

Development of Revised Methodology for Collecting Origin-Destination Data

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ABSTRACT

Trip Origin and Destination (O-D) data is needed to support continuing analyses and implementation of Florida's Strategic Intermodal System (SIS). The data can also be used in support of the Department's traffic count program and can provide data for specific projects for improvements to the SIS. These projects can then help to improve mobility, safety, and economic vitality for Florida's traveling public.

An extensive literature review was conducted for both passenger transportation and freight movement O-D survey methodologies. Based on the results of literature review, a list of survey methods was studied. The advantages and disadvantages of each methodology were summarized in tables. After the meeting with FDOT, some criteria for selecting the preferred O-D survey methodology were determined, including: 1) Disruption of traffic; 2) Statistical reliability; 3) Data attributes; 4) Cost effectiveness; 5) Geographic coverage; and 6) Response rate.

Different survey methodologies were recommended for passenger transportation than freight movements. For passenger transportation, a license plate mail out-mail back/internet was recommended for external survey. Since this method can only capture the trips of in-state vehicles, an additional postcard survey at the rest areas or off-ramp intersections was recommended to be used to catch those out-of-state vehicles to minimize the data bias. For the truck movements, a combination of fax, mail and internet survey of warehouse and distribution centers was recommended for intra-regional trips, and a roadside interview was recommended for inter-regional travel. A map of weight stations, rest areas, state roads, and Traffic Analysis Zones (TAZ) was developed for identifying the potential survey sites. The past studies showed that a proper incentive will have a positive impact on the rate of return. The web-based survey can provide very accurate data and can significantly reduce the work load of data input. A higher amount of incentives can be given to the respondents who submit the survey through the web because of the potential savings on labor costs.

1 INTRODUCTION

1.1 Background

Trip Origin and Destination (O-D) data is needed to support continuing analyses and implementation of Florida's Strategic Intermodal System (SIS). The data can also be utilized in support of the Department's traffic count program and can provide data for specific projects for improvements to the SIS. These projects can then help to improve mobility, safety, and economic vitality for Florida's traveling public.

The data obtained from O-D studies can be used to help produce a series of alternatives to be evaluated for future growth in specific corridors of the SIS, and for inputs into the Statewide Highway and Freight Models. These data may also be used as a baseline for future data monitoring and surveys on the state's limited access highway system.

The FDOT System Planning Office has requested that the Center for Urban Transportation Research (CUTR) at the University of South Florida (USF) conduct research into the development of a methodology for collecting O-D data without obstructing traffic. The main focus of the methodology will be for the collection of O-D data related to intercity or interregional travel.

Upon acceptance by FDOT, the recommended methodology will be incorporated into an O-D study effort in early spring of 2006. This effort is planned to be initiated by a pilot O-D survey on one of the Interstate corridors. The most probable area for this pilot O-D survey is the Interstate 75 corridor from the Florida/Georgia line to the Turnpike/Interstate 75 interchange area. Additional segments including Interstate 10 east of the Interstate 75 interchange, and US-301 from the Interstate 10 interchange to the Ocala area could also be reviewed to provide a Regional aspect to this pilot O-D effort. In the future, additional corridors or regional area surveys will be conducted after the analysis of the pilot O-D effort is complete. The ultimate goal is to provide a comprehensive effort to provide O-D data for SIS alternative development and modeling efforts.

1.2 Study Objectives

The objective of this research is to develop a methodology for collection of valid O-D data that does not involve interruption of traffic flow. A particular concern that was identified by FDOT is the capture of O-D data related to freight movement. The purpose of this effort is to develop an appropriate methodology to collect this data that will then be tested and evaluated in a subsequent project.

1.3 Kick-off Meeting Summary

A kick-off meeting was held at FDOT Systems Planning Office, Tallahassee on December 12, 2005. A few key points that came out of the meeting are listed as follows:

1. Roadside interviews, where we stop traffic and pull a sample of people over for interviewing, is still allowed, just not on limited access roadways.
2. One new approach is to capture license plates of passing vehicles, and then using registered vehicle data, follow up with a mail out survey form. This approach has some merits, but may have a potential issue with respect to privacy of the vehicle owner. To apply this

- method, a literature review on this specifically should be conducted to see how other locations that did these types of surveys addressed these issues. But for now, it is an option.
3. With regard to the level of detail required, the O-D data should be zone to zone travel since it will be used in the statewide transportation models. FDOT will send CUTR information regarding the zones used in the model. The zones are typically larger than a TAZ used in local transportation models, but are much smaller than a city.
 4. For roadside interview, vehicles can be stopped on conventional roads, just not on interstates. Interview or hand motorists a mail-in postcard can be conducted at interstate off-ramps intersections. The data collection process should not back traffic onto the freeway mainline. Roadside interview can be conducted in rest areas or weight stations.
 5. FDOT is interested in cars as well as trucks. They are interested in commodity flow information (tonnage and cargo) for commercial vehicles.
 6. The data will be used in the statewide models and should be useable for developing a map of desire lines of travel.
 7. A matrix of various methods of O-D data collection should be developed, including the advantage and disadvantage of each.
 8. With respect to truck data, some of the major distribution centers (i.e. Publix Centers in Lakeland and Jacksonville, Dollar General in Alachua, the Ports and Airports, etc.) should be identified, and considered for data collection there as well.

2 LITERATURE REVIEW

Origin and destination (O-D) data is of fundamental importance to understand the travel patterns and the associated demands on a transportation network over an entire region. This data is normally used as the basic input to transportation models developed to support the decision making process of the transportation agencies.

Historically, there has been considerable research and studies focused on O-D data collection methodologies, including roadside interviews, postcard mail-back surveys, license plate mail back, online survey, telephone surveys, and combinations of these methods. Over the last decade, there have been multiple studies of different magnitudes at the state and metropolitan level, seeking to collect truck trip O-D information for either modeling or policy planning purposes. The survey methodologies are usually similar for passenger transportation and trucks. However, more information is typically requested for a truck O-D survey.

This literature review presents summarized information on some of the most relevant past studies and documents the state-of-the-practice.

2.1 Review of Auto O-D Survey Methods

Trip Origin-Destination surveys have been conducted in many jurisdictions for many decades. Traditionally, these surveys have had, however, a very limited geographical scope as they have primarily been used in conjunction with corridor analysis. Studies with larger or more comprehensive scopes, and consequently larger geographical coverage, are related to the needs of Metropolitan Planning Organizations (MPOs) while studies at the State level are not common events. As described elsewhere in this literature review, there is consensus in the transportation community of the need to bring all these results into a common framework for data aggregation and analysis.

O-D surveys generally follow the procedures established for Vehicle Intercept and External Station Surveys in the Travel Survey Manual (1). The basic questions to be answered are where to survey, what methods to use, what techniques, and the design of the survey location. There are four general methods for conducting O-D surveys as described in the Travel Survey Manual (1), as follows:

1. The license plate survey- Fieldworkers record the license plate number of vehicles passing the survey location, the vehicles' owners are determined using data from one or more state's Department of Motor Vehicles (DMV), and the vehicle owners are then sent a mail survey.
2. Roadside Handout Survey- Fieldworkers stop some or all vehicles passing the survey location, and hand out self-completion mailback survey forms.
3. Roadside Interview Survey-Fieldworkers stop some or all vehicles passing the survey location, and conduct short interviews with drivers.

4. Combined Roadside Interview and Handout Survey-Fieldworkers stop some or all vehicles passing the survey location, conduct short interviews with drivers, and then hand out self-completion mail back survey forms.

The advantages and disadvantages of each of these four methods (1) are summarized in Tables 1-3.

Table 1 Advantages and Disadvantages of the License Plate Survey

Advantages

1. This method is the safest, because traffic is not stopped as opposed with the other methods.
2. The number of field personnel is typically less than the other methods.
3. The mail questionnaire can be more extensive than interviews in terms of the number of questions asked (especially about socioeconomic and household related questions).
4. Although survey operations at night are difficult and unreliable for all the methods, improvements in videotaping equipment technology are making the collection of license plate information at night more feasible.
5. No traffic delays at survey stations, even at high-volume locations.

Disadvantages

1. No personal contacts are made between surveyors and potential respondents, so there is no opportunity to answer questions or explain aspects of the survey
 2. It is critical that the questionnaires be mailed to potential respondents within a short-time period after the license plates are observed (one to two days is usually the maximum). Logistically, this proves difficult because of multi-agency coordination requirements and difficulties in identifying the license plate numbers from the videotape, audiotape, or fieldworkers' notes.
 3. The method is essentially a mail survey, so it is likely to have relatively high non-response and strong potential for response bias
 4. People driving rental or lease cars will not be surveyed. In addition, people driving someone else's vehicle will not receive the questionnaire unless it is passed on by the vehicle owner.
-

Table 2 Advantages and Disadvantages of the Roadside Handout Survey

Advantages

1. This method is usually less expensive than other methods.
2. Traffic delays are less of a problem than for the interview methods.
3. Screening for certain types of respondents is possible (unlike license plate method).

Disadvantages

1. This method requires traffic stoppages (albeit short ones).
 2. The response rate tends to be low, and there is little opportunity to conduct follow-ups.
 3. Pulling vehicles over without a legitimate law enforcement reason is not permitted in many states.
-

Table 3 Advantages and Disadvantages of the Roadside Interview Survey

Advantages

1. The response rate is much higher than the other methods, so the potential for survey bias is not as great.
2. Personal contacts are made between surveyors and respondents.
3. Selected survey samples can be identified at each location to satisfy standards for statistical analysis.
4. The data are available much sooner than for the other methods, which rely on mailback surveys.

Disadvantages

1. Traffic delays occur especially on high-volume facilities and during peak traffic periods.
2. The method is not permitted in a number of states.
3. This method is more expensive than the Roadside Handout Survey.
4. The method is the least safe of the methods.
5. Because of the potential for delays, the interview must be extremely short.

2.1.1 Statewide O-D Survey in Vermont, 1995

In 1994, the Vermont Agency of Transportation (VAOT) conducted the field work to collect data as part of their effort to develop a statewide travel demand forecasting model. Some of these efforts were directed towards a Statewide Household Travel Survey (2) using a mail out – mail in survey that had a response rate of 8.6% and which allow them to capture data on more than 1% of the households in the State.

During the same year, another effort went underway to collect statewide origin-destination (O-D) data for the first time in Vermont. They implemented two methods: roadside interview and handout of postcard surveys to be mailed back. The survey method chosen for a particular site was based on traffic volume, physical constraints and language needs (because of the presence of French speaking travelers from Canada).

Table 4 Summary of the Statewide O-D Survey in Vermont

Methodology	Roadside interview and roadside handout of mail-back postcard survey
Study Objectives	Estimate external-to-external and external-to-internal trip tables of the statewide travel demand forecasting model
Survey questionnaires	Trip origin detailed to street address Trip destination detailed to street address Trip purpose Vehicle occupancy Vehicle type
Survey Sites	25 roadways crossing the state line (out of 70 but representing 90% of all traffic entering the State of Vermont)
Selection Criteria	Geographic location Functional classification Average annual traffic volume

Survey Scheduling	12 hours at each site (7am-7pm on Tuesdays, Wednesdays, and Thursdays during June)
Sample Size	Estimated based on sampling rates of 34%, 24%, and 14% for traffic volumes of <5k, 5k-10k, and 10k-20k for a 12 hour period in one direction
Field Adjusted Sample Size	Roadside interview: 42.0% (average of 502 interviews, max 747, min 228) Mail-back postcards: 54.5% (average of 1676 cards distributed, max 4304, min 243)
Measures to Minimize Data Biases	Random selection of vehicles, including trucks Vehicles selected from all the lanes Bilingual cards (English and French) Site selection to represent different functional classification, traffic volumes, and geographical areas
Incentives	N/A
Response rate	Mail-back postcards: average 23.9% (min 8.9% max 33.1%) Roadside interview: average 95.2% (above 96.5% in 8 sites, 83.3% in one site)
Cost per survey	Mail-back postcard survey: Average \$14.21 per usable response \$31.75 when traffic volume: 2,000 – 3,000 vpd \$14.65 when traffic volume: 4,500 – 6,000 vpd \$8.50 when traffic volume: over 14,500 vpd Roadside interview: \$12.40 per usable response \$9.35 when traffic volume: 2,000 – 3,000 vpd \$11.15 when traffic volume: 4,500 – 6,000 vpd
Study findings	<ol style="list-style-type: none"> 1. Mail-back postcards are better suited for high traffic volume roads. 2. Roadside interview is more cost-effective on roads with less than 5,000 vpd. 3. Although both techniques require stopping traffic, field logistics are much more complicated for roadside interviews. 4. Interviews could generally be conducted in less than 1 minute. 5. Mail-back postcards should not be used in low traffic volume roads as it might not meet the sample size requirements due to low response rate. 6. Police assistance is desirable for all sites where traffic is stopped on the road for the survey.
Comments	<ol style="list-style-type: none"> 1. Mail-back postcards response rate could be improved with the use of incentives. 2. It might be possible to use existing natural stop locations (exit ramps, intersections, rest areas) to distribute postcards. 3. Postcards could have been mailed out if vehicle owner info could be gathered from field observations.

2.1.2 Cordon Line Travel Survey, Tampa Bay (Gannett Fleming), 2004 (3)

As part of the 7th Regional Transportation Analysis (RTA), a Cordon Line Travel Survey was conducted to enhance and validate the 2003 Tampa Bay Regional Planning Model (TBRPM). Previous RTA Origin-Destination Surveys had considered three vehicle classifications: Passenger car, Light truck, and Heavy Truck. This current study (2003) did not contemplate the assessment of truck traffic. A license plate survey was used in this project. The detailed information is summarized in Table 5.

Table 5 Summary of Cordon Line Travel Survey, Tampa

Methodology	License plate matching (two methods: manual visual identification tape recording in the field and photographic recording in the field with manual visual identification in office) with owner's records in DMV database to mail survey out within 48 hours of trip
Study Objectives	Validation of the 2003 Tampa Bay Regional Planning Model
Survey questionnaires	Trip origin and its location Trip destination and its location Trip purpose Number of occupants in the vehicle Trip frequency Other possible stops along the way
Survey Sites	29 locations
Selection Criteria	Traffic volumes and other indicators of significance Availability, date and reliability of existing data Recent growth or apparent change in the traffic volume mix Ability and reliability of determining characteristics based on similar sites
Survey Scheduling	6-hour periods between 12pm and 6pm on Tuesdays, Wednesdays, and Thursdays of four weeks between March 12 th and April 11 th , 2003
Sample Size	Based on the experience of past surveys and consultation with FDOT. Pre-specified number of completed surveys: Interstate Hwy: 1200, Arterial AADT>40k: 900, Arterial AADT 15-40k: 750, Arterial AADT<15k: 500, Low Volume Roadway: 250
Field Adjusted Sample Size	Number of recorded license plates based on 38% response rate and 50% success rate of license plate capturing and matching (only in-state privately owned vehicles: no cargo trucks): Interstate Hwy: 6316, Arterial AADT>40k: 4736, Arterial AADT 15-40k: 3948, Arterial AADT<15k: 2632, Low Volume Roadway: 1316 A total of approximately 15000 questionnaires were mailed out
Measures to Minimize Data Biases	Although only "privately-owned in-state" vehicles were used as part of the sample, all vehicle types were counted for consistency
Incentives	No
Response rate	About 33%

Cost per survey	N/A
Study findings	<ol style="list-style-type: none"> 1. This methodology was found to be effective to conduct the O-D survey without the disruption of normal traffic flow. 2. A toll free 1-800 number was found to be useful to answer public questions and complains. 3. Human errors in data entry can be corrected with software.
Comments	<ol style="list-style-type: none"> 1. Although the response rate is already very high for this type of survey, an incentive or public campaign before and during survey period could have been used to increase response rate. 2. An option of using website to return the survey should be provided to increase response rate and reduce data input efforts.

2.1.3 Citrus County Cordon Survey (Resource Systems Group, Inc.), 2004 (4)

This survey was conduct to obtain O-D data for traffic heading into Citrus County by the Resource Systems Group, Inc. (RSG), a sub-consultant to URS, to support the Florida Turnpike Enterprise's Tampa Regional Model Update. Survey data was collected in early June 2004 from travelers on US 19 near Inglis at the Levy/Citrus County line and on SR 44 near Rutland on the Sumter/Citrus County line. The methodology and results from this study are summarized in Table 6.

Table 6 Summary of Citrus County Cordon Survey

Methodology	License plate matching (photographic recording in the field with manual visual identification in office) with owner's records in DMV database to mail survey out within 2 weeks of trip
Study Objectives	To support the Florida Turnpike Enterprise's Tampa Regional Model Update; To supplement similar survey data that were collected during an earlier study.
Survey Questionnaires	Trip origin and its location Trip destination and its location Trip purpose Number of occupants in the vehicle Trip frequency Toll Costs SunPass Transponder Information
Survey Sites	2 locations
Selection Criteria	Traffic volume Major highways to cross the county line
Survey Scheduling	12-hour periods between 6:50 am and 7:15 pm on a typical weekday in early June 2004
Sample Size	N/A
Field Adjusted Sample Size	All non-commercial (two-axle) vehicles were photographed. 2,676 vehicles were photographed on SR 44; 2,909 vehicles were

	photographed on US 19.
Measures to Minimize Data Biases	For quality assurance, all vehicles (commercial and non-commercial) were separately counted during the sampling period.
Incentives	A one-dollar bill included in the mailout package
Response Rate	Approximately 32.4 %
Cost per Survey	N/A
Study Findings	<ol style="list-style-type: none"> 1 The cover letter printed on FDOT letterhead and signed by a high-ranking FDOT official was found to be helpful to convince potential respondents to participate, and address potential concerns about privacy. 2 The information (FAQ) sheet was provided to answer frequently asked questions about the study purpose and approach, and how personal privacy was being protected. 3 Study showed that a small financial incentive offered in advance can help boost survey response rates.
Comments	The study indicated that vehicle owners received the survey packet within two weeks of the day they were observed traveling. However, one to two days is usually the maximum indicated by the Travel Survey Manual (1).

2.1.4 I-595 Vehicle Trip Length Study, FDOT District 4 (The CORRADINO Group), 2003 (5)

The primary east-west connector in Broward County, Florida, is the interstate highway I-595 that connects downtown Ft. Lauderdale, the Ft. Lauderdale-Hollywood Airport, the city of Davie, and the city of Plantation. It also connects with I-95, US 1, and SR7/US 441. All of them go north. There are several improvements projects being considered by FDOT. The survey was conducted to develop travel forecasts and other planning analyses as part of the studies being conducted by the FDOT and other local municipalities.

This survey was conducted on March 4, 2003 through March 20, 2003 from 7:00 a.m. to 3:15 p.m. at seven sites along I-595. Teams of surveyors worked at the eastbound and westbound off ramps and at major intersections approaching I-595. Surveyors approached stopped vehicles and offered them a survey form. When the traffic signal turned green the surveyors moved out of the traffic stream. All surveyors wore FDOT approved Class III safety vests. Police officers in cars with flashing lights were located at the end of each exit ramp. The methodology and results from this study are summarized in Table 7.

