September 2002

Cordon Line Highway Traffic Survey for the Delaware Valley Region

Regional Cordon Line Stations for the Delaware Valley Region

Report 6

Delaware Valley Regional Planning Commission

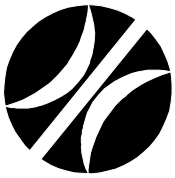
REPORT NO.6

REGIONAL CORDON LINE STATIONS FOR THE DELAWARE VALLEY REGION

September 2002

Delaware Valley Regional Planning Commission
The Bourse Building
111 South Independence Mall East
Philadelphia, PA 19106-2582

Created in 1965, the Delaware Valley Regional Planning Commission (DVRPC) is an interstate, intercounty, and intercity agency which provides continuing, comprehensive, and coordinated planning to shape a vision for the future growth of the Delaware Valley region. The region includes Bucks, Chester, Delaware, and Montgomery counties as well as the City of Philadelphia, in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer counties in New Jersey. DVRPC provides technical assistance and services, conducts high priority studies that respond to the request and demands of member state and local governments, fosters cooperation among various constituents to forge a consensus on diverse regional issues, determines and meets the needs of the private sector, and practices public outreach efforts to promote two-way communication and public awareness of regional issues and the commission.



Our logo is adapted from the official DVRPC seal, and is designed as a stylized image of the Delaware Valley. The outer ring symbolizes the region as a whole while the diagonal bar signifies the Delaware River. The two adjoining crescents represent the Commonwealth of Pennsylvania and the State of New Jersey.

DVRPC is funded by a variety of funding sources including federal grants from the U.S. Department of Transportation's Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), the Pennsylvania and New Jersey departments of transportation, as well as by DVRPC's state and local member governments. This report was primarily funded by the Pennsylvania Department of Transportation and the Federal Highway Administration (FHWA). The authors, however, are solely responsible for its findings and conclusions, which may not represent the official views or policies of the funding agencies.

TABLE OF CONTENTS

LIST OF MAPS

LIST OF FIGURES

LIST OF TABLES

APPENDIX A: List of Tables

APPENDIX B: List of Regional Cordon Station Survey Location Maps

APPENDIX C: List of Regional Cordon Station Traffic Counts

(page intentionally left blank)

EXECUTIVE SUMMARY

The External and Through Traffic Survey collected current information on traffic entering and exiting the DVRPC region. The traffic surveys were surveyed at twelve stations around the region during the summer of 2001. Information was collected in both directions through a roadside interview, using the questionnaire shown on page 6. Questions were asked about trip origin and destination, purpose, highways used, vehicle type, occupancy, truck garage location and truck commodities. Detailed findings are available individually in Section IV and in the Appendices in the back of the report. The survey was conducted with the cooperation of the Pennsylvania Department of Transportation, the New Jersey Department of Transportation, the Delaware Department of Transportation and police from Pennsylvania, New Jersey, and Delaware. Traffic was surveyed at each of the stations during the time period from 6:45 A.M. to 7:15 P.M.

The major findings for these survey stations are as follows:

- The sample size for the aggregated cordon stations was about 92 percent of the desired sampled goal of 20,300 surveys. There were 18,577 vehicle drivers broken out as 15,476 passenger vehicles and 3,101 commercial vehicles.

- Only about 3 percent of those surveyed (513 automobiles and 96 trucks of the 18,577 total vehicles surveyed) responded that they were going to stop before arriving at their destination.

- The reasons for traveling on regional facilities were “saves time” with about 66 percent for automobiles and 68 percent for trucks. The secondary response for automobile and truck drivers was “most direct” (24% and 22%, respectively).

- Automobiles are about 46 percent of the total surveyed vehicles. Vans / station wagons, and SUVs each have about 11 percent shares while light and heavy trucks have 15 percent and 7 percent shares, respectively.

- The work trip was the most common reported trip purpose with a 53 percent share of the total trips. The social trip was the second greatest response with about a 20 percent share. The remaining five categories are divided among the remaining 17 percent of the survey responses.

- Single occupant vehicles are about 69 percent of the total passenger vehicles surveyed. Two occupant vehicles constitute about 22 percent of the surveyed vehicles. Three and four occupant vehicles are about 6 percent and 3 percent, respectively. Only about 1 percent of the surveyed vehicles had 5+ occupants.

- The average total vehicle occupancy is 1.45 persons per vehicle with the van/station wagon having the greatest average occupancy (1.74), while SUVs and automobiles have lower occupancy rates (1.49 and 1.40, respectively). Average occupancy are the lowest for work trips with 1.16 persons per vehicle.

- About one-third of the surveyed trucks are garaged inside the DVRPC region (10% in New Jersey and 23% in Pennsylvania). Trucks housed outside the DVRPC region in New Jersey have a 22 percent share and outside the DVRPC region in Pennsylvania have a 20 percent share.

- Surveyed trucks were carrying building materials (24%) or were empty (21%) in a large portion of the cases. Agricultural products (9%), retail merchandise (7%), and refrigerated products (5%) occupy the middle range of responses. Petroleum products (3%) and parcels (2%) constituted the smallest share of driver responses.

I. INTRODUCTION

The DVRPC cordon line traffic survey was conducted to collect current information on traffic volumes and determine the origin-destination travel patterns, travel activity, and travel mode of vehicles crossing the nine-county DVRPC cordon line which forms the regional boundary. The external and through trip travel patterns are especially critical for transportation facilities located near the nine-county boundary, as this is an area where in recent years major new development has occurred. The survey, conducted in the spring and summer of 2001, updated trip characteristics and patterns that were last collected in the 1980s. The survey data will be used in the ongoing planning process, validation of travel simulation models, traffic forecasting, preliminary engineering, estimation of vehicle miles of travel (VMT), and monitoring of external and through travel. The toll authorities of the region, state transportation departments, neighboring metropolitan planning organizations, county planners, and interregional freight operators will benefit from this survey, which will provide useful data for the improvement of highway facilities in the next 20 years.

