change modes?						
32	[Q30=Yes] To/From what mode did you change?	1 2 3 4 5	1 2 3 4 5	2 3 4 5	1 2 3 4 5	1 2 3 4 5	2 3 4 5

Appendix E

Example Stated Preference Pricing Effects Survey Instrument

- Pricing Policies Stated Preference Survey – Commute Trip Version
- Pricing Policies Stated Preference Survey – Non-commute Trip Version

TRAVEL BEHAVIOR SURVEY

Thank you for participating in the Regional Travel Behavior Survey. This survey is unique; you've probably never completed one like it. Take ample time to familiarize yourself with the survey materials before you begin; you'll find it will be fun.

This survey is designed to investigate how local residents, such as yourself, might change their travel habits if travel conditions were different from what they are today. Imagine that as the population in your area grows, traffic becomes heavier and slower; the time it takes to get to work, shop or run errands increases; and travel costs, such as gasoline, parking or transit fares, rise. In this "imagined" future, travel time around the area might decrease, but at the cost of paying a toll for certain roads at certain times of the day.

Your participation in this survey is very important. Your answers provide critical information for effective planning for the future. We assure you that your answers are completely confidential and will be used for statistical purposes only.

In the following pages, you'll be presented with eight (8) tables outlining future Travel Options and Travel Conditions for a typical commute to work. Each table is followed by two (2) questions. Each table and set of 2 questions is a separate and independent task, and should be done one at a time.

When completing the survey, please assume that your current typical commute to work takes 15 minutes.

The next page contains survey instructions. It is very important that you read these before you begin. If you have any questions, please call **Mary McBride at 1-800-447-8287.**

SURVEY INSTRUCTIONS

Remove the Key Terms pull-out section and read through the explanations for each of the Travel Options and the Travel Conditions. Then familiarize yourself with the format of the Sample Table — Travel Options and Travel Conditions, below. The Sample Table serves as an example of the type of table you will be using in the survey.

SAMPLE TABLE - TRAVEL OPTIONS AND TRAVEL CONDITIONS

	PRIVATE VEHICLE								PUBLIC TRANSIT				BICYCLE	WALK	
	Drive Alone				Carpool / Vanpool				Regular Bus		Express Bus				
	Free Route		Toll Route		Free Route		Toll Route								
	Peak	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*			
Travel time	30 min.	25 min.	10 min.	10 min.	45 min.	35 min.	25 min.	20 min.	35 min.	35 min.	30 min.	30 min.	40 min.	2.5 hours	I
Bike/Walk path													No	Yes	
Toll cost			$0.50	$0.50			$0.50	$0.50							would
Fuel cost per gallon	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50							
Daily parking cost increase	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00							not
Fare									$1.00	$1.00	$1.00	$1.00			
Closest stop to home									6 blocks	6 blocks	9 blocks	9 blocks			make
Closest stop to destination									12 blocks	12 blocks	21 blocks	21 blocks			
Number of transfers required									None	None	None	None			the
Park-n-ride availability									Yes	Yes	Yes	Yes			
Time between buses									10 min.	30 min.	30 min.	30 min.			trip
Distance between stops									8 blocks	8 blocks	2.0 miles	2.0 miles			
Seat availability									5 of 5 times	5 of 5 times	4 of 5 times	5 of 5 times			
On-board security									No	No	Yes	Yes			
Station security									Yes	Yes	No	No			
	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11	Option 12	Option 13	Option 14	Option 15

1A. Study the Travel Options.

The Sample Table outlines four Private Vehicle Travel Options:
(1) Free Route, Drive Alone
(2) Free Route, Carpool/Vanpool
(3)Toll Route, Drive Alone
(4) Toll Route, Carpool/Vanpool

Two Public Transit options are also included:
(1) Regular Bus
(2) Express Bus/Light Rail

For each of these Travel Options, two Travel Periods are given:
(1) Peak (7am to 9am and 4pm to 6pm, Monday through Friday)
(2) Non-Peak (all other times)

In addition, the Sample Table includes the options of:
(1) Bicycling
(2) Walking

1B. **Study the Travel Conditions.**
The Sample Table presents four types of Travel Conditions for Private Vehicles: (1) Travel time
(2) Toll cost
(3) Fuel cost
(4) Daily parking cost increase

Eleven types of Travel Conditions are given for Public Transit: (1) Travel time,
(2) Fare
(3) Closest stop to home
(4) Closest stop to destination
(5) Number of transfers required
(6) Park-n-ride availability
(7) Time between buses
(8) Distance between stops
(9) Seat availability
(10) On-board security
(11) Station security

Two types of conditions are given for Bicycling and Walking: (1) Travel Time
(2) Bicycle/walk path

2. Flip through the pages of this booklet and look at Tables 1 - 8. Notice that these tables are similar in set-up to the Sample Table, except that they contain information that determine your choice among Travel Options.

EXAMPLE: Now, focus on just the first four travel options and the first two travel conditions. (When you complete the actual survey, you will want to consider all of the conditions for all of the options.) You find:

- Option 1: Free Route - Drive Alone during peak hours takes 30 minutes but has no cost.
- Option 2: Free Route - Drive Alone during off-peak hours takes 25 minutes but has no cost.
- Option 3: Toll Route - Drive Alone during peak hours takes 10 minutes but you have to pay $0.50
- Option 4: Toll Route - Drive Alone during off-peak hours takes 10 minutes but you have to pay $0.50

SAMPLE QUESTION: Study the travel conditions for Options 1-4 in the Sample Table. Given these conditions, distribute your total weekly commute trips to work (home to work only) among the four options.

Option 1	Option 2	Option 3	Option 4

SAMPLE ANSWERS: Suppose John Doe commutes to work five times per week, and he prefers Option 1. He would write "5" in the box under Option 1. Suppose Jane Smith commmutes to work four days per week, and prefers Option 2 for two trips to work and Option 4 for 2 trips. She would write a "2" in the box under Option 2 and a "2" in the box under Option 4.

Before you begin the survey, please complete Section A below.

SECTION A (BEGIN HERE)

A. How many times per week do you typically commute to work? (Write number in the blank.) _____

B. Are you required by your employer to arrive at a certain time?
❑ no ❑ yes (If yes, write report time in blank.) _____

Read and evaluate all of the information contained in Table 1 on the next page. Based on this information answer questions 1 and 2 that follow the table. After completing these questions, proceed to the next page.

When completing the survey, please assume that your typical commute to work takes 15 minutes.

1. Please examine the following travel conditions to determine your preferred way(s) of traveling to work. *(Remember that peak hours are 7am to 9am and 4pm to 6pm, Monday through Friday. All other hours are off-peak.)*

TABLE 1
VERSION SP1 - Commute

	PRIVATE VEHICLE								PUBLIC TRANSIT				BICYCLE	WALK	
	Drive Alone				Carpool / Vanpool				Regular Bus		Light Rail				
	Free Route		Toll Route		Free Route		Toll Route								
	Peak	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*			
Travel time	45 min.	35 min.	30 min.	20 min.	60 min.	45 min.	45 min.	30 min.	50 min.	40 min.	35 min.	25 min.	55 min.	3.5 hours	I
Bike/Walk path													Yes	No	
Toll cost			$1.50	$1.50			$1.50	$1.50							would
Fuel cost per gallon	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50							
Daily parking cost increase	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00							not
Fare									$1.00	$1.00	$1.00	$1.00			
Closest stop to home									9 blocks	9 blocks	15 blocks	15 blocks			make
Closest stop to destination									9 blocks	9 blocks	15 blocks	15 blocks			
Number of transfers required									Two	Two	Two	Two			the
Park-n-ride availability									Yes	Yes	Yes	Yes			
Time between buses									20 min.	45 min.	10 min.	15 min.			trip
Distance between stops									6 blocks	6 blocks	1.5 miles	1.5 miles			
Seat availability									4 of 5 times	5 of 5 times	4 of 5 times	5 of 5 times			
On-board security									Yes	Yes	No	No			
Station security									Yes	Yes	No	No			

1a) Distribute trips to work among preferred options

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11	Option 12	Option 13	Option 14	Option 15

1b) For options 5 through 8, please indicate the # of people in your carpool/vanpool

- ☐ 2 PERSON CARPOOL
- ☐ 3+ PERSON CARPOOL

1c) Total of Options 1 - 15: ☐

(Check that the total number of trips matches your answer to Question A on page 2.)

2. Which of the following would you do if these travel conditions lasted for many years? *(Check as many boxes as apply)*

If you would not choose any of the options below, check here ☐

- ☐ KEEP CURRENT VEHICLE(S) AND BUY MORE FUEL EFFICIENT VEHICLE(S) FOR MOST TRIPS
- ☐ REPLACE VEHICLE(S) WITH MORE FUEL EFFICIENT VEHICLE(S)
- ☐ MOVE CLOSER TO WORK
- ☐ SEEK MORE FLEXIBLE HOURS AT CURRENT JOB
- ☐ USE VEHICLE(S) LESS
- ☐ LOOK FOR WORK CLOSER TO HOME
- ☐ TELECOMMUTE (WORK FROM YOUR HOME)

3. Please examine the following travel conditions to determine your preferred way(s) of traveling to work. *(Remember that peak hours are 7am to 9am and 4pm to 6pm, Monday through Friday. All other hours are off-peak.)*

TABLE 2
VERSION SP1 - Commute

	PRIVATE VEHICLE								PUBLIC TRANSIT				BICYCLE	WALK	
	Drive Alone				Carpool / Vanpool				Regular Bus		Light Rail				
	Free Route		Toll Route		Free Route		Toll Route								
	Peak	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*			
Travel time	35 min.	35 min.	25 min.	25 min.	45 min.	45 min.	35 min.	35 min.	35 min.	25 min.	25 min.	15 min.	55 min.	3.5 hours	I
Bike/Walk path													Yes	No	
Toll cost			$1.00	$1.00			$1.00	$1.00							would
Fuel cost per gallon	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50							
Daily parking cost increase	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00							not
Fare									$0.50	$0.50	$0.50	$0.50			
Closest stop to home									3 blocks	3 blocks	6 blocks	6 blocks			make
Closest stop to destination									12 blocks	12 blocks	15 blocks	15 blocks			
Number of transfers required									None	None	None	None			the
Park-n-ride availability									No	No	Yes	Yes			
Time between buses									20 min.	60 min.	5 min.	15 min.			trip
Distance between stops									4 blocks	4 blocks	2.0 miles	2.0 miles			
Seat availability									4 of 5 times	5 of 5 times	4 of 5 times	5 of 5 times			
On-board security									Yes	Yes	No	No			
Station security									Yes	Yes	No	No			

3a) Distribute trips to work among preferred options

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11	Option 12	Option 13	Option 14	Option 15

3c) Total of Options 1 - 15: ☐

(Check that the total number of trips matches your answer to Question A on page 2.)

3b) For options 5 through 8, please indicate the # of people in your carpool/vanpool

- ☐ 2 PERSON CARPOOL
- ☐ 3+ PERSON CARPOOL

4. Which of the following would you do if these travel conditions lasted for many years? *(Check as many boxes as apply)*

If you would not choose any of the options below, check here ☐

- ☐ KEEP CURRENT VEHICLE(S) AND BUY MORE FUEL EFFICIENT VEHICLE(S) FOR MOST TRIPS
- ☐ REPLACE VEHICLE(S) WITH MORE FUEL EFFICIENT VEHICLE(S)
- ☐ MOVE CLOSER TO WORK
- ☐ SEEK MORE FLEXIBLE HOURS AT CURRENT JOB
- ☐ USE VEHICLE(S) LESS
- ☐ LOOK FOR WORK CLOSER TO HOME
- ☐ TELECOMMUTE (WORK FROM YOUR HOME)

5. Please examine the following travel conditions to determine your preferred way(s) of traveling to work. *(Remember that peak hours are 7am to 9am and 4pm to 6pm, Monday through Friday. All other hours are off-peak.)*

TABLE 3
VERSION SP1 - Commute

	PRIVATE VEHICLE								PUBLIC TRANSIT				BICYCLE	WALK	
	Drive Alone				Carpool / Vanpool				Regular Bus		Express Bus				
	Free Route		Toll Route		Free Route		Toll Route								
	Peak	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*			
Travel time	30 min.	25 min.	20 min.	15 min.	40 min.	30 min.	30 min.	20 min.	30 min.	25 min.	25 min.	20 min.	40 min.	2.5 hours	I
Bike/Walk path													No	Yes	
Toll cost			$1.00	$1.00			$0.50	$0.50							would
Fuel cost per gallon	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50							
Daily parking cost increase	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00							not
Fare									$0.50	$0.50	$0.50	$0.50			
Closest stop to home									6 blocks	6 blocks	9 blocks	9 blocks			make
Closest stop to destination									6 blocks	6 blocks	9 blocks	9 blocks			
Number of transfers required									One	One	One	One			the
Park-n-ride availability									Yes	Yes	No	No			
Time between buses									15 min.	30 min.	15 min.	60 min.			trip
Distance between stops									4 blocks	4 blocks	1.0 mile	1.0 mile			
Seat availability									3 of 5 times	4 of 5 times	3 of 5 times	4 of 5 times			
On-board security									Yes	Yes	Yes	Yes			
Station security									Yes	Yes	Yes	Yes			

5a) Distribute trips to work among preferred options

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11	Option 12	Option 13	Option 14	Option 15

5c) Total of Options 1 - 15: ☐

(Check that the total number of trips matches your answer to Question A on page 2.)

5b) For options 5 through 8, please indicate the # of people in your carpool/vanpool

☐ 2 PERSON CARPOOL

☐ 3+ PERSON CARPOOL

6. Which of the following would you do if these travel conditions lasted for many years? *(Check as many boxes as apply)*

If you would not choose any of the options below, check here ☐

☐ KEEP CURRENT VEHICLE(S) AND BUY MORE FUEL EFFICIENT VEHICLE(S) FOR MOST TRIPS

☐ REPLACE VEHICLE(S) WITH MORE FUEL EFFICIENT VEHICLE(S)

☐ MOVE CLOSER TO WORK

☐ SEEK MORE FLEXIBLE HOURS AT CURRENT JOB

☐ USE VEHICLE(S) LESS

☐ LOOK FOR WORK CLOSER TO HOME

☐ TELECOMMUTE (WORK FROM YOUR HOME)

7. Please examine the following travel conditions to determine your preferred way(s) of traveling to work. *(Remember that peak hours are 7am to 9am and 4pm to 6pm, Monday through Friday. All other hours are off-peak.)*

TABLE 4
VERSION SP1 - Commute

	PRIVATE VEHICLE								PUBLIC TRANSIT				BICYCLE	WALK	
	Drive Alone				Carpool / Vanpool				Regular Bus		Light Rail				
	Free Route		Toll Route		Free Route		Toll Route								
	Peak	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*			
Travel time	40 min.	35 min.	30 min.	25 min.	55 min.	45 min.	45 min.	35 min.	45 min.	40 min.	35 min.	30 min.	55 min.	3.5 hours	I
Bike/Walk path													Yes	Yes	
Toll cost			$2.00	$2.00			$2.00	$2.00							would
Fuel cost per gallon	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50							
Daily parking cost increase	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00							not
Fare									$1.50	$1.50	$1.50	$1.50			
Closest stop to home									12 blocks	12 blocks	21 blocks	21 blocks			make
Closest stop to destination									12 blocks	12 blocks	21 blocks	21 blocks			
Number of transfers required									None	None	None	None			the
Park-n-ride availability									No	No	Yes	Yes			
Time between buses									25 min.	60 min.	10 min.	20 min.			trip
Distance between stops									8 blocks	8 blocks	2.0 miles	2.0 miles			
Seat availability									5 of 5 times	5 of 5 times	5 of 5 times	5 of 5 times			
On-board security									No	No	Yes	Yes			
Station security									No	No	Yes	Yes			

7a) Distribute trips to work among preferred options

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11	Option 12	Option 13	Option 14	Option 15

7b) For options 5 through 8, please indicate the # of people in your carpool/vanpool

- ☐ 2 PERSON CARPOOL
- ☐ 3+ PERSON CARPOOL

7c) Total of Options 1 - 15: ☐

(Check that the total number of trips matches your answer to Question A on page 2.)