Table 7 Summary of I-595 Vehicle Trip Length Study

Methodology	Roadside Handout Survey (Return by mail or internet)
Study Objectives	To help determine travel patterns and usage of I-595 To develop travel forecasts and develop transit and roadway improvements from the analysis
Survey questionnaires	Trip origin Type of place of trip origin Trip End Type of place of trip end Where did you enter I-595 Where did you exit I-595 Trip purpose Number of people in vehicle Type of vehicle used during trip Number of vehicles available to household Annual household income Number of workers in household Number of people in household Would you use transit if it was in the form of buses in special lanes, or in the form of trains? Residency in South Florida Space for additional comments
Survey Sites	Seven locations along I-595 1. Davie Road 2. Pine Island Road 3. Nob Hill Road 4. Flaming Road 5. 136 th Avenue 6. Hiatus Road 7. University Drive
Selection Criteria	At off ramps and major intersections approaching I-595
Survey Scheduling	From 7:00 a.m. to 3:15 p.m. on March 4, 2003 through March 20, 2003. Respondents had one week to return their survey via regular mail or by internet.
Sample Size	Questionnaires were distributed as much as possible between 6:30 a.m. and 6:45 p.m. with scheduled breaks between 9:30 and 11:00 a.m. and 2:00 to 3:30 p.m.
Field Adjusted Sample Size	Survey forms were given to all willing drivers stopped at a traffic signal
Response Rate	A pilot study showed a response rate of 12.7%. Although the majority of the respondents (88.0%) replied to the survey via regular mail, the fact that 12 percent responded on-line is an important consideration in future surveys.
Incentives	No
Cost per Survey	N/A

Study Findings	<ol style="list-style-type: none"> 1. Several categories were compared to see if there was a bias between the surveys that were returned through the mail and those that were sent back through the Internet. The differences were negligible for all categories with the exception of the percent of those who would use a train. 2. The final question on the survey allowed respondents the opportunity to provide comments on how transportation in South Florida could be improved. Nearly 4,000 respondents (over 50% of total responses) provided comments.
Comments	The long questionnaire may cause the low response rate for the survey.

2.2 Review of Truck O-D Survey Methods

There is an increasing level of interest within the transportation planning community to have more and better data about freight movements over the road network system. Historically, freight planning efforts and the use of freight-related data have been accomplished by district offices to address specific needs, but have not occurred in a comprehensive manner. FDOT recognizes the needs for a data-supported, comprehensive approach to freight planning. The data for this type of effort must come from various sources because no single freight data source provides all of the information needed. The single, most needed element is accurate freight O-D data (6). This information is a critical element in freight planning activities, but is available only at a more aggregate level, rather than a specific level. Various freight data have been collected internally and externally to FDOT. The in-house data collected includes the truck traffic volume, truck percentage, and truck weight information. Other data in external sources include the Commodity Flow Survey (CFS) produced by BTS, TRANSEARCH database, and data sources compiled by the Bureau of Economic and Business Research (BEBR) housed at the University of Florida.

There has been much literature about truck travel survey methodologies, recently. Most past studies on truck O-D surveys have been summarized in several reports and conference proceedings, including Earlier Truck Travel Surveys by Lau (1995), Oregon DOT Special Project Report 343 (2004), and Strategic Freight Transportation Analysis by Washington DOT.

2.2.1 Lau's Earlier Truck Travel Surveys (1995)

In 1995, Samuel Lau (7) summarized the most comprehensive studies and an extensive literature review related to truck travel surveys and truck travel demand forecasting conducted since 1970. This report emphasized the need for accurate and reliable truck travel data to support any comprehensive truck/freight planning. The study identified seven areas in which improved truck travel data would provide great benefits. Table 8 presents these areas and how the data could be used.

Table 8 Benefits Derived from Obtaining Reliable Truck Data

AREA OF ANALYSIS	APPLICATION
1. Truck Travel Model Development	<ul style="list-style-type: none"> • Truck trip generation • Origin and Destination analysis • Local and freeway route assignments • Congestion and speed simulations • Travel time analysis • Analyze impact of toll facilities • Spatial and temporal analysis (time-of-day, day-of-week, and seasonal)
2. Corridor/Route Analysis	<ul style="list-style-type: none"> • Evaluate route/corridor traffic management proposal for freight impacts • Provide information on truck travel to formulate traffic management plans during roadway reconstructions • Assess impact of truck route reassignments or closures
3. Air Quality Modeling	<ul style="list-style-type: none"> • Estimate truck emissions
4. Intermodal Freight Planning	<ul style="list-style-type: none"> • Facilitate seaport planning • Facilitate airport planning • Understand competition and demand of different freight modes • Provide data to develop performance measures for Intermodal Management Systems as required under ISTEA
5. Pavement Management System	<ul style="list-style-type: none"> • Evaluate and design road geometrics • Help calibrate pavement deterioration models
6. Truck Traffic Regulation and Enforcement	<ul style="list-style-type: none"> • Route restriction analysis • Dangerous goods movement regulation and enforcement analyses • Truck driver safety programs
7. Public-Private Partnerships	<ul style="list-style-type: none"> • Open dialog with private freight industries in gathering data • Provide truck travel data to public and freight industry for research and analysis • Freight-economics analysis

Lau's report made extensive comparisons of types of data collected and the uses of the truck survey data collected in studies conducted in Chicago, Ontario, Vancouver, Phoenix, Alameda

County (California), New York – New Jersey (Port Authority), El Paso (Texas), and Houston – Galveston (Texas).

2.2.2 New York State DOT Conference (2002)

The conference “Data Needs in the Changing World of Logistics and Freight Transportation” (8) was held in Saratoga Springs, New York, in November 2001. It was sponsored by the New York State Department of Transportation (NYSDOT) and other organizations with the objective of providing “transportation officials with a broader understanding of data issues associated with the changing focus of the global competitive markets and its implication on the existing transportation infrastructure, trade corridors, and market areas.”

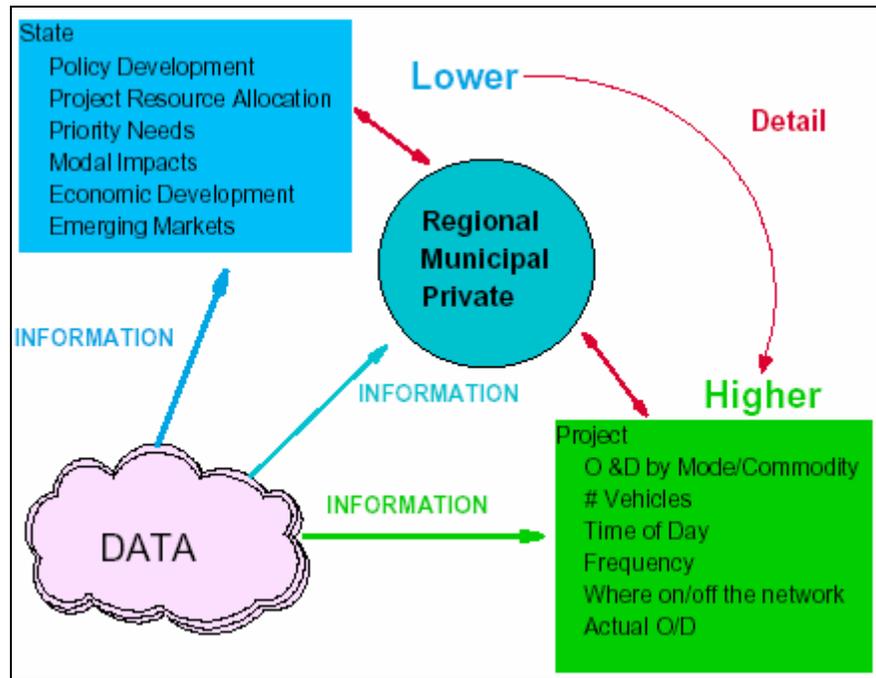
Although there was an implicit interest in discussing the conditions that prevail in the Northeast transportation network, specifically the Montreal-Boston-New York-Washington corridor, the discussions and conclusions reached have general implications. Most importantly, the conference focused its deliberations on the issues surrounding freight data needs (8). Some of the specific objectives of the conference were:

- Discuss new actions or strategies to obtain and enhance freight data and analysis
- Identify the data required to address various decision support needs
- Examine analytical and forecasting capabilities in freight transportation
- Identify strategies for improving freight data collection

One consensus point in the conference was that the intended use of the data should guide the data collection effort, and that there are varying data needs among users as illustrated by Figure 2.1. No single data set will satisfy all needs, but the overall objective should be to develop a data architecture of compatible elements that work with each other, where the researchers, planners, operators and policy makers can find the relevant information according to their specific interest.

Another critical issue that emerged from the conference was that there is a need to collect additional local O-D data. In order to improve analysis and forecasting methods more disaggregate data is needed and the cooperation of the shippers and carriers is essential. Ideally, the complete logistics chain from producer to shipper to consumer should be modeled. It is envisioned that the designer of data collection efforts should take advantage of existing and emerging technologies.

Figure 1: Varying Data Needs among Users (8)



2.2.3 Oregon DOT Special Project Report 343 (2004)

A research project (9) was conducted to identify freight data attributes necessary for urban region truck modeling and freight planning efforts, and to evaluate alternative data collection methodologies to provide the necessary data attributes for the Oregon DOT.

This report presented a summary of the finding of Lau's Truck Travel Surveys (7) with regard to the survey method implemented and the data applications of eight studies as presented in Table 9. The survey costs and response rate of each survey method used are summarized in Table 9. The types of data collected in each of these studies in Lau's report are summarized in Table 10. Another report reviewed was the NCHRP Report 298 "Truck Trip Generation Data: A Synthesis of Highway Practice" in particular with reference to techniques for truck trips data collection as summarized in Table 11. Another study reviewed was the Strategic Freight Transportation Analysis (SFTA) sponsored by the Washington State Department of Transportation (WSDOT) which is primarily focused on regional and statewide truck movements (10).

One of the findings of the literature review in this report (9) was that a combination of each data collection methodology may be applicable when studying freight movement over a large geographical area.

Table 9 Summary of Truck Travel Surveys in Urban Areas (7)

Survey Location	Survey Year	Survey Method	Approx. No. Completed Surveys	Response Rate	Data Applications	Total Survey Cost	\$ / Survey
Chicago	1986	Mailout-Mailback	3,506	25.30%	<ul style="list-style-type: none"> • Truck Travel Model Development • Corridor/Route Analysis • Effects of toll on trucks • Truck Speed simulation model • Truck activity mapping 	\$200,000	\$57
Ontario	1988	Roadside Interview	19,225	96.50%	<ul style="list-style-type: none"> • Time series comparison • Evaluate & design road geometrics • Pavement management planning • Truck accident analysis • Dangerous goods regulation and enforcement analysis • Driver education program 	NA	NA
Phoenix	1991	Combined Telephone-Mailout-Mailback	720	30.00%	<ul style="list-style-type: none"> • Truck travel model development 	\$90,000 ¹	\$125
N.Y. & N.J.	1991	Roadside Interview	4,500	NA	<ul style="list-style-type: none"> • Evaluate dedicated route/corridor proposal • Traffic management for highway reconstruction • Time-series freight analysis • Freight-economic analysis 	NA	NA NA
Alameda County, CA	1991	Combined Telephone-Mailout-Mailback & Roadside Interview	2,200 over 8,000	79.00% NA	<ul style="list-style-type: none"> • I-880 corridor analysis • Create truck travel submodel for corridor analysis • Generate 24-hour & PM peak volumes by axle 	\$285,000 ²	NA
N.Y. & N.J.	1992-94	Roadside Interview	14,671	37.8% ³	NA	\$312,000 ⁴	\$21
El Paso	1994	Telephone Interview	188	42.60%	<ul style="list-style-type: none"> • Truck travel model development • Part of regional travel study • Truck emissions analysis 	\$65,000 ⁵	\$3456
Houston-Galveston	1994	Combined Telephone-Mailout-Mailback	900	35%-40%	<ul style="list-style-type: none"> • Truck travel model development 	\$150,000	\$167

Source: Lau, Samuel W. "Truck Travel Surveys: A review of the Literature and State-of-the-Art." Metropolitan Transportation Commission, 1995.

¹ Cost include data collection, data coding, and model development.

² The cost included sample design, survey design, data collection, coding, data reporting, and model development. Approximately, \$5,000 was also included in the total cost for conduction vehicle classification counts at 11 locations along I-80 and I-880.

³ This was a sampling rate. No response rate was given.

⁴ This was a multi-agency effort, with partnership from the New Jersey Department of Transportation (NJDOT), the New York Metropolitan Transportation Council (NYMTC), and the Port Authority of New York and New Jersey. The survey was conducted at 18 locations with 3 interviewers per toll plaza for 24 hours.

⁵ Cost included sample design, survey design, data collection, coding, reporting, survey analysis, and model development.

⁶ The higher cost was due to a high number of incomplete surveys.

Table 10 Summary of Data Collected from Truck Travel Surveys in Urban Areas (7)

Survey Location	Survey Year	Survey Method	Sample Source	Weight	Axle	Truck Type	O-D	Odometer Reading	Commodity	Land Use	Driver Info	Route Info
Chicago	1986	Mailout-Mailback	DMV	√		√	√	√		√		
Ontario	1988	Roadside Interview	Roadside Interview ¹⁰	√	√	√	√	√	√		√	
Phoenix	1991	Combined Telephone-Mailout-Mailback	DMV	√	√	√	√	√		√		
N.Y. & N.J.	1991	Roadside Interview	Toll Plaza		√	√	√		√			
Alameda County, CA	1991	Combined Telephone-Mailout-Mailback & Roadside Interview	DMV, Port of Oakland Roadside Interview		√		√	√	√	√		
					√		√	√	√	√		
N.Y. & N.J.	1992-94	Roadside Interview	Roadside Interview		√	√	√		√			
El Paso	1994	Telephone Interview	TVICS ¹¹		√	√	√	√	√	√		√
Houston-Galveston	1994	Combined Telephone-Mailout-Mailback	DMV			√	√	√	√	√		

¹⁰ Sample taken at roadside intercept surveys.¹¹ Sample drawn from the Texas Vehicle Information and Computer Services, Inc (TVICS) database

Table 11 Truck Trip Data Collection Approaches and Implementation Techniques (9)

Survey Approach	Implementation Technique	Advantages	Disadvantages
Vehicle Classification Counts	Manual Counts (direct observation)	<ul style="list-style-type: none"> • May be more accurate than automated counters. • No traffic disruption. • Low risk to individual observers. 	<ul style="list-style-type: none"> • High personnel requirement • Potential for human error. • No information regarding O-D, trip purpose, route, commodity, etc.
	Automated or Electronic Data Collection (WIM, Loop Detectors, etc.)	<ul style="list-style-type: none"> • No traffic disruption. • Able to collect traffic counts at many sites, efficiently with low labor requirement. 	<ul style="list-style-type: none"> • Potential for equipment failure. • No information regarding O-D, trip purpose, route, commodity, etc. • Limited to location and availability of electronic transponders.
	Video Surveillance	<ul style="list-style-type: none"> • No traffic disruption. • Better information on type of commodity hauled compared with automated counters. 	<ul style="list-style-type: none"> • High equipment cost requirement. • Potential for equipment failure or recording during adverse weather. • No information regarding O-D, trip purpose, route, specific commodity, etc.
Roadside Intercept Surveys	Roadside Interview	<ul style="list-style-type: none"> • Complete information, especially related to O-D, route, trip purpose, specific commodity, etc. • High response rate • Good sampling control • Ability to expand to total truck traffic population. 	<ul style="list-style-type: none"> • High labor requirement. • Significant risk to survey personnel. • Potential disruption of traffic. • Limited locations where survey may be implemented. • Only captures truck traffic that passes through interview sites.
Travel Diary	Phone Survey	<ul style="list-style-type: none"> • Higher response rate when compared to mail surveys. • Quick turnaround. 	<ul style="list-style-type: none"> • Difficulty obtaining appropriate and correct phone numbers. • Can only call during regular business hours. • Under-representation of out-of-state trucks in sampling frame.
	Mailout-Mailback Survey (owners, operators, or receivers)	<ul style="list-style-type: none"> • Inexpensive 	<ul style="list-style-type: none"> • Low response. • Difficulty ensuring appropriate individual complete survey. • Requires access to vehicle registration list file (DMV or third party list) • Under-representation of out-of-state trucks in sampling frame.
	Combination Phone-Mailout-Mailback Survey	<ul style="list-style-type: none"> • Improved response rate over mail only survey. • Better identification of appropriate survey respondent. 	<ul style="list-style-type: none"> • Relatively low response. • Follow-up calls may be time-consuming and costly. • Requires access to vehicle registration list file (DMV or third party list). • Under-representation of out-of-state trucks in sampling frame.
	Personal Interview	<ul style="list-style-type: none"> • Complete information 	<ul style="list-style-type: none"> • High labor requirement. • Expensive.

Source: Fischer, Michael J. and Han Myong. "Truck Trip Generation Data: A Synthesis of Highway Practice." NCHRP Synthesis 298, Transportation Research Board, National Research Council, Washington, D.C., 2001.

Jessup et al (9) presents an analysis of data requirements for their study. In reviewing past studies, authors came up with a classification of data attributes typically collected. Table 12 summarizes these attributes. Other important information collected included the land use at origin and destination. For vehicles carrying less than a complete truck load (LTL), land use at intermediate stops is also of interest (10).

Table 12 Data Attributes Collected in the Past Studies (9)

Dimension of Data Attributes	Attribute
Time	<ul style="list-style-type: none"> • Coverage: 24 hours, peak hour • Travel time • Truck flow by time of day • Traffic composition (% trucks over time) • Trip frequency • Vehicle utilization (hours per day) • Number of trips on survey day • Speed profiles (by route, time of day)
Trip	<ul style="list-style-type: none"> • Route • Distance • Purpose • Origin • Destination • Start and stop times • Odometer reading • Intermediate stops (trip chaining) • Location and magnitude of trip generators • Facility type • Type of truck pattern (E-E, E-I, I-E, I-I) • Business type
Vehicle	<ul style="list-style-type: none"> • Type of vehicle (configuration) • Weight • Trailer dimensions • Fuel type • Driver characteristics • Driver and vehicle activity at each stop

A comparison has been made between the different methodologies implemented in the past in terms of implementation challenges, investment and maintenance requirements, statistical reliability, data attributes, and geographic coverage (9). The findings are summarized in Table 13.

Table 13 Comparing and Contrasting Alternative Truck O-D Data Collection Methodologies (9)

Mail Survey		
	Advantages	Disadvantages
Implementation	Easy to implement. No disruption of traffic, which is very important in urban settings.	Very difficult to obtain trip detail for all shipment types that the shipper or trip generator may possess.
Investment and Maintenance	Low investment requirement. Minimal personnel requirement.	Must be replicated periodically to maintain current relevance.
Statistical Reliability / Sampling Frame	Generally good information for those that respond. Survey design may include targeted truck movement types or specific commodities.	Low response rate may create biased data. Difficulty finding appropriate person to complete survey, also contributing to bias or non-response.
Data Attributes	Very good data detail for completed responses.	Limited ability to clarify meaning of specific questions.
Geographic Coverage		Poor coverage of urban truck movements from trucks licensed in other states and areas. Low response also limits coverage.
Telephone Survey		
	Advantages	Disadvantages
Implementation	Easy to implement. No disruption of traffic, which is very important in urban settings. Quicker turnaround than mail.	Difficulty finding appropriate and correct phone numbers. Can only call during business hours. 20 to 30 minutes in length.
Investment and Maintenance	Low investment requirement.	Must be replicated periodically to maintain current relevance. Higher personnel requirement when compared to mail.
Statistical Reliability / Sampling Frame	Generally good information for those that respond. Survey design may include targeted truck movement types or specific commodities.	Low response rate may create biased data. Difficulty finding appropriate person to complete survey, also contributing to bias or non-response.
Data Attributes	Very good data detail for completed responses.	None.
Geographic Coverage	Generally coverage is limited to those vehicles licensed within the area.	Poor coverage of urban truck movements from trucks licensed in other states and areas.