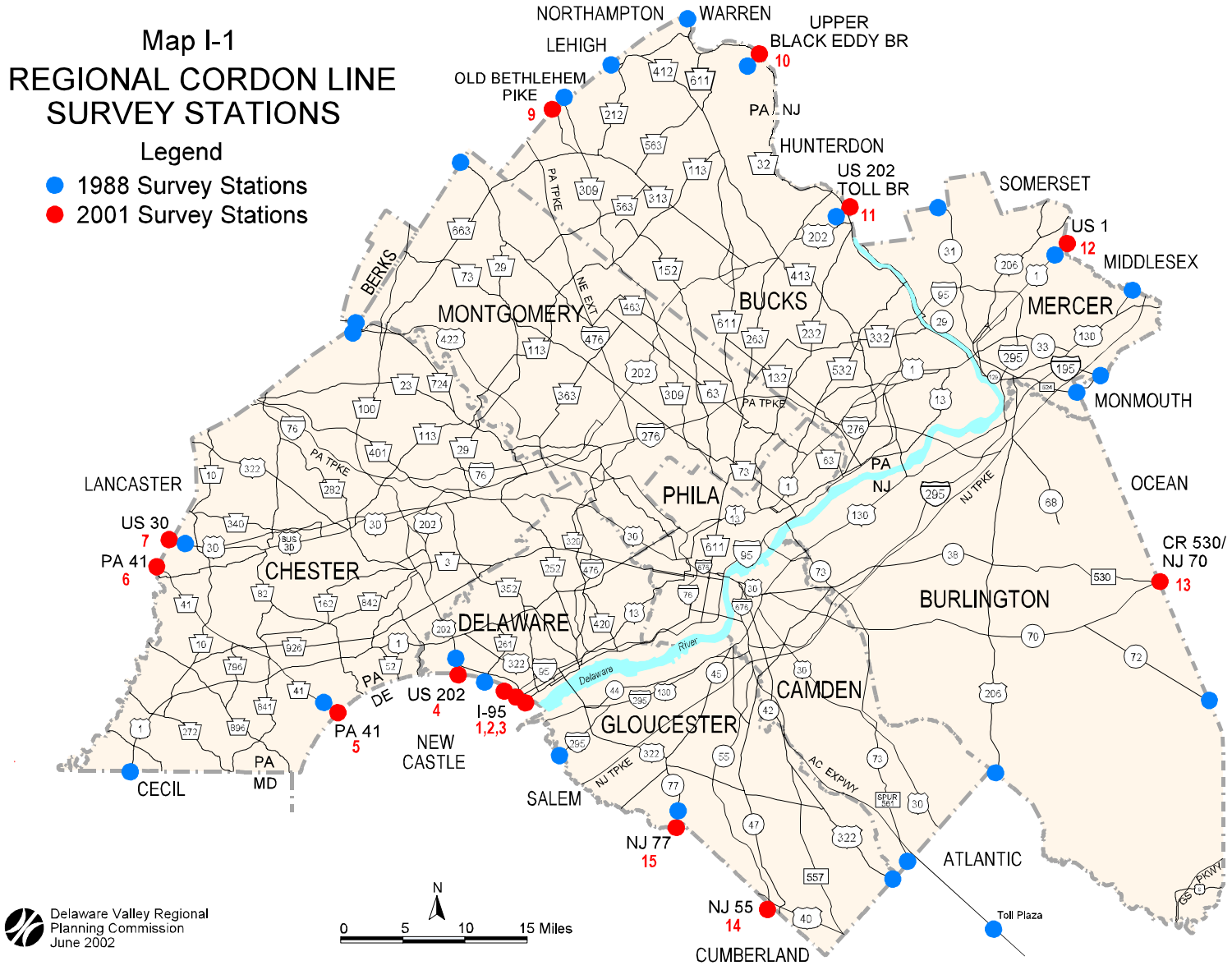
Map I-1 displays the highway facilities which were surveyed in 2001 as well as the locations of the 1988 survey. Traffic counts and a sample of interviews were collected at 12 locations crossing the boundary of the nine-county region representing a broad range of highway types, from local to interstate facilities. This information was supplemented with data from two recently conducted surveys, one on the Pennsylvania Turnpike and the other on the New Jersey Turnpike. In addition, traffic counts were taken on an additional 140 highway facilities crossing the regional boundary and bus and rail ridership was collected from carriers crossing the boundary. Survey results are presented in a series of reports. This report briefly presents the aggregated results of the 12 cordon stations surveys conducted around the region.

The survey consisted of roadside interviews at each location. Questions were asked about trip origin, destination, and purpose; highway use and vehicle type; and vehicle occupancy. The questionnaire also asked about the reasons for travel and how people make their travel decisions and plan their daily trips. Truck type, garaging and commodity information were also included in the survey questionnaire. Section II of the report describes the design and conduct of the survey. Included are a description of the survey questionnaire, the sample size, and the collection method. A description of the survey sites covered in this report are presented. A summary tabulation of traffic volumes at each site and vehicle classification information are also included.

Section III provides a summary of traffic volumes for the 12 highway facilities, turnpikes, and public transportation crossing the regional cordon line

The survey results are presented in Section IV. Included is a review of the processes employed to enter the survey data, geocode origin/destination information, and tabulate the answers to survey questions. The major findings of the survey and traffic characteristics are presented; the findings for each question are offered in graphic and written form.

Detailed survey information is provided in the Appendices, including traffic and vehicle classification counts. Simple and cross tabulations of survey responses are shown in the series of tables for the aggregated survey stations.


Map I-1
REGIONAL CORDON LINE SURVEY STATIONS
Legend
1988 Survey Stations
2001 Survey Stations
NORTHAMPTON
WARREN
LEHIGH
UPPER BLACK EDDY BR
10
OLD BETHLEHEM PIKE
9
PA
NJ
HUNTERDON
US 202 TOLL BR
11
SOMERSET
US 1
12
MIDDLESEX
MERCER
MONTGOMERY
BUCKS
BERKS
MONMOUTH
LANCASTER
PHILA
OCEAN
US 30
7
PA 41
6
CHESTER
DELAWARE
BURLINGTON
CR 530/ NJ 70
13
CAMDEN
US 202
4
I-95
1,2,3
PA 41
5
NEW CASTLE
GLOUCESTER
CECIL
PA
MD
PA
DE
SALEM
NJ 77
15
ATLANTIC
NJ 55
14
CUMBERLAND
Toll Plaza
Delaware River
PA TPKE
NE EXT
NJ TPKE
AC EXPWY
Delaware Valley Regional Planning Commission
June 2002
N
0 5 10 15 Miles

II. DESIGN AND CONDUCT OF THE SURVEY

The cordon line survey was designed to gather information from a sample of drivers crossing the boundary of the DVRPC region. At each station, two types of traffic information was collected; total number of passing vehicles and driver trip-making characteristics. The recording of all traffic, by vehicle type and by the hour, was collected using DVRPC's Portable Traffic Recorder units. This information was used to establish the sample size necessary for roadside interviews to collect trip-making characteristics. As shown on the following page, the survey questionnaire consists of 13 questions; two of which need not be asked since the surveyor would be able to check the vehicle type and occupancy. The following information was collected in the interview: time of trip, origin and destination of the trip, major highways used, number of travelers (including the driver). For commercial vehicles additional questions ascertained county where the vehicle is garaged or parked when not in service and the type of commodity carried by trucks.

A. Survey Locations

The aggregated results of the regional survey locations are included in this report. These facilities, freeways, arterials, and local roads, were chosen due to their strategic importance for travel to and from the Delaware Valley region.