8. Which of the following would you do if these travel conditions lasted for many years? *(Check as many boxes as apply)*

If you would not choose any of the options below, check here ☐

- ☐ KEEP CURRENT VEHICLE(S) AND BUY MORE FUEL EFFICIENT VEHICLE(S) FOR MOST TRIPS
- ☐ REPLACE VEHICLE(S) WITH MORE FUEL EFFICIENT VEHICLE(S)
- ☐ MOVE CLOSER TO WORK
- ☐ SEEK MORE FLEXIBLE HOURS AT CURRENT JOB
- ☐ USE VEHICLE(S) LESS
- ☐ LOOK FOR WORK CLOSER TO HOME
- ☐ TELECOMMUTE (WORK FROM YOUR HOME)

9. Please examine the following travel conditions to determine your preferred way(s) of traveling to work. *(Remember that peak hours are 7am to 9am and 4pm to 6pm, Monday through Friday. All other hours are off-peak.)*

TABLE 5
VERSION SP1 - Commute

	PRIVATE VEHICLE								PUBLIC TRANSIT				BICYCLE	WALK	
	Drive Alone				Carpool / Vanpool				Regular Bus		Express Bus				
	Free Route		Toll Route		Free Route		Toll Route								
	Peak	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*			
Travel time	20 min.	15 min.	15 min.	10 min.	35 min.	20 min.	30 min.	15 min.	45 min.	40 min.	35 min.	30 min.	25 min.	1.5 hours	I
Bike/Walk path													No	Yes	
Toll cost			$1.50	$1.50			$1.00	$1.00							would
Fuel cost per gallon	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50							
Daily parking cost increase	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00							not
Fare									$1.00	$1.00	$1.00	$1.00			
Closest stop to home									12 blocks	12 blocks	18 blocks	18 blocks			make
Closest stop to destination									3 blocks	3 blocks	9 blocks	9 blocks			
Number of transfers required									None	None	None	None			the
Park-n-ride availability									No	No	No	No			
Time between buses									15 min.	15 min.	30 min.	60 min.			trip
Distance between stops									6 blocks	6 blocks	0.5 miles	0.5 miles			
Seat availability									3 of 5 times	4 of 5 times	3 of 5 times	4 of 5 times			
On-board security									Yes	Yes	Yes	Yes			
Station security									Yes	Yes	Yes	Yes			

9a) Distribute trips to work among preferred options

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11	Option 12	Option 13	Option 14	Option 15

9c) Total of Options 1 - 15: ☐

(Check that the total number of trips matches your answer to Question A on page 2.)

9b) For options 5 through 8, please indicate the # of people in your carpool/vanpool

☐ 2 PERSON CARPOOL

☐ 3+ PERSON CARPOOL

10. Which of the following would you do if these travel conditions lasted for many years? *(Check as many boxes as apply)*

If you would not choose any of the options below, check here ☐

☐ KEEP CURRENT VEHICLE(S) AND BUY MORE FUEL EFFICIENT VEHICLE(S) FOR MOST TRIPS

☐ REPLACE VEHICLE(S) WITH MORE FUEL EFFICIENT VEHICLE(S)

☐ MOVE CLOSER TO WORK

☐ SEEK MORE FLEXIBLE HOURS AT CURRENT JOB

☐ USE VEHICLE(S) LESS

☐ LOOK FOR WORK CLOSER TO HOME

☐ TELECOMMUTE (WORK FROM YOUR HOME)

11. Please examine the following travel conditions to determine your preferred way(s) of traveling to work. ***(Remember that peak hours are 7am to 9am and 4pm to 6pm, Monday through Friday. All other hours are off-peak.)***

TABLE 6
VERSION SP1 - Commute

	PRIVATE VEHICLE								PUBLIC TRANSIT				BICYCLE	WALK	
	Drive Alone				Carpool / Vanpool				Regular Bus		Light Rail				
	Free Route		Toll Route		Free Route		Toll Route								
	Peak	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*			
Travel time	40 min.	35 min.	25 min.	20 min.	50 min.	45 min.	35 min.	30 min.	40 min.	35 min.	25 min.	20 min.	55 min.	3.5 hours	I
Bike/Walk path													Yes	Yes	
Toll cost			$0.50	$0.50			$0.50	$0.50							would
Fuel cost per gallon	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50							
Daily parking cost increase	None	None	None	None	None	None	None	None							not
Fare									None	None	None	None			
Closest stop to home									6 blocks	6 blocks	6 blocks	6 blocks			make
Closest stop to destination									9 blocks	9 blocks	9 blocks	9 blocks			
Number of transfers required									One	One	Two	Two			the
Park-n-ride availability									Yes	Yes	Yes	Yes			
Time between buses									25 min.	45 min.	5 min.	20 min.			trip
Distance between stops									2 blocks	2 blocks	1.5 miles	1.5 miles			
Seat availability									5 of 5 times	5 of 5 times	5 of 5 times	5 of 5 times			
On-board security									No	No	Yes	Yes			
Station security									No	No	Yes	Yes			

11a) Distribute trips to work among preferred options

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11	Option 12	Option 13	Option 14	Option 15

11b) For options 5 through 8, please indicate the # of people in your carpool/vanpool

- ☐ 2 PERSON CARPOOL
- ☐ 3+ PERSON CARPOOL

11c) Total of Options 1 - 15: ☐

(Check that the total number of trips matches your answer to Question A on page 2.)

12. Which of the following would you do if these travel conditions lasted for many years? ***(Check as many boxes as apply)***

If you would not choose any of the options below, check here ☐

- ☐ KEEP CURRENT VEHICLE(S) AND BUY MORE FUEL EFFICIENT VEHICLE(S) FOR MOST TRIPS
- ☐ REPLACE VEHICLE(S) WITH MORE FUEL EFFICIENT VEHICLE(S)
- ☐ MOVE CLOSER TO WORK
- ☐ SEEK MORE FLEXIBLE HOURS AT CURRENT JOB
- ☐ USE VEHICLE(S) LESS
- ☐ LOOK FOR WORK CLOSER TO HOME
- ☐ TELECOMMUTE (WORK FROM YOUR HOME)

13. Please examine the following travel conditions to determine your preferred way(s) of traveling to work. *(Remember that peak hours are 7am to 9am and 4pm to 6pm, Monday through Friday. All other hours are off-peak.)*

TABLE 7
VERSION SP1 - Commute

	PRIVATE VEHICLE								PUBLIC TRANSIT				BICYCLE	WALK	
	Drive Alone				Carpool / Vanpool				Regular Bus		Express Bus				
	Free Route		Toll Route		Free Route		Toll Route								
	Peak	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*			
Travel time	35 min.	25 min.	25 min.	15 min.	50 min.	30 min.	40 min.	20 min.	40 min.	30 min.	25 min.	25 min.	40 min.	2.5 hours	I
Bike/Walk path													No	No	
Toll cost			$2.00	$2.00			$1.50	$1.50							would
Fuel cost per gallon	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50							
Daily parking cost increase	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00							not
Fare									$1.50	$1.50	$1.50	$1.50			
Closest stop to home									9 blocks	9 blocks	18 blocks	18 blocks			make
Closest stop to destination									6 blocks	6 blocks	15 blocks	15 blocks			
Number of transfers required									Two	Two	One	One			the
Park-n-ride availability									Yes	Yes	No	No			
Time between buses									10 min.	30 min.	30 min.	30 min.			trip
Distance between stops									8 blocks	8 blocks	1.0 mile	1.0 mile			
Seat availability									2 of 5 times	3 of 5 times	2 of 5 times	3 of 5 times			
On-board security									No	No	No	No			
Station security									No	No	No	No			

13a) Distribute trips to work among preferred options

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11	Option 12	Option 13	Option 14	Option 15

13c) Total of Options 1 - 15: ☐

(Check that the total number of trips matches your answer to Question A on page 2.)

13b) For options 5 through 8, please indicate the # of people in your carpool/vanpool

☐ 2 PERSON CARPOOL

☐ 3+ PERSON CARPOOL

14. Which of the following would you do if these travel conditions lasted for many years? *(Check as many boxes as apply)*

If you would not choose any of the options below, check here ☐

☐ KEEP CURRENT VEHICLE(S) AND BUY MORE FUEL EFFICIENT VEHICLE(S) FOR MOST TRIPS

☐ REPLACE VEHICLE(S) WITH MORE FUEL EFFICIENT VEHICLE(S)

☐ MOVE CLOSER TO WORK

☐ SEEK MORE FLEXIBLE HOURS AT CURRENT JOB

☐ USE VEHICLE(S) LESS

☐ LOOK FOR WORK CLOSER TO HOME

☐ TELECOMMUTE (WORK FROM YOUR HOME)

15. Please examine the following travel conditions to determine your preferred way(s) of traveling to work. *(Remember that peak hours are 7am to 9am and 4pm to 6pm, Monday through Friday. All other hours are off-peak.)*

TABLE 8
VERSION SP1 - Commute

	PRIVATE VEHICLE								PUBLIC TRANSIT				BICYCLE	WALK	
	Drive Alone				Carpool / Vanpool				Regular Bus		Express Bus				
	Free Route		Toll Route		Free Route		Toll Route								
	Peak	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*			
Travel time	15 min.	15 min.	10 min.	10 min.	25 min.	20 min.	20 min.	15 min.	25 min.	25 min.	15 min.	15 min.	25 min.	1.5 hours	I
Bike/Walk path													No	No	
Toll cost			$0.50	$0.50			None	None							would
Fuel cost per gallon	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50							
Daily parking cost increase	None	None	None	None	None	None	None	None							not
Fare									None	None	None	None			
Closest stop to home									3 blocks	3 blocks	3 blocks	3 blocks			make
Closest stop to destination									3 blocks	3 blocks	3 blocks	3 blocks			
Number of transfers required									None	None	None	None			the
Park-n-ride availability									No	No	No	No			
Time between buses									10 min.	10 min.	15 min.	30 min.			trip
Distance between stops									2 blocks	2 blocks	0.5 miles	0.5 miles			
Seat availability									2 of 5 times	3 of 5 times	2 of 5 times	3 of 5 times			
On-board security									No	No	No	No			
Station security									No	No	No	No			

15a) Distribute trips to work among preferred options

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11	Option 12	Option 13	Option 14	Option 15

15c) Total of Options 1 - 15: ☐

(Check that the total number of trips matches your answer to Question A on page 2.)

15b) For options 5 through 8, please indicate the # of people in your carpool/vanpool

☐ 2 PERSON CARPOOL

☐ 3+ PERSON CARPOOL

16. Which of the following would you do if these travel conditions lasted for many years? *(Check as many boxes as apply)*

If you would not choose any of the options below, check here ☐

☐ KEEP CURRENT VEHICLE(S) AND BUY MORE FUEL EFFICIENT VEHICLE(S) FOR MOST TRIPS

☐ REPLACE VEHICLE(S) WITH MORE FUEL EFFICIENT VEHICLE(S)

☐ MOVE CLOSER TO WORK

☐ SEEK MORE FLEXIBLE HOURS AT CURRENT JOB

☐ USE VEHICLE(S) LESS

☐ LOOK FOR WORK CLOSER TO HOME

☐ TELECOMMUTE (WORK FROM YOUR HOME)

KEY TERMS

Please pull out this sheet and keep it handy while you complete the survey.

Travel Conditions	Travel conditions are the features of the travel options. For example, some of the features of the "Regular Bus" travel option are fare, seat availability, and station security.
Travel Options	Travel options are the types of transportation available. For the four private vehicle options and two public transit options, two travel times (peak and off-peak) are given. In addition, there are bicycle and walk options offered.

TRAVEL OPTIONS

Bicycle	Bicycling is defined as travel on a non-motorized two or three wheel vehicle. Bicycling may take place on the street or on a designated bicycle/walk path.
Bus	There are two types of bus service available: Regular and Express. *Regular Bus*: The regular bus runs on a fixed schedule, making frequent stops. *Express Bus*: The express bus runs less frequently than the regular bus, but makes fewer stops, allowing you to get to your destination more quickly.
Carpool	A carpool consists of two or more people driving in a private vehicle to the same destination, or destinations close to each other. Toll, fuel and parking costs are shared among the vehicle's passengers.
Drive Alone	The driver is the only person in the car.
Free Route	A free route is a non-toll route, usually on secondary roads, which can get you to your destination.
Light Rail	Light rail operates on tracks, like a train, and is powered by overhead electric power lines. MAX is the Portland light rail system.
Off-Peak	Off-peak hours are all non-peak hours (see peak definition below). Traffic during these hours is generally lighter than during peak hours.
Peak	Peak always refers to the hours of 7am to 9am and 4pm to 6pm, Monday through Friday. These are the hours during which traffic is heaviest.
Private Vehicle	A private vehicle is one which is driven by a private citizen. Your car, truck, van or motorcycle is a private vehicle.
Toll Route	A toll route is one on which you must pay a fee to travel. All toll costs are for a one-way trip.

Please turn the page for more definitions.

KEY TERMS (continued)

Vanpool	A vanpool consists of three or more travelers sharing a trip in a van. One of the vanpoolers may drive the van, or there may be a separate driver provided. Toll, fuel and parking costs are shared among the vehicle's passengers.
Walk	Walking is defined as traveling on foot. Walking may take place along roads or on designated bicycle/walk paths.

TRAVEL CONDITIONS

Bicycle/Walk Path	A bicycle/walk path is a safe path designated for the use of bicyclists and walkers only.
Closest Stop to Destination	The closest stop to destination is the stop nearest to the location to which you are traveling.
Closest Stop to Home	The closest stop to home is the stop located nearest to your residence.
Daily Parking Cost Increase	The daily parking cost increase is the additional amount you will pay to park one vehicle. Add this amount to your current daily parking fee.
Distance Between Stops	The distance between stops is the distance the bus travels between scheduled stops.
Fare	The fare is the cost per one-way trip.
Fuel Cost	The fuel cost is the per gallon cost for gasoline.
On Board Security	On-board security takes the form of a guard who patrols the buses.
Park-n-Ride	Park-n-ride is a system whereby travelers drive their cars to a central parking lot from which they can take public transit to their final destinations.
Seat Availability	The seat availability refers to the likelihood of finding a seat available.
Station Security	Station security means that the bus stations are monitored either electronically or by guards.
Time Between Buses	The time between buses is the wait time between buses running on the same route.
Toll Cost	The toll cost is the one way charge for driving on a toll road.
Travel Time	The travel time is the length of time you spend in your car, on the bus, bicycling or walking as you travel to your destination.

TRAVEL BEHAVIOR SURVEY

Thank you for participating in the Regional Travel Behavior Survey. This survey is unique; you've probably never completed one like it. Take ample time to familiarize yourself with the survey materials before you begin; you'll find it will be fun.

This survey is designed to investigate how local residents, such as yourself, might change their travel habits if travel conditions were different from what they are today. Imagine that as the population in your area grows, traffic becomes heavier and slower; the time it takes to get to work, shop or run errands increases; and travel costs, such as gasoline, parking or transit fares, rise. In this "imagined" future, travel time around the area might decrease, but at the cost of paying a toll for certain roads.

Your participation in this survey is very important. Your answers provide critical information for effective planning for the future. We assure you that your answers are completely confidential and will be used for statistical purposes only.

In the following pages, you'll be presented with eight (8) tables outlining future Travel Options and Travel Conditions for a typical trip. Each table is followed by two (2) questions. Each table and set of 2 questions is a separate and independent task, and should be done one at a time.

The next page contains survey instructions. It is very important that you read these before you begin. If you have any questions, please call **Mary McBride at 1-800-447-8287.**

SURVEY INSTRUCTIONS

Remove the **Key Terms** pull-out section and read through the explanations for each of the Travel Options and the Travel Conditions. Then familiarize yourself with the format of the Sample Table — Travel Options and Travel Conditions, below. The Sample Table serves as an example of the type of table you will be using in the survey.

SAMPLE TABLE - TRAVEL OPTIONS AND TRAVEL CONDITIONS

	PRIVATE VEHICLE								PUBLIC TRANSIT				BICYCLE	WALK	
	Drive Alone				Carpool / Vanpool				Regular Bus		Express Bus				
	Free Route		Toll Route		Free Route		Toll Route								
	Peak	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*			
Travel time	30 min.	25 min.	10 min.	10 min.	45 min.	35 min.	25 min.	20 min.	35 min.	35 min.	30 min.	30 min.	40 min.	2.5 hours	I
Bike/Walk path													No	Yes	
Toll cost			$0.50	$0.50			$0.50	$0.50							would
Fuel cost per gallon	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50							
Daily parking cost increase	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00							not
Fare									$1.00	$1.00	$1.00	$1.00			
Closest stop to home									6 blocks	6 blocks	9 blocks	9 blocks			make
Closest stop to destination									12 blocks	12 blocks	21 blocks	21 blocks			
Number of transfers required									None	None	None	None			the
Park-n-ride availability									Yes	Yes	Yes	Yes			
Time between buses									10 min.	30 min.	30 min.	30 min.			trip
Distance between stops									8 blocks	8 blocks	2.0 miles	2.0 miles			
Seat availability									5 of 5 times	5 of 5 times	4 of 5 times	5 of 5 times			
On-board security									No	No	Yes	Yes			
Station security									Yes	Yes	No	No			
	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11	Option 12	Option 13	Option 14	Option 15

1A. Study the Travel Options.

The Sample Table outlines four Private Vehicle Travel Options:
(1) Free Route, Drive Alone
(2) Free Route, Carpool/Vanpool
(3)Toll Route, Drive Alone
(4) Toll Route, Carpool/Vanpool

Two Public Transit Options are also included:
(1) Regular Bus
(2) Express Bus/Light Rail

For each of these Travel Options, two Travel Periods are given:
(1) Peak (7am to 9am and 4pm to 6pm, Monday through Friday)
(2) Non-Peak (all other times)

In addition, the Sample Table includes the options of:
(1) Bicycling
(2) Walking

1B. **Study the Travel Conditions.**
The Sample Table presents four types of Travel Conditions for Private Vehicles: (1) Travel time
(2) Toll cost
(3) Fuel cost
(4) Daily parking cost increase

Eleven types of Travel Conditions are given for Public Transit: (1) Travel time
(2) Fare
(3) Closest stop to home
(4) Closest stop to destination
(5) Number of transfers required
(6) Park-n-ride availability
(7) Time between buses
(8) Distance between stops
(9) Seat availability
(10) On-board security
(11) Station security

Two types of conditions are given for Bicycling and Walking: (1) Travel time
(2) Bicycle/walk path

2. Flip through the pages of this booklet and look at Tables 1 - 8. Notice that these tables are similar in set-up to the Sample Table, except that they contain information that determine your choice among Travel Options.