Table 13 Comparing and Contrasting Alternative Truck O-D Data Collection Methodologies (9)

Combined Mail and Telephone Survey		
	Advantages	Disadvantages
Implementation	Easy to implement. No disruption of traffic, which is very important in urban settings. Quicker turnaround than mail.	Difficulty finding appropriate and correct phone numbers. Can only call during business hours. Follow-up calls may be time-consuming and costly.
Investment and Maintenance	Moderate investment requirement in personnel.	Must be replicated periodically to maintain current relevance. Higher personnel requirement when compared to mail.
Statistical Reliability / Sampling Frame	Generally good information for those that respond. Survey design may include targeted truck movement types or specific commodities.	Difficulty finding appropriate person to complete survey, also contributing to bias or non-response.
Data Attributes	Improved ability to explain questions and clarify intent, leading to better data detail.	None.
Geographic Coverage	Generally coverage is limited to those vehicles licensed within the area.	Poor coverage of urban truck movements from trucks licensed in other states and areas.

Roadside Interview		
	Advantages	Disadvantages
Implementation	Relatively easy to implement. 2 to 6 minute interview.	Relatively high labor requirement, especially for large geographic areas. Potential disruption of traffic. Significant risk to survey personnel.
Investment and Maintenance	If managed properly, investment costs are relatively low.	Must be replicated periodically to maintain current relevance. Higher personnel requirement than phone and mail.
Statistical Reliability / Sampling Frame	Best statistical control since sample is from known traffic population, over a known time period. Highest response rate.	Limited location where survey may be implemented may bias sampling.
Data Attributes	Excellent ability to obtain all desired data and information, given one-on-one contact with driver. Complete information on O-D, route, trip purpose, commodity, etc.	None.
Geographic Coverage	Does provide coverage of truck activity other than at survey locations but truck must first pass through survey site. Includes vehicles passing through from outside geographical area.	Only captures truck traffic that passes through interview sites.

Table 13 Comparing and Contrasting Alternative Truck O-D Data Collection Methodologies (9)

Video Surveillance		
	Advantages	Disadvantages
Implementation	No disruption of traffic. technical difficulties.	Potential for equipment failure or Weather and time of day/night impact visibility and data collection.
Investment and Maintenance		High equipment cost and requirements. Relatively high maintenance and replacement cost for video equipment.
Statistical Reliability / Sampling Frame	Captures all trucks passing a video site, during all (visible) time periods.	Provides limited information.
Data Attributes	Provides general descriptive information on traffic flows.	No information regarding O-D, trip purpose, freight/goods type carried, route, etc.
Geographic Coverage		Limited to locations with video capability within and around urban area.
GPS Receiver		
	Advantages	Disadvantages
Implementation	No disruption of traffic.	Requires private shipper participation.
Investment and Maintenance		Very high equipment investment cost. Equipment malfunction and technical difficulties common.
Statistical Reliability / Sampling Frame		Limited to sample of vehicles participating in study. Very limited sample of all freight movements in urban setting.
Data Attributes		Very limited information regarding trip purpose, commodity hauled and trip chaining.
Geographic Coverage		Limited to sample size.

As part of this study, there was a pilot test of two selected methodologies: roadside interviews and mail out/fax survey. One pilot study tested a roadside intercept survey method at three different locations, including an interstate highway weigh station, a Port of Portland marine terminal, and a private freight warehouse/distribution center. The other pilot study tested a combination of mail and fax survey methods. The performance of these five techniques was evaluated in their ability to

deliver the data attributes considered most relevant for the needs of ODOT in their planning and modeling efforts. The results are summarized in Table 14.

Table 14 Performance of Data Collection Methods as Related to Data Needs (9)

Planning/Modeling Data Attributes	Roadside Interviews			Mail/Fax Surveys	
	Interstate	Port	Warehouse/Distribution Center	Mail	Fax
O & D Detail	Acceptable	Very Good	Very Good	Incomplete	Incomplete
Route Identification	Excellent	Excellent	Excellent	Incomplete	Incomplete
Land Use at Stops	Limited	Limited	Limited	Acceptable	Acceptable
Commodity, Weight, Vehicle Type/Config.	Very Good	Very Good	Very Good	Acceptable	Acceptable
Location of Stops, Location of Trip Generators, Time of Day	Limited	Limited	Limited	Incomplete	Incomplete
Volume of Shipments	Excellent	Excellent	Excellent	Excellent	Excellent

2.2.3. Strategic Freight Transportation Analysis (Washington State University), 2004

Washington State University conducted the Strategic Freight Transportation Analysis project which follows on the success of the Eastern Washington Intermodal Transportation Study (EWITS) both of which are geared towards facilitating the transportation planning efforts at the state and regional level and to forecast the future needs of freight and passenger services (10, 11).

One of the particular challenges identified in both the SFTA and the EWITS studies is to obtain comprehensive information on freight truck movements and in response they have implemented the 1993 O-D truck survey using roadside interview and the more recent, and similar, 2002/2003 statewide O-D data collection effort summarized in Table 15.

Table 15 Summary of Survey Method for Truck O-D (11)

Methodology:	Roadside interview
Study Objective:	To provide statistically reliable information on truck characteristics and commodity flows for all major Washington highways To provide useful freight and goods movement information for major transportation planning sub regions as well as the State as a whole Data collection period should be a continuous 24-hour period in each of the four seasons of the year
Survey questionnaires:	Truck configuration Trailer type Number of axles Authorization for transport of hazmat Carrier name and location (city, state) Vehicle weight Empty/Loaded

	Main type of commodity Trip Origin Trip Destination Route selected
Survey Sites	A total of 27 sites
Selection Criteria	Maintaining consistency with previous project 1993/1994 O-D Study (EWITS: Eastern Washington Inter-modal Transportation Study). Most locations were permanent weight stations and ports of entry.
Survey Scheduling	4-week period for each season: April 2002, July 2002, October 2002, and January 2003: 7 sites each week for three weeks and 6 sites during the fourth week. Data collection hours (ideally 24 continuous) were restricted to operational hours of weight stations. Survey was conducted on Wednesdays of each week to avoid unusual traffic flow patterns.
Sample Size	Goal to maximize the number of trucks surveyed Previous study (1993/1994) goal was 10% of trucks traveling I-5, 20% on all major corridors and 50% of trucks at sites with the lowest truck traffic volume.
Field Adjusted Sample Size	60 to 80% of the trucks at sites where weight stations had lower volumes during operating hours. 5 to 20% of total trucks at sites with higher volume. Lowest percentages were seen at sites with high volume of truck traffic and with trucks using bypass established procedures. An estimated total of 24000 trucks were stopped for interviews during 4-month period.
Incentives	A coupon for a free cup of coffee as a token of thanks for their participation. An extra incentive for service clubs to perform quality work.
Response rate	95 percent of truck drivers requested to complete an interview agreed to participate.
Cost per survey	N/A
Study findings:	<ol style="list-style-type: none"> 1. Field questionnaires had to be modified to improve quality of data and to have it completed in approximately 3 minutes. 2. Community service clubs can be a viable labor force for conducting personal interview of truck drivers. 3. Involvement of uniformed enforcement officers is a critical factor in obtaining cooperation and participation from truck drivers requested to complete interviews. 4. Site setup and the use of systemic sampling techniques are important factors to maintain traffic flows and promote cooperation at the interview sites. 5. Establishing on going procedures for evaluation and modification of procedures is important to quality data collection.

Comments	More detailed info on O-D locations might be necessary depending on spatial resolution of analysis zones
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2.3 Other Issues

2.3.1 Use of Cell Phone Technology for O-D Study

A study (12) by Delcan.Net for the Maryland Department of Transportation in the Baltimore area used anonymous data from cell phone to estimate speeds and travel times on expressways and arterial roads. The technology uses a statistical base to infer phone (& vehicle) movements as cell phones transition from one cell tower to another cell tower. The phones must be on, although not in use. The partnership states that the data from cell phones movements can also generate origin-destination data needed for support of planning models. However, this technology has not been used for any O-D study. More detailed information can be found at the website: www.delcan.com.

A study (13) by the Center for Urban Transportation Research at University of South Florida used PDA/GPS combos and GPS-enabled cell phones to recorded O-D data, including path of travel (GPS point recorded every 4 seconds with avg. accuracy around 2-3 meters). Each point also included a timestamp, speed, and heading value. In Phase 1 of this project, a user interface was developed for the PDA that prompted the user to input their mode of transportation, purpose for trip, and occupancy of vehicle if relevant. The PDA acts as a “smart” diary that attempts to “pre-fill” fields for the user, in an attempt to reduce user fatigue (i.e. if the user has visited and labeled their destination previously, the PDA “knows” where they are and the user doesn’t have input that they are at “Work”. Speed is also used to guess mode of transportation). The user still verifies the values in real-time, so the quality of the data should be maintained and should be more accurate than standard retrospective surveys. All inputs are screened by the PDA to make sure they are valid entries as well. All data is automatically dumped from PDA to server database via a wireless “sync” (eliminating data cleansing & processing time), so it is in a completely relational format ready for query and analysis using standard SQL commands. We also created some “smart” algorithms that attempt to determine the mode of transportation based on the GPS data, in hopes of eliminating needed user input for this info in the future. This technique was used to collect individual travel behavior, not for a large area O-D survey.

2.3.2 Incentives to Improve the Rates of Return

Incentives have been used to increase the response rates. Previous experience and literature have indicated the significance of including incentives in travel survey. A study by M.A. Abdel-Aty (14, 15) used U.S. saving bonds as an incentive to increase the response rate. Respondents had the option to be included in a random drawing for 10 bonds worth \$100 each. Although there is no definite way to know how the incentive affected the response rate, it is important to note that more than 99 percent of respondents participated. This shows an interest in the incentive, which leads one to believe that the incentive had a positive effect on the response rate.

Many researchers (16) have examined the effect of providing a variety of nonmonetary incentives to subjects. These include token gifts such as small packages of coffee, ball-point pens, postage stamps, key rings, trading stamps, participation in a raffle or lottery, or a donation to a charity in the respondent's name. Generally (although not consistently), nonmonetary incentives have

resulted in an increased response. A meta-analysis of 38 studies that used some form of an incentive revealed that monetary and nonmonetary incentives were effective only when enclosed with the survey. The promise of an incentive for a returned questionnaire was not effective in increasing response. The average increase in response rate for monetary and nonmonetary incentives was 19.1 percent and 7.9 percent, respectively.

Most researchers have found that higher monetary incentives generally work better than smaller ones. One researcher proposed a diminishing return model, where increasing the amount of the incentive would have a decreasing effect on response rate. A meta-analysis of fifteen studies showed that an incentive of 25¢ increased the response rate by an average of 16 percent, and \$1 increased the response by 31 percent.

A study by Tooley M. (17) compared four different incentive methods and how each of them affect the rate of returns of a household travel survey. These four incentive methods are: 1) Monetary preincentives: monetary incentives included with mailouts; 2) Nonmonetary preincentives: nonmonetary incentives included with mailout; 3) Monetary postincentives: monetary incentives given upon return of the survey, and 4) Nonmonetary postincentives: nonmonetary incentives given upon return of the survey. It was found that general survey literature supports the use of monetary and nonmonetary preincentives, but is not supportive of the use of monetary or nonmonetary postincentives. The study concluded that cash or other incentives, especially those offered with the survey packet, have a positive effect on rates of return.

2.4 Summary

The key points and findings of the literature review are summarized as the followings:

1. The license plate survey method has been used for two O-D surveys for passenger transportation in Florida, recently. These two studies showed this survey method is applicable for auto O-D survey with a response rate of over thirty percent. The advantage of this approach is no disruption of normal traffic flow, and is safer than roadside interview and postcard survey. The disadvantage of this method is the potential issue with respect to privacy of the vehicle owner. However, both studies included detailed information and techniques that addressed how the drivers' privacy has been protected.
2. The postcard survey was used for a corridor O-D study. The study on I-595 showed a fairly low response rate using this method. This method has little impact on the normal traffic because the postcards were distributed at the signalized intersection when vehicles were stopped at the red light.
3. Roadside intercept surveys have been suggested not to be applied on the high-volume state highways. However, it was found that this method is still very effective to collect truck O-D information at weight stations or rest areas.
4. The website has been used as an alternative to mail for respondents to return their survey results. The survey results from the web were found to be more accurate with less data input efforts.
5. One study concluded that cash or other incentives, especially those offered with the survey packet, have a positive effect on rates of return.
6. Cell phone and GPS-enabled cell phones technology have the potential to generate origin-destination data needed for support of planning models.

3 O-D DATA COLLECTION METHODOLOGY

The most important measure for a successful survey is a level of participation that is maximally high, with answers that are maximally reliable (18). Therefore, how to obtain the willing, reliable assistance of as many respondents as possible is the key to a success survey. There are a number of things that can be done to make the survey more “respondent friendly”:

- Directly contact with respondents to see how they view such matters (asking the respondents how FDOT can improve the transportation in their areas at the end of O-D survey would have some pleasant side effects)
- Design the questionnaires in a type size that people can read, a clear layout, and understandable questions. The sample forms for passenger transportation O-D survey, truck roadside interview, warehouse and distribution center mail/fax survey are contained in Appendix A, B, and C respectively.
- Keep the questionnaire as short as possible, normally it should take less than 1 minute for a passenger car O-D survey, and less than 3 minutes for a truck O-D survey.

In addition, the selection of a proper survey method is the key to a success for survey. Based on the literature review, O-D data collection methodologies include:

- License Plate Mail-out Surveys
- Roadside Interview
- Mail-back Postcard Surveys
- Internet Surveys
- Phone Surveys
- Cell Phone, and GPS Receiver

The advantage and disadvantages of each of above O-D survey methods are summarized in this chapter. Some special concerns raised at the kick-off meeting will also be addressed. Two separate methods will be recommended for the passenger car and truck trip O-D survey, respectively.

3.1 License Plate Mail-out Surveys

The license plate mail-out surveys involves recording license plate numbers of vehicles on a selected roadway, tracing vehicle ownership, and mailing a survey to owners. There are two different methods to obtain the license plate number: taking a photo/video or manually recording the tag on vehicles. Photo or video are often used for high volume highways and the manual recording method can be used for low and medium volume roadways. This method has no disruption to normal traffic flow because it does not require vehicles to be stopped to receive the survey. The disadvantages of this technique are that the amount of work involved in tracing their ownership is huge because of the large number of out-of-state vehicles expected to be traveling

into Florida, and the accuracy of the data is expected to be lower than that of the roadside postcard survey because the surveys are mailed at a later date.

In addition, this approach is sometimes perceived to be a potential issue with respect to privacy of the vehicle owner. The recent O-D survey by Gennett Fleming applied this method to conduct a Cordon Line Travel Survey for FDOT District 7. In this survey, a 1-800 number was set up to explain the survey to the respondents. Another recent study included detailed information and techniques that addressed how the drivers' privacy has been protected. The survey form, and cover letter, and Q&A for this study are contained in Appendix A. both studies had a good response rate of over thirty percent.

Based on the experiences from the most recent survey for FDOT, the DHSMV had updated their process, allowing individuals to request restrictions on access to their records (in response to the new privacy laws). However, only a very small percentage of individuals have chosen to do so.

The cost for looking up the addresses corresponding to the plates is \$39 per plate for the public from the DHSMV website. However, the cost for a DHSMV record request placed by governmental agency (e.g., FDOT) was very low (approximately \$0.01 per plate).

There have been quite a few O-D surveys using license plates by the California DOT. The response rate, cost, and sample size information (19) are included in Table 16

Table 16 License Plate Travel Surveys Conducted in California from 1990 to 1997

Conducted By	Methodology	Response Rate	Sample Size	Cost per survey	Total Cost
Division of Rail Amtrak & KPMG (1992)	License Plate Videotaped; Mail-out / Mail-back Postcard	30% 28% 22%	15,100 5,800 7,300	\$16	\$75,000 per site
Medocino County & DKS (1990)	License Plate; Mail-out / Mail-back Questionnaire	27%	588	N/A	N/A
Caltrans, District 4 & Systan Inc. (1994)	License Plate; Mail-out / Mail-back	30%	18,000	N/A	\$150,000
Caltrans, AMBAG and Three Counties (1994)	License Plate Videotaped ; Mail-out / Mail-back Postcard	15%	44,500	N/A	N/A
Saint Luis Obispo Council of Govs, District 5	License Plate Videotaped ; Mail-out / Mail-back Postcard	43.4%	2,137	N/A	N/A
Saint Luis Obispo Council of Govs, District 5	License Plate; Mail-out / Mail-back	12.7%	1,400	N/A	N/A
Caltrans, District 7 and CTS	License Plate; Mail-out / Mail-back Postcard	11.7% 12.5%	1,721 4024	N/A	\$60,000
Caltrans, District 8 and SBAG	License Plate; Mail-out / Mail-back Postcard	22% 24%	21,000 23,000	N/A N/A	\$7,000 \$10,000
Caltrans, District 12 and Orange County	License Plate Videotaped ; Mail-out / Mail-back	11%	7,450	\$9,13	\$68,700

	Postcard				
Santa Barbara County Assn. Of Gov.	License Plate; Mail-out / Mail-back	24%	3361	N/A	N/A

3.2 Roadside Interview

Roadside interview involves directing vehicles into a designated interview area and asking a series of short questions. This technique has been widely used for both truck and auto trip data collection because it has a very high response rate, good sampling control, broad geographic coverage, and normally result in complete information. The disadvantage of this method is that it generally requires more personnel and traffic control at survey sites. Sometimes, it may be difficult to implement due to traffic disruption, especially in urban areas.

This type of survey has not been used in the most recent cordon station surveys and screenline surveys in the state of Florida due to increasing concerns about disruption of traffic, "road rage", higher speed limits, and the general declining response to surveys. However, there has not yet emerged a satisfactory replacement for this survey, especially to obtain truck O-D data.

There are many advantages to collecting data on truck and freight movements via roadside interviews. The survey sites are often selected at the rest areas, weigh stations, truck stops, or warehouse centers where there is no disruption to the normal traffic flow.

A map of weight stations, rest areas, state roads, and Traffic Analysis Zones (TAZ) was developed for identifying the potential survey sites, as seen in Appendix F.