1. I-95, Delaware Expressway

Interstate 95, stretching from Florida to Maine, is the primary route for traffic along the eastern seaboard of the United States. Due to a discontinuous section in the northern part of the DVRPC region, much traffic traveling through the region today uses the Delaware Memorial Bridge and the New Jersey Turnpike. However, this section of I-95 still serves a significant amount of interstate traffic between the Philadelphia metropolitan area and Wilmington, Baltimore and the Washington region.

I-95 at the cordon line is three lanes by direction, a road profile which makes it difficult to stop traffic. Due to this geometry at the regional boundary, the survey site was established approximately one mile south of the cordon where I-95 splits into I-95, providing local service to Wilmington and I-495, providing a bypass function around Wilmington. In addition, ramps provide access to DE 92, Naamans Rd (see Map B -1). This location offered a two lane by direction cross section on both I-95 and I-495 and traffic signal control at the ramps to Naamans Rd. Police from the Delaware State Police New Castle Barracks assisted with traffic control.

Figure II-1. External and Through Survey Field Form

Delaware Valley Regional Planning Commission **№** 10000
EXTERNAL AND THROUGH TRIP SURVEY **Time :** : 1[ ] AM 2[ ] PM

1. Where did you start this trip? (Origin) **2. Is this home?** 1[ ] Yes 2[ ] No

_____
Street address or nearest intersection

_____
Town or City County State Zip Code

3. Where will this trip end? (Destination) **4. Is this home?** 1[ ] Yes 2[ ] No

_____
Street address or nearest intersection

_____
Town or City County State Zip Code

5. Will you stop before arriving at your destination? **6. Is this home?** 1[ ] Yes 2[ ] No

1[ ] No 2[ ] Yes, If yes, where?

_____
Street address or nearest intersection

_____
Town or City County State Zip Code

7. Why do you use this road? (check one or more)
1[ ] Saves Time 3[ ] Less Congestion 5[ ] No Traffic Lights
2[ ] Saves Money 4[ ] Better Road Condition 6[ ] Other_____

8. What is/are the major road(s) that you will take to reach the destination after this road?

1st Highway_____ 2nd Highway _____

9. What type of vehicle is used for the trip?

Passenger Vehicles	**Light Trucks**	**Heavy Trucks (3 axles or more)**
1[ ] Auto	5[ ] Pickup	9[ ] Tractor-Trailer
2[ ] Van, Sta. Wagon	6[ ] Panel	10[ ] Double Trailer
3[ ] SUV	7[ ] Single Unit	11[ ] Other _____
4[ ] Other _____	8[ ] Other _____	

10. What is the purpose of this trip? (Passenger Vehicles Only)
1[ ] Work 3[ ] Eat Meal 5[ ] Social/Recreation 7[ ] Visitor/Tourist
2[ ] School 4[ ] Shopping 6[ ] Medical 8[ ] Other _____

11. How many people are in the vehicle? (Passenger Vehicles Only)
1[ ] One 2[ ] Two 3[ ] Three 4[ ] Four 5[ ] Five 6[ ] More than Five

12. Where is this truck garaged or parked when not in service? (Trucks Only)
1[ ] Bucks County 4[ ] Montgomery County 7[ ] Burlington County 10[ ] Mercer County
2[ ] Chester County 5[ ] Philadelphia County 8[ ] Camden County 11[ ] Other NJ County
3[ ] Delaware County 6[ ] Other PA County 9[ ] Gloucester County 12[ ] Other State

13. What type of commodities are you carrying? (Trucks Only)
1[ ] Empty 4[ ] Agricultural Products 7[ ] Retail Store Merchandise
2[ ] Manufactured Products 5[ ] Building Materials 8[ ] Parcels
3[ ] Petroleum Products 6[ ] Refrigerated Products 9[ ] Other _____

2. US 202

US 202, Wilmington West Chester Pike is the major north-south thoroughfare connecting the Wilmington region with Philadelphia's far western suburbs. It also provides access to the high tech US 202 corridor in northeastern Chester county and provides connections with the Pennsylvania Turnpike via PA 100.

The survey site was in Pennsylvania approximately 1/10th of a mile north of the state line and just north of the unsignalized intersection with Pyle Road, a local road accessing residential uses (see Map B-2). A traffic signal approximately ½ mile north of the site at the intersection with PA 491, Naamans Creek Rd, helped to provide some traffic control. Pennsylvania State Police from the Media barracks provided traffic control. Traffic flow was normal during the survey, although a midday northbound backup necessitated suspension of the survey for about 20 minutes.

3. PA 41

PA 41, Gap Newport Pike is a major arterial connecting the Wilmington area with Chester County and central Pennsylvania. It is an important freight corridor, connecting the Port of Wilmington with markets in the midwest. Land use on the Delaware side of the state line is predominantly residential, providing bedroom communities for the Wilmington area. On the Pennsylvania side, land use has been agricultural, with a focus on mushroom cultivation. Increasingly, however, residential development pressure is leading to the transformation of much land to residential use.

The survey site was approximately ½ mile north of the state line just north of an interchange with Kaolin Rd, also called DE 7 on the Delaware side of the line(see Map B-3). This provided the opportunity to survey traffic from both facilities, as much of the DE 7 traffic continues north on PA 41. At this location PA 41 is a two lane facility with narrow paved shoulders. This necessitated the offsetting of the survey directions to allow for traffic flow. Pennsylvania State Police from the Avondale barracks provided traffic control.

4. PA 41, Gap Newport Pike

PA 41, Gap Newport Pike (also known as Newport Lancaster Pike) is a major arterial connecting the Wilmington area with Chester County and central Pennsylvania. Land use is predominantly rural, with the landscape dominated by farms and agricultural support services. Due to the commercial nature of the PA 41 corridor and the recreational traffic bound for the factory outlet centers and antique stores in Lancaster County, a mixture of diners, truck stops, and gasoline stations are evident. Finally, this area is at the fringe of the Philadelphia metropolitan area which has increased residential development pressure. New subdivisions are being marketed in Atglen just south of the cordon, Gap to the north of the cordon, and Parkesburg, just east of the survey site.

The survey site was approximately 1/5 mile south of the cordon (see Map B-4). At this location PA 41 is a two lane facility with 10 foot paved shoulders. This necessitated the offsetting of the survey directions to allow for traffic flow. Pennsylvania Police from the Lancaster barracks provided traffic control.

5. US 30, Lincoln Highway

US 30 is the major east-west thoroughfare between the DVRPC region and points west. In eastern Pennsylvania, US 30 is still a major thoroughfare between the Philadelphia and Lancaster urban areas. To the east of the cordon station, US 30 exists as a freeway facility from the intersection with US 202 near Frazer almost to PA 10. Like PA 41, US 30 provides access to the factory outlet centers and tourist destinations in Lancaster County. Scattered residences exist in the vicinity of the cordon station, together with individual commercial sites. Large scale residential and commercial development is creeping west toward the cordon, with land sale signs a common sight along the alignment.