EXAMPLE: Now, focus on just the first four travel options and the first two travel conditions. (When you complete the actual survey, you will want to consider all of the conditions for all of the options.) You find:

- Option 1: Free Route - Drive Alone during peak hours takes 30 minutes but has no cost.
- Option 2: Free Route - Drive Alone during off-peak hours takes 25 minutes but has no cost.
- Option 3: Toll Route - Drive Alone during peak hours takes 10 minutes but you have to pay $0.50
- Option 4: Toll Route - Drive Alone during off-peak hours takes 10 minutes but you have to pay $0.50

SAMPLE QUESTION: Imagine that on a Friday morning at 10:00 am, it now takes you 15 minutes to drive to the grocery store. Study the travel conditions for Options 1-4 in the Sample Table. Imagine now that these are the conditions under which you now have drive to the store. Given these conditions, place a mark under the option would you choose for your trip to the grocery store.

Option 1	Option 2	Option 3	Option 4
❑	❑	❑	❑

SURVEY BEGINS HERE

The label below lists the characteristics of a trip you reported to us on the 1994 Activity and Travel Behavior survey. As you complete the survey, imagine that this is the trip you must make.

On a Friday
you left home at 5:45 pm
and drove to COURTHOUSE HEALTH CLUB
to exercise.
It took you 15 minutes to drive there.

405295:NONCOMM:LE 4

Read and evaluate all of the information contained in Table 1 on the next page. Based on this information, decide how you will make your trip and answer questions 1 and 2 that follow the table. After completing these questions, proceed to the next page.

Please examine the following travel conditions. Check the box below the option you would choose for your trip if these were the only options available.
(Remember that peak hours are 7am to 9am and 4pm to 6pm, Monday through Friday. All other hours are off-peak.)

TABLE 1
VERSION LP1 - Non-Commute

	PRIVATE VEHICLE								PUBLIC TRANSIT				BICYCLE	WALK	
	Drive Alone				Carpool / Vanpool				Regular Bus		Light Rail				
	Free Route		Toll Route		Free Route		Toll Route								
	Peak	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*			
Travel time	55 min.	45 min.	40 min.	30 min.	70 min.	55 min.	55 min.	40 min.	70 min.	60 min.	55 min.	45 min.	70 min.	4.5 hours	I
Bike/Walk path													Yes	No	
Toll cost			$1.50	$1.50			$1.50	$1.50							wou
Fuel cost per gallon	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50							
Daily parking cost increase	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00							not
Fare									$1.00	$1.00	$1.00	$1.00			
Closest stop to home									9 blocks	9 blocks	15 blocks	15 blocks			make
Closest stop to destination									9 blocks	9 blocks	15 blocks	15 blocks			
Number of transfers required									Two	Two	Two	Two			the
Park-n-ride availability									Yes	Yes	Yes	Yes			
Time between buses									20 min.	45 min.	10 min.	15 min.			trip
Distance between stops									6 blocks	6 blocks	1.5 miles	1.5 miles			
Seat availability									4 of 5 times	5 of 5 times	4 of 5 times	5 of 5 times			
On-board security									Yes	Yes	No	No			
Station security									Yes	Yes	No	No			

1a) Check ONE box only

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11	Option 12	Option 13	Option 14	Option 15
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

1b) For options 5 through 8, please indicate the # of people in your carpool/vanpool

☐ 2 PERSON CARPOOL
☐ 3+ PERSON CARPOOL

2. Which of the following would you do if these travel conditions lasted for many years? *(Check as many boxes as apply)*
If you would not choose any of the options below, check here ☐

☐ MAKE TRIP LESS OFTEN
☐ COMBINE TRIP WITH OTHER TRIPS
☐ MAKE TRIP AT DIFFERENT TIME OF DAY
☐ LOOK FOR A SIMILAR DESTINATION CLOSER TO HOME
☐ DO ACTIVITY AT HOME
☐ NOT MAKE TRIP AT ALL

Please examine the following travel conditions. Check the box below the option you would choose for your trip if these were the only options available.
(Remember that peak hours are 7am to 9am and 4pm to 6pm, Monday through Friday. All other hours are off-peak.)

TABLE 2
VERSION LP1 - Non-Commute

	PRIVATE VEHICLE								PUBLIC TRANSIT				BICYCLE	WALK	
	Drive Alone				Carpool / Vanpool				Regular Bus		Light Rail				
	Free Route		Toll Route		Free Route		Toll Route								
	Peak	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*			
Travel time	45 min.	45 min.	35 min.	35 min.	55 min.	55 min.	45 min.	45 min.	45 min.	35 min.	35 min.	25 min.	70 min.	4.5 hours	I
Bike/Walk path													Yes	No	
Toll cost			$1.00	$1.00			$1.00	$1.00							would
Fuel cost per gallon	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50							
Daily parking cost increase	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00							not
Fare									$0.50	$0.50	$0.50	$0.50			
Closest stop to home									3 blocks	3 blocks	6 blocks	6 blocks			make
Closest stop to destination									12 blocks	12 blocks	15 blocks	15 blocks			
Number of transfers required									None	None	None	None			the
Park-n-ride availability									No	No	Yes	Yes			
Time between buses									20 min.	60 min.	5 min.	15 min.			trip
Distance between stops									4 blocks	4 blocks	2.0 miles	2.0 miles			
Seat availability									4 of 5 times	5 of 5 times	4 of 5 times	5 of 5 times			
On-board security									Yes	Yes	No	No			
Station security									Yes	Yes	No	No			

3a) Check ONE box only

Option 1 ☐ Option 2 ☐ Option 3 ☐ Option 4 ☐ Option 5 ☐ Option 6 ☐ Option 7 ☐ Option 8 ☐ Option 9 ☐ Option 10 ☐ Option 11 ☐ Option 12 ☐ Option 13 ☐ Option 14 ☐ Option 15 ☐

3b) For options 5 through 8, please indicate the # of people in your carpool/vanpool

☐ 2 PERSON CARPOOL
☐ 3+ PERSON CARPOOL

4. Which of the following would you do if these travel conditions lasted for many years? ***(Check as many boxes as apply)***
If you would not choose any of the options below, check here ☐

☐ MAKE TRIP LESS OFTEN
☐ COMBINE TRIP WITH OTHER TRIPS
☐ MAKE TRIP AT DIFFERENT TIME OF DAY
☐ LOOK FOR A SIMILAR DESTINATION CLOSER TO HOME
☐ DO ACTIVITY AT HOME
☐ NOT MAKE TRIP AT ALL

Please examine the following travel conditions. Check the box below the option you would choose for your trip if these were the only options available.
(Remember that peak hours are 7am to 9am and 4pm to 6pm, Monday through Friday. All other hours are off-peak.)

TABLE 3
VERSION LP1 - Non-Commute

	PRIVATE VEHICLE								PUBLIC TRANSIT				BICYCLE	WALK	
	Drive Alone				Carpool / Vanpool				Regular Bus		Express Bus				
	Free Route		Toll Route		Free Route		Toll Route								
	Peak	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*			
Travel time	40 min.	35 min.	30 min.	25 min.	50 min.	40 min.	40 min.	30 min.	45 min.	40 min.	40 min.	35 min.	55 min.	3.5 hours	I
Bike/Walk path													No	Yes	
Toll cost			$1.00	$1.00			$0.50	$0.50							would
Fuel cost per gallon	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50							
Daily parking cost increase	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00							not
Fare									$0.50	$0.50	$0.50	$0.50			
Closest stop to home									6 blocks	6 blocks	9 blocks	9 blocks			make
Closest stop to destination									6 blocks	6 blocks	9 blocks	9 blocks			
Number of transfers required									One	One	One	One			the
Park-n-ride availability									Yes	Yes	No	No			
Time between buses									15 min.	30 min.	15 min.	60 min.			trip
Distance between stops									4 blocks	4 blocks	1.0 mile	1.0 mile			
Seat availability									3 of 5 times	4 of 5 times	3 of 5 times	4 of 5 times			
On-board security									Yes	Yes	Yes	Yes			
Station security									Yes	Yes	Yes	Yes			

5a) Check ONE box only

Option 1 ☐ Option 2 ☐ Option 3 ☐ Option 4 ☐ Option 5 ☐ Option 6 ☐ Option 7 ☐ Option 8 ☐ Option 9 ☐ Option 10 ☐ Option 11 ☐ Option 12 ☐ Option 13 ☐ Option 14 ☐ Option 15 ☐

5b) For options 5 through 8, please indicate the # of people in your carpool/vanpool

☐ 2 PERSON CARPOOL
☐ 3+ PERSON CARPOOL

6. Which of the following would you do if these travel conditions lasted for many years? ***(Check as many boxes as apply)***

If you would not choose any of the options below, check here ☐

☐ MAKE TRIP LESS OFTEN
☐ COMBINE TRIP WITH OTHER TRIPS
☐ MAKE TRIP AT DIFFERENT TIME OF DAY
☐ LOOK FOR A SIMILAR DESTINATION CLOSER TO HOME
☐ DO ACTIVITY AT HOME
☐ NOT MAKE TRIP AT ALL

Please examine the following travel conditions. Check the box below the option you would choose for your trip if these were the only options available.
(Remember that peak hours are 7am to 9am and 4pm to 6pm, Monday through Friday. All other hours are off-peak.)

TABLE 4
VERSION LP1 - Non-Commute

	PRIVATE VEHICLE								PUBLIC TRANSIT				BICYCLE	WALK	
	Drive Alone				Carpool / Vanpool				Regular Bus		Light Rail				
	Free Route		Toll Route		Free Route		Toll Route								
	Peak	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*			
Travel time	50 min.	45 min.	40 min.	35 min.	65 min.	55 min.	55 min.	45 min.	70 min.	65 min.	60 min.	55 min.	70 min.	4.5 hours	I
Bike/Walk path													Yes	Yes	
Toll cost			$2.00	$2.00			$2.00	$2.00							would
Fuel cost per gallon	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50							
Daily parking cost increase	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00							not
Fare									$1.50	$1.50	$1.50	$1.50			
Closest stop to home									12 blocks	12 blocks	21 blocks	21 blocks			make
Closest stop to destination									12 blocks	12 blocks	21 blocks	21 blocks			
Number of transfers required									None	None	None	None			the
Park-n-ride availability									No	No	Yes	Yes			
Time between buses									25 min.	60 min.	10 min.	20 min.			trip
Distance between stops									8 blocks	8 blocks	2.0 miles	2.0 miles			
Seat availability									5 of 5 times	5 of 5 times	5 of 5 times	5 of 5 times			
On-board security									No	No	Yes	Yes			
Station security									No	No	Yes	Yes			

7a) Check ONE box only

Option 1 ☐ Option 2 ☐ Option 3 ☐ Option 4 ☐ Option 5 ☐ Option 6 ☐ Option 7 ☐ Option 8 ☐ Option 9 ☐ Option 10 ☐ Option 11 ☐ Option 12 ☐ Option 13 ☐ Option 14 ☐ Option 15 ☐

7b) For options 5 through 8, please indicate the # of people in your carpool/vanpool

☐ 2 PERSON CARPOOL
☐ 3+ PERSON CARPOOL

8. Which of the following would you do if these travel conditions lasted for many years? ***(Check as many boxes as apply)***

If you would not choose any of the options below, check here ☐

☐ MAKE TRIP LESS OFTEN
☐ COMBINE TRIP WITH OTHER TRIPS
☐ MAKE TRIP AT DIFFERENT TIME OF DAY
☐ LOOK FOR A SIMILAR DESTINATION CLOSER TO HOME
☐ DO ACTIVITY AT HOME
☐ NOT MAKE TRIP AT ALL

Please examine the following travel conditions. Check the box below the option you would choose for your trip if these were the only options available.
(Remember that peak hours are 7am to 9am and 4pm to 6pm, Monday through Friday. All other hours are off-peak.)

TABLE 5
VERSION LP1 - Non-Commute

	PRIVATE VEHICLE								PUBLIC TRANSIT				BICYCLE	WALK	
	Drive Alone				Carpool / Vanpool				Regular Bus		Express Bus				
	Free Route		Toll Route		Free Route		Toll Route								
	Peak	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*			
Travel time	30 min.	25 min.	25 min.	20 min.	45 min.	30 min.	40 min.	25 min.	70 min.	65 min.	60 min.	55 min.	40 min.	2.5 hours	I
Bike/Walk path													No	Yes	
Toll cost			$1.50	$1.50			$1.00	$1.00							would
Fuel cost per gallon	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50							
Daily parking cost increase	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00							not
Fare									$1.00	$1.00	$1.00	$1.00			
Closest stop to home									12 blocks	12 blocks	18 blocks	18 blocks			make
Closest stop to destination									3 blocks	3 blocks	9 blocks	9 blocks			
Number of transfers required									None	None	None	None			the
Park-n-ride availability									No	No	No	No			
Time between buses									15 min.	15 min.	30 min.	60 min.			trip
Distance between stops									6 blocks	6 blocks	0.5 miles	0.5 miles			
Seat availability									3 of 5 times	4 of 5 times	3 of 5 times	4 of 5 times			
On-board security									Yes	Yes	Yes	Yes			
Station security									Yes	Yes	Yes	Yes			

9a) Check ONE box only

Option 1 ☐ Option 2 ☐ Option 3 ☐ Option 4 ☐ Option 5 ☐ Option 6 ☐ Option 7 ☐ Option 8 ☐ Option 9 ☐ Option 10 ☐ Option 11 ☐ Option 12 ☐ Option 13 ☐ Option 14 ☐ Option 15 ☐

9b) For options 5 through 8, please indicate the # of people in your carpool/vanpool

☐ 2 PERSON CARPOOL
☐ 3+ PERSON CARPOOL

10. Which of the following would you do if these travel conditions lasted for many years? ***(Check as many boxes as apply)***
If you would not choose any of the options below, check here ☐

☐ MAKE TRIP LESS OFTEN
☐ COMBINE TRIP WITH OTHER TRIPS
☐ MAKE TRIP AT DIFFERENT TIME OF DAY
☐ LOOK FOR A SIMILAR DESTINATION CLOSER TO HOME
☐ DO ACTIVITY AT HOME
☐ NOT MAKE TRIP AT ALL

Please examine the following travel conditions. Check the box below the option you would choose for your trip if these were the only options available.
(Remember that peak hours are 7am to 9am and 4pm to 6pm, Monday through Friday. All other hours are off-peak.)

TABLE 6
VERSION LP1 - Non-Commute

	PRIVATE VEHICLE								PUBLIC TRANSIT				BICYCLE	WALK	
	Drive Alone				Carpool / Vanpool				Regular Bus		Light Rail				
	Free Route		Toll Route		Free Route		Toll Route								
	Peak	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*			
Travel time	50 min.	45 min.	35 min.	30 min.	60 min.	55 min.	45 min.	40 min.	55 min.	50 min.	40 min.	35 min.	70 min.	4.5 hours	I
Bike/Walk path													Yes	Yes	
Toll cost			$0.50	$0.50			$0.50	$0.50							would
Fuel cost per gallon	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50							
Daily parking cost increase	None	None	None	None	None	None	None	None							not
Fare									None	None	None	None			
Closest stop to home									6 blocks	6 blocks	6 blocks	6 blocks			make
Closest stop to destination									9 blocks	9 blocks	9 blocks	9 blocks			
Number of transfers required									One	One	Two	Two			the
Park-n-ride availability									Yes	Yes	Yes	Yes			
Time between buses									25 min.	45 min.	5 min.	20 min.			trip
Distance between stops									2 blocks	2 blocks	1.5 miles	1.5 miles			
Seat availability									5 of 5 times	5 of 5 times	5 of 5 times	5 of 5 times			
On-board security									No	No	Yes	Yes			
Station security									No	No	Yes	Yes			

11a) Check ONE box only

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11	Option 12	Option 13	Option 14	Option 15
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

11b) For options 5 through 8, please indicate the # of people in your carpool/vanpool

☐ 2 PERSON CARPOOL
☐ 3+ PERSON CARPOOL

12. Which of the following would you do if these travel conditions lasted for many years? *(Check as many boxes as apply)*
If you would not choose any of the options below, check here ☐

☐ MAKE TRIP LESS OFTEN
☐ COMBINE TRIP WITH OTHER TRIPS
☐ MAKE TRIP AT DIFFERENT TIME OF DAY
☐ LOOK FOR A SIMILAR DESTINATION CLOSER TO HOME
☐ DO ACTIVITY AT HOME
☐ NOT MAKE TRIP AT ALL

Please examine the following travel conditions. Check the box below the option you would choose for your trip if these were the only options available.
(Remember that peak hours are 7am to 9am and 4pm to 6pm, Monday through Friday. All other hours are off-peak.)