3.3 Mail-back Postcard Surveys

Mail-back postcard surveys are often used when traffic volume is high. Compared to the roadside interview, postcard surveys have less impact on traffic. Postcards with a brief questionnaire can be distributed to motorists either at rest areas on the interstates or at signalized intersections or gas stations where they normally stop. The advantages of this technique are that postcards can be distributed quickly and with fewer personnel than are required for interviews. The disadvantage is that a higher number of vehicles must be sampled to obtain an adequate number of completed surveys because of the lower response rate of less than 30 percent. A recent O-D survey on I-595 showed a response rate of approximately twelve percent of this method. Postcard surveys are often used for O-D survey along a corridor, interstate road, or a toll road. The postcards are usually distributed at toll booths, on/off ramp signalized intersections, rest areas, gas stations, and other "natural stops" areas where there is no disruption to normal traffic flow. The respondents can return the survey by prepaid mail or through the internet. The past studies indicated an increasing amount of respondents like to return the survey through the internet.

3.4 Online Surveys

Web-based survey, in comparison to telephone and mail surveys, provide valuable information less expensively, more quickly and often result in a significantly higher response rate. The web-based surveys are considerably less expensive to conduct than traditional mail and telephone surveys because they do not include costs for design, printing, postage, telephone, call personnel or data entry. When comparing to traditional survey technologies using mail or telephone, Internet surveys provide the ideal solution for information gathering because of their fast turnaround.

Prior study has demonstrated the online survey could be a promising future approach for collecting travel data. The advantages of a web-based survey are that responses completed on the Internet have a lower percentage of survey responses missing data because of automatically validation before submission. Internet respondents also tended to complete their surveys more often than mail back surveys. A sample of online O-D survey form is contained in Appendix D.

A response rate of online surveys could be very high if a proper incentive was applied. Past studies showed that an incentive had a positive effect on the response rate. The money saved for data input and validation could be used as an incentive to boost the response rate of an online survey. A coupon or a gift certificate could be a good incentive for those respondents who return the survey through the Internet.

3.5 Phone Surveys

Telephone surveys typically have a higher response rate than mail-back, and lower response rate than roadside interviews. This method has no disruption to traffic flow and no risk for survey personnel. However, it involves a great effort of identifying the appropriate contact person and phone number. This method is often used for household travel surveys, and seldom used to do an O-D survey. The household telephone O-D travel surveys conducted in California (18) are summarized in Table 17. It showed that the response rate is approximately 35-49 percent, and the cost per usable survey is very high.

Table 17 Household Telephone Origin Destination Travel Surveys Conducted in California from 1990 to 1997

Conducted By	Methodology	Response Rate	Sample Size	Cost per Survey	Total Cost
MTC	Household telephone interviews; mail-out/ phone retrieval	49%	9400	\$84	\$1,000,000
Caltrans Office of Travel Forecasting and Analysis and Maritz Marketing Research Inc.	Household Telephone; CATI; Travel Diary	50% precontact 69% of agreed precontact	13,500 weekday 900 weekend	\$104	\$1,494,000
SCAG	Household telephone interviews; activity diary	50% precontact 69% of agreed precontact	16,000	\$94	\$1,500,000

3.6 Cell Phone, and Global Positioning System (GPS) Receiver

Cell phone tracking technology currently and presumably can only provide the data on phone (the owners) movements as cell phones transition from one cell tower to another cell tower. The phones must be on, although not in use. The data from cell phone movements can possibly generate origin-destination data needed for support of planning models. However, to date, this technology has not been used for an O-D study. Widespread utilization of GPS receivers for O-D data collection is currently cost prohibitive, especially for large rural and urban areas.

3.7 Recommended Automobile O-D Survey Methodology

Based on the discussion at the kick-off meeting with the FDOT, some criteria for selecting an appropriate O-D survey methodology were determined, including:

- Will not disrupt the traffic
- Good response rate
- Statistical reliability
- Collect the essential data attributes
- Cost effectiveness
- Geographic coverage

Table 18 listed the available methodologies and their cons and pros at each category. Based on analysis of results and comparison of different methods, the research team proposed that a license plate survey be the method for collecting O-D data for passenger transportation. Since this method can only capture the trips of in-state vehicles, an additional postcard survey method at the rest areas or off-ramp intersections was recommended to be used to catch those out-of-state vehicles to minimize the data bias.

3.8 Recommended Truck O-D Survey Methodology

The O-D survey methodology for trucks is limited to roadside interview, and combination of phone and mail/fax survey. The first statewide truck O-D survey used the roadside interview for the Washington DOT. The recent report SPR 343 “Truck Trip Data Collection Methods” summarized the truck data collection methods and recommended two different methods for inter-regional truck and intra-regional truck movements. The recommendation in this report is consistent with the research results in the report SPR 343.

3.8.1 Inter-Regional Movements

The inter-regional movements refers to flows into and out of the area of interest, including external-to-external, internal-to-external, and external-to-external. These types of trip movements can be captured on the major highways, such as I-75, I-4, I-10, and so on. The rest areas, agriculture inspection stations or weigh stations are often the sites to conduct roadside interviews of truck drivers. The statewide traffic analysis zone (TAZ) map, major state highway, and locations of rest areas and weigh stations are developed and contained in Appendix F. The research team recommended that this type of truck O-D data be collected by use of roadside intercept interviews.

3.8.2 Intra-Regional Movements

Intra-regional movements refer to distribution and assembly activities within the city/region. This type of truck traffic flow may not be able to be captured at rest areas or weight station on the major highways. Therefore, a combination of mail/fax out and mail/fax/internet back to the distribution centers or warehouses was recommended to collect the O-D data for intra-regional movements. A sample form of warehouse and distribution center mail/fax/online survey is contained in Appendix C. A listing of contact information of warehouse and distribution center in Florida is contained in Appendix E.

4 CONCLUSIONS AND RECOMMENDATIONS

The objective of this research is to develop a revised methodology for collection of valid O-D data that does not involve interruption of traffic flow. The traditional roadside intercept interview seems no longer safe to collect automotive O-D data on major highways with high traffic volumes. The literature review results showed the license plate survey method has been successfully used for external surveys in several FDOT Districts. The potential drivers' privacy issues has been addressed very well by either setting up a 1-800 number or sending a cover letter and frequently asked questions and answers. The drivers' address can be obtained from DMV and the cost for a DMV records request placed by governmental agency (e.g., FDOT) was very low. For passenger transportation, a license plate mail out-mail back/internet was recommended for external surveys. The internet was recommended to be an additional option for the respondents to return the survey. Since only in-state vehicle owners' mail address can be collected through DMV, to minimize the data bias, an additional postcard survey at the rest areas or off-ramp intersections was recommended to be used to collect O-D data for those out-of-state vehicles.

For freight movements, a combination of fax, mail and internet survey of warehouse and distribution centers was recommended for intra-regional trips, and a roadside interview was recommended for inter-regional travel. A map of weigh stations, rest areas, state roads, and Traffic Analysis Zones (TAZ) was developed for identifying the potential survey sites. A list of contact information of warehouse and distribution centers in Florida was developed in this study.

Previous studies indicate that a proper incentive will have a positive impact on the rate of return. The web-based survey can provide very high accuracy data and can significantly reduce the work load of data input.

Table 18 Comparison of Survey Methodologies

Methodology	Disrupt the traffic or respondents	Response Rate	Cost Effectiveness	Statistical Reliability	Data Attributes	Geographic Coverage
License Plate Mail-out Surveys	Might distract traffic	Moderate response rate, higher than mail-back surveys 32% - 33% *	Moderate to low investment for equipment and personnel	Low response rate may create biased data	Very good data from completed, very useful O-D surveys	Covers the vehicles only registered in implemented state
Roadside Interview	Disruption of traffic, safety concerns	High Response Rate 38% - 96% *	Higher personnel requires higher investment	Best statistical control	Best for O-D surveys, detailed data can be obtained	Covers the vehicles passing through geographical area
Mail-back Postcard Surveys	May disrupt traffic at intersections & other locations	Low response rate 13% - 25% *	Low investment	Low response rate may create biased data	Very good data from completed	Covers the vehicles passing through geographical area
Phone Surveys	Disrupting people during business hours	Higher response rates than the mail-back surveys 43% *	Higher investment than mail surveys	Low response rate may create biased data	Detailed data can be obtained with good explanation of survey	No geographic limitation as long as respondents are informed about the survey
Mail-back & Telephone Combined	Disrupting people during business hours	Higher response rates than the mail-back surveys 30% - 40% *	Moderate Investment	Low response rate may create biased data	Detailed data can be obtained with good explanation of survey	No geographic limitation as long as respondents are informed about the survey
Internet Surveys	No disruption of traffic or respondents	Low response rate, depends on internet availability	Lowest Investment	No control over respondents	Detailed data can be obtained from completed surveys	No geographic limitation as long as respondents are informed about the survey
GPS Receiver	No disruption of traffic or respondents	Data is obtained from equipment	New technology very high investment	Limited to sample size	Descriptive information of traffic flows	Limited to sample size
Cell Phone	No disruption of traffic or respondents	Data is obtained from equipment	Low investment data can be acquired from service providers	More than one cell phone user in a vehicle might bias the data	Descriptive information of traffic flows	Limited to respondents with cell phones on and geographic coverage of service provider

*Rates are based on the literature reviewed in this report.

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APPENDIX A: O-D SURVEY FORM FOR PASSENGER CAR

Figure A-1 Tampa Bay Cordon Line Travel Survey Form



Florida Department of Transportation
West Central Florida Travel Characteristics Survey

Questions:

1. This trip began at: (Check one only)

- Home, Friend's or Relative's Home, My Workplace, Personal Appointment, School, Business Appointment, Shopping/Errands, Restaurant, Other (Specify)

2. The place where this trip began:

City/Town:
Street Address OR Nearest Intersection (Provide both street names)
Name of Business (if appropriate):

3. This trip ended at: (Check one only)

- Home, Friend's or Relative's Home, My Workplace, Personal Appointment, School, Business Appointment, Shopping/Errands, Restaurant, Other (Specify)

4. The place where this trip ended:

City/Town:
Street Address OR Nearest Intersection (Provide both street names)
Name of Business (if appropriate):

5. How often do you typically make this trip? (Check one only)

- Less than once a week, One to five times a week, More than five times a week

6. On this particular trip, how many people were in your vehicle including the driver and all passengers?

7. If you made stops on this trip, what was the purpose of these stops? (Check all that apply)

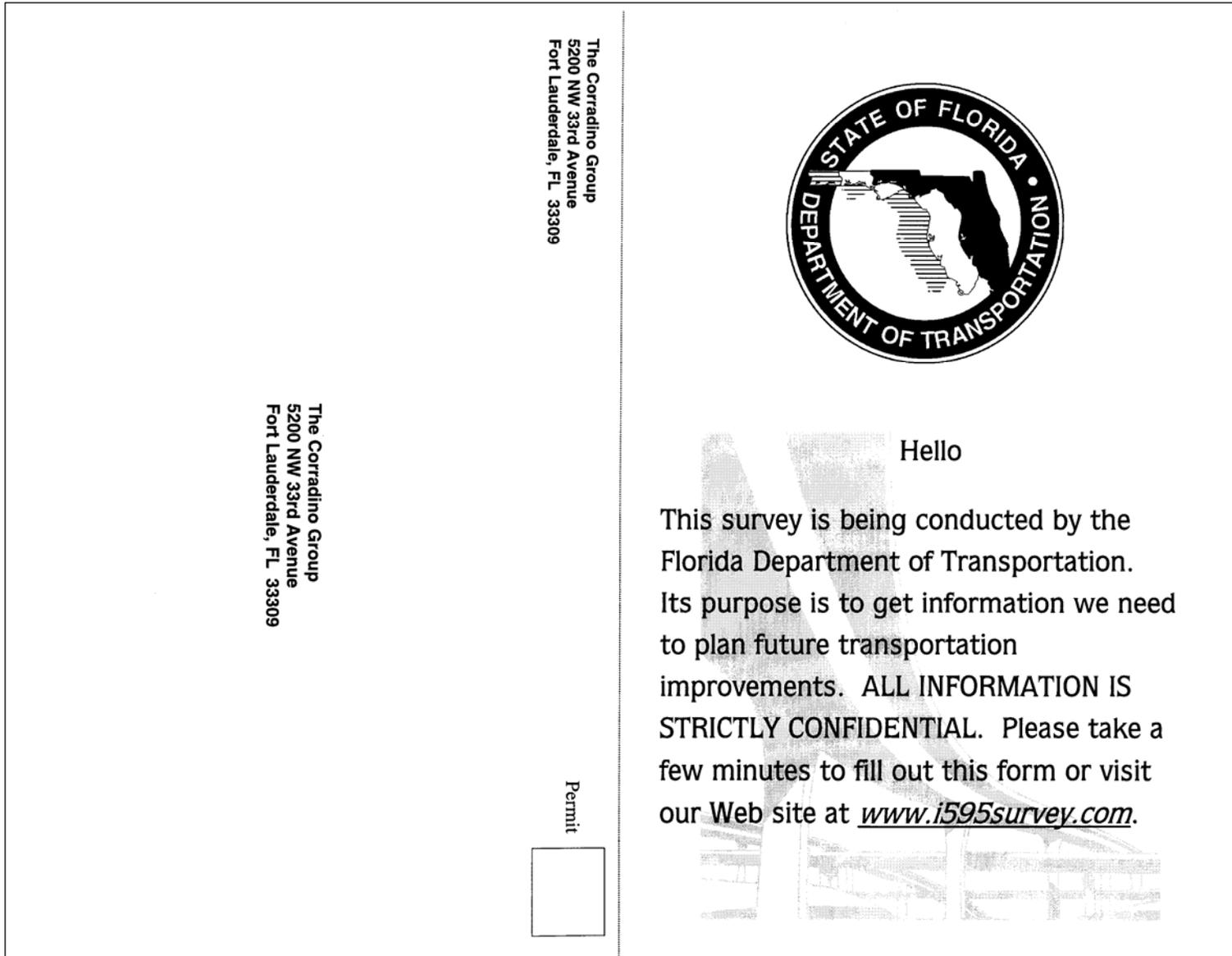
- Work Related, School, Daycare, Gas or Auto Service, Eat Meal, Recreation, Shopping, Rest Break, Errands, Pick Up or Drop Off Passenger, Other (Specify)

If you would care to make any specific suggestions about how to improve travel along your route, please write them below in the space provided.

Thank you very much for your interest and cooperation!

Form box containing a checkbox and the text: Please check here if no one at your address made the trip described in the cover letter

Figure A-2 FDOT Survey Form Used in I-595 Vehicle Trip Length Study



The image shows a survey form with a header section on the right and a large blank area on the left. The header section contains the Florida Department of Transportation logo, a greeting, a survey description, and a confidentiality notice. The left side of the form is mostly blank, with a vertical address block and a permit box at the bottom.

STATE OF FLORIDA • DEPARTMENT OF TRANSPORTATION

Hello

This survey is being conducted by the Florida Department of Transportation. Its purpose is to get information we need to plan future transportation improvements. **ALL INFORMATION IS STRICTLY CONFIDENTIAL.** Please take a few minutes to fill out this form or visit our Web site at www.i595survey.com.

The Corradino Group
5200 NW 33rd Avenue
Fort Lauderdale, FL 33309

The Corradino Group
5200 NW 33rd Avenue
Fort Lauderdale, FL 33309

Permit

Figure A-2 Continued

Survey Control # _____

Please take a moment to answer a few questions about the trip you were making today when you received this card (excluding any return trip).

Please record your responses on the attached card OR contact our Web site at www.i595survey.com. You must have the survey control number (see top right) to complete the survey online.

Information should be provided only for the trip you were making when you received this card.

- Where did your trip begin? (the last place you entered your vehicle prior to receiving this card, excluding short stops for gas or food)

Street Address _____

Nearest Intersection/Landmark _____

Town _____ State/Province _____ Zip _____
- At what type of place did your trip begin? (Choose only one)

Your Primary Residence Workplace Store Airport

Your Seasonal Residence Hotel/Motel Recreation Area

Other (please specify) _____
- Where did/will your trip end? (the first place you exited the vehicle after receiving this card, excluding short stops for gas or food)

Street Address _____

Nearest Intersection/Landmark _____

Town _____ State/Province _____ Zip _____
- What type of place is your trip end point? (Choose only one)

Your Primary Residence Workplace Store Airport

Your Seasonal Residence Hotel/Motel Recreation Area

Other (please specify) _____
- If you have traveled or will travel on I-595, where did you get on? (Choose only one)

US 1 Ft. Lauderdale Int. Airport I-95 US 441/SR7

Fla. Turnpike Davie Road University Drive

Pine Island Road Nob Hill Road Hiatus Road

Flamingo Road 136th Avenue I-75/Sawgrass Xway

Did not use I-595
- Where did or will you get off I-595? (Choose only one)

US 1 Ft. Lauderdale Int. Airport I-95 US 441/SR7

Fla. Turnpike Davie Road University Drive

Pine Island Road Nob Hill Road Hiatus Road

Flamingo Road 136th Avenue I-75/Sawgrass Xway

Did not use I-595
- What was the purpose of your trip? (Choose only one)

Work Commute Business Related Going Home

Shopping School

Recreation Other (please specify) _____
- How many people were in the vehicle, including the driver?

1 2 3 4 5 or more
- What type of vehicle were you in?

Passenger vehicle/motorcycle Pick-up truck/van/SUV/minivan

Truck (2+ axles, more than 4 tires)

Other _____
- How many vehicles are available to your household?

1 2 3+ None
- What is your annual household income?

Less than \$20,000 \$20,000-\$39,999 \$40,000-\$74,999 \$75,000 and above
- How many workers (age 16 and older) are in your household?

1 2 3 4 5 or more None
- How many people are in your household?

1 2 3 4 5 or more
- If a low cost and fast transit alternative were available for this trip, would you consider using it? Please answer both.

Buses in special lanes yes no

Trains (like Metrorail or Tri-Rail) yes no
- Are you a South Florida resident?

Permanent Seasonal Not a South Florida resident
- Please add any comments on how we can improve transportation in South Florida.

Please complete, fold, and mail this form as soon as possible. No postage is necessary. Thank you very much for your cooperation! You do not need to mail it if you completed the Web survey.

Figure A-3 California Department of Transportation Travel Survey Form

First Class
U.S. Postage
PAID
Permit No. 673
Oakland, CA

California Department of Transportation
District 4 - Advance Planning
P.O. Box 23660
Oakland, CA 94623-9919

PLEASE DETACH AND MAIL THIS POSTAGE PAID CARD TODAY. THANK YOU.