The survey site was on the Chester County side of the border, just east of Swan Rd. (see Map B-5). The cross section of US 30 includes 1 travel lane by direction, a center turn lane, and paved shoulders. The survey was offset, so that traffic could be surveyed in the travel lane, with the center turn lane operating as a bypass. Pennsylvania State Police from the Lancaster barracks were on site to assure the safety of the survey crew and the motoring public. Traffic flow was normal for much of the survey, although for about ½ hour of the afternoon survey a traffic accident on PA 41 led some vehicles to divert along PA 10 and into the survey. Drivers who expressed this during the survey were excused and their survey information rejected.

6. Old Bethlehem Pike

Old Bethlehem Pike serves local traffic between Quakertown, Bucks County with Coopersburg, Lehigh County. With the exception of a small industrial operation on the east side of the survey site, land use along this segment of the road is residential, with a mix of single family residences on large lots. Further toward Quakertown, agricultural uses are mixed with newer residential developments.

The survey site was located approximately 1/4 mile north of the regional boundary at the intersection of Old Bethlehem Pike and Homestead Dr. (see Map B-6). At this point, Old Bethlehem Pike is a two lane facility without shoulders. The survey was offset on either side of the intersection with Homestead Dr. Due to low traffic volume, the traffic lane was used for the survey, with any occurring backup cleared before another group of vehicles was stopped and interviewed. Upper Saucon Township police provided traffic control.

7. Upper Black Eddy Bridge

The Upper Black Eddy Bridge is an older 2 lane facility spanning the Delaware River. It connects rural northern Bucks County with Milford Boro, an older industrial era town along the river. The Pennsylvania side of the bridge is relatively undeveloped. PA 32, River Rd, is a scenic route paralleling the river and is lined with older homes on large lots, farms, and a few rock quarries which use the bridge to access markets in central New Jersey. As with many of the towns along the upper Delaware River, Milford Borough is transforming into a quaint village of local residents and second homes.

The survey site was located at the foot of the bridge on the New Jersey side of the river (see Map B-7). For outbound traffic from the DVRPC region, the area in front of the former

railroad station was cordoned off with traffic cones and used for the survey. By restricting parking in the first block of the town, sufficient width was available for a lane of traffic in each direction and the inbound traffic survey. Police from the Delaware River Joint Toll Bridge Commission provided traffic control.

8. US 202 Toll Bridge

US 202 is a major north-south thoroughfare providing a bypass to Philadelphia. It crosses the Delaware River between Bucks County, PA and Hunterdon County, NJ connecting Philadelphia's northern suburbs with central New Jersey. Land use along US 202 on the Pennsylvania side of the river is changing from agricultural to residential and its supporting commercial uses. Though still relatively undeveloped, the US 202 corridor on the New Jersey side of the Delaware River nonetheless provides access to Trenton from the north and to employment in central New Jersey.

The survey was established at the toll plaza which is situated on the Pennsylvania side of the river (see Map B-8). The raised concrete islands in advance of the toll booths also provided a safe location for the surveyor. Although US 202 widens prior to the toll plaza, the effective number of lanes is governed by the number of open toll booths. During the course of the survey, a maximum of two toll lanes were open in each direction. Surveyors distributed themselves among the open toll lanes. Delaware River Joint Toll Bridge Commission police were on site to assure the safety of the survey crew and the motoring public.

9. US 1, Brunswick Pike

In the Delaware Valley region, the US 1 designation was bestowed on Brunswick Pike, connecting New Brunswick, NJ with Trenton, NJ; thence Lincoln Highway to the Philadelphia City Line. Today, US 1 continues through Philadelphia on Roosevelt Boulevard to City Ave and continues south as Baltimore Pike. Partly due to proximity to Princeton University, the US 1 corridor has become a major location for high technology and corporate campuses. Employment along the corridor has spurred the development of major retail centers. The resulting heavy traffic has kept US 1 under almost constant reconstruction, as the New Jersey Department of Transportation has widened the facility and grade separated interchanges in order to facilitate traffic movement.

US 1 at the cordon line is three lanes by direction with narrow shoulders which makes it difficult to stop traffic. Due to this road profile at the regional boundary, the survey site was established approximately one mile north of the cordon at the College Rd interchange in Plainsboro Township, Middlesex County (see Map B-9). This location offered a two lane by direction cross section, as well as the advantage of a traffic signal at Independence Way, which tended to slow traffic in the vicinity of the survey site. Local police from Plainsboro Township assisted with traffic control.

10. NJ 70

NJ 70 is the major east-west thoroughfare between the DVRPC region and northern New Jersey shore communities. It also provides major access for military installations in the area, including Fort Dix, McGuire Air Force Base and Lakehurst Naval Air Engineering Station. In this area, the Delaware Valley regional boundary between Burlington and Ocean counties is relatively undeveloped, with the survey site itself lying within the boundaries of the Lebanon State Forest. Although the posted speed limit on this two lane road is a 50 mph, with few curb cuts (those being dirt roads into the state forest), an almost tangent alignment, wide shoulders and good sight distance, travel speeds tend to be higher.

The survey site was on the Ocean County side of the border, straddling a forest access road on the south side of the alignment (see Map B-10). Just west of the county boundary CR 530, Lakehurst Rd, diverges from NJ 70 providing access to Browns Mills and military housing serving all three installations. This made the location ideal for survey, as the results yielded information about both facilities. NJ State Police were on site to assure the safety of the survey crew and the motoring public.

11. NJ 55 Freeway

The NJ 55 Freeway is a relatively new freeway facility connecting the Philadelphia and Camden area with Glassboro, Vineland and far southern New Jersey. It's connection with NJ 47 provides access to popular shore points, including Cape May and Wildwood. The access it provides has proved instrumental in the recent development of this part of South Jersey, as attested by the residential and commercial activity along its alignment as it winds south through Gloucester County. Although this segment of NJ 55 lies within the boundaries of Vineland, an incorporated area, the landscape is relatively undeveloped.

The survey site was located approximately ½ mile south of the regional boundary and 1 mile south of the US 40 interchange where a tangent section of roadway provides good sight distance (see Map B-11). At this point the travel lanes are separated by a grass median. Wide paved shoulders provided a safe location for the conduct of the survey while still allowing two lanes of through traffic by direction. Vineland police provided traffic control.

12. NJ 77, Bridgeton Pike

NJ 77 is a local facility providing access to the land uses along its alignment. Land use consists primarily of agriculture and some older residences. Newer residential development is occurring in Harrison Township to the north, but this part of Elk Township remains relatively untouched.