TABLE 7
VERSION LP1 - Non-Commute

	PRIVATE VEHICLE								PUBLIC TRANSIT				BICYCLE	WALK	
	Drive Alone				Carpool / Vanpool				Regular Bus		Express Bus				
	Free Route		Toll Route		Free Route		Toll Route								
	Peak	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*			
Travel time	45 min.	35 min.	35 min.	25 min.	60 min.	40 min.	50 min.	30 min.	60 min.	50 min.	45 min.	45 min.	55 min.	3.5 hours	I
Bike/Walk path													No	No	
Toll cost			$2.00	$2.00			$1.50	$1.50							would
Fuel cost per gallon	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50							
Daily parking cost increase	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00							not
Fare									$1.50	$1.50	$1.50	$1.50			
Closest stop to home									9 blocks	9 blocks	18 blocks	18 blocks			make
Closest stop to destination									6 blocks	6 blocks	15 blocks	15 blocks			
Number of transfers required									Two	Two	One	One			the
Park-n-ride availability									Yes	Yes	No	No			
Time between buses									10 min.	30 min.	30 min.	30 min.			trip
Distance between stops									8 blocks	8 blocks	1.0 mile	1.0 mile			
Seat availability									2 of 5 times	3 of 5 times	2 of 5 times	3 of 5 times			
On-board security									No	No	No	No			
Station security									No	No	No	No			

13a) Check ONE box only

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11	Option 12	Option 13	Option 14	Option 15
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

13b) For options 5 through 8, please indicate the # of people in your carpool/vanpool

☐ 2 PERSON CARPOOL
☐ 3+ PERSON CARPOOL

14. Which of the following would you do if these travel conditions lasted for many years? *(Check as many boxes as apply)*
If you would not choose any of the options below, check here ☐

☐ MAKE TRIP LESS OFTEN
☐ COMBINE TRIP WITH OTHER TRIPS
☐ MAKE TRIP AT DIFFERENT TIME OF DAY
☐ LOOK FOR A SIMILAR DESTINATION CLOSER TO HOME
☐ DO ACTIVITY AT HOME
☐ NOT MAKE TRIP AT ALL

Please examine the following travel conditions. Check the box below the option you would choose for your trip if these were the only options available.
(Remember that peak hours are 7am to 9am and 4pm to 6pm, Monday through Friday. All other hours are off-peak.)

TABLE 8
VERSION LP1 - Non-Commute

	PRIVATE VEHICLE								PUBLIC TRANSIT				BICYCLE	WALK	
	Drive Alone				Carpool / Vanpool				Regular Bus		Express Bus				
	Free Route		Toll Route		Free Route		Toll Route								
	Peak	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*	*Peak*	*Off-Peak*			
Travel time	25 min.	25 min.	20 min.	20 min.	35 min.	30 min.	30 min.	25 min.	35 min.	35 min.	25 min.	25 min.	40 min.	2.5 hours	I
Bike/Walk path													No	No	
Toll cost			$0.50	$0.50			None	None							would
Fuel cost per gallon	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50							
Daily parking cost increase	None	None	None	None	None	None	None	None							not
Fare									None	None	None	None			
Closest stop to home									3 blocks	3 blocks	3 blocks	3 blocks			make
Closest stop to destination									3 blocks	3 blocks	3 blocks	3 blocks			
Number of transfers required									None	None	None	None			the
Park-n-ride availability									No	No	No	No			
Time between buses									10 min.	10 min.	15 min.	30 min.			trip
Distance between stops									2 blocks	2 blocks	0.5 miles	0.5 miles			
Seat availability									2 of 5 times	3 of 5 times	2 of 5 times	3 of 5 times			
On-board security									No	No	No	No			
Station security									No	No	No	No			

15a) Check ONE box only

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11	Option 12	Option 13	Option 14	Option 15
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

15b) For options 5 through 8, please indicate the # of people in your carpool/vanpool

☐ 2 PERSON CARPOOL
☐ 3+ PERSON CARPOOL

16. Which of the following would you do if these travel conditions lasted for many years? ***(Check as many boxes as apply)***
If you would not choose any of the options below, check here ☐

☐ MAKE TRIP LESS OFTEN
☐ COMBINE TRIP WITH OTHER TRIPS
☐ MAKE TRIP AT DIFFERENT TIME OF DAY
☐ LOOK FOR A SIMILAR DESTINATION CLOSER TO HOME
☐ DO ACTIVITY AT HOME
☐ NOT MAKE TRIP AT ALL

KEY TERMS

Please pull out this sheet and keep it handy while you complete the survey.

Commute to Work	Commute to work is defined as the time it takes you to travel from your home to your worksite.
Travel Conditions	Travel conditions are the features of the travel options. For example, some of the features of the "Regular Bus" travel option are fare, seat availability, and station security.
Travel Options	Travel options are the types of transportation available. For the four private vehicle options and two public transit options, two travel times (peak and off-peak) are given. In addition, there are bicycle and walk options offered.

TRAVEL OPTIONS

Bicycle	Bicycling is defined as travel on a non-motorized two or three wheel vehicle. Bicycling may take place on the street or on a designated bicycle/walk path.
Bus	There are two types of bus service available: Regular and Express. *Regular Bus*: The regular bus runs on a fixed schedule, making frequent stops. *Express Bus*: The express bus runs less frequently than the regular bus, but makes fewer stops, allowing you to get to your destination more quickly.
Carpool	A carpool consists of two or more people driving in a private vehicle to the same destination, or destinations close to each other. Toll, fuel and parking costs are shared among the vehicle's passengers.
Drive Alone	The driver is the only person in the car.
Free Route	A free route is a non-toll route, usually on secondary roads, which can get you to your destination.
Light Rail	Light rail operates on tracks, like a train, and is powered by overhead electric power lines. MAX is the Portland light rail system.
Off-Peak	Off-peak hours are all non-peak hours (see peak definition below). Traffic during these hours is generally lighter than during peak hours.
Peak	Peak always refers to the hours of 7am to 9am and 4pm to 6pm, Monday through Friday. These are the hours during which traffic is heaviest.
Private Vehicle	A private vehicle is one which is driven by a private citizen. Your car, truck, van or motorcycle is a private vehicle. Employer owned cars or vans which are typically used to commute to work or used in carpools or vanpools are also considered private vehicles.
Toll Route	A toll route is one on which you must pay a fee to travel. All toll costs are for a one-way trip.

Please turn the page for more definitions.

KEY TERMS (continued)

Vanpool	A vanpool consists of three or more travelers sharing a trip in a van. One of the vanpoolers may drive the van, or there may be a separate driver provided. Toll, fuel and parking costs are shared among the vehicle's passengers.
Walk	Walking is defined as traveling on foot. Walking may take place along roads or on designated bicycle/walk paths.

TRAVEL CONDITIONS

Bicycle/Walk Path	A bicycle/walk path is a safe path designated for the use of bicyclists and walkers only.
Closest Stop to Destination	The closest stop to destination is the stop nearest to your worksite.
Closest Stop to Home	The closest stop to home is the stop located nearest to your residence.
Daily Parking Cost Increase	The daily parking cost increase is the additional amount you will pay to park one vehicle. Add this amount to your current daily parking fee.
Distance Between Stops	The distance between stops is the distance the bus travels between scheduled stops.
Fare	The fare is the cost per one-way trip.
Fuel Cost	The fuel cost is the per gallon cost for gasoline.
On Board Security	On-board security takes the form of a guard who patrols the buses.
Park-n-Ride	Park-n-ride is a system whereby travelers drive their cars to a central parking lot from which they can take public transit to their final destinations.
Seat Availability	The seat availability refers to the likelihood of finding a seat available.
Station Security	Station security means that the bus stations are monitored either electronically or by guards.
Time Between Buses	The time between buses is the wait time between buses running on the same route.
Toll Cost	The toll cost is the one way charge for driving on a toll road.
Travel Time	The travel time is the length of time you spend during your commute in your car, on the bus, or on light rail, bicycling or walking.

Appendix F

Example Stated Preference Residential Choice Survey Instrument

RESIDENTIAL CHOICE SURVEY

Thank you for participating in this Residential Choice Survey. Your participation is very important. The purpose of this survey is to find out what types of housing, and residential settings local residents such as yourself prefer. As your area's population increases, planning for future housing must accommodate growth and minimize transportation and environmental problems. Your answers will provide critical information for effective planning for the future of your community.

Residential choices involve trade-offs between housing costs, residence size, community amenities such as shopping, parks and recreation, and other factors that influence the type of community in which you choose to live. This survey is designed to investigate what type of residential situation local residents, such as yourself, might choose if they were considering a move.

The format of the survey is unique; you've probably never completed one like it. In the following pages, you'll be presented with a series of eight (8) tables outlining possible future Residential Options. After evaluating each table, you will be asked to indicate the housing option you would most likely choose. Each table and set of questions is a separate task, and should be done one at a time. Because this is a unique survey format, please take time to read the survey instructions before you begin. Once you do begin, you'll find that it will be interesting and fun. Your answers are completely confidential.

The next page contains survey instructions. It is very important that you read these before you begin. If you have any questions, please call **Mary McBride at 1-800-447-8287.**

Survey Instructions

Remove the **KEY TERMS** pull-out section and read through the explanations for each of the Housing Options types and Property Characteristics. Then familiarize yourself with the format of the Sample Table-- Housing Options. The Sample Table serves as an example of the type of table you will be using to complete the survey.

SAMPLE TABLE - HOUSING OPTIONS

	Residences to Purchase		Residences to Rent or Lease		
Property Characteristics	**Single Family**	**Multi-Family**	**Single Family**	**Multi-Family**	
Type of Dwelling	single house on lot	condominium	duplex / row house	apartment	
Residence Size	less than 1,000 sq. ft.	1,000 - 1,500 sq. ft.	less than 1,000 sq. ft.	1,000 - 1,500 sq. ft.	
Lot Size	7,500 - 10,000 sq. ft.	n/a	7,500 - 10,000 sq. ft.	n/a	
Parking	driveway, but no garage	garage	detached garage	reserved uncovered spot	
Range of Prices or Monthly Rents	less than $75K	more than $150K	$400 - $800	$600 - $900	
Community Type	rural	mixed use	urban	mixed use	*MOVE*
Housing Mix	mostly single family	mostly multi-family	mostly multi-family	mostly multi-family	
Age of Development	0 - 5 years	0 - 5 years	0 - 5 years	5 - 10 years	*OUT*
Mix of Residential Ownership	mostly rent	mostly rent	mostly rent	mostly own	
Shops / Services / Entertainment	basic shops and some specialty shops	basic shops and some specialty shops	community square with shops, restaurants, movie theater, etc.	basic shops and some specialty shops	*OF THE*
Local Parks	none	none	none	yes	
Bicycle Paths	yes	none	none	yes	*METRO*
School Quality	excellent	good	fair	fair	
Neighborhood Safety	average	above average	above average	above average	*AREA*
Local Shopping Prices Relative to Area Average	10% below	10% more	10% below	same	
Walking Time to Closest Local Shops	10 - 20 minutes	20 - 30 minutes	10 - 20 minutes	10 - 20 minutes	
Bus Fare & Travel Time to Closest Local Shops	$0.50, less than 5 minutes	$1.00, 15 - 20 minutes	$0.50, 5 - 10 minutes	$0.50, less than 5 minutes	
Travel Time to Work by Auto	more than 20 minutes	less than 10 minutes	10 - 15 minutes	more than 20 minutes	
Travel Time to Work by Public Transit	30 - 45 minutes	less than 15 minutes	15 - 30 minutes	more than 45 minutes	
	Option 1 ☐	Option 2 ☐	Option 3 ☐	Option 4 ☐	Option 5 ☐

1. Study the Housing Options and Property Characteristics

1A. The Sample Table outlines four Housing Options:
(1) Single Family Residence, Purchase
(2) Multi-Family Residence, Purchase
(3) Single Family Residence, Rent or Lease
(4) Multi-Family Residence, Rent or Lease

1B. The Sample Table presents nineteen Property Characteristics:
(1) Type of Dwelling
(2) Residence Size
(3) Lot Size
(4) Parking
(5) Range of Prices or Monthly Rents
(6) Community Type
(7) Housing Mix
(8) Age of Development
(9) Mix of Residential Ownership
(10) Shops/Services/Entertainment
(11) Local Parks
(12) Bicycle Paths
(13) School Quality
(14) Neighborhood Safety
(15) Local Shopping Prices Relative to Area Average
(16) Walking Time to Closest Local Shops
(17) Bus Fare & Travel Time to Closest Local Shops
(18) Travel Time to Work by Auto
(19) Travel Time to Work by Public Transit

2. Flip through the pages of this booklet and look at Tables 1 - 8. Notice that these tables are similar in set-up to the Sample Table, except that each contains slightly different information for some of the Property Characteristics.

EXAMPLE: Look at the Sample Table. Focus on just the first two housing options (Residences to Purchase) and the first five Property Characteristics (When you complete the actual survey, you will want to consider all of the characteristics for all of the options.) You find:

- Single Family, Purchase - is a single home on a lot. It is less than 1,000 square feet in size, is on a lot of 7,500 to 10,000 square feet and has a driveway, but no garage. It costs less than $75,000 to purchase.

- Multi-family, Purchase - is a condominium. It is 1,000 to 1,500 square feet in size, and has a garage. It costs more than $150,000 to purchase.

SAMPLE QUESTION 1: Suppose you had to move in the next 12 months. If these were the only residences available, which of the following options would you choose? **(When you answer, assume that your personal circumstances: family situation, finances, etc., are the same as they are today. You should assume that all of the residence options to purchase, rent or lease are located in your current metropolitan area.)**

Option 1 ❑ Option 2 ❑

Proceed to the next page to begin the survey. Read and evaluate all of the information contained in each table. Based on this information, answer the questions which follow each table.

TABLE: 1
VERSION: P/V 6

Property Characteristics	Residences to Purchase		Residences to Rent or Lease		
	Single Family	Multi-Family	Single Family	Multi-Family	
Type of Dwelling	single house on lot	apartment	single house on lot	apartment	
Residence Size	more than 2,000 sq. ft.	1,000 - 1,500 sq. ft.	1,500 - 2,000 sq. ft.	500 - 1,000 sq. ft.	
Lot Size	7,500 - 10,000 sq. ft.	n/a	7,500 - 10,000 sq. ft.	n/a	
Parking	driveway, but no garage	reserved uncovered spot	detached garage	garage	
Range of Prices or Monthly Rents	more than $225K	$100K - $150K	$800 - $1,200	$300 - $600	
Community Type	urban	urban	rural	suburban	*MOVE*
Housing Mix	mostly multi-family	mostly single family	mostly single family	mostly multi-family	
Age of Development	over 15 years	10 - 15 years	0 - 5 years	over 15 years	*OUT*
Mix of Residential Ownership	mostly own	mostly rent	mostly rent	mostly rent	
Shops / Services / Entertainment	basic shops and some specialty shops	community square with shops, restaurants, movie theater, etc.	none	basic shops	*OF THE*
Local Parks	none	yes	yes	yes	
Bicycle Paths	yes	none	yes	yes	*METRO*
School Quality	fair	excellent	good	very good	
Neighborhood Safety	average	above average	above average	above average	*AREA*
Local Shopping Prices Relative to Area Average	10% more	same	10% more	same	
Walking Time to Closest Local Shops	20 - 30 minutes	more than 30 minutes	20 - 30 minutes	more than 30 minutes	
Bus Fare & Travel Time to Closest Local Shops	$1.00, more than 20 minutes	$1.00, more than 20 minutes	$1.00, more than 20 minutes	$1.00, 15 - 20 minutes	
Travel Time to Work by Auto	less than 10 minutes	10 - 15 minutes	10 - 15 minutes	10 - 15 minutes	
Travel Time to Work by Public Transit	less than 15 minutes	less than 15 minutes	less than 15 minutes	less than 15 minutes	

1) **Suppose you <u>had to move</u> in the next 12 months. If these were the only residences available, which of the following options would you choose?** ***(Check ONE box only)***

Option 1 ☐ Option 2 ☐ Option 3 ☐ Option 4 ☐ Option 5 ☐

2) **At this new residence, how many vehicles would you need?** ***(Check ONE box only)***

☐ MORE ☐ SAME ☐ FEWER

3) **Suppose you were only <u>considering moving</u> in the next 12 months and had the option of staying where you are now, would you ...** ***(Check ONE box only)***