C

Caltrans Travel Survey
(October 19, 1994)
Estbound Highway 152 Near San Luis Reservoir

1. I was driving FROM: (Please check one only)

a <input type="checkbox"/> Home	d <input type="checkbox"/> Shopping	g <input type="checkbox"/> School
b <input type="checkbox"/> Work Place	e <input type="checkbox"/> Social	h <input type="checkbox"/> Other
c <input type="checkbox"/> Work Related	f <input type="checkbox"/> Recreation	

2. The place I was driving FROM is located at:
Address OR major cross streets OR prominent place:

City/Town: _____ (Please print)

3. The time I was driving from the above location was:

_____ : _____ AM/PM (Please circle one)
(hour) (min)

4. I was driving TO: (Please check one only)

a <input type="checkbox"/> Home	d <input type="checkbox"/> Shopping	g <input type="checkbox"/> School
b <input type="checkbox"/> Work Place	e <input type="checkbox"/> Social	h <input type="checkbox"/> Other
c <input type="checkbox"/> Work Related	f <input type="checkbox"/> Recreation	

5. I was driving TO is located at:
Address OR major cross streets OR prominent place:

City/Town: _____ (Please print)

6. The time I arrived at the location in Question 5 was

_____ : _____ AM/PM (Please circle one)
(hour) (min)

7. Including the driver, how many people were in this vehicle?
_____ people (Please fill in)

8. How often do typically make this trip?

a <input type="checkbox"/> 4 or more times per week	d <input type="checkbox"/> 2 - 6 per year
b <input type="checkbox"/> 1 - 3 times per week	e <input type="checkbox"/> 1 times or less per year
c <input type="checkbox"/> 1 - 3 times per month	

9. Including yourself how many people live in your household?
_____ people (Please fill in)

10. Do you live in a:

a <input type="checkbox"/> Single dwelling unit (house)
b <input type="checkbox"/> Other than single dwellin unit

11. How many vehicles are owned or are available for use by members of your household? _____ vehicles (Please fill in)

12. Which range best describes your household's total annual income: (Please check only one box)

a <input type="checkbox"/> Less than \$10,000	d <input type="checkbox"/> \$35,000 - \$49,999
b <input type="checkbox"/> \$10,000 - \$19,999	e <input type="checkbox"/> \$50,000 - 74,999
c <input type="checkbox"/> \$20,000 - \$34,999	f <input type="checkbox"/> \$75,000 and over

13. Comments abd suggestions:

Figure A-4 WSU/WSDOT Canadian Border Southbound Passenger Car Survey Form

CONFIDENTIAL WSU/WSDOT Canadian Border Southbound Passenger Car Interview Form	
1. Location: _____	2. Interviewer: _____
3. Time of interview: _____ a.m. _____ p.m.	
4. Is this vehicle a part of the official sample? <input type="checkbox"/> yes <input type="checkbox"/> no	
5. Type of vehicle: 1) <input type="checkbox"/> car 2) <input type="checkbox"/> car with trailer 3) <input type="checkbox"/> RV 4) <input type="checkbox"/> light truck	
6. Number of passengers: _____	
7. Where do you live? City/State/Province: _____	
<p style="text-align: center;">Questions for U.S. Residents</p> <p>8. Where in Canada did this trip begin today? City/Province: _____</p> <p>9. Why were you in Canada? 1) <input type="checkbox"/> Recreation 2) <input type="checkbox"/> Work/business 3) <input type="checkbox"/> Shop 4) <input type="checkbox"/> Eat 5) <input type="checkbox"/> Visit friends/family 6) <input type="checkbox"/> Delivery 7) <input type="checkbox"/> Pick-up 8) <input type="checkbox"/> Other: _____</p> <p>10. What is your primary destination today? City/State: _____</p> <p>11. Why are you traveling to this destination? 1) <input type="checkbox"/> Return home 2) <input type="checkbox"/> Recreation 3) <input type="checkbox"/> Work/business 4) <input type="checkbox"/> Shop 5) <input type="checkbox"/> Eat 6) <input type="checkbox"/> Buy gas 7) <input type="checkbox"/> Visit friends/family 8) <input type="checkbox"/> Delivery 9) <input type="checkbox"/> Pick-up 10) <input type="checkbox"/> Other: _____</p> <p>12. What Washington highways will you use from this border station to your destination today? <i>(highlight on attached map)</i></p> <p>13. How many times do you typically travel through this station in a month?</p>	<p style="text-align: center;">Questions for Canadian Residents</p> <p>14. Where in Canada did this trip begin today? City/Province: _____</p> <p>15. What is your primary destination today? City/State: _____</p> <p>16. Why are you traveling to this destination? 1) <input type="checkbox"/> Recreation 2) <input type="checkbox"/> Work/business 3) <input type="checkbox"/> Shop 4) <input type="checkbox"/> Eat 5) <input type="checkbox"/> Buy gas 6) <input type="checkbox"/> Visit friends/family 7) <input type="checkbox"/> Delivery 8) <input type="checkbox"/> Pick-up 9) <input type="checkbox"/> Other: _____</p> <p>17. What Washington highways will you use from this border station to your destination today? <i>(highlight on attached map)</i></p> <p>18. Approximately how many times do you typically travel to this destination in a month? _____</p>

Figure A-5 City of Menasha O-D Survey Form

CITY OF MENASHA

STUDY ZONE

City of Menasha Zone 1
 Town of Menasha Zone 2
 Town of Harrison Zone 3

SURVEY

1. Where were you COMING FROM when you received this survey?
 (check one).....(0)_ Home (1)_ Work (4)_ School (8)_ Shopping (9)_ Recreation (7)_ Other
and location is (If from within survey area as shown on the map above, complete "1a" below; if not skip to "1b").

1a. Enter appropriate zone number from map above

1b. City/Village/Town _____, County _____ State _____

2. Where were you GOING TO when you received this survey?
 (check one).....(0)_ Home (1)_ Work (4)_ School (8)_ Shopping (9)_ Recreation (7)_ Other
and location is (If from within survey area as shown on the map above, complete "2a" below; if not skip to "2b").

2a. Enter appropriate zone number from map above

2b. City/Village/Town _____, County _____ State _____

3. What type of vehicle were you driving? (1)_ Passenger Car (3)_ Light Truck or Van
 (5)_ Heavy Truck

4. How many people were in the vehicle: **Thank you for your participation.**

DOT USE ONLY

In/Outbound
1 2
 Document No.
015154

Thru Trip
1 Yes 2 No
 Entrance

 Exit

Figure A-6 Atlanta Regional Commission External Travel O-D Survey

ATLANTA REGIONAL COMMISSION
External Travel Origin - Destination Survey

Please answer the questions below about the trip you were making when you were handed this card, and drop it into any U.S. mailbox as soon as possible. NO POSTAGE is required. Please fill out this card even if you have received others. Your assistance will help identify the transportation need in the Atlanta Metropolitan area. Fully completed questionnaires received within two week will be entered in a drawing for a cash prize of \$100. Please fill in your return address on the reverse side if you wish to be entered in the drawing.

THANK YOU FOR YOUR COOPERATION.

1. Where did you start this trip? (Be Specific)

Street Address, Nearest Intersection or other Specific Description

2. Is the location in Question #1: (Check One)

<input type="checkbox"/> Your Workplace	<input type="checkbox"/> Shopping
<input type="checkbox"/> Other Workplace	<input type="checkbox"/> Social/Recreation
<input type="checkbox"/> Driver's Home	<input type="checkbox"/> School
<input type="checkbox"/> Other's Home	<input type="checkbox"/> Other: (specify) _____

3. What time did you leave the location I Question #1? _____ A.M. P.M.

4. What is the purpose of this trip? (Check One)

<input type="checkbox"/> Commute To/From Work	<input type="checkbox"/> School
<input type="checkbox"/> Business	<input type="checkbox"/> Recreation
<input type="checkbox"/> Shopping	<input type="checkbox"/> Personal Business
<input type="checkbox"/> Visit Friend/Relative	<input type="checkbox"/> Other: (specify) _____

5. Please specify the highway you used to enter the Metro area:

6. Where will this trip end today? (Be Specific)

Street Address, Nearest Intersection or other Specific Description

7. Is the location in Question #6: (Check One)

<input type="checkbox"/> Your Workplace	<input type="checkbox"/> Shopping
<input type="checkbox"/> Other Workplace	<input type="checkbox"/> Social/Recreation
<input type="checkbox"/> Driver's Home	<input type="checkbox"/> School
<input type="checkbox"/> Other's Home	<input type="checkbox"/> Other: (specify) _____

8. How many times do you typically make this trip between these two places for the same purpose

<input type="checkbox"/> 5 or more/week	<input type="checkbox"/> 1 to 3/month	<input type="checkbox"/> 1/year
<input type="checkbox"/> 3 to 4/week	<input type="checkbox"/> 6 to 12/year	<input type="checkbox"/> less than 1/year
<input type="checkbox"/> 1 to 2/week	<input type="checkbox"/> 2 to 5 /year	

9. How many people (including yourself) were in the vehicle? _____

10. Please identify the type of vehicle you were driving: (Check One)

<input type="checkbox"/> Passenger Car	<input type="checkbox"/> Van	<input type="checkbox"/> Single Unit Truck
<input type="checkbox"/> Minivan	<input type="checkbox"/> Motorcycle	<input type="checkbox"/> Tractor Trailer Combination
<input type="checkbox"/> Pickup	<input type="checkbox"/> Bus	<input type="checkbox"/> Other: _____

11. Is the vehicle owned (borrowed,leased) or rented? (Check One)

<input type="checkbox"/> Owned	<input type="checkbox"/> Rented
--------------------------------	---------------------------------

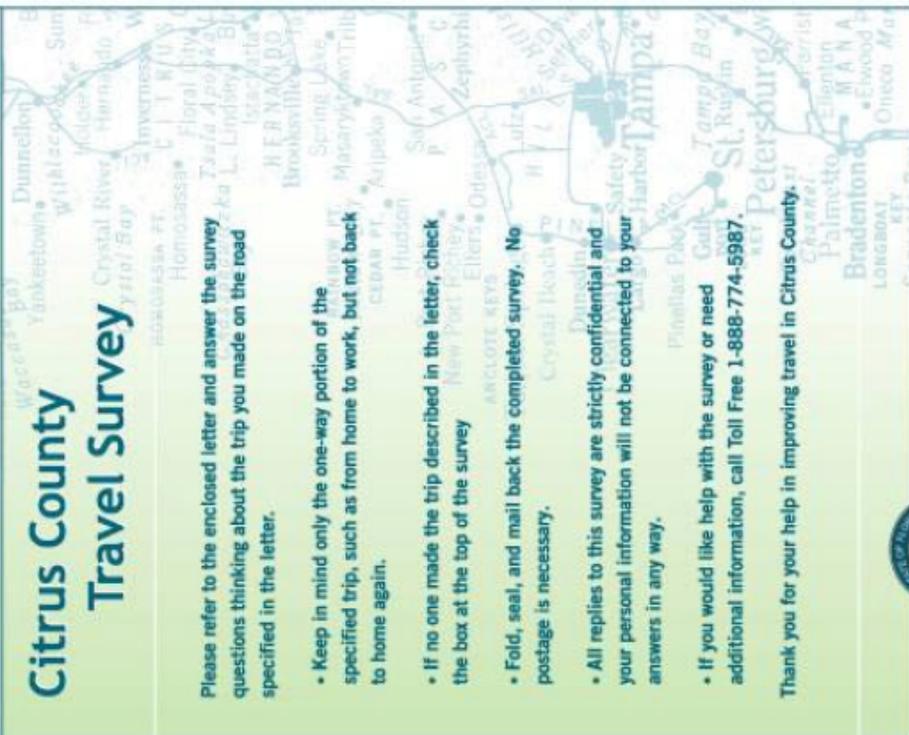
Figure A-7 Roadside Origin-Destination Surveys, Sample Form

BANDERA ROAD O-D SURVEY

1. Purpose of this trip
 Work School Shopping Recreation Multiple Other
2. Trip origin map zone No. _____
3. Trip destination map zone No. _____
4. Number of times per week you make this trip:
 >5 5 4 3 2 1 <1
5. What street do you usually enter Bandera Road:
 Inside 410 410 Wurzbach Seneca El Verde Grissom Poss
 Hueber Reindeer Trail Eckhert Mainland Guilbeau Bresnahan Braun
 Old Prue/Camino Villa Prue/Tezel 1604 Outside 1604
6. What street do you usually get off Bandera Road:
 Inside 410 410 Wurzbach Seneca El Verde Grissom Poss
 Hueber Reindeer Trail Eckhert Mainland Guilbeau Bresnahan Braun
 Old Prue/Camino Villa Prue/Tezel 1604 Outside 1604
7. On this trip, how much time do you expect to spend on Bandera Road:
 < 2min 2-5 min 6-10 min 11-20 min 21-30 min >30 min
8. If available, what would you use to reduce the time you spend on Bandera Road:
 A carpool lane An express lane An alternate route Other Don't know
9. Vehicle occupancy:
 1 2 3 4 5 >5
10. Station No. _____
11. Surveyor's name _____
12. Date and time _____

Figure A-8 Citrus County Cordon Survey Report Survey Questionnaire

Citrus County Travel Survey



Please refer to the enclosed letter and answer the survey questions thinking about the trip you made on the road specified in the letter.

- Keep in mind only the one-way portion of the specified trip, such as from home to work, but not back to home again.
- If no one made the trip described in the letter, check the box at the top of the survey.
- Fold, seal, and mail back the completed survey. No postage is necessary.
- All replies to this survey are strictly confidential and your personal information will not be connected to your answers in any way.
- If you would like help with the survey or need additional information, call Toll Free 1-888-774-5987.

Thank you for your help in improving travel in Citrus County.



This study is sponsored by the
Florida Department of Transportation.

POSTAGE WILL BE PAID BY ADDRESSEE

BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO 15 WILCEN VT

CITRUS COUNTY TRAVEL SURVEY
PO BOX 280474
TAMPA FL 33685-9957



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



Figure A-8 Continued

Citrus County Travel Survey

When answering, please keep in mind the trip you made on the road and date specified in the enclosed letter.

1 My trip BEGAN at: (Check only one)
 Home
 Work
 School
 Shopping/Errands
 Friend's or Relative's Home
 Personal Appointment
 Business Appointment
 Restaurant
 Other, please specify: _____

Please indicate the city or town AND the address or nearest intersection (provide both street names of intersection) where your trip began and ended. If your trip began or ended at a business, please also indicate the name of the business.

2 Where did this trip BEGIN?
 Town _____
 Address OR Nearest Intersection _____
 Name of Business (if appropriate) _____

3 Where did this trip END?
 Town _____
 Address OR Nearest Intersection _____
 Name of Business (if appropriate) _____

4 My trip ENDED at: (Check only one)
 Home
 Work
 School
 Shopping/Errands
 Friend's or Relative's Home
 Personal Appointment
 Business Appointment
 Restaurant
 Other, please specify: _____

Please check here if no one at your address made the trip described in the letter.

5 What time did you begin and end your trip?
 Began at ____:____ am pm
 Ended at ____:____ am pm

6 How many people were in the vehicle including you?
 1 (drove alone) 2 3 4 5 or more

7 How often do you typically make this trip? (Check only one)
 Less than once a week
 One to five times a week
 More than five times a week

8 Did you pay a toll for this trip?
 Yes, if Yes, how much? _____
 No

9 A SunPass "transponder" is a small device placed in a car that can be used to collect tolls electronically. Transponders allow motorists to pay discounted tolls without having to stop and pay cash at tolls plazas. Motorists must first purchase a transponder (\$25+tax) and set up a prepaid account (\$25 initial deposit) in order to pay tolls electronically. Do you currently own a SunPass transponder?
 Yes
 No, but I plan to purchase one
 No, and I have no plans to purchase one

10 If you wish to make suggestions about how to improve travel on your route, please write them below.

Thank you for participating

PLEASE TAPE CLOSED BEFORE MAILING

Figure A-8 Continued

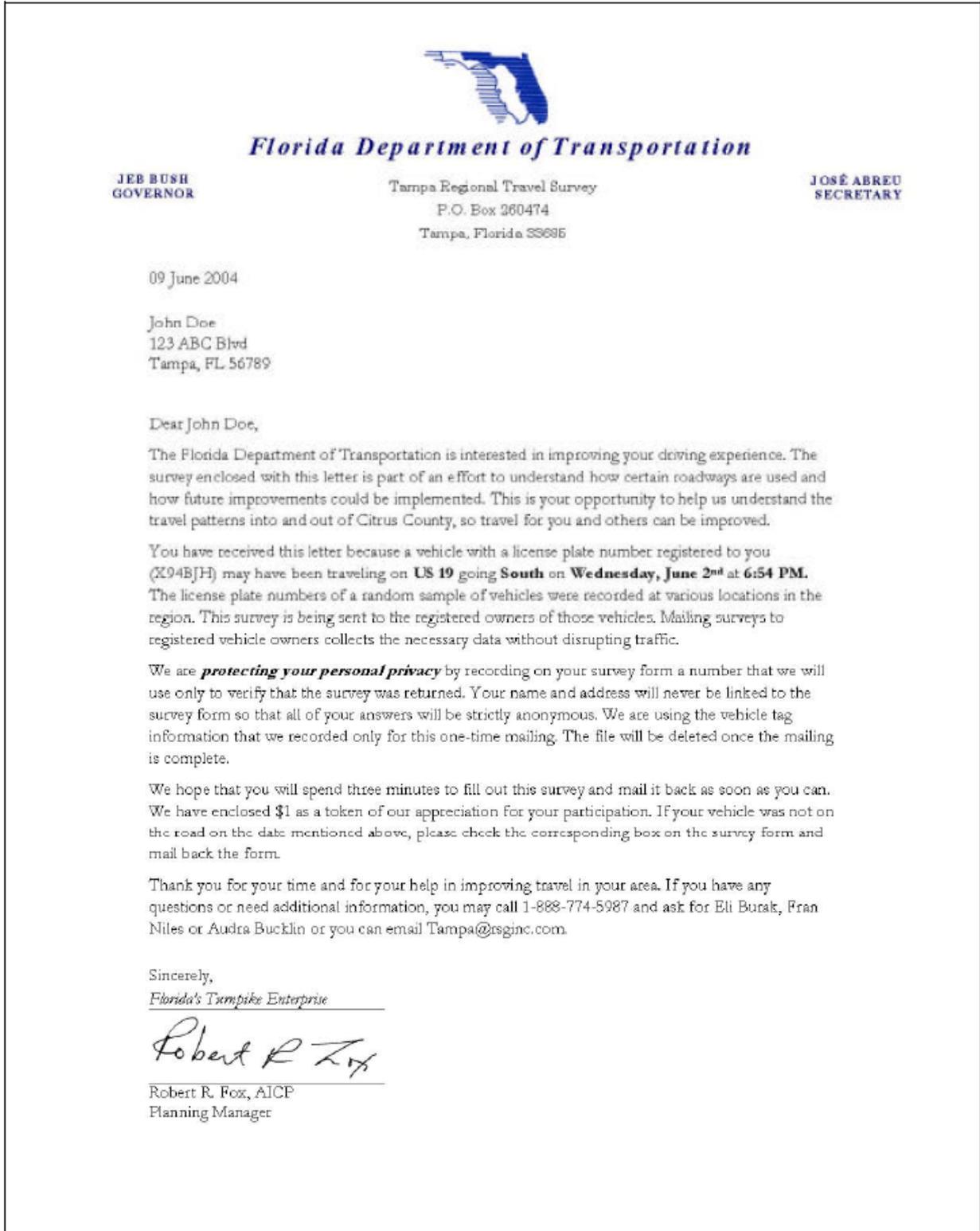


Figure A-8 Continued

FREQUENTLY ASKED QUESTIONS

How did we select you to participate in this survey?

As part of the traffic data collection process for this study, the license plate numbers of a random sample of vehicles were recorded at various locations in the region. This survey is being sent to the registered owners of those vehicles.

What if your vehicle was not on that road on the date shown on the letter?

If this is the case, then it is likely that we made an error in recording the plate number. We apologize and we'd appreciate your checking the box on the survey form saying that the vehicle was not on that road on that date and returning the card.

Why are we conducting the survey this way?