The survey was established about ½ mile north of the regional boundary, just north of the intersection of NJ 77 and CR 641, Ferrell Road (see Map B-12). The roadway consists of 1 lane by direction with paved shoulders which immediately yield to grass, providing extra width for the conduct of the survey. Due to the road profile, the survey was offset. New Jersey State Police were on site to assure the safety of the surveyors and the motoring public.

B. Sample Methodology

Traffic and vehicle classification counts were taken at each site. The hourly ATR counts and vehicle classification counts, by direction, are presented in the Appendices. Based on these volumes, standard statistical methods were applied and a sample size was established for each location. The sample was then disaggregated into an appropriate number of surveys for passenger and commercial vehicles for each survey period as discussed in Section III.

1. Traffic Counts

Traffic volumes at the 12 survey stations were approximately 337,700 vehicles per day. This volume has been derived from the individual station counts which were performed in advance of the surveys by the DVRPC or which were provided by the respective authority managing a specific facility. Not all of the traffic counts had totals disaggregated by vehicle type or by hourly volumes. Consequently, descriptions of the morning and afternoon peak hours are not possible. Individual survey station reports may have this information, but collectively this information is not available.

2. Sample Size

Based on the hourly traffic and vehicle classification counts, a sample size were determined for both passenger and commercial vehicles. The summary survey results for the region are presented in Section IV. A total of 18,577 drivers responded to the surveys, which was about 92 percent of the desired sample goal of 20,300 surveys. Of the sample total, 15,476 were interviews with drivers of passenger vehicles and 3,101 were interviews with drivers of commercial vehicles.

C. Survey Conduct

A manual was prepared to guide the conduct of the survey. It contained information on the distribution of surveys by survey period; partnering agency information; number of police officers needed for traffic control and staffing requirements for each site; a preliminary schedule of survey sites and shifts, as well as a listing of equipment requirements and diagram of a hypothetical site as it would be set up for survey operations.

Before the survey work could be initiated, a crew of temporary workers was hired and trained. General orientation sessions were followed with role playing by the survey crew. In this manner, the surveyor became familiar with the questions and possible problematic situations. It also allowed the surveyors to become comfortable with the survey process, so that once in the field, traffic delay would be minimal and the survey process would be safe and efficient. As the surveyors became experienced with the process, per survey time dropped to the range of 35 to 45 seconds.

While in the office prior to initiating field work, surveyors allocated the proper number of forms for passenger and commercial vehicles by time period. Four different colored forms

were used to designate the traffic direction (inbound or outbound) and interview time (morning or afternoon). Forms were allocated to the following survey times:

Morning Survey	Afternoon Survey
6:45 - 8:30 a.m.	1:00 - 2:30 p.m.
8:30 - 9:30 a.m.	2:30 - 3:30 p.m.
9:30 - 10:30 a.m. (meal break)	*3:30 - 4:30 p.m. (meal break)*
10:30 - 12:00 noon	4:30 - 6:00 p.m.
12:00 - 1:00 p.m.	6:00 - 7:15 p.m.

Although in general the conduct was the same for each survey station, the geography of the site dictated a measure of innovation. Safety, both of the survey crew and the driving public, was the primary operating directive. For a four lane facility, the right lane and shoulder were used for the survey. This provided the left lane for traffic to bypass the survey. Two lane facilities required the survey to be offset by direction. Multiple signs were placed in advance of the site in accordance with state guidelines and distance standards. These warned motorists of the traffic survey, to be prepared to stop, and that police control was in effect. Police vehicles were prominently displayed ahead of the site, with lights flashing, as this tended to slow traffic entering the vicinity of the survey. Police and traffic cones helped direct traffic through the site, and a sign announced the end of the survey site. All survey personnel were outfitted with safety vests. Although each site was visited before the survey date and preliminary sketches of the setup were prepared, the input of the police officers on site was solicited and followed.

Since only a sample of the drivers were interviewed, the platooning method was used in selecting vehicles to be surveyed. A crew chief was designated for each direction and assumed the last position in the survey line. The crew chief was responsible for communicating with the other surveyors and with the police officer. The crew chief would signal the officer when the crew was ready for a platoon of vehicles. Interviews would be conducted, and the appropriate information recorded. The lead surveyor would then assure the safe re-entry of the surveyed vehicles to the traffic stream and the crew chief would signal the police officer for another platoon of vehicles.

Coordinating the survey was the responsibility of the survey chief. This person was responsible for scheduling the appropriate number of survey staff, coordinating with the police, and assuring that the survey site was properly prepared. During the survey the survey chief had the responsibility of distributing and collecting survey forms, resolving situations with the police, seeing to the physical needs of the survey crew, and speaking with motorist regarding survey questions and concerns. The survey chief would join the line of surveyors when an extra person was needed to fill the quota of surveys.