☐ STAY WITH THE NEW RESIDENCE OPTION YOU CHOSE IN QUESTION 1 ☐ STAY WHERE YOU ARE NOW

TABLE: 2
VERSION: P/V 6

Property Characteristics	Residences to Purchase		Residences to Rent or Lease		
	Single Family	Multi-Family	Single Family	Multi-Family	
Type of Dwelling	single house on lot	condominium	single house on lot	apartment	
Residence Size	1,500 - 2,000 sq. ft.	more than 1,500 sq. ft.	more than 2,000 sq. ft.	more than 1,500 sq. ft.	
Lot Size	more than 10,000 sq. ft.	n/a	5,000 - 7,500 sq. ft.	n/a	
Parking	driveway, but no garage	street parking only	street parking only	reserved uncovered spot	
Range of Prices or Monthly Rents	$150K - $225K	$100K - $150K	more than $1,200	more than $900	
Community Type	suburban	suburban	urban	mixed use	*MOVE*
Housing Mix	mostly single family	mostly single family	mostly single family	mostly multi-family	
Age of Development	0 - 5 years	10 - 15 years	over 15 years	5 - 10 years	*OUT*
Mix of Residential Ownership	mostly rent	mostly own	mostly own	mostly own	
Shops / Services / Entertainment	basic shops and some specialty shops	none	community square with shops, restaurants, movie theater, etc.	community square with shops, restaurants, movie theater, etc.	*OF THE*
Local Parks	yes	yes	yes	none	
Bicycle Paths	yes	none	yes	yes	*METRO*
School Quality	fair	fair	excellent	good	
Neighborhood Safety	above average	average	above average	above average	*AREA*
Local Shopping Prices Relative to Area Average	same	same	20% more	same	
Walking Time to Closest Local Shops	more than 30 minutes	20 - 30 minutes	more than 30 minutes	20 - 30 minutes	
Bus Fare & Travel Time to Closest Local Shops	$1.00, 15 - 20 minutes	$1.00, 15 - 20 minutes	$1.00, 15 - 20 minutes	$1.00, more than 20 minutes	
Travel Time to Work by Auto	15 - 20 minutes	15 - 20 minutes	15 - 20 minutes	15 - 20 minutes	
Travel Time to Work by Public Transit	30 - 45 minutes	more than 45 minutes	more than 45 minutes	more than 45 minutes	

Option 1 ☐ Option 2 ☐ Option 3 ☐ Option 4 ☐ Option 5 ☐

4) **Suppose you <u>had to move</u> in the next 12 months. If these were the only residences available, which of the following options would you choose?** ***(Check ONE box only)***

5) **At this new residence, how many vehicles would you need?** ***(Check ONE box only)***

☐ MORE ☐ SAME ☐ FEWER

6) **Suppose you were only <u>considering moving</u> in the next 12 months and had the option of staying where you are now, would you ...** ***(Check ONE box only)***

☐ STAY WITH THE NEW RESIDENCE OPTION YOU CHOSE IN QUESTION 4 ☐ STAY WHERE YOU ARE NOW

TABLE: 3
VERSION: P/V 6

Property Characteristics	Residences to Purchase		Residences to Rent or Lease		
	Single Family	Multi-Family	Single Family	Multi-Family	
Type of Dwelling	duplex / row house	condominium	duplex / row house	apartment	
Residence Size	less than 1,000 sq. ft.	500 - 1,000 sq. ft.	less than 1,000 sq. ft.	less than 500 sq. ft.	
Lot Size	more than 10,000 sq. ft.	n/a	7,500 - 10,000 sq. ft.	n/a	
Parking	detached garage	carport	driveway, but no garage	reserved uncovered spot	
Range of Prices or Monthly Rents	$75K - $150K	less than $50K	$400 - $800	less than $300	
Community Type	suburban	mixed use	mixed use	rural	*MOVE*
Housing Mix	mostly multi-family	mostly single family	mostly single family	mostly multi-family	
Age of Development	over 15 years	5 - 10 years	over 15 years	0 - 5 years	*OUT*
Mix of Residential Ownership	mostly rent	mostly rent	mostly rent	mostly rent	
Shops / Services / Entertainment	none	none	basic shops	basic shops	*OF THE*
Local Parks	none	none	none	none	
Bicycle Paths	yes	yes	yes	none	*METRO*
School Quality	good	good	fair	excellent	
Neighborhood Safety	above average	above average	above average	above average	*AREA*
Local Shopping Prices Relative to Area Average	10% below	10% below	20% more	10% more	
Walking Time to Closest Local Shops	less than 10 minutes	less than 10 minutes	10 - 20 minutes	10 - 20 minutes	
Bus Fare & Travel Time to Closest Local Shops	$0.50, 5 - 10 minutes	$0.50, 5 - 10 minutes	$0.50, less than 5 minutes	$0.50, 5 - 10 minutes	
Travel Time to Work by Auto	15 - 20 minutes	less than 10 minutes	less than 10 minutes	more than 20 minutes	
Travel Time to Work by Public Transit	more than 45 minutes	15 - 30 minutes	less than 15 minutes	30 - 45 minutes	

7) **Suppose you had to move in the next 12 months. If these were the only residences available, which of the following options would you choose?** ***(Check ONE box only)***

Option 1 ☐ Option 2 ☐ Option 3 ☐ Option 4 ☐ Option 5 ☐

8) **At this new residence, how many vehicles would you need?** ***(Check ONE box only)***

☐ MORE ☐ SAME ☐ FEWER

9) **Suppose you were only considering moving in the next 12 months and had the option of staying where you are now, would you ...** ***(Check ONE box only)***

☐ STAY WITH THE NEW RESIDENCE OPTION YOU CHOSE IN QUESTION 7 ☐ STAY WHERE YOU ARE NOW

TABLE: 4
VERSION: P/V 6

Property Characteristics	Residences to Purchase		Residences to Rent or Lease		
	Single Family	Multi-Family	Single Family	Multi-Family	
Type of Dwelling	duplex / row house	apartment	duplex / row house	condominium	
Residence Size	1,000 - 1,500 sq. ft.	less than 500 sq. ft.	1,000 - 1,500 sq. ft.	500 - 1,000 sq. ft.	
Lot Size	less than 5,000 sq. ft.	n/a	more than 10,000 sq. ft.	n/a	
Parking	attached garage	carport	street parking only	reserved uncovered spot	
Range of Prices or Monthly Rents	less than $75K	less than $50K	less than $400	less than $300	
Community Type	rural	urban	suburban	rural	*MOVE*
Housing Mix	mostly single family	mostly multi-family	mostly single family	mostly single family	
Age of Development	5 - 10 years	5 - 10 years	5 - 10 years	10 - 15 years	*OUT*
Mix of Residential Ownership	mostly rent	mostly own	mostly rent	mostly rent	
Shops / Services / Entertainment	community square with shops, restaurants, movie theater, etc.	basic shops	basic shops and some specialty shops	none	*OF THE*
Local Parks	yes	none	none	none	
Bicycle Paths	none	yes	none	none	*METRO*
School Quality	good	good	very good	fair	
Neighborhood Safety	average	average	average	above average	*AREA*
Local Shopping Prices Relative to Area Average	10% more	10% more	same	20% more	
Walking Time to Closest Local Shops	less than 10 minutes	10 - 20 minutes	10 - 20 minutes	less than 10 minutes	
Bus Fare & Travel Time to Closest Local Shops	$0.50, less than 5 minutes	$0.50, less than 5 minutes	$0.50, 5 - 10 minutes	$0.50, less than 5 minutes	
Travel Time to Work by Auto	more than 20 minutes	10 - 15 minutes	less than 10 minutes	less than 10 minutes	
Travel Time to Work by Public Transit	30 - 45 minutes	15 - 30 minutes	15 - 30 minutes	less than 15 minutes	

10) **Suppose you <u>had to move</u> in the next 12 months. If these were the only residences available, which of the following options would you choose?** ***(Check ONE box only)***

Option 1 ☐ Option 2 ☐ Option 3 ☐ Option 4 ☐ Option 5 ☐

11) **At this new residence, how many vehicles would you need?** ***(Check ONE box only)***

☐ MORE ☐ SAME ☐ FEWER

12) **Suppose you were only <u>considering moving</u> in the next 12 months and had the option of staying where you are now, would you ...** ***(Check ONE box only)***

☐ STAY WITH THE NEW RESIDENCE OPTION YOU CHOSE IN QUESTION 10 ☐ STAY WHERE YOU ARE NOW

TABLE: 5
VERSION: P/V 6

Property Characteristics	Residences to Purchase		Residences to Rent or Lease		
	Single Family	Multi-Family	Single Family	Multi-Family	
Type of Dwelling	duplex / row house	condominium	single house on lot	apartment	
Residence Size	1,500 - 2,000 sq. ft.	1,000 - 1,500 sq. ft.	1,000 - 1,500 sq. ft.	1,000 - 1,500 sq. ft.	
Lot Size	5,000 - 7,500 sq. ft.	n/a	7,500 - 10,000 sq. ft.	n/a	
Parking	street parking only	reserved uncovered spot	attached garage	carport	
Range of Prices or Monthly Rents	more than $225K	more than $150K	$400 - $800	$600 - $900	
Community Type	mixed use	rural	mixed use	suburban	*MOVE*
Housing Mix	mostly multi-family	mostly single family	mostly multi-family	mostly single family	
Age of Development	10 - 15 years	over 15 years	5 - 10 years	5 - 10 years	*OUT*
Mix of Residential Ownership	mostly rent	mostly own	mostly own	mostly rent	
Shops / Services / Entertainment	basic shops	basic shops and some specialty shops	none	community square with shops, restaurants, movie theater, etc.	*OF THE*
Local Parks	yes	yes	none	yes	
Bicycle Paths	yes	none	none	none	*METRO*
School Quality	excellent	very good	very good	good	
Neighborhood Safety	above average	above average	above average	average	*AREA*
Local Shopping Prices Relative to Area Average	10% below	10% below	10% below	20% more	
Walking Time to Closest Local Shops	10 - 20 minutes	less than 10 minutes	20 - 30 minutes	20 - 30 minutes	
Bus Fare & Travel Time to Closest Local Shops	$0.50, less than 5 minutes	$0.50, less than 5 minutes	$1.00, 15 - 20 minutes	$1.00, 15 - 20 minutes	
Travel Time to Work by Auto	10 - 15 minutes	more than 20 minutes	more than 20 minutes	15 - 20 minutes	
Travel Time to Work by Public Transit	less than 15 minutes	30 - 45 minutes	30 - 45 minutes	30 - 45 minutes	

13) Suppose you <u>had to move</u> in the next 12 months. If these were the only residences available, which of the following options would you choose? *(Check ONE box only)*

Option 1 ☐ Option 2 ☐ Option 3 ☐ Option 4 ☐ Option 5 ☐

14) At this new residence, how many vehicles would you need? *(Check ONE box only)*

☐ MORE ☐ SAME ☐ FEWER

15) Suppose you were only <u>considering moving</u> in the next 12 months and had the option of staying where you are now, would you ... *(Check ONE box only)*

☐ STAY WITH THE NEW RESIDENCE OPTION YOU CHOSE IN QUESTION 13 ☐ STAY WHERE YOU ARE NOW

TABLE: 6
VERSION: P/V 6

Property Characteristics	Residences to Purchase		Residences to Rent or Lease		
	Single Family	Multi-Family	Single Family	Multi-Family	
Type of Dwelling	single house on lot	apartment	duplex / row house	condominium	
Residence Size	less than 1,000 sq. ft.	500 - 1,000 sq. ft.	1,500 - 2,000 sq. ft.	less than 500 sq. ft.	
Lot Size	less than 5,000 sq. ft.	n/a	5,000 - 7,500 sq. ft.	n/a	
Parking	street parking only	street parking only	driveway, but no garage	reserved uncovered spot	
Range of Prices or Monthly Rents	less than $75K	$50K - $100K	more than $1,200	$300 - $600	
Community Type	mixed use	mixed use	rural	urban	*MOVE*
Housing Mix	mostly single family	mostly multi-family	mostly multi-family	mostly multi-family	
Age of Development	10 - 15 years	0 - 5 years	10 - 15 years	0 - 5 years	*OUT*
Mix of Residential Ownership	mostly own	mostly own	mostly rent	mostly own	
Shops / Services / Entertainment	community square with shops, restaurants, movie theater, etc.	basic shops	community square with shops, restaurants, movie theater, etc.	basic shops and some specialty shops	*OF THE*
Local Parks	none	yes	none	none	
Bicycle Paths	none	yes	yes	yes	*METRO*
School Quality	very good	very good	fair	fair	
Neighborhood Safety	average	average	average	average	*AREA*
Local Shopping Prices Relative to Area Average	20% more	20% more	same	10% more	
Walking Time to Closest Local Shops	20 - 30 minutes	20 - 30 minutes	less than 10 minutes	10 - 20 minutes	
Bus Fare & Travel Time to Closest Local Shops	$1.00, 15 - 20 minutes	$1.00, more than 20 minutes	$0.50, 5 - 10 minutes	$0.50, less than 5 minutes	
Travel Time to Work by Auto	more than 20 minutes	15 - 20 minutes	15 - 20 minutes	less than 10 minutes	
Travel Time to Work by Public Transit	more than 45 minutes	30 - 45 minutes	30 - 45 minutes	15 - 30 minutes	

16) **Suppose you <u>had to move</u> in the next 12 months. If these were the only residences available, which of the following options would you choose?** ***(Check ONE box only)***

Option 1 ☐ Option 2 ☐ Option 3 ☐ Option 4 ☐ Option 5 ☐

17) **At this new residence, how many vehicles would you need?** ***(Check ONE box only)***

☐ MORE ☐ SAME ☐ FEWER

18) **Suppose you were only <u>considering moving</u> in the next 12 months and had the option of staying where you are now, would you ...** ***(Check ONE box only)***

☐ STAY WITH THE NEW RESIDENCE OPTION YOU CHOSE IN QUESTION 16 ☐ STAY WHERE YOU ARE NOW

TABLE: 7
VERSION: P/V 6

Property Characteristics	Residences to Purchase		Residences to Rent or Lease		
	Single Family	Multi-Family	Single Family	Multi-Family	
Type of Dwelling	duplex / row house	condominium	single house on lot	condominium	
Residence Size	more than 2,000 sq. ft.	less than 500 sq. ft.	less than 1,000 sq. ft.	more than 1,500 sq. ft.	
Lot Size	more than 10,000 sq. ft.	n/a	more than 10,000 sq. ft.	n/a	
Parking	attached garage	garage	attached garage	garage	
Range of Prices or Monthly Rents	$150K - $225K	$50K - $100K	less than $400	$600 - $900	
Community Type	urban	rural	suburban	urban	*MOVE*
Housing Mix	mostly single family	mostly multi-family	mostly multi-family	mostly single family	
Age of Development	0 - 5 years	over 15 years	10 - 15 years	over 15 years	*OUT*
Mix of Residential Ownership	mostly own	mostly rent	mostly own	mostly own	
Shops / Services / Entertainment	none	basic shops and some specialty shops	basic shops	none	*OF THE*
Local Parks	yes	none	yes	yes	
Bicycle Paths	none	none	none	none	*METRO*
School Quality	very good	excellent	good	excellent	
Neighborhood Safety	above average	average	average	average	*AREA*
Local Shopping Prices Relative to Area Average	20% more	20% more	10% below	same	
Walking Time to Closest Local Shops	10 - 20 minutes	10 - 20 minutes	more than 30 minutes	more than 30 minutes	
Bus Fare & Travel Time to Closest Local Shops	$0.50, 5 - 10 minutes	$0.50, 5 - 10 minutes	$1.00, more than 20 minutes	$1.00, more than 20 minutes	
Travel Time to Work by Auto	10 - 15 minutes	less than 10 minutes	10 - 15 minutes	more than 20 minutes	
Travel Time to Work by Public Transit	15 - 30 minutes	less than 15 minutes	15 - 30 minutes	more than 45 minutes	

19) **Suppose you <u>had to move</u> in the next 12 months. If these were the only residences available, which of the following options would you choose?** ***(Check ONE box only)***

Option 1 ☐ Option 2 ☐ Option 3 ☐ Option 4 ☐ Option 5 ☐

20) **At this new residence, how many vehicles would you need?** ***(Check ONE box only)***

☐ MORE ☐ SAME ☐ FEWER

21) **Suppose you were only <u>considering moving</u> in the next 12 months and had the option of staying where you are now, would you ...** ***(Check ONE box only)***

☐ STAY WITH THE NEW RESIDENCE OPTION YOU CHOSE IN QUESTION 19 ☐ STAY WHERE YOU ARE NOW

TABLE: 8
VERSION: P/V 6

Property Characteristics	Residences to Purchase		Residences to Rent or Lease		
	Single Family	Multi-Family	Single Family	Multi-Family	
Type of Dwelling	single house on lot	apartment	duplex / row house	condominium	
Residence Size	1,000 - 1,500 sq. ft.	more than 1,500 sq. ft.	more than 2,000 sq. ft.	1,000 - 1,500 sq. ft.	
Lot Size	less than 5,000 sq. ft.	n/a	more than 10,000 sq. ft.	n/a	
Parking	detached garage	garage	detached garage	carport	
Range of Prices or Monthly Rents	$75K - $150K	more than $150K	$800 - $1,200	more than $900	
Community Type	rural	suburban	urban	mixed use	*MOVE*
Housing Mix	mostly multi-family	mostly multi-family	mostly multi-family	mostly single family	
Age of Development	5 - 10 years	0 - 5 years	0 - 5 years	10 - 15 years	*OUT*
Mix of Residential Ownership	mostly own	mostly rent	mostly own	mostly own	
Shops / Services / Entertainment	basic shops	community square with shops, restaurants, movie theater, etc.	basic shops and some specialty shops	basic shops and some specialty shops	*OF THE*
Local Parks	none	none	yes	yes	
Bicycle Paths	none	yes	none	yes	*METRO*
School Quality	excellent	fair	excellent	very good	
Neighborhood Safety	average	above average	average	average	*AREA*
Local Shopping Prices Relative to Area Average	same	10% more	10% more	same	
Walking Time to Closest Local Shops	more than 30 minutes	more than 30 minutes	less than 10 minutes	less than 10 minutes	
Bus Fare & Travel Time to Closest Local Shops	$1.00, more than 20 minutes	$1.00, 15 - 20 minutes	$0.50, less than 5 minutes	$0.50, 5 - 10 minutes	
Travel Time to Work by Auto	less than 10 minutes	more than 20 minutes	more than 20 minutes	10 - 15 minutes	
Travel Time to Work by Public Transit	15 - 30 minutes	more than 45 minutes	more than 45 minutes	15 - 30 minutes	

22) Suppose you had to move in the next 12 months. If these were the only residences available, which of the following options would you choose? *(Check ONE box only)*

Option 1 ☐ Option 2 ☐ Option 3 ☐ Option 4 ☐ Option 5 ☐

23) At this new residence, how many vehicles would you need? *(Check ONE box only)*

☐ MORE ☐ SAME ☐ FEWER

24) Suppose you were only considering moving in the next 12 months and had the option of staying where you are now, would you ... *(Check ONE box only)*

☐ STAY WITH THE NEW RESIDENCE OPTION YOU CHOSE IN QUESTION 22 ☐ STAY WHERE YOU ARE NOW

KEY TERMS

Closest Local Shopping Area — The shopping area closest to the residence described.