New routes or other transportation improvements can be developed to better serve travelers if we know where trips on existing roads are being made from and to. For some other transportation studies, vehicles have been stopped along roads in order to pass out or administer surveys. However, that method can inconvenience travelers and cause safety issues. The approach used for this study, of mailing surveys to registered vehicle owners, collects the necessary data without disrupting traffic.

Why have we included the \$1 bill with the survey?

Participation in this survey is entirely voluntary, but your response is important to the study. Everybody uses the area's roads in different ways. Only if we know more about how travelers like you use the roads can well-designed improvements be made. The \$1 bill is a small token of our appreciation for your attention to this survey.

How are we protecting your personal privacy?

We have recorded on your survey form a number that we will use only to verify that the survey was returned. Your name and address will never be linked to the survey form so that all of the answers that you give will be strictly anonymous. We are using the vehicle tag information that we recorded only for this one-time mailing. The file will be deleted once the mailing is complete.

How can you get additional information about the study?

You may call our project manager, Eli Burak, at 1-888-774-5987 X108 or Audra Bucklin at X133.

Thanks again for your participation in this important study!

Figure A-8 Continued

You may have recently received or will receive multiple surveys in the mail regarding your travel on either US19 or SR44 entering into Citrus County. This is not a mistake. You are receiving more than one survey because a vehicle registered to you may have traveled multiple times during the study date.

Please take the time to fill out the surveys and mail them back. Included in each survey is a dollar to show our appreciation for your help in this study.

Your participation will help us better understand traffic patterns in and around the Citrus County and the greater Tampa region.

Please call us toll free at 1-888-774-5987 or email tampa@rsginc.com if you have any questions.

Thank you again for your help.

Florida's Turnpike Enterprise



Robert R. Fox, AICP

Planning manager

APPENDIX B: O-D SURVEY FORM FOR TRUCKS

Figure B-1 Washington State Truck O-D Survey Form

Record #: _____ <i>(For Data Entry Use Only)</i>	CONFIDENTIAL							
Washington State Department of Transportation & Washington Strategic Freight Transportation Analysis Project: Truck								
Season <i>[Circle One]</i> Spring Summer Fall Winter								
1) Station Location: _____								
2) Name of Interviewer: _____								
3) Interview Shift: <i>[Please Circle One]</i>								
<table style="width: 100%; border: none;"> <tr> <td style="width: 33%; text-align: center;"> 1. Day Shift 6:00 a.m. – 2:00 p.m. </td> <td style="width: 33%; text-align: center;"> 2. Evening Shift 2:00 p.m. – 10:00 p.m. </td> <td style="width: 33%; text-align: center;"> 3. Night Shift 10:00 p.m. – 6:00 a.m. </td> </tr> </table>		1. Day Shift 6:00 a.m. – 2:00 p.m.	2. Evening Shift 2:00 p.m. – 10:00 p.m.	3. Night Shift 10:00 p.m. – 6:00 a.m.				
1. Day Shift 6:00 a.m. – 2:00 p.m.	2. Evening Shift 2:00 p.m. – 10:00 p.m.	3. Night Shift 10:00 p.m. – 6:00 a.m.						
4) Time of Interview: _____ a.m. _____ p.m.								
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="text-align: center;">5) Truck Configuration <i>[Please Check Only One]</i></th> <th style="text-align: center;">6) Trailer Style <i>[If Appropriate, Check More Than One]</i></th> </tr> <tr> <td style="vertical-align: top;"> 1. <input type="checkbox"/> Straight Truck 2. <input type="checkbox"/> Straight Truck and Trailer 3. <input type="checkbox"/> Tractor Only 4. <input type="checkbox"/> Tractor and Trailer 5. <input type="checkbox"/> Tractor with two Trailers 6. <input type="checkbox"/> Other: _____ </td> <td style="vertical-align: top;"> 1. <input type="checkbox"/> Van (Without Temperature Control) 2. <input type="checkbox"/> Van (With Temperature Control) 3. <input type="checkbox"/> Flatbed 4. <input type="checkbox"/> Car Carrier 5. <input type="checkbox"/> Hopper 6. <input type="checkbox"/> Stake and Rack 7. <input type="checkbox"/> Concrete Mixer 8. <input type="checkbox"/> Tanker 9. <input type="checkbox"/> Float 10. <input type="checkbox"/> Dump 11. <input type="checkbox"/> Container 12. <input type="checkbox"/> Chip 13. <input type="checkbox"/> Animal Carrier 14. <input type="checkbox"/> Logging 15. <input type="checkbox"/> Other: _____ </td> </tr> </table>	5) Truck Configuration <i>[Please Check Only One]</i>	6) Trailer Style <i>[If Appropriate, Check More Than One]</i>	1. <input type="checkbox"/> Straight Truck 2. <input type="checkbox"/> Straight Truck and Trailer 3. <input type="checkbox"/> Tractor Only 4. <input type="checkbox"/> Tractor and Trailer 5. <input type="checkbox"/> Tractor with two Trailers 6. <input type="checkbox"/> Other: _____	1. <input type="checkbox"/> Van (Without Temperature Control) 2. <input type="checkbox"/> Van (With Temperature Control) 3. <input type="checkbox"/> Flatbed 4. <input type="checkbox"/> Car Carrier 5. <input type="checkbox"/> Hopper 6. <input type="checkbox"/> Stake and Rack 7. <input type="checkbox"/> Concrete Mixer 8. <input type="checkbox"/> Tanker 9. <input type="checkbox"/> Float 10. <input type="checkbox"/> Dump 11. <input type="checkbox"/> Container 12. <input type="checkbox"/> Chip 13. <input type="checkbox"/> Animal Carrier 14. <input type="checkbox"/> Logging 15. <input type="checkbox"/> Other: _____	<table style="width: 100%; border: none;"> <tr> <td style="width: 33%; text-align: center;"># of Axles on Truck or Tractor</td> <td style="width: 33%; text-align: center;"># of Axles on 1st Trailer</td> <td style="width: 33%; text-align: center;"># of Axles on 2nd Trailer</td> </tr> </table>	# of Axles on Truck or Tractor	# of Axles on 1 st Trailer	# of Axles on 2 nd Trailer
5) Truck Configuration <i>[Please Check Only One]</i>	6) Trailer Style <i>[If Appropriate, Check More Than One]</i>							
1. <input type="checkbox"/> Straight Truck 2. <input type="checkbox"/> Straight Truck and Trailer 3. <input type="checkbox"/> Tractor Only 4. <input type="checkbox"/> Tractor and Trailer 5. <input type="checkbox"/> Tractor with two Trailers 6. <input type="checkbox"/> Other: _____	1. <input type="checkbox"/> Van (Without Temperature Control) 2. <input type="checkbox"/> Van (With Temperature Control) 3. <input type="checkbox"/> Flatbed 4. <input type="checkbox"/> Car Carrier 5. <input type="checkbox"/> Hopper 6. <input type="checkbox"/> Stake and Rack 7. <input type="checkbox"/> Concrete Mixer 8. <input type="checkbox"/> Tanker 9. <input type="checkbox"/> Float 10. <input type="checkbox"/> Dump 11. <input type="checkbox"/> Container 12. <input type="checkbox"/> Chip 13. <input type="checkbox"/> Animal Carrier 14. <input type="checkbox"/> Logging 15. <input type="checkbox"/> Other: _____							
# of Axles on Truck or Tractor	# of Axles on 1 st Trailer	# of Axles on 2 nd Trailer						
7) Number of Axles on the Ground: _____								
8) Is a Hazardous Material Placard Displayed? <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, ID #: _____								

Figure B-1 Continued

- 9) Carrier Name: _____
- 10) Carrier Home Base [City and State/Province] _____
- 11) What is the **Unloaded Weight** of this Vehicle?
 _____ Lbs. [OR] _____ Kgs.
- 12) What is Your Estimated **Payload Weight**? [Weight of cargo only, Please enter 0 if the rig is **EMPTY**]
 _____ Lbs. [OR] _____ Kgs.
- 13) What is the **Registered Maximum Weight** of this Vehicle?
 _____ Lbs. [OR] _____ Kgs.
- 14) Is the vehicle **LOADED** or **EMPTY**?
LOADED **EMPTY**
- 15) What is the **Major Commodity** on Board? _____

[Please fill out the following section **COMPLETELY**]

Where Did THIS Trip Begin?	Where Will THIS Trip End?
<p>16) City, State/Province : _____</p> <p>17) Facility:</p> <p>1. <input type="checkbox"/> Truck Terminal</p> <p>2. <input type="checkbox"/> Rail Terminal</p> <p>3. <input type="checkbox"/> Marine Terminal</p> <p>4. <input type="checkbox"/> Air Terminal</p> <p>5. <input type="checkbox"/> Factory</p> <p>6. <input type="checkbox"/> Warehouse/Distribution Center</p> <p>7. <input type="checkbox"/> Farm</p> <p>8. <input type="checkbox"/> Point of Sale/ Consumption</p> <p>9. <input type="checkbox"/> Other : _____</p> <p>18) If LTL, List Origin Cities, States/Provinces:</p> <p>a. _____</p> <p>b. _____</p> <p>c. _____</p> <p>d. _____</p> <p>[Please Go to Question #1 9]</p>	<p>19) City, State/Province: _____</p> <p>20) Facility:</p> <p>1. <input type="checkbox"/> Truck Terminal</p> <p>2. <input type="checkbox"/> Rail Terminal</p> <p>3. <input type="checkbox"/> Marine Terminal</p> <p>4. <input type="checkbox"/> Air Terminal</p> <p>5. <input type="checkbox"/> Factory</p> <p>6. <input type="checkbox"/> Warehouse/Distribution Center</p> <p>7. <input type="checkbox"/> Farm</p> <p>8. <input type="checkbox"/> Point of Sale/Consumption</p> <p>9. <input type="checkbox"/> Other: _____</p> <p>21) If LTL, List Destination Cities, States/Provinces:</p> <p>a. _____</p> <p>b. _____</p> <p>c. _____</p> <p>d. _____</p> <p>[Please Go to Question #22]</p>

- 22) Please Identify the Washington State Highways Used to Travel from the Listed Origin to Destination on the Attached Map.

Figure B-2 Virginia DOT I-81 Corridor Improvement Study Truck Intercept Survey Form



Interstate 81 Truck Survey
Virginia Department of Transportation **June 2004**

Truck type: (Check one)

<input type="checkbox"/> Single Unit <input type="checkbox"/> Tractor Only (no trailer)	<input type="checkbox"/> Tractor + Single Trailer <input type="checkbox"/> Tractor + Multiple Trailers
--	---

Total number of axles: (Check one)

<input type="checkbox"/> 2	<input type="checkbox"/> 4	<input type="checkbox"/> 6
<input type="checkbox"/> 3	<input type="checkbox"/> 5	<input type="checkbox"/> 7 or more

Is your truck empty? (not carrying any products, tools, equipment, or materials)

Yes
 No

If your truck is loaded, what cargo are you carrying?
 (e.g. "cattle," "logs," "processed foods," "chemicals," "empty container," "unknown")
 (Estimate % of truck volume filled by each type of cargo)

	%
	%
	%
	%

Which direction are you headed on I-81? (Check one)

Northbound
 Southbound

Where did you first enter I-81? (Check one)

Outside of Virginia (first entered I-81 in TN, WV, MD, PA, or NY)
 From I-64
 From I-66
 From I-77
 From I-581
 Other: at Exit # _____ or Route Name in Virginia _____

Where will you finally exit I-81? (Check one)

Outside of Virginia (will finally exit I-81 in TN, WV, MD, PA, or NY)
 At I-64
 At I-66
 At I-77
 At I-581
 Other: at Exit # _____ or Route Name in Virginia _____

1

Figure B-2 Continued

Where is your home base/garage? *[where vehicle is usually parked when not on road]*
City: _____ State: _____

Where did you pick up this load? *[If empty, Where did you drop off your last load?]*
City: _____ State: _____

Type of facility where you picked up load:
 Farm/Forest/Mine Manufacturing Plant Distribution Center Other

Where will you drop off this load? *[If empty, Where will you pick up your next load?]*
City: _____ State: _____

Type of facility where you will drop off load:
 Farm/Forest/Mine Manufacturing Plant Distribution Center Other

How many times per month do you travel on I-81?
_____ times per month Northbound. _____ times per month Southbound.

Of these trips, how many times do you travel empty?
_____ times per month Northbound. _____ times per month Southbound.

Is this truck stop the only place where you're stopping inside Virginia?
 Yes No

If no, in order, list all your stops inside Virginia, including this location:
(Circle reasons for stop)

(1st) City: _____ Pick-Up Drop-Off Fuel/Food/Rest Other
(2nd) City: _____ Pick-Up Drop-Off Fuel/Food/Rest Other
(3rd) City: _____ Pick-Up Drop-Off Fuel/Food/Rest Other
(4th) City: _____ Pick-Up Drop-Off Fuel/Food/Rest Other

For this load, are you using any toll roads other than bridges or tunnels?
 Yes No

For this load, are you using alternative routes to avoid toll roads?
 Yes No

If I-81 were a toll road, would you use alternative routes?
 Yes – as an alternative, I would use _____
 No

2

Figure B-3 1991 Caltrans-Alameda County Truck Intercept and Classification Count Forms

Truck EMPTY or FULL (circle one)	What city are you COMING FROM? (circle if this is where the truck is GARAGED, was LAST LOADED or was LAST UNLOADED)	What city are you GOING TO? (circle if this is where the truck is GARAGED, will be LAST LOADED or LAST UNLOADED)	Where is the truck GARAGED? (only if previously answered)	What TYPE OF GOODS are you hauling? (circle if empty)	Number of AXLES (circle answers)
1 1. Empty 2. Full	City _____ State _____ 1. Garaged 2. Last Loaded 2. Last Unloaded	City _____ State _____ 1. Garaged 2. Next Loaded 2. Next Unloaded	City _____ State _____	(specify) _____ Empty	2 6 3 7 4 8 5 9
2 1. Empty 2. Full	City _____ State _____ 1. Garaged 2. Last Loaded 2. Last Unloaded	City _____ State _____ 1. Garaged 2. Next Loaded 2. Next Unloaded	City _____ State _____	(specify) _____ Empty	2 6 3 7 4 8 5 9
3 1. Empty 2. Full	City _____ State _____ 1. Garaged 2. Last Loaded 2. Last Unloaded	City _____ State _____ 1. Garaged 2. Next Loaded 2. Next Unloaded	City _____ State _____	(specify) _____ Empty	2 6 3 7 4 8 5 9
4 1. Empty 2. Full	City _____ State _____ 1. Garaged 2. Last Loaded 2. Last Unloaded	City _____ State _____ 1. Garaged 2. Next Loaded 2. Next Unloaded	City _____ State _____	(specify) _____ Empty	2 6 3 7 4 8 5 9

Station # _____ Station Location _____ Direction of Traffic _____
Date _____ Hour _____ : _____ AM PM Interviewer _____ Serial Number _____

APPENDIX C: WAREHOUSE/DISTRIBUTION CENTER MAIL SURVEY FORM

Figure C-1 Warehouse / Distribution Center Mail/Fax Survey Form



Warehouse / Distribution Center Freight Truck Survey

The Oregon Department of Transportation (ODOT) is seeking improved methods to address freight transportation needs and has contracted with Washington State University to obtain information on freight movements for businesses handling freight in the Portland metropolitan/urban area. This information will help ODOT to better understand the needs of the freight industry and plan for improvements that will benefit the freight transportation system. We will treat your responses as strictly confidential.

The data you have provided will NOT be identified with your firm. It will be averaged with other survey responses to help provide ODOT with a more accurate picture of freight movements in the Portland area. Please provide the information requested below and return this questionnaire in the postage-paid envelope provided.

To obtain a mailed copy of the survey results, please check here.

Principal Investigators:
Ken Casavant and Eric Jessup
103 Hulbert Hall
Pullman, WA 99163
509-335-1608 / 509-335-5558



July 2003

Figure C-1 Continued

Warehouse / Distribution Center Freight Truck Survey

- 1) Company Name: «Company Name»
- 2) Address
 Street: «Address»
 City: «City» State: «City» Zip: «Zip»
- 3) Name of Person
 Completing the Survey: «Contact» Phone # «Phone»

Please answer the following questions regarding typical freight activity at this location:

- 4) Is freight received/distributed at this facility? Yes No (If no, return in enclosed envelope.)
- 5) What is the approximate square footage of this facility? _____ Sq. ft.
- 6) How many loading bays does your facility have? _____ Bays
- 7) How many employees work at this facility? _____ Employees
- 8) In the tables below, please indicate the percentage of **INBOUND** and **OUTBOUND** shipments received throughout the **day**. Please make sure the percentages sum to 100% for each table.

INBOUND SHIPMENTS						
Arrival Time	6 AM – 9 AM	9 AM – 3 PM	3 PM – 6 PM	6 PM – 10 PM	10 PM – 6 AM	Total
Percentage						100%

OUTBOUND SHIPMENTS						
Departure Time	6 AM – 9 AM	9 AM – 3 PM	3 PM – 6 PM	6 PM – 10 PM	10 PM – 6 AM	Total
Percentage						100%

Figure C-1 Continued

9) In the tables below, please indicate the percentage of **INBOUND** and **OUTBOUND** shipments received throughout the **year**. Please make sure the percentages sum to 100% for each table.

INBOUND SHIPMENTS							
Season	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sept-Oct	Nov-Dec	Total
Percentage							100%

OUTBOUND SHIPMENTS							
Season	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sept-Oct	Nov-Dec	Total
Percentage							100%

For the following pages, please refer to the code table below.

Truck Configuration Code	Truck Configuration Description	Trailer Style Code	Trailer Style Description
1.	Straight Truck	1.	Van (No Temperature Control)
2.	Straight Truck and Trailer	2.	Van (With Temperature Control)
3.	Tractor Only	3.	Flatbed
4.	Tractor and Trailer	4.	Car Carrier
5.	Tractor with two Trailers	5.	Hopper
6.	Tractor with three Trailers	6.	Stake and Rack
7.	Other (please describe):	7.	Concrete Mixer
		8.	Tanker
		9.	Float
		10.	Dump
		11.	Container
		12.	Chip
		13.	Animal Carrier
		14.	Logging
		15.	Other (Please Describe):

Figure C-1 Continued

10) Please provide information regarding the Origins of your most common commodities. Identify the typical truck configuration and trailer style using the corresponding number from the table on page 3.

Inbound Shipments	Shipment Information			
Commodity Description	Number of Truckloads per Week	Avg. Payload Wt. per Load (lbs)	Average Number of Stops per Trip	Average Length of Route (miles)

Figure C-1 Continued

Note: You may list a commodity more than once, with different origins, if you receive from multiple locations.

Truck Information		Origin	
Typical Truck Configuration (Codes)	Typical Trailer Style (Codes)	Origin Street Address / Location	Typical Routes / Highways Used

bound

Figure C-1 Continued

11) Please provide information regarding the Destinations of your most common commodities. Identify the typical truck configuration and trailer style using the corresponding number from the table on page 3.

Outbound Shipments	Shipment Information			
Commodity Description	Number of Truckloads per Week	Avg. Payload Wt. per Load (lbs)	Average Number of Stops per Trip	Average Length of Route (miles)

Figure C-1 Continued

Note: You may list a commodity more than once, with different destinations, if you ship to multiple locations.