D. Data Entry, Geocoding and Processing

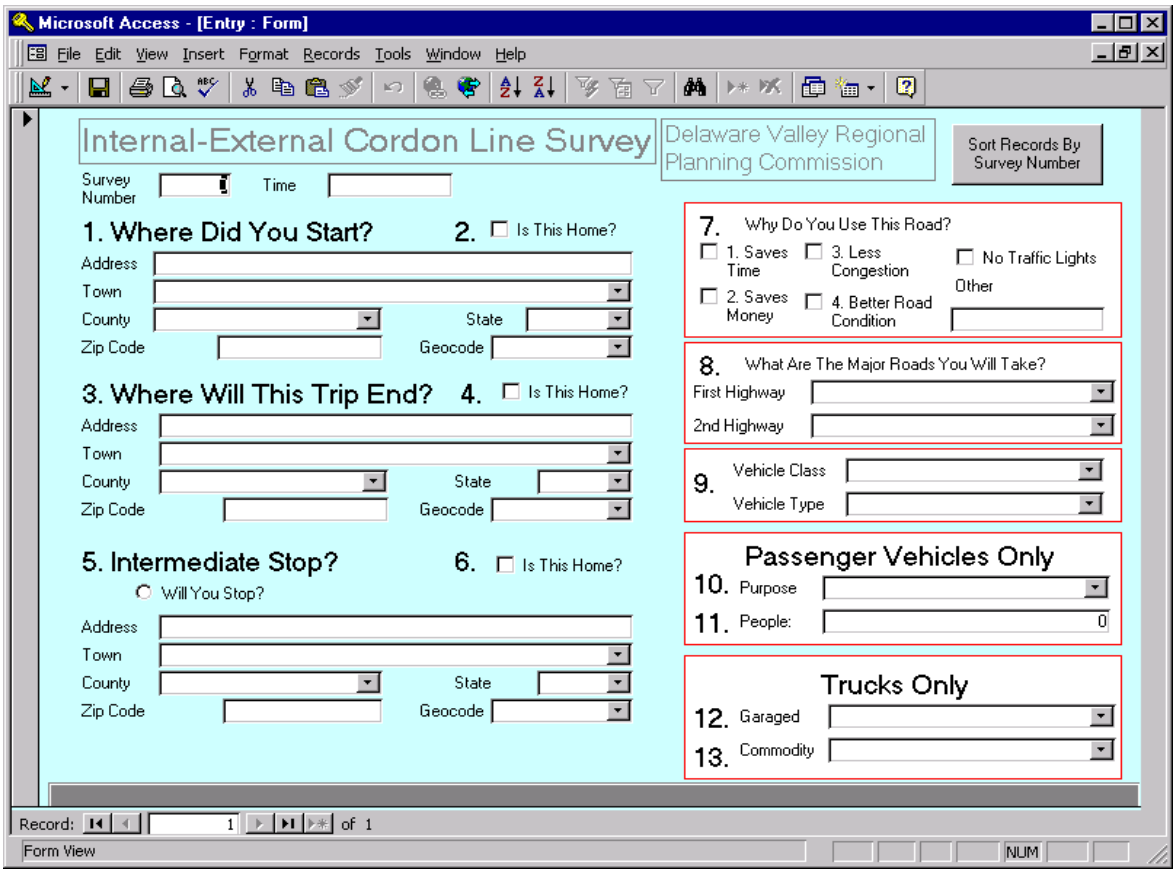
1. Data Entry

Paper field responses collected from survey station interviews were converted into an electronic form suitable for spatial and statistical analysis. A Microsoft Access database resembling the paper field survey form was used so the data entry approximated the entry of information in the field. Data entry goals included replicating the survey form to allow logical flow from paper to digital format; to standardize spelling of responses; to ensure that entries were within acceptable geographic bounds; and to avoid duplicate entries.

Several methods to this end were employed. First, extensive lists of common names for the key variables were built into the Access entry form. These include common names for places, municipalities, counties, and roads. Second, responses on the field survey form for purpose, vehicle class, vehicle type, and commodity were all made part of menu choices. Third, where possible, allowable entries were limited by either forcing a binary yes/no response or use of a validation rule to limit the range of acceptable numbers. To ease review of entries, the database remained flat with all responses recorded in one data table.

An example of this screen is shown in Figure II-2 and can be compared with the survey form shown in Figure II-1.

Figure II-2. Survey Entry Form as Displayed on Computer Screen

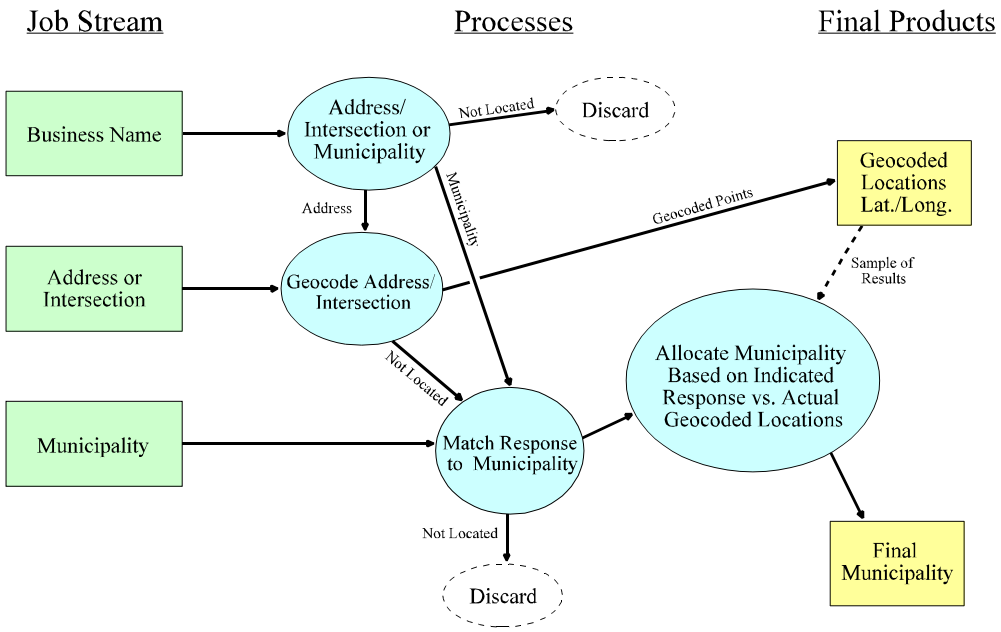


Finally, the survey number was used as both a unique identifier and a means to prevent duplication of data entry. The survey number also served to identify cordon station and direction. The database and entries were designed to allow further analysis and processing. One example is the geocode field that was used to specify a likely method of assigning geographic data, such as via municipality, business address, personal address, or intersection.

2. Geocoding

Geocoding refers to the assignment of geographic attributes based on entered survey data (See Figure II-3 for DVRPC Geocoding Process). Another term for this process is data conflation. The conflation process allows for spatial analysis of survey responses and separates the data into several job streams based upon likely geocoding method, and assigns unique identifiers to each address. To assign a unique identifier, full survey entries were separated into singular addresses using the survey ID number and either origin or destination. Note that stopover points were not assigned a geographic location. After separation of origin and destination, three categories were used to assign a method for data conflation: 1) where the address is a street address, intersection of named roads, or a partial combination of the two; 2) where the address is a business name with full or partial street and place information; and 3) where the address is a town, place, state, or other such designated area without a street address or road name. Those entries where the address was invalid, unreadable, or in any other way unable to be determined or placed into one of the three categories, were discarded.