Metro or Metropolitan Area — Portland/Vancouver and the surrounding suburbs and communities. You may assume that your current residence falls within the metropolitan area.

PROPERTY CHARACTERISTICS

Age of Development — The number of years since the community was built. You may assume that the all residences within a community were built within the same time frame.

Bus Fare and Travel Time to Local Shops — The fare and travel time for the local bus to the community's business area.

Community Type — Communities can be grouped into two categories: traditional and non-traditional.

Traditional Communities -The traditional form of community is a single-use development--single family homes, separate office parks and shopping centers. People who live in these types of communities are largely dependent on their cars to get from place to place.

Urban:
Urban areas are cities.

Suburban:
Suburbs are typically residential areas on the outskirts of cities or large towns.

Rural:
Rural areas are sparsely populated, less developed and located farther from cities and larger towns.

Non-traditional
Mixed Use
Mixed use is an alternative form of community. This type of community has housing, shopping and office activities in a more densely settled environment, thereby preserving more of the surrounding open spaces.

These communities include a mix of housing and commercial environments such that most destinations can be comfortably reached on foot or by bicycle. Bicycle and foot paths extend throughout the community, creating a "pedestrian/ bicyclist friendly" environment. People who live in one of these communities are able to walk to stores and transit in the regional center. Lot sizes are often small, and the housing mix includes condominiums, single family homes and apartments.

Housing Mix — The housing mix may be mostly single family (house or duplex/row house) or mostly multi-family (condominiums and apartments).

Local Parks — The availability of convenient local parks.

Lot Size — The square footage of the dwelling's property. There are four lot sizes:

Less than 5,000 square feet (less than 1/8 acre)
5,000 to 7,500 square feet (1/8 to acre to 3/16 acre)
7,500 to 10,000 square feet (3/16 to 1/4 acre)
More than 10,000 square feet (more than 1/4 acre)

Mix of Residential Ownership — The ratio of owners to renters. A particular community may have mostly owners or mostly renters.

Neighborhood Safety

The relative safety of the community. There are two of safety ranges:

Above Average - Safer than the average neighborhood in your metropolitan area
Average - As safe as the average neighborhood in your metropolitan area

Parking

The type of parking available. Parking may be on-street or off-street.

Range of Prices or Monthly Rents

The cost to purchase, rent or lease a home. All costs are presented as a range. For homes which you may purchase, the tables list the total purchase price. You may assume the following range of monthly mortgage payments for the given purchase prices:

Purchase Price	Monthly Payment	
	0% down payment	*10% down payment*
Less than $70,000	Less than $650	Less than $550
$70,000 to $110,000	$650 to $1,000	$550 to $850
$110,000 to $150,000	$1,000 to $1,350	$850 to $1,150
More than $150,000	More than $1,350	More than $1,150

Residence Size

The total square footage of the house, condominium or apartment interior. An average 3 bedroom house is 1,500 square feet; an average 2 bedroom apartment is 800 square feet.

Shops/Services/ Entertainment

These are shops, services and entertainment offered in the closest local shopping area. Four levels are offered:
None - Convenience store only, no other shops, services or entertainment.
Basic Shops - grocery, dry cleaner, etc.
Basic and Specialty Shops - basic stores (as defined above), plus jewelry store, book store, shoe store, etc.
Community Square with shops, restaurants, movie, etc.

School Quality

The relative ranking of the public school system on an area-wide basis. Schools are ranked as:

Excellent - 90th percentile and above of area schools
Very Good - 75th to 90th percentile of area schools
Good- 60th to 75th percentile of area schools
Fair- 45th to 60th percentile of area schools

Shopping Prices Relative to Area Average

The general cost of shopping in the closest local shopping area relative to the surrounding area.

Travel Time to Work by Auto

The typical door-to-door time to travel from your home to work by private vehicle.

Travel Time to Work by Public Transit

The typical door-to-door time required to travel from your home to work by public transit. This includes walking to and from the bus stops and any necessary transfers. You may assume that all public transit is safe, convenient and reliable.

Type of Dwelling

The type of housing. Dwellings may be a single house on a lot, condominium duplex/row house or apartment.

Walking Time to Closest Local Shops

The average number of minutes it takes to walk to the local shops closest to the residence described.

COMPLETE THIS PAGE ONLY AFTER COMPLETING THE QUESTIONNAIRE BOOKLET

Following is a brief set of questions regarding the local shopping area closest to your current residence. Please refer to the **KEY TERMS** sheet for definitions of terms.

1. Which of the following types of shops, services and entertainment, are available in the local shopping area closest to your home? (Check all that apply)

   ❑ basic shops (grocery, dry cleaner, etc.)
   ❑ specialty shops (clothing store, jewelry store, florist, etc.)
   ❑ community square with shops, restaurants, movies, etc.
   ❑ none

2. Do you shop in the local shopping area for . . .? (Check all that apply)

   ❑ groceries
   ❑ clothing
   ❑ convenience items
   ❑ entertainment (movies, etc.)

3. How do local shopping prices compare to the area average?

   ❑ approximately 10% less
   ❑ approximately the same
   ❑ approximately 10% more
   ❑ approximately 20% more
   ❑ other_____

4. What is the walking time to your closest local shopping area?

   ❑ less than 10 minutes
   ❑ 10-20 minutes
   ❑ 20-30 minutes
   ❑ more than 30 minutes
   ❑ don't know

5. Is there a local bus available to take you from your home to your closest local shopping area?

   ❑ Yes **Write one-way fare and approximate travel time to the local shopping area here:** One-way fare: _____ Travel time: _____ minutes
   ❑ No

6. Study the table below. If you lived in a community where these conditions existed, would you shop in the local shopping area for . . . ? (Check all that apply)

   ❑ groceries
   ❑ clothing
   ❑ convenience items
   ❑ entertainment (movies, etc.)

Community Features	Local Business Area Offerings
Shops/services/entertainment	community square with shops, restaurant(s), movie, etc.
Local shopping prices relative to area average	20% more
Walking time to closest local shops	more than 30 minutes
Bus fare & travel time to closest local shops	$1.00, 15-20 minutes

7. Do you think you will change residences sometime in the future?

   ❑ Yes ❑ No

8. If you answered "Yes" to question 7, in how many years/months do you expect to move?

   _____ years and _____months

Appendix G

Example Stated Preference Auto Acquisition Survey Instrument

VEHICLE BUYING BEHAVIOR SURVEY

Thank you for participating in the Regional Vehicle Buying Behavior Survey. This survey is unique; you've probably never completed one like it. Take ample time to familiarize yourself with the survey materials before you begin; you'll find it will be fun. This survey is designed to investigate how local residents, such as yourself, might choose a vehicle to purchase, based on trade-offs among mileage, range, emissions, size, and price, as well as other factors that influence the type of vehicle you buy.

Your participation in this survey is very important. Your answers provide critical information for effective planning for future transportation. We assure you that your answers are completely confidential and will be used for statistical purposes only.

In the following pages, you'll be presented with eight (8) tables outlining future Transport Options and Transport Characteristics. Each table is followed by a question asking which option you prefer. Each table is a separate and independent task, and should be done one at a time. After the eighth table there are three additional questions.

The next page contains survey instructions. It is very important that you read these before you begin. If you have any questions, please call **Mary McBride at 1-800-447-8287.**

SURVEY INSTRUCTIONS

Remove the Key Terms pull-out section and read through the explanations for each of the Transport Options and the Transport Features. Then familiarize yourself with the format of Table A — Transport Options and Transport Features, below. Table A serves as an example of the type of table you will be using in the survey.

SAMPLE	New Truck	New Minivan/SUV	Used Truck	Used Minivan/SUV	New Fuel Truck	Conventional Bus	Express Bus	Bicycle
Age of vehicle	new	new	9 years old	1 year old	new			
Price of vehicle	$12,000	$24,000	$15,000	$15,000	$30,000			
Fuel economy (mpg equivalent)	30	50	25	40	25			
Range between refueling	450 miles	450 miles	350 miles	450 miles	150 miles			
Price of fuel (in gasoline gallon equivalents)	0 $2.50/gal	0 $2.50/gal	0 $2.50/gal	0 $2.50/gal	0 $3.50/gal			
Type of fuel	gasoline	gasoline	gasoline	diesel	new (alternative)			
Safety	average	above average	average	above average	average			
Maintenance cost/year	50	150	100	200	200			
Acceleration (0 to 60 mph)	14 seconds	12 seconds	14 seconds	12 seconds	14 seconds			
Ride & interior comfort	bouncy & roomy	bouncy & roomy	smooth & roomy	smooth & roomy	bouncy & small			
Truck cab/seating	regular cab	4 people	extended cab	6 people	regular cab			
Amount of "bad" emissions (1=low<------>8=high)	2	4	8	7	1			
Emission surcharge	$125/year	$325/year	$1075/year	$925/year	$25/year			
Bicycle path								Yes
Travel time to work relative to drive time						10 minutes more	About same	4 times drive time
Transit stop closest to home						9 blocks	12 blocks	
Transit stop closest to destination						12 blocks	16 blocks	
Frequency of service						every 20 minutes	every 30 minutes	
Reliability						on time 85%	on time 100%	
Transit Safety						both stations & vehicles patrolled	both stations & vehicles patrolled	
Fare						free	$1.00	

1. Thinking about your next vehicle purchase, if the above were your only choices, which would you be most likely to choose? **(CHECK ONLY ONE):**

Option 1 New Truck	Option 2 New Minivan/SUV	Option 3 Used Truck	Option 4 Used Minivan/SUV	Option 5 New Fuel Truck	Option 6 Probably not replace my current vehicle, but try instead to use transit or bicycle
❑	❑	❑	❑	❑	❑

1A. **Study the Travel Mode Options.**

Table A outlines five Private Vehicle Options:

(1) New Truck
(2) New Minivan/Sports Utility Vehicle (SUV)
(3) Used Truck
(4) Used Minivan/SUV
(5) New Fuel Truck or Minivan/SUV

Two Public Transit options are also included:

(1) Conventional Bus
(2) Express Bus

In addition, Table A includes the option of Bicycling.

1B. **Study the Transport Features**

Table A presents thirteen types of Transport Features for Private Vehicles:

(1) Age of vehicle
(2) Price of vehicle
(3) Fuel economy
(4) Range between refueling
(5) Price of fuel
(6) Type of fuel
(7) Safety
(8) Maintenance cost per year
(9) Acceleration
(10) Ride & interior comfort
(11) Truck cab/Seating
(12) Amount of "bad" emissions
(13) Emission surcharge

Seven types of Transport Features are given for Public Transit:

(1) Travel time relative to drive time
(2) Transit stop closest to home
(3) Transit stop closest to destination
(4) Frequency of service
(5) Reliability
(6) Transit Safety
(7) Fare

Two types of conditions are given for Bicycling:

(1) Travel time relative to drive time
(2) Bicycle path

2. Flip through the pages of this booklet and look at Tables 1 - 8. Notice that these tables are similar in set-up to Table A, except that they contain information that you to determine your preferred choice among Transport Options.

EXAMPLE: Now, looking back at Table A, focus on just the first four transport options and the first four transport features. (When you complete the actual survey, you will want to consider all of the features for all of the options.) You find:

- New Truck: New Vehicle - costs $12,000 and gets 30 miles per gallon.
- New Minivan/SUV: New Vehicle - costs $24,000 and gets 50 miles per gallon.
- Used Truck: Used Vehicle (9 years)- costs $15,000 and gets 25 miles per gallon.
- Used Minivan/SUV: Used Vehicle (1 year) - costs $15,000 and gets 40 miles per gallon.

SAMPLE QUESTION: Thinking about your next vehicle purchase, if the above were your only choices, which would you be most likely to choose?

☐ New Truck ☐ New Minivan/SUV
☐ Used Truck ☐ Used Minivan/SUV

When completing the survey, you may imagine that vehicle features not listed, such as color and brand, can be anything you prefer.

Proceed to the next page for the 8 Tables of Transport Mode Options and Transport Conditions.

Table 1

	New Truck	New Minivan	Used Truck	Used Minivan	New Fuel Truck	Conventional Bus	Express Bus	Bicycle
Age of vehicle	new	new	6 years old	1 year old	new			
Price of vehicle	$12,000	$24,000	$10,000	$10,000	$30,000			
Fuel economy (mpg equivalent)	20	20	25	40	25			
Range between refueling	150 miles	250 miles	350 miles	450 miles	200 miles			
Price of fuel (in gasoline gallon equivalents)	0 $1.50/gal	0 $1.50/gal	0 $1.50/gal	0 $1.50/gal	0 $4.50/gal			
Type of fuel	gasoline	diesel	gasoline	gasoline	new (alternative)			
Safety	average	average	above average	average	above average			
Maintenance cost/year	100	150	400	100	300			
Acceleration (0 to 60 mph)	14 seconds	12 seconds	14 seconds	12 seconds	14 seconds			
Ride & interior comfort	bouncy & roomy	smooth & roomy	smooth & roomy	bouncy & roomy	smooth & roomy			
Truck cab/seating	extended cab	4 people	extended cab	4 people	regular cab			
Amount of "bad" emissions (1=low<------>8=high)	1	1	7	5	1			
Emission surcharge	$25/year	$25/year	$925/year	$625/year	$25/year			
Bicycle path								No
Travel time to work relative to drive time						30 minutes more	20 minutes more	4 times drive time
Transit stop closest to home						6 blocks	8 blocks	
Transit stop closest to destination						9 blocks	12 blocks	
Frequency of service						every 30 minutes	every 45 minutes	
Reliability						on time 85%	on time 100%	
Transit safety						only stations patrolled	both stations & vehicles patrolled	
Fare						$0.50	$1.00	

1. Thinking about your next vehicle purchase, if the above were your only choices, which would you be most likely to choose? **(CHECK ONLY ONE):**

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
New Truck	New Minivan	Used Truck	Used Minivan	New Fuel Truck	Probably not replace my current vehicle, but try instead to use transit or bicycle
❑	❑	❑	❑	❑	❑

Table 2

	New Truck	New SUV	Used Truck	Used SUV	New Fuel SUV	Conventional Bus	Express Bus	Bicycle
Age of vehicle	new	new	6 years old	1 year old	new			
Price of vehicle	$8,000	$18,000	$10,000	$5,000	$30,000			
Fuel economy (mpg equivalent)	30	50	25	40	25			
Range between refueling	350 miles	350 miles	450 miles	350 miles	150 miles			
Price of fuel (in gasoline gallon equivalents)	0 $2.50/gal	0 $2.50/gal	0 $2.50/gal	0 $2.50/gal	0 $3.50/gal			
Type of fuel	gasoline	diesel	gasoline	gasoline	new (alternative)			
Safety	above average	above average	average	above average	above average			
Maintenance cost/year	150	200	100	300	100			
Acceleration (0 to 60 mph)	8 seconds	8 seconds	10 seconds	14 seconds	14 seconds			
Ride & interior comfort	smooth & roomy	smooth & roomy	smooth & small	bouncy & small	smooth & small			
Truck cab/seating	extended cab	2 people	extended cab	6 people	6 people			
Amount of "bad" emissions (1=low<------->8=high)	2	4	8	7	1			
Emission surcharge	$175/year	$475/year	$1075/year	$925/year	$25/year			
Bicycle path								No
Travel time to work relative to drive time						20 minutes more	10 minutes more	4 times drive time
Transit stop closest to home						3 blocks	8 blocks	
Transit stop closest to destination						6 blocks	8 blocks	
Frequency of service						every 10 minutes	every 30 minutes	
Reliability						on time 90%	on time 00%	
Transit safety						both stations & vehicles patrolled	both stations & vehicles patrolled	
Fare						free	free	