Truck Information		Destination	
Typical Truck Configuration (Codes)	Typical Trailer Style (Codes)	Destination Street Address / Location	Typical Routes / Highways Used

Figure C-1 Continued

End of Survey

Thank you for participating in this survey.

Figure C-2 Virginia DOT I-81 Corridor Improvement Study Shipper/Carrier Survey Form


I-81

I-81 Corridor Improvement Study
Freight Forecast and Diversion Technical Report


I-81 CORRIDOR IMPROVEMENT STUDY

FREIGHT MOVEMENT SURVEY



Dear Transportation/Logistics/Fleet Manager:

Virginia's stretch of Interstate 81 is vital to your business. Please help the Virginia Department of Transportation (VDOT) improve I-81 by completing this survey and faxing it to (301) 469-3001 or mailing it to the address on the last page.

In lieu of the paper survey, we strongly encourage you to complete the web version at <http://www.ifawest.com/I-81/Survey.html>.

This survey will take 5-7 minutes. We are especially interested in your comments about existing I-81 bottlenecks, congestion, etc. Your answers will help VDOT evaluate improvement scenarios for I-81 as part of the Tier 1 environmental review. Responses will be kept anonymous and used solely for transportation planning purposes.

If you have questions about this survey, please contact Jason Bezis at bezis@jfaucett.com or at (925) 284-5998. For general inquiries about the I-81 environmental review, project manager Chris Collins can be reached at VDOT headquarters at (804) 225-4249.

About You

First Name: _____ Last Name: _____

Your Title/Position: _____

Phone Number: (____) _____ E-mail Address: _____

Business Name: _____

Facility

1. Location of facility:

City: _____ Zip Code: _____

1

Figure C-2 Continued



I-81 Corridor Improvement Study
 Freight Forecast and Diversion Technical Report

2. Facility type: (check one)

- Independent Operation (company's only location)
- Chain/Branch/Franchise (one of company's many locations)

3. How many people work at your facility? (check one)

- 1-4
- 5-9
- 10-19
- 20-49
- 50-99
- 100 +

4. Nature of operation at facility: (check all that apply)

- Farming/ Forestry/ Mining
- Manufacturing/Factory
- Construction
- Distribution Center/Warehouse/Wholesale
- Retail Sales
- Motor Carrier/Truck Operator
- Truck Rest Stop/ Food Service
- Truck Service/ Fueling/Repair & Maintenance
- Other: _____

5. Types of materials, products or equipment RECEIVED (inbound) at your facility:

- Raw Agricultural & Animal Products (i.e. crops, livestock, animal feed)
- Food Products, Alcohol, & Tobacco (i.e. meat, bakery products, dairy products, prepared foodstuffs)
- Forestry, Wood, and Paper Products (i.e., logs, lumber, paper) [EXCEPT furniture]
- Chemicals & Chemical Products (i.e., basic chemicals, fertilizers, pharmaceuticals)
- Petroleum Products (Refined) (i.e., plastics & rubber, gasoline, fuel oils)
- Mining Materials (Raw Form) (i.e., coal, sand, gravel, ores, crude petroleum, salt, clay)
- Manufactured Metal & Mineral Products (i.e. metal bars, rods, pipes, nails, screws; cement; concrete products, bricks; glass)
- Other Manufactured Products or Equipment (i.e. furniture, tools, electronics, cameras, clocks, machinery, textiles, vehicles, aircraft, boats etc.)
- Waste, Refuse, Recycling (i.e. hazardous waste, trash, yard waste, recyclable products)
- Miscellaneous (i.e. mail & courier parcels, mixed freight)
- Other: _____

2

Figure C-2 Continued



I-81 Corridor Improvement Study
 Freight Forecast and Diversion Technical Report

6. Types of materials, products or equipment SHIPPED (outbound) from your facility:

- Raw Agricultural & Animal Products (i.e. crops, livestock, animal feed)
- Food Products, Alcohol, & Tobacco (i.e. meat, bakery products, dairy products, prepared foodstuffs)
- Forestry, Wood, and Paper Products (i.e., logs, lumber, paper) [EXCEPT furniture]
- Chemicals & Chemical Products (i.e., basic chemicals, fertilizers, pharmaceuticals)
- Petroleum Products (Refined) (i.e., plastics & rubber, gasoline, fuel oils)
- Mining Materials (Raw Form) (i.e., coal, sand, gravel, ores, crude petroleum, salt, clay)
- Manufactured Metal & Mineral Products (i.e. metal bars, rods, pipes, nails, screws; cement; concrete products, bricks; glass)
- Other Manufactured Products or Equipment (i.e. furniture, tools, electronics, cameras, clocks, machinery, textiles, vehicles, aircraft, boats etc.)
- Waste, Refuse, Recycling (i.e. hazardous waste, trash, yard waste, recyclable products)
- Miscellaneous (i.e. mail & courier parcels, mixed freight)
- Other: _____

Activity at Facility

7. On an average workday, how many trucks are coming in and out of your facility?

IN: (check one)	OUT: (check one)
<input type="checkbox"/> 1-4	<input type="checkbox"/> 1-4
<input type="checkbox"/> 5-9	<input type="checkbox"/> 5-9
<input type="checkbox"/> 10-24	<input type="checkbox"/> 10-24
<input type="checkbox"/> 24-49	<input type="checkbox"/> 24-49
<input type="checkbox"/> 50-99	<input type="checkbox"/> 50-99
<input type="checkbox"/> 100+	<input type="checkbox"/> 100+

8. How many days do you operate in a week? (check one)

- 1-4
- 5
- 6
- 7

9. How far do most trucks travel to and from your facility? (check one)

- Local (within 50-mile radius)
- Long Distance (more than 50-mile radius)

5

Figure C-2 Continued

	I-81 Corridor Improvement Study Freight Forecast and Diversion Technical Report
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10. Where do most trucks travel to and from your facility? (check one)

Inside Virginia
 Outside Virginia

11. Other than Virginia, what are the 3 most common ORIGIN states for materials, products, and equipment received at your facility?

<input type="checkbox"/> Maryland	<input type="checkbox"/> New York	<input type="checkbox"/> North Carolina
<input type="checkbox"/> Ohio	<input type="checkbox"/> Pennsylvania	<input type="checkbox"/> Tennessee
<input type="checkbox"/> Other: _____	<input type="checkbox"/> Other: _____	<input type="checkbox"/> Other: _____

12. Other than Virginia, what are the 3 most common DESTINATION states for materials, products, and equipment shipped from your facility?

<input type="checkbox"/> Maryland	<input type="checkbox"/> New York	<input type="checkbox"/> North Carolina
<input type="checkbox"/> Ohio	<input type="checkbox"/> Pennsylvania	<input type="checkbox"/> Tennessee
<input type="checkbox"/> Other: _____	<input type="checkbox"/> Other: _____	<input type="checkbox"/> Other: _____

13. Do you have fluctuations in truck trips or activities during the day?

No
 Yes

If Yes, which times are your peak periods? (Check all that apply)

<input type="checkbox"/> 5am-10am	<input type="checkbox"/> 4pm-7pm
<input type="checkbox"/> 10am-4pm	<input type="checkbox"/> 7pm-5am

14. Do you have fluctuations in truck trips or activities during the year?

No
 Yes

If Yes, which months are your peak periods? (Check all that apply)

<input type="checkbox"/> January	<input type="checkbox"/> May	<input type="checkbox"/> September
<input type="checkbox"/> February	<input type="checkbox"/> June	<input type="checkbox"/> October
<input type="checkbox"/> March	<input type="checkbox"/> July	<input type="checkbox"/> November
<input type="checkbox"/> April	<input type="checkbox"/> August	<input type="checkbox"/> December

15. Do the trucks moving in and out of your facility use I-81?

Yes, percentage of truck trips using I-81: _____%
 No
 Don't Know

4

Figure C-2 Continued

	I-81 Corridor Improvement Study Freight Forecast and Diversion Technical Report
<hr/>	
16. Does your facility use railroad transportation? <input type="checkbox"/> Yes, percentage of freight volume using railroad transportation: _____ % <input type="checkbox"/> No <input type="checkbox"/> Don't Know	
If you do not use railroad transportation, why not? (If you do use rail transportation, why?) If this space is not sufficient, please continue on back.	
17. How can I-81 be improved to help your business? If this space is not sufficient, please continue on back.	
18. Please identify any traffic problems related to I-81 truck movements (i.e., bottlenecks, congestion, safety). If this space is not sufficient, please continue on back.	
Thank you for your participation.	
<p><u>When complete, please mail or fax to:</u> Jack Faucett Associates (VDOT subcontractor) 4550 Montgomery Avenue, Suite 300N Bethesda, MD 20814 Phone: (925) 284-5998 (attn: Jason Bezis) E-mail: bezis@jfaucett.com Web survey: http://www.jfaucett.com/I-81/Survey.html</p>	
5	

APPENDIX D: ONLINE SURVEY FORM

Figure D-1 A Proposed Online Survey Form



Florida Department of Transportation

Travel Survey

1. This trip began at:

<input type="radio"/> Home	<input type="radio"/> Friend's or Relative's Home
<input type="radio"/> My Workplace	<input type="radio"/> Personal Appointment
<input type="radio"/> School	<input type="radio"/> Business Appointment
<input type="radio"/> Shopping/Errands	<input type="radio"/> Restaurant
<input type="radio"/> Other (Specify)	<input style="width: 150px;" type="text"/>

2. The place where this trip began:

City / Town :

Street Address, Nearest Intersection (Provide Both Street Names)

Name of Business (if appropriate)

3. This trip ended at:

<input type="radio"/> Home	<input type="radio"/> Friend's or Relative's Home
<input type="radio"/> My Workplace	<input type="radio"/> Personal Appointment
<input type="radio"/> School	<input type="radio"/> Business Appointment
<input type="radio"/> Shopping/Errands	<input type="radio"/> Restaurant
<input type="radio"/> Other (Specify)	<input style="width: 150px;" type="text"/>

4. The place where this trip ended:

City / Town :

Street Address, Nearest Intersection (Provide Both Street Names)

Name of Business (if appropriate)

Figure D-1 Continued

5. How often do you typically make this trip?

Less than once a week

One to five times a week

More than five times a week

6. On this particular trip, how many people were in your vehicle including the driver and all passengers?

Daycare

7. If you made stops on this trip, what was the purpose of these stops? (Check all that apply)

Work Related School Errands

Gas or Auto Service Eat Meal

Shopping Rest Break

Pick Up or Drop Off Passenger

Other (Specify)

If you would care to make any specific suggestions about how to improve travel along your route, please write them below in the space provided.

**APPENDIX E: LIST OF CONTACT INFORMATION OF WAREHOUSE AND
DISTRIBUTION CENTER IN FLORIDA**

E-1 State of Florida Commercial Airports List and Contact Information

Daytona Beach International Airport

<http://www.volusia.org/airport/>
Airport Information
700 Catalina Drive
Suite 300
Daytona Beach, FL 32114

Fort Lauderdale-Hollywood International Airport

<http://www.broward.org/airport/>
ContactFLL@broward.org

Gainesville Regional Airport

<http://www.flygainesville.com/>
Gainesville Regional Airport Administration
3880 N.E. 39th Avenue, Suite A
Gainesville, Florida 32609
Phone 352-373-0249
FAX 352-374-8368
INFO@FLYGAINESVILLE.COM

Jacksonville International Airport

<http://www.jaa.aero/>
Jacksonville Aviation Authority
P.O. Box 18018
Jacksonville, FL 32229
(904) 741-2000

Key West International Airport

<http://www.monroecounty-fl.gov/Pages/index>
3491 South Roosevelt Blvd.
Key West, FL 33040
Phone: (305) 296-7223
Fax:(305) 292-3578
Alternate Phone: (305) 296-5439

Melbourne International Airport

<http://www.mlair.com/>
Melbourne International Airport
One Air Terminal Pkwy, Suite 220
Melbourne, Fl 32901-1888

Miami International Airport

<http://www.miami-airport.com/>
MIA Info Line: (305)876-7000

Naples Municipal Airport

<http://www.flynnaples.com/>
Naples Municipal Airport
160 Aviation Drive North
Naples, FL 34104
Phone (239) 643-0733
Fax (239) 643-4084
administration@flynnaples.com

Okaloosa Regional Airport/Fort Walton Beach

<http://www.okaloosacountyairports.com/>
Okaloosa County Airports System
1701 Hwy 85 North
Eglin AFB, FL 32542
Phone #(850) 651-7160, Fax #(850) 651-7164

Orlando International Airport

<http://www.orlandoairports.net/goaa/main.htm>
Greater Orlando Aviation Authority
Orlando International Airport
One Airport Boulevard
Orlando, Florida 32827-4399

Orlando Sanford International Airport

<http://www.orlandosanfordairport.com/>
Sanford Airport Authority
1200 Red Cleveland Boulevard
Sanford, Florida 32773
407-585-4000

Palm Beach International Airport

<http://www.pbia.org/>
Palm Beach International Airport
1000 Turnage Boulevard
West Palm Beach, FL 33406
Phone: (561) 471-7420

Panama City/Bay County International Airport

<http://www.pcairport.com/>
3173 Airport Rd.
Panama City ,FL 32405
850-763-6751
pcairport@pcairport.com

Pensacola Regional Airport

<http://www.flypensacola.com/>
2430 Airport Blvd., Ste 225
Pensacola, FL 32504
(850) 436-5000
Fax (850) 436-5006

Sarasota Bradenton International Airport

<http://srq-airport.com/>
6000 Airport Circle
Sarasota, FL 34243
941-359-2770

Southwest Florida International Airport

<http://www.flylcpa.com/>

St. Petersburg-Clearwater International Airport

<http://www.fly2pie.com/>

Tallahassee Regional Airport

<http://www.talgov.com/airport/index.cfm>
Tallahassee Regional Airport

3300 Capital Circle SW, Ste #1
Tallahassee, FL 32310
850-891-7801

Tampa International Airport
<http://www.tampaairport.com/>
P.O. Box 22287
Tampa, Florida 33622-2287

E-2 State of Florida Seaports List and Contact Information

Port Canaveral

<http://www.portcanaveral.org/>
P.O. Box 267
Cape Canaveral, FL 32920
(321) 783.7831

Port Everglades

<http://www.broward.org/port/>
1850 Eller Drive
Fort Lauderdale, FL 33316
954-523-3404
PortEverglades@broward.org

Port of Fernandina

<http://www.ameliamaritime.com/pof.html>
501 North 3rd Street
P.O. Drawer 1543
Fernandina Beach, FL 32035
Phone: (904) 261-0753

Port of Fort Pierce

<http://www.stlucieco.gov/port/>

Port of Jacksonville

<http://www.jaxport.com/>
Jacksonville Port Authority Communications Office
P.O. Box 3005
2831 Talleyrand Avenue
Jacksonville, FL 32206
(904) 630-3080
info@jaxport.com

Port of Key West

<http://www.keywestcity.com/depts/port/port.asp>
<http://www.keywestcity.com/contacts/contactshome1.asp?menu=Port%20Operations>

Port Manatee

<http://www.portmanatee.com/>
Manatee County Port Authority
300 Tampa Bay Way
Palmetto, FL 34221-6608
portoffice@portmanatee.com
Telephone: 941/722-6621

Port of Miami

<http://www.metro-dade.com/portofmiami/>
1015 N. America Way 2nd Floor
Miami, FL 33132
(305) 371-7678

Port of Palm Beach

<http://www.portofpalmbeach.com/>
One Each 11th Street. Ste. 400
Riviera Bch. FL 33404

(561)383-4100
info@portofpalmbeach.com

Port of Panama City

<http://www.portpanamacityusa.com/>
5321 W Hwy 98
Panama City, Florida 32401

Port of Pensacola

<http://www.portofpensacola.com/>

Port of Port St. Joe

<http://www.portofportstjoe.com/>
Post Office Box 745
Port St. Joe., FL 32457
Toll Free: (866) GoStJoe
(866) 467-8563

Port of St. Petersburg

<http://www.stpete.org/port.htm>
250 8th Ave. S.E.
St. Petersburg, Florida 33701
port@stpete.org
Toll Free: 1-800-782-8350

Port of Tampa

<http://www.tampaport.com>
1101 Channelside Drive
Tampa, FL 33602
Telephone: 813-905-7678(PORT)
US Toll Free Telephone: 800-741-2297