Figure II-3. DVRPC Geocoding Process

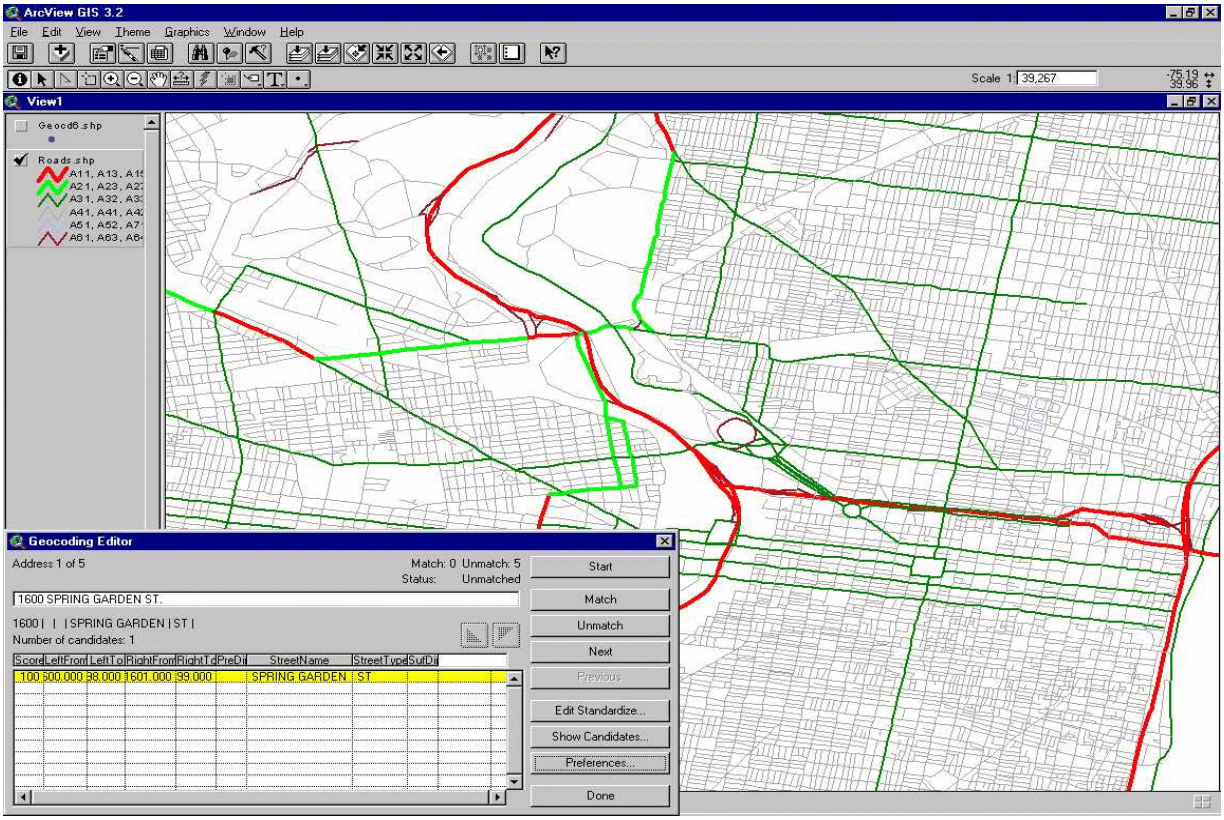


3. Street Addresses and Businesses

The first category of origins and destinations to be assigned geographic locations (latitude and longitude) was the group containing a street address, intersection, or road name. The ArcView 3.2 program was able to geocode many of the recognizable data entries. The underlying address and road name data to which it was matched was the U.S. Census TIGER files for the DVRPC region and adjacent counties. This group was first processed using the Geocoding interface in ArcView 3.2, automatically comparing entered address or intersection versus TIGER data. After the initial run, many of the addresses remained unmatched due to spelling errors in road names. To fix this, those addresses not found initially were again put through the geocoding program and checked against atlases of streets and roads in the chosen areas. This second attempt was done manually, and while very time consuming, yielded the vast majority of the remaining entries thought likely to be geocoded. Those few entries that could not be geocoded were grouped with entries where only municipality was known, or discarded.

Figure II-4 shows the ArcView Geocoding interface used to process those data items not found automatically. Entries that had a business address or name were assigned to an address using either the internet yellow pages or local phone books. After assigning the addresses to be geocoded they were "run" through the Arcview geocoding process as above. Any entries that still had not been assigned a geographic location were placed into the town/place entry file.

Figure II-4. Interface for ArcView Geocoding



4. Town / Place Addresses

All entries not processed using the prior two techniques were assigned geographic location via town/place name. The first part of this process was to standardize spellings and ancillary data such as county for each response. A process was developed to assign geography using surveyed town/place response, and appropriate latitude and longitude measurements. The process began with place names. Entries corresponding to places completely inside an MCD (Minor Civil Division) were assigned to either the geographic center of the place as defined by the Census Bureau, or the focal intersection for the named place. This was most effective for small villages.

The entries consisting of MCD names were allocated by comparing reported MCDs versus actual MCDs based upon the geocoding process. This process corrects for the variation between respondents conception of geographic bounds and actual political borders. Respondents indicating a specific MCD as a destination were equally likely to be traveling to the adjacent townships based upon given intersection or address. The responses were scattered across several MCDs based upon the ratio established from geocoded results, rather than assign all trips to the centroid of the MCD.

This process ensures that the geographic location for the entries assigned to municipalities near the reported MCD are representative of the actual sample. A similar procedure allocates responses when boroughs are surrounded by townships with the same name. Finally, state centroids were used to assign geographic location to states and provinces beyond 200 miles. This allows for reasonable distance calculations for longer trips.

The geocoding process yielded results allowing a full range of spatial analysis. To allow for differing geographic resolutions, survey data was grouped by accuracy. Consequently, 65.3 percent of survey responses could be assigned using address or intersection data, and 28.9 percent of responses could be assigned by municipality. Only 5.9 percent of all surveyed points were not assigned a geographic location.

III. SUMMARY OF THE REGIONAL CORDON LINE TRAFFIC VOLUMES

A. Highway Facilities

The 12 highway facilities selected by DVRPC for roadside survey during the summer and fall of 2001, shown on the location Map I-1 on page 4, are listed below (note that I-95 required three survey sites to capture the traffic volume). These 12 were chosen to provide even geographical distribution and to represent a variety of highway types. Expressways are highways with median separation of direction, grade separated interchanges, and a segregated right of way. Arterials are major highways important for intercity or regional travel with signalized intersections and which commonly provide access to adjacent properties. Local roads primarily handle trips with nearby origins and destinations.

Table III-1. Summary of Regional Cordon Line Traffic Volumes

Highway	Counties	Type	Sample Size	24-Hour Volume
I-95	Delaware/New Castle	Expressway	2,996	117,741
US 202 South	Delaware/New Castle	Arterial	1,665	41,300
PA 41 South	Chester/New Castle	Arterial	1,543	17,810
PA 41 North	Chester/Lancaster	Arterial	1,640	13,061
US 30	Chester/Lancaster	Arterial	1,648	18,612
Old Bethlehem Pk.	Bucks/Lehigh	Local	903	3,357
U. Black Eddy Br.	Bucks/Hunterdon	Local	916	5,037
US 202 North	Bucks/Hunterdon	Arterial (Toll)	1,638	11,076
US 1	Mercer/Middlesex	Arterial	1,793	54,310
NJ 70	Burlington/Ocean	Arterial	1,362	9,890
NJ 55	Gloucester/Cumberland	Expressway	1,487	41,438
NJ 77	Gloucester/Salem	Local	986	4,122
	Total		**18,577**	**337,754**

In addition, the Pennsylvania and New Jersey turnpikes cross the DVRPC cordon line at the following locations:

Highway	Counties	Type	24-Hour Volume
PA Tpke. (I-76)	Chester/Berks	Expwy (Toll)	41,647
PA Tpke., NE Ext. (I-476)	Bucks/Lehigh	Expwy (Toll)	43,531
NJ Tpke.	Mercer/Middlesex	Expwy (Toll)	123,900
NJ Tpke.	Gloucester/Salem	Expwy (Toll)	42,912
	Total		**251,990**

Traffic data on both turnpikes was provided by the respective turnpike commissions of Pennsylvania and New Jersey, and the resulting data will be used in conjunction with the regional Cordon Line Survey by DVRPC in calibrating the traffic simulation models. Turnpike data, however, were not used in the analysis, since they have not yet been analyzed.