2. Thinking about your next vehicle purchase, if the above were your only choices, which would you be most likely to choose? **(CHECK ONLY ONE):**

Option 1 New Truck	Option 2 New SUV	Option 3 Used Truck	Option 4 Used SUV	Option 5 New Fuel SUV	Option 6 Probably not replace my current vehicle, but try instead to use transit or bicycle
☐	☐	☐	☐	☐	☐

Table 3	New Truck	New Minivan	Used Truck	Used Minivan	New Fuel Truck	Conventional Bus	Express Bus	Bicycle
Age of vehicle	new	new	9 years old	3 years old	new			
Price of vehicle	$12,000	$30,000	$15,000	$5,000	$24,000			
Fuel economy (mpg equivalent)	20	20	15	50	15			
Range between refueling	150 miles	150 miles	250 miles	450 miles	150 miles			
Price of fuel (in gasoline gallon equivalents)	0 $1.50/gal	0 $1.50/gal	0 $1.50/gal	0 $1.50/gal	0 $4.50/gal			
Type of fuel	gasoline	gasoline	gasoline	gasoline	new (alternative)			
Safety	average	above average	above average	average	above average			
Maintenance cost/year	250	150	400	400	200			
Acceleration (0 to 60 mph)	10 seconds	14 seconds	14 seconds	12 seconds	10 seconds			
Ride & interior comfort	smooth & roomy	smooth & roomy	smooth & small	smooth & small	bouncy & roomy			
Truck cab/seating	extended cab	4 people	regular cab	6 people	extended cab			
Amount of "bad" emissions (1=low<------>8=high)	1	4	5	6	1			
Emission surcharge	$25/year	$475/year	$625/year	$775/year	$25/year			
Bicycle path								Yes
Travel time to work relative to drive time						30 minutes more	20 minutes more	4 times drive time
Transit stop closest to home						12 blocks	16 blocks	
Transit stop closest to destination						12 blocks	16 blocks	
Frequency of service						every 30 minutes	every 45 minutes	
Reliability						on time 90%	on time 90%	
Transit safety						only vehicles patrolled	none	
Fare						$0.50	$1.50	

3. Thinking about your next vehicle purchase, if the above were your only choices, which would you be most likely to choose? **(CHECK ONLY ONE):**

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
New Truck	New Minivan	Used Truck	Used Minivan	New Fuel Truck	Probably not replace my current vehicle, but try instead to use transit or bicycle
❑	❑	❑	❑	❑	❑

Table 4

	New Truck	New SUV	Used Truck	Used SUV	New Fuel SUV	Conventional Bus	Express Bus	Bicycle
Age of vehicle	new	new	12 years old	5 years old	new			
Price of vehicle	$8,000	$30,000	$20,000	$15,000	$18,000			
Fuel economy (mpg equivalent)	15	50	20	50	25			
Range between refueling	250 miles	450 miles	150 miles	350 miles	150 miles			
Price of fuel (in gasoline gallon equivalents)	0 - $2.50/gal	0 $2.50/gal	0 $2.50/gal	0 $2.50/gal	0 $3.50/gal			
Type of fuel	gasoline	gasoline	gasoline	gasoline	new (alternative)			
Safety	above average	above average	average	above average	average			
Maintenance cost/year	50	250	200	100	200			
Acceleration (0 to 60 mph)	10 seconds	14 seconds	14 seconds	12 seconds	14 seconds			
Ride & interior comfort	smooth & roomy	bouncy & roomy	smooth & small	smooth & small	bouncy & roomy			
Truck cab/seating	extended cab	4 people	regular cab	6 people	2 people			
Amount of "bad" emissions (1=low<------>8=high)	2	1	7	6	1			
Emission surcharge	$175/year	$25/year	$925/year	$775/year	$25/year			
Bicycle path								No
Travel time to work relative to drive time						30 minutes more	20 minutes more	4 times drive time
Transit stop closest to home						6 blocks	8 blocks	
Transit stop closest to destination						12 blocks	16 blocks	
Frequency of service						every 20 minutes	every hour	
Reliability						on time 90%	on time 950%	
Transit safety						both stations & vehicles patrolled	only stations patrolled	
Fare						$1.00	$1.50	

4. Thinking about your next vehicle purchase, if the above were your only choices, which would you be most likely to choose? **(CHECK ONLY ONE):**

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
New Truck	New SUV	Used Truck	Used SUV	New Fuel SUV	Probably not replace my current vehicle, but try instead to use transit or bicycle
❑	❑	❑	❑	❑	❑

Table 5

	New Truck	New Minivan	Used Truck	Used Minivan	New Fuel Truck	Conventional Bus	Express Bus	Bicycle
Age of vehicle	new	new	6 years old	1 year old	new			
Price of vehicle	$10,000	$24,000	$5,000	$20,000	$18,000			
Fuel economy (mpg equivalent)	30	50	20	30	15			
Range between refueling	350 miles	450 miles	250 miles	250 miles	100 miles			
Price of fuel (in gasoline gallon equivalents)	0 $4.50/gal	0 $4.50/gal	0 $4.50/gal	0 $4.50/gal	0 $4.50/gal			
Type of fuel	gasoline	diesel	gasoline	diesel	new (alternative)			
Safety	average	average	above average	above average	above average			
Maintenance cost/year	100	50	200	300	200			
Acceleration (0 to 60 mph)	12 seconds	12 seconds	10 seconds	14 seconds	14 seconds			
Ride & interior comfort	smooth & roomy	smooth & roomy	smooth & small	bouncy & small	smooth & small			
Truck cab/seating	extended	6 people	extended cab	4 people	regular cab			
Amount of "bad" emissions (1=low<------>8=high)	1	2	7	8	1			
Emission surcharge	$25/year	$175/year	$925/year	$1075/year	$25/year			
Bicycle path								Yes
Travel time to work relative to drive time						10 minutes more	About same	4 times drive time
Transit stop closest to home						6 blocks	8 blocks	
Transit stop closest to destination						9 blocks	12 blocks	
Frequency of service						every 40 minutes	every hour	
Reliability						on time 85%	on time 90%	
Transit safety						only stations patrolled	both stations & vehicles patrolled	
Fare						$1.00	$1.50	

5. Thinking about your next vehicle purchase, if the above were your only choices, which would you be most likely to choose? **(CHECK ONLY ONE):**

- ☐ **Option 1** New Truck
- ☐ **Option 2** New Minivan
- ☐ **Option 3** Used Truck
- ☐ **Option 4** Used Minivan
- ☐ **Option 5** New Fuel Truck
- ☐ **Option 6** Probably not replace my current vehicle, but try instead to use transit or bicycle

Table 6

	New Truck	New SUV	Used Truck	Used SUV	New Fuel SUV	Conventional Bus	Express Bus	Bicycle
Age of vehicle	new	new	3 years old	5 years old	new			
Price of vehicle	$14,000	$12,000	$5,000	$5,000	$30,000			
Fuel economy (mpg equivalent)	25	20	30	40	15			
Range between refueling	350 miles	250 miles	350 miles	350 miles	100 miles			
Price of fuel (in gasoline gallon equivalents)	0 $2.50/gal	0 $2.50/gal	0 $2.50/gal	0 $2.50/gal	0 $2.50/gal			
Type of fuel	gasoline	gasoline	gasoline	gasoline	new (alternative)			
Safety	above average	above average	above average	above average	above average			
Maintenance cost/year	100	100	100	300	100			
Acceleration (0 to 60 mph)	10 seconds	12 seconds	10 seconds	12 seconds	10 seconds			
Ride & interior comfort	smooth & small	smooth & roomy	bouncy & roomy	bouncy & roomy	smooth & roomy			
Truck cab/seating	extended cab	4 people	regular cab	2 people	4 people			
Amount of "bad" emissions (1=low<------>8=high)	2	4	5	7	1			
Emission surcharge	$125/year	$475/year	$625/year	$775/year	$25/year			
Bicycle path								No
Travel time to work relative to drive time						20 minutes more	10 minutes more	4 times drive time
Transit stop closest to home						9 blocks	12 blocks	
Transit stop closest to destination						6 blocks	8 blocks	
Frequency of service						every 20 minutes	every 30 minutes	
Reliability						on time 85%	on time 100%	
Transit safety						none	both stations & vehicles patrolled	
Fare						free	$0.50	

6. Thinking about your next vehicle purchase, if the above were your only choices, which would you be most likely to choose? **(CHECK ONLY ONE):**

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
New Truck	New SUV	Used Truck	Used SUV	New Fuel SUV	Probably not replace my current vehicle, but try instead to use transit or bicycle
☐	☐	☐	☐	☐	☐

Table 7

	New Truck	New SUV	Used Truck	Used SUV	New Fuel Truck	Conventional Bus	Express Bus	Bicycle
Age of vehicle	new	new	3 years old	1 year old	new			
Price of vehicle	$14,000	$30,000	$10,000	$10,000	$24,000			
Fuel economy (mpg equivalent)	30	20	20	20	25			
Range between refueling	350 miles	250 miles	150 miles	150 miles	200 miles			
Price of fuel (in gasoline gallon equivalents)	0 $1.50/gal	0 $1.50/gal	0 $1.50/gal	0 $1.50/gal	0 $3.50/gal			
Type of fuel	gasoline	gasoline	gasoline	gasoline	new (alternative)			
Safety	above average	average	above average	average	average			
Maintenance cost/year	50	100	200	200	200			
Acceleration (0 to 60 mph)	10 seconds	14 seconds	12 seconds	12 seconds	16 seconds			
Ride & interior comfort	smooth & small	smooth & small	bouncy & small	smooth & roomy	bouncy & small			
Truck cab/seating	regular cab	2 people	extended cab	2 people	regular cab			
Amount of "bad" emissions (1=low<------>8=high)	3	3	8	7	1			
Emission surcharge	$325/year	$325/year	$1075/year	$925/year	$25/year			
Bicycle path								Yes
Travel time to work relative to drive time						20 minutes more	10 minutes more	4 times drive time
Transit stop closest to home						6 blocks	8 blocks	
Transit stop closest to destination						9 blocks	12 blocks	
Frequency of service						every 10 minutes	every 15 minutes	
Reliability						on time 95%	on time 95%	
Transit safety						both stations & vehicles patrolled	only vehicles patrolled	
Fare						$0.50	$1.00	

7. Thinking about your next vehicle purchase, if the above were your only choices, which would you be most likely to choose? **(CHECK ONLY ONE):**

- ☐ **Option 1** New Truck
- ☐ **Option 2** New SUV
- ☐ **Option 3** Used Truck
- ☐ **Option 4** Used SUV
- ☐ **Option 5** New Fuel Truck
- ☐ **Option 6** Probably not replace my current vehicle, but try instead to use transit or bicycle

Table 8

	New Truck	New Minivan	Used Truck	Used Minivan	New Fuel Minivan	Conventional Bus	Express Bus	Bicycle
Age of vehicle	new	new	3 years old	7 years old	new			
Price of vehicle	$12,000	$24,000	$15,000	$20,000	$24,000			
Fuel economy (mpg equivalent)	30	40	20	40	30			
Range between refueling	350 miles	350 miles	250 miles	450 miles	150 miles			
Price of fuel (in gasoline gallon equivalents)	0 $2.50/gal	0 $2.50/gal	0 $2.50/gal	0 $2.50/gal	0 $3.50/gal			
Type of fuel	gasoline	diesel	gasoline	gasoline	new (alternative)			
Safety	average	average	above average	average	above average			
Maintenance cost/year	50	150	400	400	100			
Acceleration (0 to 60 mph)	14 seconds	10 seconds	10 seconds	12 seconds	14 seconds			
Ride & interior comfort	bouncy & small	bouncy & small	bouncy & roomy	smooth & roomy	smooth & roomy			
Truck cab/seating	extended cab	6 people	extended cab	8 people	6 people			
Amount of "bad" emissions (1=low<------>8=high)	1	1	6	6	1			
Emission surcharge	$25/year	$25/year	$775/year	$775/year	$25/year			
Bicycle path								No
Travel time to work relative to drive time						40 minutes more	30 minutes more	4 times drive time
Transit stop closest to home						6 blocks	8 blocks	
Transit stop closest to destination						9 blocks	12 blocks	
Frequency of service						every 20 minutes	every 30 minutes	
Reliability						on time 85%	on time 90%	
Transit safety						none	only stations patrolled	
Fare						$0.50	$1.50	

8. Thinking about your next vehicle purchase, if the above were your only choices, which would you be most likely to choose? **(CHECK ONLY ONE):**

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
New Truck	New Minivan	Used Truck	Used Minivan	New Fuel Minivan	Probably not replace my current vehicle, but try instead to use transit or bicycle
❑	❑	❑	❑	❑	❑

Please turn the page for additional questions.

9. If you indicated at any time that you would buy a new or used vehicle, realistically when would that be?
(WRITE MONTHS OR YEARS IN BLANK): _____

10. If you indicated at any time that you would buy a new or used vehicle, which current vehicles, if any, would you replace?
(WRITE MAKE/MODEL/YEAR IN BLANK): _____

11. If you indicated at any time that you would not replace your current vehicle, would you sell any of your vehicles?
Yes_____ No_____

If so, which ones?
(WRITE MAKE/MODEL/YEAR IN BLANK): _____

KEY TERMS

Please pull out this sheet and keep it handy while you complete the survey.

Transport Options	Transport options are the types of transportation available. In addition to the five private vehicle options and two public transit options, a bicycle option is offered.
Transport Features	Transport features are the characteristics of the transport options. For example, some of the features of the Conventional Bus transport option are fare, safety, and frequency of service.

TRANSPORT OPTIONS

Bicycle	Bicycling is defined as transport on a non-motorized two or three wheel vehicle.
Conventional Bus	The conventional bus runs on a fixed schedule, making frequent stops.
Express Bus	The express bus runs less frequently than the conventional bus, but makes fewer stops, allowing you to get to your destination more quickly.
Private Vehicle	A private vehicle is one which is driven by a private citizen. Your car, truck, van or motorcycle is a private vehicle. Private vehicles can be new or used conventionally fueled vehicles or new fuel vehicles. *New trucks, minivans, and sports utility vehicles (SUVs)* are not previously owned. *Used trucks, minvans, and SUVs* are previously owned. *New fuel trucks, minvans, and SUVs* are vehicles that operate using alternative fuels.

TRANSPORT FEATURES

Acceleration	Acceleration is how quickly (in seconds) your vehicle can reach 60 miles per hour (mph) after you press down the gas pedal.
"Bad" Emissions	"Bad" emissions are from your private vehicle and contribute to carbon monoxide or ozone in the air. Emission range from 1(low) to 8(high).
Bicycle Path	A bicycle path is a safe path designated for use by bicyclists only. Bicycling may take place on the street or on a designated bicycle path.
Emission Surcharge	The emission surcharge is an additional yearly charge based on your vehicle's emissions level. The higher a vehicle's "bad" emissions, the higher its emission surcharge.
Fare	Fare is the cost per one-way trip.
Frequency of Service	Frequency of service is the interval at which buses or trains arrive at a station or stop. For example, a bus could arrive every 20 minutes.

Please turn the page for more definitions.

KEY TERMS (continued)

Fuel Economy	The fuel economy is how many miles the vehicle can reach on one gasoline gallon equivalent. *A gasoline gallon equivalent* is the amount of fuel that has the same energy content as a gallon of gasoline.
Maintenance Cost	The maintenance cost is the cost of maintaining and repairing you vehicle averaged over 5 years.
Price of Fuel	The price of fuel is the per gallon cost for gasoline or the price per gasoline gallon equivalent for alternative fuels.
Price of Vehicle	The price of the vehicle is how much the vehicle costs to purchase, including tax, title, and license, but not including extras like radio or air conditioner.
Range Between Refueling	The range between refueling is how many miles the vehicle can go after being filled or fully charged before needing to be refueled.
Reliability	Reliability is the percentage of time the transit arrives to its destination on schedule.
Ride & Interior Comfort	The ride is how smooth trips in your vehicle are. The ride can be smooth or bouncy. The interior comfort is how comfortable the interior is to you. The interior comfort can be small (cramped) or roomy.
Safety	Safety is how well the vehicle is equipped with items such as seat belts and air bags for emergencies . Ratings can be average or above average.
Time Between Buses	The time between buses is the wait time between buses running on the same route.
Transit Safety	Transit Safety means either On-board Security or Station Security. *On-board security* is a guard who patrols the buses. *Station security* means that the bus stations are monitored either electronically or by guards.
Transit Stop Closest to Destination	The transit stop closest to destination is the stop nearest to the location to which you are traveling.
Transit Stop Closest to Home	The transit stop closest to home is the stop located nearest to your residence.
Truck Cab/Seating	Truck cabs are either regular or extended. Seating is the number of people that can be seated in the vehicle. The number of people can range from 2 to 8.
Type of Fuel	The type of fuel is the fuel used to power the auto. Options are gasoline diesel, or new (alternative fuel). New fuels emit fewer "bad" emissions than gasoline or diesel.