Table E-1 Warehouses and Distribution Centers List and Contact Information

A One A Produce & Provisions

1351 Nw 22Nd St
Pompano Beach, Fl 33069-

Abc Foods

8218 Malvern Circle
Tampa, Fl 33615-

Abdor Florida Inc

925 Ne 24Th Ave
Hallandale , Fl 33009-

Agro Cold Storage

590 Ne 185Th Street
North Miami, Fl 33179-

Akro Dist Inc

1271 Laquinta Dr Ste 17
Orlando, Fl 32809-

Albertsons Distribution Center

1402 Albertsons Dr
Plant City, FL 33563
(813) 757-2500

Allen Distributing Inc

7952 Interstate Court
North Ft Myers, Fl 33917-

American Pizza Products Inc

4411 Bridgett Lane
Pensacola, Fl 32502-

Americold Corp

1601 North 50Th St
Tampa, Fl 33622-

Ameriserve

5545 Shawland Rd
Jacksonville , Fl 32254-

Anco Foods

1100 Nw 33Rd St
Pompano Beach, Fl 33064-

Apostolic Distribution Center

6703 NW 15th Ave
Miami, FL 33147
(305) 696-361

Associated Grocers Of Fl Inc

7000 Nw 32Nd Ave
Miami, Fl 33152-7695

B J'S Wholesale Club Inc

7817 Nw 103Rd Street
Hialeah Gardens , Fl 33016-

Baer's Furniture Corporate Office & Distribution Center

1589 NW 12th Ave
Pompano Beach, FL 33069
(954) 946-8001

Bari Italian Foods Dist Branch

7300 Technology Dr
Melbourne, FL 32904-

Bay Food Distributors Inc

6630 Jenson Rd
Tampa, FL 33619-

Beach Trading Co Inc

1814 Industrial Blvd
Jacksonville , FL 32254-

Berg Distribution Center

Serving Your Area
(407) 332-0072

Cabrera'S Beef & Pork Inc

765 W 27Th St
Hialeah , FL 33010-

Cameo Distributors Inc

5422 Carrier Dr Suite
Orlando, FL 32819-

Caney Distributing Co Inc

743 Nw 23Rd St
Miami, FL 33127-

Caribbean Cold Storage Inc

1505 Dennis St
Jacksonville , FL 32204-

Central Florida Donut Distribution Center LLC

2550 Michigan Ave
Kissimmee, FL 34744
(407) 933-6811

Cheeky Distribution Center

19501 Biscayne Blvd
Aventura, FL 33180
(786) 428-0133

Cheeky Distribution Center

2182 SE 17th St
Fort Lauderdale, FL 33316
(954) 318-0241

Cheeky Distribution Center

11401 NW 12th St
Miami, FL 33172
(786) 439-3917

Cheeky Distribution Center

8888 SW 136th St
Miami, FL 33176
(786) 249-0064

Cheeky Distribution Center

10300 W FOREST HILL BLVD
Wellington, FL 33414
(561) 422-9032

Cheeky Distribution Center Warehouse

6708 NW 82nd Ave
Miami, FL 33166
(305) 597-0688

Cheney Brothers Inc

One Cheney Way
Riviera Beach, FL 33404-7000

Christy Distribution Center

503 Brookhaven DR
Orlando, FL 32803
(407) 896-1800

Circuit City Distribution Center Lake County

19925 Independence Blvd
Groveland, FL 34736
(352) 429-6200

Clopay Distribution Center

11800 NW 100th Rd
Medley, FL 33178
(305) 884-1530

Colorado Boxed Beef Co

501 Ne 183Rd St
N Miami, FL 33179-

Computer Distribution Center

14631 N Nebraska Ave
Tampa, FL 33613
(813) 972-4897

Cookin Good

4712 W Ohio Ave
Tampa, FL 33614-

Custom Cold Storage &

1177 Nw 81St Street
Miami, FL 33150-

D B Brown

3220 S W 2Nd Avenue
Ft Lauderdale , FL 33315-

Daffin Foodservice

#1 Estes Street
Marianna, FL 32446-

Daily Bread Distribution Center

1408 Morningside Dr
Melbourne, FL 32901
(321) 953-8000

Dollar General In Alachua

17815 Peggy Road
Alachua, Florida 32616
386-418-5000

Danko Distribution Center

525 NE 29th St
Miami, FL 33137
(305) 438-9020

Domino's Distribution Center

7600 American Way
Groveland, FL 34736
(352) 429-5555

Eastern Distribution Service Center

660 Linton Blvd
Delray Beach, FL 33444
(561) 272-5274

Economy Cash & Carry

841 N. Combee Rd
Lakeland, FL 33801-

Eliot Scott Company

785 S Congress Ave
Delray Beach , FL 33444-

Ess Food Usa Inc

4601 Sheridan St Suite
Hollywood , FL 33021-

Expeditors International Distribution Center

10205 NW 19th St
Miami, FL 33172
(305) 436-5277

Falcone/Henry Lee Co

1361 Nw 155Th Dr
Miami, FL 33169-5723

Falla Food Sales Inc

7337 Nw 37Th Ave
Miami, FL 33147-

Fantis Foods Of Florida Inc

3399 118Th Ave North
St Petersburg, FL 33716-

Fashion Import Inc

3251 E 11Th Ave
Hialeah , FL 33013-

Fast Food Merchandisers Inc

2096 Dennis St
Jacksonville , FL 32204-

Fine Distributing Inc

9860 Currie Davis Dr
Tampa, FL 33619-

Fjr Food Distributors Inc

118 W. Grant Street
Orlando, FL 32806-

Fl Plantation Cold Storage Inc

501 Ne 183Rd Street
N Miami, FL 33169-

Fleming Foods Inc

3400 Nw 74Th Avenue
Miami, FL 33122-

Florida Cold Storage

4501 Dignan St
Jacksonville , Fl 32254-

Florida Distribution Centers Inc

5001 L B Mcleod Rd
Orlando, FL 32811
(407) 297-1004

Florida Food Service Inc

317 Ne 35Th Ave
Gainesville , Fl 32609-

Florida Freezer Limited Partne

7952 Interstate Court
North Ft Myers, Fl 33917-

Food Lion Warehouse

Hwy 17 N (P O Box 806)
Green Cove , Fl 32043-

Food Lion Warehouse

1802 Jim Johnson Rd
Plant City, Fl 33566-

Food Wholesalers Inc

1960 5Th Ave South
St Petersburg, Fl 33712-

Foreign Trade Zone Distribution Center/IDS

8985 Columbia Rd
Melbourne, FL
(321) 799-2889

Four Star Poultry & Provision

2180 Nw 13Th Ave
Miami, Fl 33142-

Garcia Inc (Manolo)

1465 Nw 21St Terrace
Miami, Fl 33142-

Geno'S Pizza Product

9276 N Davis Hwy
Pensacola, Fl 32514-

Gold Kist Inc

4320 C Gandy Blvd
Tampa, Fl 33611-

Golden Poultry Company Inc

1731 Nw 18Th Street
Pompano Beach, Fl 33069-

Government Cars Distributions Center Inc

8020 NW 7th Ave
Miami, FL 33150
(305) 751-1777

Greene Poultry Inc (Don)

12701 Nw 38Th Avenue
Opa Locka, Fl 33054-

Grocery Distribution Center

5600 Lucerne Park Rd
Winter Haven, FL 33881
(863) 294-1710

Guichard International

1380 Nw 23Rd St
Miami, Fl 33127-

Gulf Central Distribution Center Incorporated

4535 S Dale Mabry Hwy
Tampa, FL 33611
(813) 837-5602

Gulf Coast Meats & Prod Inc

8402 Lemon Rd
Port Richey, Fl 34668-

Gulf Distribution Center

2951 Work Dr
Fort Myers, FL 33916
(239) 337-4129

Guzman (Ana Julia)

1765 Nw 17Th Street
Miami, Fl 33125-

H & O Food Sales Inc

305 W Main Street
Lakeland, Fl 33801-

Haagen-Dazs Ice Cream Distribution Center

10479 N Commerce Pkwy
Miramar, FL 33025
(954) 447-1230

Harborside Refrigerated

2900 Guy N Verger Blvd
Tampa, Fl 33605-

Harlen Johnson'S Whlesle

3930 Hollywood Ave
Pensacola, Fl 32505-

Harvest Meat Co

2540 Shader Rd
Orlando, Fl 32854-0389

Harvest Valley Inc

2111 S Division Ave
Orlando, Fl 32805-

Henry Lee Company

3301 Nw 125Th St
Miami, Fl 33167-

Hoshizaki Southeastern Distribution Center Inc

Serving Your Area
(386) 785-0202

Hoshizaki Southeastern Distribution Center Inc

5589 Commonwealth Ave
Jacksonville, FL 32254
(904) 783-6069

Hoshizaki Southeastern Distribution Center Incorporated

5402 Pioneer Park Blvd
Tampa, FL 33634
(813) 249-6800

Hudson Foods Inc

7270 Nw 12Th St
Miami, Fl 33126-

Iberia Foods Corp

350 Ne 75Th Street
Miami, Fl 33138-

Imeson Distribution Center

550 Gun Club Rd
Jacksonville, FL 32218
(904) 751-5500

Imeson Distribution Center

550 Gun Club Rd
Jacksonville, FL 32218
(904) 751-5500

Industrial Cold Storage

1814 Industrial Blvd
Jacksonville , Fl 32203-

Jacob Fleishman & Sons Inc

1177 Nw 81St St
Miami, Fl 33150-

Jacksonville Warehouse Companies

<http://www.jaxwhse.com/contact.htm>

Jar Distribution Center

10755 SW 190th St
Miami, FL 33157
(786) 242-9877

Jetro Cash & Carry

2041 Nw 12Th Ave
Miami, Fl 33127-

Johnsons Brothers

1640 Martin Luther King
Panama City, Fl 32401-

Kansas Marine Co

5511 Nw 163Rd Street
Hialeah , Fl 33014-

Kemmerer Sales Inc

6831 N W 37Th Ave
Miami, Fl 33147-

Ken Horne Distributors

1202 Pine Island Road
Cape Coral , Fl 33909-

L & M Foods Inc

500 Ne 185 Street
North Miami Beach, Fl 33179-

Libreria San Pablo & St Paul Distribution Center

5800 SW 8th St
West Miami, FL 33144
(305) 269-9585

Limousine Distribution Center

Serving Your Area
(561) 687-5466

Long Food Company

2640 Kunze Ave
Orlando, Fl 32856-

Lowes Flatbed Distribution Center

525 T S Wilson Rd
Frostproof, FL 33843
(863) 635-8300

M F Z Public Warehouse Inc

2335 Nw 107Th Avenue
Miami, Fl 33172-

Manna Provision

6239 New Kings Rd N
Jacksonville , Fl 32209-

Martin Brower Company (The)

1661 Nw 12Th Avenue
Pompano Beach, Fl 33069-

Max Food Distributor Inc

Miami, Fl 33142-

Maxim'S Import Corp

2719 Nw 24Th St
Miami, Fl 33142-

Mck-Hughs Meat Distributors

Jacksonville , Fl 32206-

Meatman Inc (The)

4100 No Powerline Rd Q-
Pompano Beach, Fl 33073-

Merchants Export Incorporate

200 Ml King Blvd
Riviera Beach, Fl 33404-

NAPA Distribution Center Office

1090 Haines St
Jacksonville, FL 32206
(904) 354-7856

National Distribution Center

2000 E Landstreet Rd
Orlando, FL 32824
(407) 857-0649

National Distribution Center

901 W Landstreet Rd
Orlando, FL 32824
(407) 826-9924

National Distribution Centers

4601 Bulls Bay Hwy
Jacksonville, FL 32219
(904) 781-0782

National Freezers

1849 Nw 1St Ave
Miami, Fl 33136-

Niagara Dist Inc

3701 N 29Th Ave
Hollywood , Fl 33020-

Ocho Rios Miami Inc

2051 Nw 15Th Ave
Miami, Fl 33142-

One Source Distribution Center

290 SW 12th AV
Pompano Beach, FL 33069
(954) 943-9990

Overseas Duty Free Supply

250 Catalonia Ave Ste
Coral Gables , Fl 33134-

P Q Beef Processors Inc

6707 Nw 37Th Avenue
Miami, Fl 33147-

Paradise Home & Patio Distribution Center

Serving Your Area
(772) 380-0203

Partners Distribution Center Inc

686 NW 112th St
Miami, FL 33168
(305) 754-0088

Patterson Dental Co Southeast Distribution Center

1401 Tradeport Dr
Jacksonville, FL 32218
(904) 741-4480

Paulinas Spanish Distribution Center

145 SW 107th Ave
Miami, FL 33174
(305) 225-2513

Pay Less Cash & Carry Whlse

3717 Vance St
Jacksonville , Fl 32205-

Pepsi Cola Distribution Center

4451 34th St N
Saint Petersburg, FL 33714
(727) 526-9794

Pepsi Cola Distribution Center

4451 34th St N
Saint Petersburg, FL 33714
(727) 527-7131

Pepsi Cola Distribution Center

Tarpon Springs, FL 34688
(727) 942-3663

Phillips Meats & Seafoods Inc.

1220 Transmitter Rd
Panama City, FL 32401-

Port Everglades Cold Stg Inc

3205 S E 19Th Ave
Ft Lauderdale , FL 33316-

Preferred Freezer Services Inc

2900 Nw 75Th Street
Miami, FL 33147-

Premier Global Distribution Center Inc

8150 NW 21st St
Doral, FL 33122
(305) 591-3550

Pride Of Omaha

689 Heinburg St
Pensacola, FL 32501-

Produce Distribution Center

2208 W 21st St
Jacksonville, FL 32209
(904) 366-1368

Produce Distribution Center Llc

2208 W 21st St
Jacksonville, FL 32209
(904) 366-1370

Publix Distribution Center

5500 Park Ridge Blvd
Boynton Beach, FL 33426
(561) 369-7900

Publix Super Markets Distribution Center

Serving Your Area
(407) 856-2301

<http://www.publix.com/careers/opportunities/groups/Distribution.do#57>

Publix Supermarkets Inc

9786 W Beaver Street
Jacksonville , FL 32231-

Py/Monarch, Inc.

330 Carswell Ave
Holly Hill , FL 32015-

Quirch Foods

7007 Nw 37Th Ave
Miami, FL 33147-

Real Cold Storage Of Miami Inc

8020 Nw 60Th Street
Miami, FL 33166-

Russell Corporation Distribution Center

3521 Russell Rd
Marianna, FL 32446
(850) 526-5205

Sage Food Enterprises Inc

1301 Nw 89Th Court
Miami, Fl 33172-3008

Sally Beauty Co-Distribution Center

1550 Vantage Way
Jacksonville, FL 32218
(904) 741-1400

Sam'S Club

7233 Seacrest Blvd
Lantana, Fl 33462-

Sam'S Club

1900 S. University Drive
Miramar, Fl 33025-

Sams Distribution Center

3010 Saddle Creek Rd
Lakeland, FL 33801
(863) 667-1136

Seaboard Cold Storage Inc

110 S 11Th St
Tampa, Fl 33622-

Seaview Distribution Center

14525 62nd St N
Clearwater, FL 33760
(727) 532-3026

Shaklee Authorized Distribution Center

412 NE 13th Ave
Gainesville, FL 32601
(352) 373-5295

Southern Packaging & Distribution Center

5330 W 5th St
Jacksonville, FL 32254
(904) 786-0811

Staples Distribution Center

1206 N Us Highway 301
Tampa, FL 33619
(813) 626-8111

Turnpike Distribution Center Inc

1580 NW 27th Ave
Pompano Beach, FL 33069
(954) 969-0946

US Commercial Warehouse & Distribution Center

2209 NW 30th Pl
Pompano Beach, FL 33069
(954) 977-8622

Walgreen Drug Stores-Distribution Center

2467 Premier Row
Orlando, FL 32809
(407) 859-8202

Walgreens Distribution Center

Serving Your Area
(561) 493-7700

Wal-Mart Distribution Center Manager

5100 Kettering Rd
Brooksville, FL

(352) 796-7525

Warehouse Distribution Center

7900 NW 68th St

Miami, FL 33166

(305) 591-7894

Warehouse Distribution Center

7900 NW 68th St

Miami, FL 33166

(305) 599-6115

Wayne Dalton Regional Distribution Center

9777 Satellite Blvd

Orlando, FL 32837

(407) 856-9557

Zephyrhills Ice & Distribution Center

5020 Hill Dr

Zephyrhills, FL 33542

(813) 715-4287

APPENDIX F: STATEWIDE MODEL ZONE MAP

Figure F-1 State of Florida Transportation Analysis Zone (TAZ) MAP

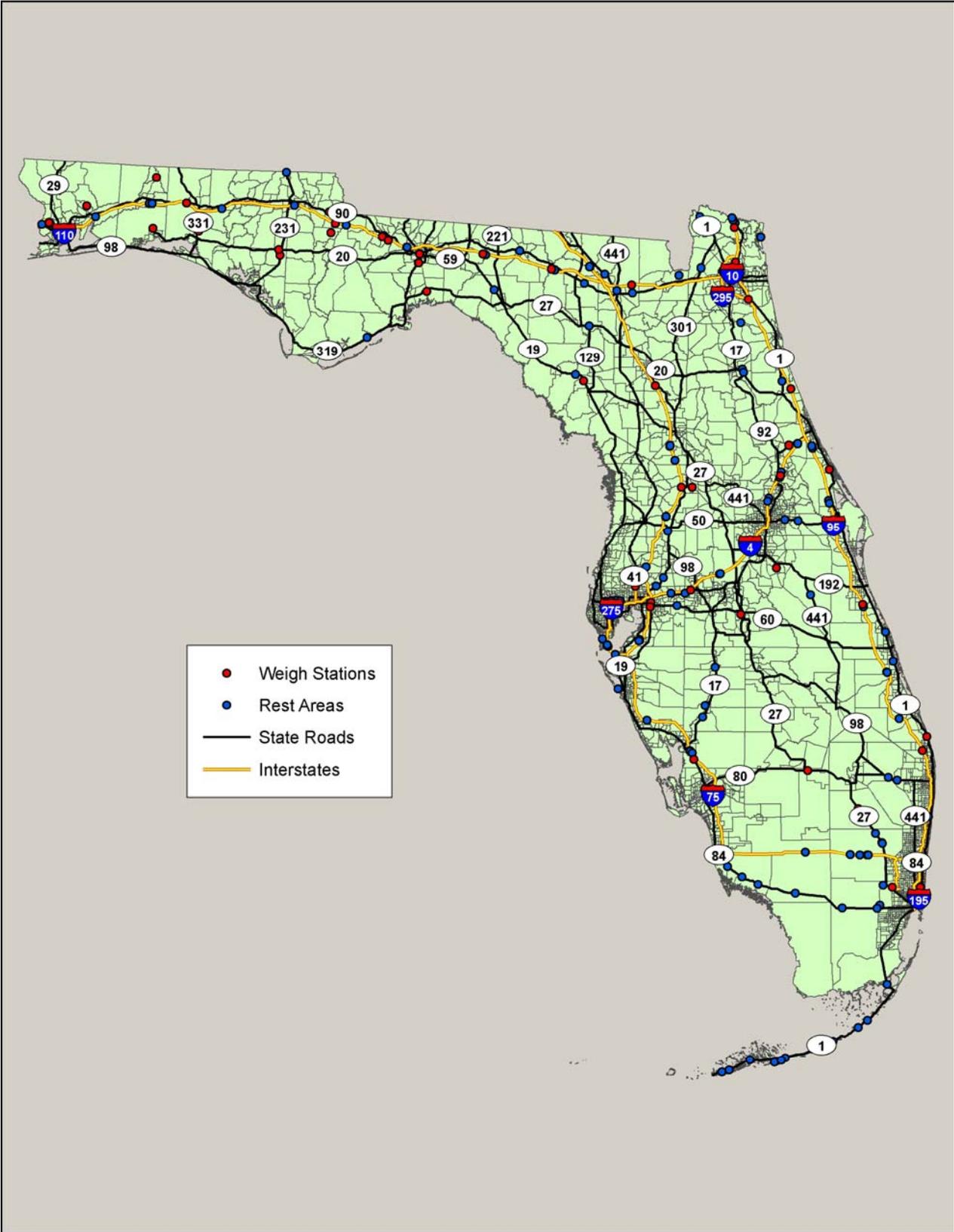


Table F-1 Number of Rest Areas in Transportation Analysis Zones (TAZ)

TAZ No	Number of Rest Areas	TAZ No	Number of Rest Areas
10	3	1541	1
77	2	1620	1
100	1	1678	2
105	1	1767	10
163	1	1800	1
229	2	1814	2
242	1	1923	2
248	1	1932	1
271	1	1961	1
278	1	2029	1
322	2	2075	2
373	2	2090	1
378	1	2192	1
391	1	2193	2
406	1	2200	1
413	1	2205	1
414	2	2265	1
417	1	2344	1
423	3	2415	1
428	1	2464	1
429	1	2521	1
546	1	2556	1
552	1	2560	1
554	2	2563	2
555	1	2583	2
561	1	2657	2
567	1	2741	1
602	1	2772	1
732	1	2780	2
786	1	2793	1
790	1	2802	1
792	1	2830	1
798	1	2835	2
805	1	2887	1
821	1	2912	1
891	2	3020	1
892	1	3154	1
959	1	3201	8
966	1	3505	2
970	1	3533	2
1001	2	3902	1
1067	2	3908	1
1100	1	3909	1
1111	1	3914	4
1199	1	3915	1
1236	1	3917	1
1386	2	3918	1
1495	2		

Table F-2 Number of Weigh Stations in Transportation Analysis Zones (TAZ)

TAZ No	Number of Weigh Stations
10	1
21	1
75	1
97	1
107	1
145	1
148	1
184	2
247	1
248	1
250	1
292	1
296	1
340	1
361	2
365	1
373	1
414	1
428	1
448	1
524	2
555	1
578	1
732	1
823	1
959	1
995	1
1001	1
1059	1
1062	1
1402	1
1495	1
1537	1
1966	1
2085	1
2125	1
2239	1
2324	1
2590	1
2731	1
2872	1
2904	1
2926	1
3065	1
3546	2
3551	2