Appendix H

Current Travel Demand Model System

Current Travel Demand Model System

Introduction

Metro's current travel demand model system, commonly referred to as the Phase III Model System, is based on survey data collected in 1985 (see Chapter 3). The models have been refined since then to incorporate various improvements. The first disaggregate mode and destination choice models were estimated in 1979. A new six-trip purpose model system was developed in 1988 and 1989 using the 1985 home interview survey data. Most recently, the addition of zonal development density, transit level-of-service, and pedestrian environment factors have improved the models' ability to predict transit, walk, and bicycle trips. Metro has placed great emphasis on the demographic and economic structure of households in developing the models, a practice that will continue with the current data collection and model development efforts.

The current model system is an expansion of the "four-step" process comprising pre-generation, trip generation, destination choice, pre-mode choice, mode choice, and assignment components. Generally, the model components have been estimated with disaggregate data and applied at a zonal level. The model components are interrelated by various feedback mechanisms as illustrated in Figure H.1. Table H.1 describes each model component and summarizes the required input variables. Each model component is briefly described in the following sections. Additional detail, including model specifications and coefficients, may also be found in *The Phase III Travel Demand Forecasting Model: A Summary of Inputs, Algorithms, and Coefficients* (Metro, June 1994). The main elements of Metro's data collection program that feed into the current model system are described in Chapter 3.

The Metro model system is available to other local jurisdictions. Metro staff are a technical resource to all local jurisdictions who have dial-in access to the EMME/2 software. Generally, local jurisdictions rely on trip tables generated by Metro but may run their own traffic assignments. For example, the City of Portland uses its own more detailed network for assignments.

Figure H.1 METRO Travel Forecasting Model Structure

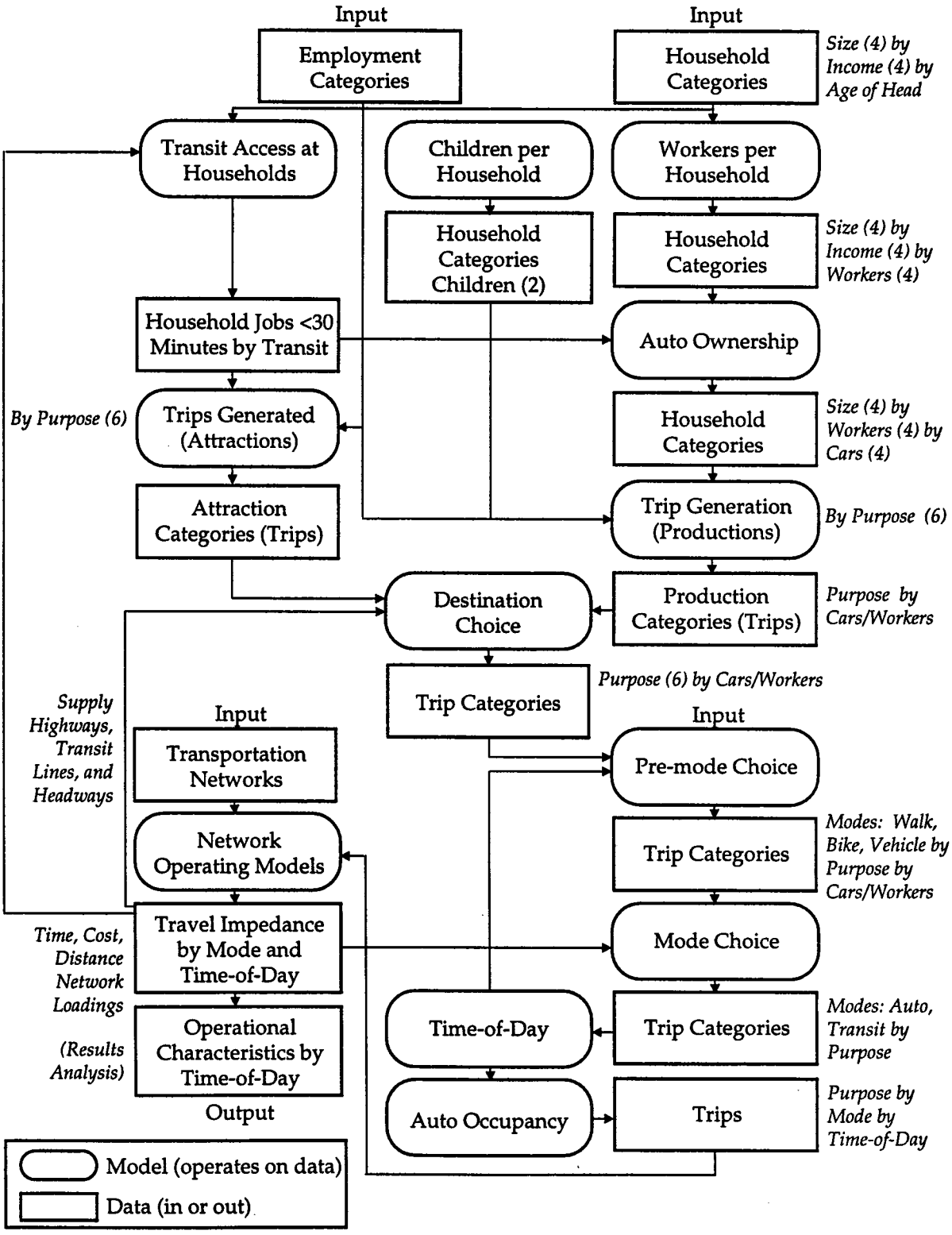


Table H.1 Existing Metro Model System Components and Data Inputs

Step	Models	Model Form(s)	Model Inputs
Pre-Trip Generation	worker model	multinomial logit	household size, income, age of household head Accessibility variables: number of employees within 30 minutes via transit
	auto ownership	multinomial logit	household size, number of workers, age of household head, household income, number of retail employees within one mile, Pedestrian Environment Factor (PEF)
	children model	multinomial logit	household size, age of household head
Trip Generation	home-based work	cross classification (productions) and, linear regression (attractions)	household size and number of workers (productions); total employment (attractions)
	home-based other	cross classification (productions) and, linear regression (attractions)	household size, number of worker, number of autos (productions); retail employment, households (attractions)
	non-home-based work	linear regression	total employment (productions); retail employment (attractions) employment, number of students and employees at institutions
	non-home-based-non-work	linear regression (productions = attractions)	retail employment, number of households
	home-based school	cross classification (productions = attractions)	children per household, household size
	home-based college	cross classification and ITE rates (attractions)	age of household head, household size (productions); numbers of students and employees at institutions
	commercial trips (productions = attractions)	linear regression	retail employment, other employment, residential land acres, industrial land acres

Table H.1 Existing Metro Model System Components and Data Inputs (continued)

Step	Models	Model Form(s)	Model Inputs
	external trips	trip purpose percentages applied to target volumes at external stations	external station counts Trip purpose percentages
Destination Choice (Trip Distribution)	destination choice model for all purposes except external-external	multinomial logit (utility function varies by trip purpose)	network model outputs: zone-to-zone travel times by mode, intrazonal travel times, natural log of attractions at destination zone
Pre-Mode Choice	home-based work, home-based other, home-based other, non-home-based non-work	binomial logit (different utility functions for each purpose using some or all of the inputs listed)	trip distance, autos per household, workers per household employment and retail employment within mile of production zone, PEF
	home-based school	cross classification into mode by location of production	n/a
	home-based college	binomial logit	trip distance, autos per household
Mode Choice	home-based work	multinomial logit	in-vehicle time, walk time, wait time, transfer wait time, cost, trip distance; autos per household, household per acre in production zone, employment per acre in attraction zone, employment within mile of attraction zone, PEF, CBD dummy
	home-based other	multinomial logit	in-vehicle time, walk time, wait time, cost, workers per household, age of household head, trip distance, autos per household, employment within mile, PEF
	non-home-based work, non-home-based-non-work	multinomial logit (utility functions vary by purpose)	walk time, wait time, trip distance, employment within mile, PEF
	home-based college	multinomial logit	in-vehicle time, walk time, wait time, cost autos per household, worker per household

Source: Cambridge Systematics, Inc.

Pre-Generation

The pre-generation step includes a worker per household model, a household auto ownership model, and a children per household model. The worker model predicts the number of workers per household on the basis of household income, size, and age of household head. The auto ownership model adds to this list of variables the Pedestrian Environment Factor (PEF), the number of retail employees located within one mile, and the number of employees within 30 minutes via transit. The PEF, described below, also enters pre-mode choice and mode choice models. Variables in the children model are household size and head of household age.

Trip Generation

Outputs from the worker, auto ownership, and children models along with other input variables are fed into trip generation models for six personal trip purposes resulting in total average weekday person trips. The trip purposes are home-based work (HBW), home-based other (HBO), non-home-based work (NHBW), non-home-based non-work (NHBNW), home-based school (HBS) and home-based college (HBC).

Average weekday vehicle trips are also generated for commercial and external trips. The commercial trips are generated from zonal employment and land use variables. External trips are based on average weekday traffic volume targets and origin destination percentages for five trip purposes including external-internal HBW, external-internal non-HBW, internal-external recreation, internal-external non-recreation, and external-external. These percentages were derived from a 1988 external station intercept survey. Time series linear regression models predict the future year traffic volume targets.

Destination Choice

A separate multinomial logit destination choice model is applied for each trip purpose. Variables entering the destination choice models include peak period and non-peak zone-to-zone highway travel times, intrazonal travel times, and the natural log of attractions at each destination zone (the peak period skims apply to the HBW model; non-peak skims are used for the other trip purposes). Calibration of the destination model required development of k-factors for trips to and from the central business district and trips crossing the Columbia or Willamette Rivers.

Pre-Mode Choice

A set of pre-mode choice models separates person trips made by walking or bicycle from those made by motorized modes (auto or transit). Maximum allowable distances for walk and bicycle usage by trip purpose were developed from 1985 survey data. For zero car households, a simple walk/bicycle percentage is applied to trips of less than maximum distance. Variables entering the pre-mode choice models include trip distance, ratio of cars to workers per household, employment within one mile of the production zone, and the PEF.

Mode Choice

A set of mode choice models splits the remaining person trips into auto and transit modes. Home-based work trips are split into drive alone, shared ride, transit with walk access, and transit with drive access. Other trip purposes are split into auto and transit. In addition to incorporating variables such as time, cost, workers per household, ratio of cars to workers per household, employment, and age of household head, the mode choice models also include the PEF.

Assignment

After application of time-of-day factors developed from the 1985 survey data, assignment of trip tables to transportation networks is carried out using the EMME/2 software package. Metro selected this package because of its user-defined volume-delay relationships, multi-path transit assignment and multi-path select link analysis capabilities, and visual analysis tools. As described below, Metro uses its RLIS geographic information system in defining, building, and maintaining the simulation networks.

The Pedestrian Environment Factor (PEF)

Pedestrian Environment Factors (PEFs) for each TAZ were developed in a 1992 study. The PEF is a score obtained by adding ratings of 1, 2, or 3 (corresponding to "bad", "average", and "good") in four categories. The four categories, designed to reflect the character of the pedestrian environment, include ease of street crossings, sidewalk continuity, local street characteristics (grid versus cul-de-sac), and topography (steep hills have a negative impact on the pedestrian environment). The use of the PEF has been somewhat controversial and Metro intends to develop more objective environmental factors as soon as possible based on objective measurements of the environment and data from the 1994 Household survey.

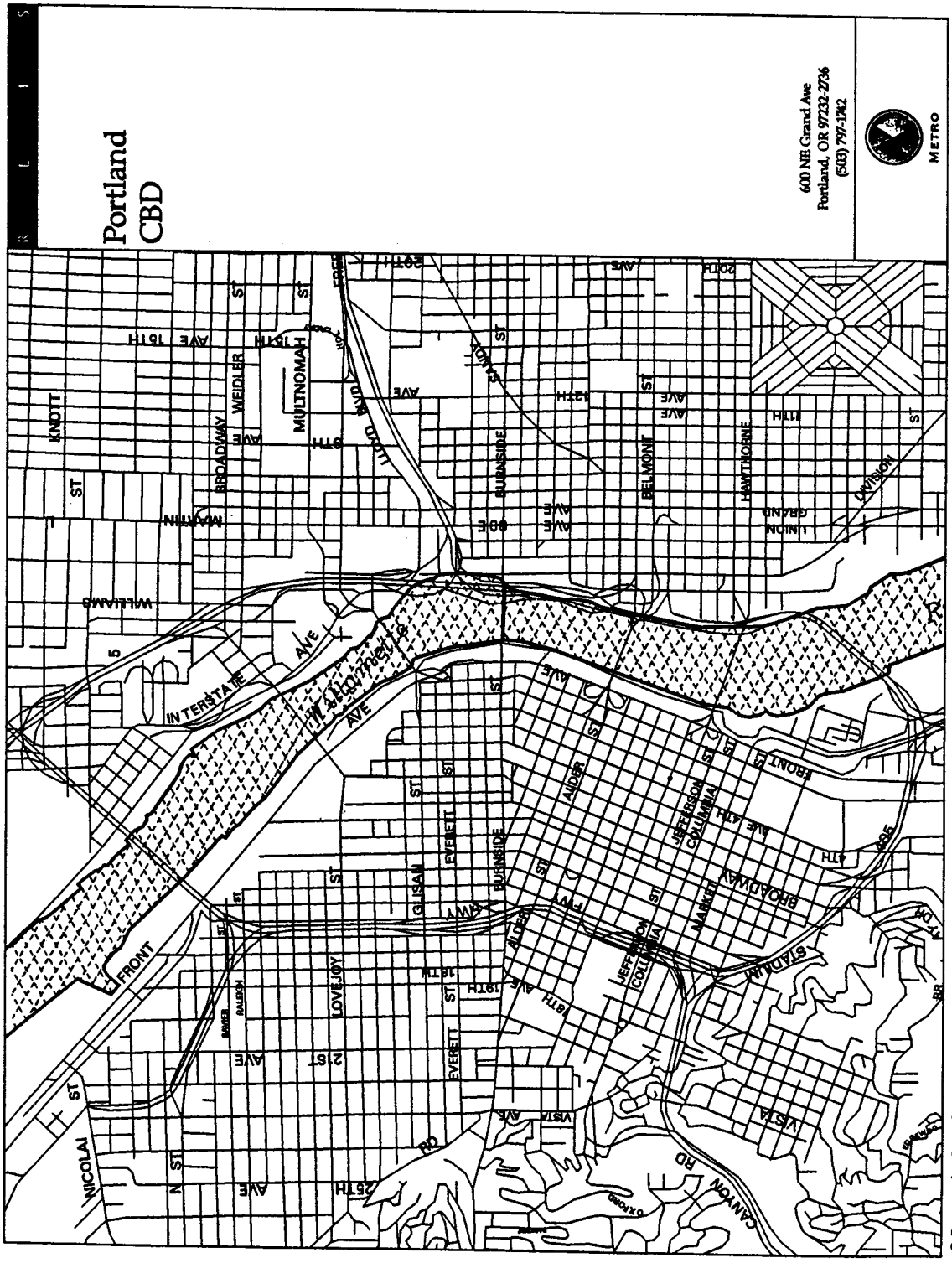
Use of GIS

Portland Metro's Regional Land Information System (RLIS) is an integral part of its transportation modeling process. As described in Chapter 3, RLIS is used to store and manipulate the zonal land use, demographic, and economic data and forecasts which feed into the travel demand model system (e.g. households, number of retail employees, acres of industrial land). RLIS also facilitates the calculation of zonal variables with a spatial dimension such as the number of employees within thirty minutes of each TAZ.

Another significant function of RLIS in the modeling process is as a storage and editing tool for the transportation system simulation networks. Networks are created and edited with the ArcInfo GIS software and then uploaded into the EMME/2 modeling package. Links between the GIS network and the model network have been automated allowing for easy movement back and forth between the GIS and modeling system. The GIS roadway network for the Portland CBD is shown in Figure H.2.

This ability to easily move back and forth between the GIS and transportation modeling systems means that the simulation networks used in the modeling process can be far more accurate and up to date than was previously practical. Editing a network in a conventional modeling package can be tedious and the abstract nature of such networks makes representing and tracking capital improvements difficult. With RLIS, Metro can easily store multiple versions of the network. For example, the regional Transportation Improvement Plan (TIP) is now created and stored in RLIS. TIP projects are accurately represented in separate data layers (1995 network, 1996 network, and so forth). Thus, for example, for the Clean Air Act's conformity analysis, the network used in the model system is always completely consistent with the TIP projects, and air quality and traffic impacts due to construction of TIP projects within any given year can be accurately modeled.

Figure H.2 Portland's Central Business District



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NOTICE

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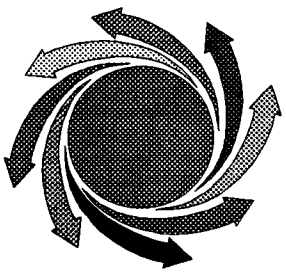

Technology Sharing

A Program of the U.S. Department of Transportation