B. Public Transportation

Scheduled rail and bus services also carry people in and out of the DVRPC region. Amtrak rail lines cross the DVRPC cordon at three locations including the Northeast Corridor (north and south) and the Harrisburg Line. In addition, NJ TRANSIT operates local rail service on the Northeast Corridor between Trenton and New York, and SEPTA operates on the corridor between Trenton and Wilmington. NJ Transit also operates local trains on the Atlantic City Line east of Lindenwold. Amtrak operates 208 trips across the cordon line on an average weekday carrying about 40,500 passengers. NJ Transit operates 60 trains carrying about 14,000 passengers, and SEPTA runs 35 trains with about 2,500 passengers. Altogether, 303 trains enter and leave the region daily with about 57,000 passengers aboard.

Scheduled bus services operated by nine private and one public carrier cross the cordon line at 27 locations, some of the more important being I-95, the New Jersey Turnpike and the Atlantic City Expressway. About 82% of the buses and about 83% of the passengers in the buses, cross the regional cordon line between DVRPC counties in NJ and the bordering NJ counties. Reasons for this include extensive NJ Transit service throughout South Jersey, heavy use of the Garden State Parkway and New Jersey Turnpike for travel, commuter service from Mercer County to New York and competitive service to Atlantic City. A total of 748 buses cross the regional cordon line on an average weekday.

Cordon line crossings by scheduled rail and bus service are tabulated on the following page. Intercity bus traffic is based on average passenger loads by route, whereas Amtrak and NJ TRANSIT is based on rider counts. Some of the bus trips using the NJ Turnpike are through trips to/from New York which do not stop within the DVRPC region.

Table III-2. Summary of Regional Cordon Line Crossings by Public Transportation

RAIL

Carrier	Line	Counties	Weekday Trains	Weekday Passengers
Amtrak	Northeast Corridor	Delaware/New Castle	82	15,463
SEPTA	Northeast Corridor	Delaware/New Castle	35	2,457
Amtrak	Harrisburg Line	Chester/Lancaster	22	1,834
Amtrak	Northeast Corridor	Mercer/Middlesex	104	23,207
NJ TRANSIT	Northeast Corridor	Mercer/Middlesex	45	13,253
NJ TRANSIT	Atlantic City Line	Camden/Atlantic	15	962
		Total	**303**	**57,176**

BUS

Highway	Carrier	Counties	Weekday Trips	Weekday Passengers
I-95	Carolina Trailways	Delaware/New Castle	8	180
I-95	Greyhound	Delaware/New Castle	24	540
PA 340	Red Rose Transit	Chester/Lancaster	34	784
I-76	Greyhound	Chester/Berks	12	270
US 422	Capitol Trailways	Chester/Berks	8	180
US 202	Trans-Bridge Lines	Bucks/Hunterdon	28	630
I-476	Martz Trailways	Bucks/Lehigh	4	66
PA 309	Bieber Trailways	Bucks/Lehigh	8	80
PA 309	Susquehanna	Bucks/Lehigh	4	40
PA 611	Greyhound	Bucks/Northampton	4	90
NJ 29	NJ Transit	Mercer/Hunterdon	4	104
US 1 North	NJ Transit	Mercer/Middlesex	52	936
NJ Turnpike	Greyhound	Mercer/Middlesex	116	2,610
NJ Turnpike	Carolina Trailways	Mercer/Middlesex	8	180
US 9	NJ Transit	Burlington/Ocean	42	924
GS Pkwy	NJ Transit	Burlington/Ocean	104	3,546
New Egypt Rd	NJ Transit	Camden/Atlantic	14	308
US 30	NJ Transit	Camden/Atlantic	54	1,188
AC Expwy	NJ Transit	Camden/Atlantic	90	2,236
US 322	NJ Transit	Gloucester/Atlantic	4	80
NJ 47	NJ Transit	Gloucester/Cumberland	12	188
NJ 77	NJ Transit	Gloucester/Salem	22	748
Woodstown Rd	NJ Transit	Gloucester/Salem	18	432
NJ Turnpike	Greyhound	Gloucester/Salem	50	1,125
NJ Turnpike	Carolina Trailways	Gloucester/Salem	8	180
I-295	NJ Transit	Gloucester/Salem	6	288
US 130	NJ Transit	Gloucester/Salem	2	96
		Total	**748**	**16,835**

(page intentionally left blank)

IV. SUMMARY SURVEY RESULTS FOR THE REGIONAL CORDON LINE STATIONS, DELAWARE VALLEY REGION

The summary survey results for the Regional Cordon Line Stations for the Delaware Valley Region are shown in this section. Information was collected in both inbound and outbound directions on facilities through a roadside interview, using the questionnaire shown on page 6. Questions were asked about trip origin and destination, purpose, highways used, vehicle type, occupancy, truck garage location and commodities transported. Simple and cross tabulations of survey responses for all of the stations are summarized in this section.

The major findings of the survey and traffic characteristics are presented with the findings for each question in graphic and written form. Included with each table or figure is text summarizing the highlights of the survey responses. The text summarizes the findings and describes points of interest not shown in the graphics. Detailed survey information is provided in the Appendices.

(page intentionally left blank)

Regional Cordon Line Survey Summary Results

(page intentionally left blank)

Total Interviews by Survey Period

Survey Period	Total Surveys	Inbound Surveys	Inbound % of Total	Outbound Surveys	Outbound % of Total
Morning Shift					
6:30 a.m. - 10:30 a.m.	5,047	2,505	27%	2,542	27%
10:30 a.m. - 1:00 p.m.	4,511	2,275	25%	4,511	24%
Evening Shift					
1:00 p.m. - 4:30 p.m.	4,391	2,157	23%	4,391	24%
4:30 p.m. - 8:00 p.m.	4,628	2,302	25%	4,628	25%
TOTAL	**18,577**	**9,301**	**100%**	**9,276**	**100%**

- There were 18,577 vehicle drivers responding to survey questions. This sample is about 92 percent of the desired goal of 20,300 surveys. The hourly shift totals have been added together in the table above. The disaggregated numbers are shown in greater detail in Table A-1 in the Appendix.

- There were similar numbers of vehicles surveyed in each direction with 9,301 inbound and 9,276 outbound vehicles surveyed at the cordon stations. Generally speaking, similar percent shares were surveyed in each direction for each survey period.

- The greatest percent share of surveyed inbound vehicles occurred in the morning shift between 6:30 a.m. and 10:30 a.m. where about 27 percent of the surveys were collected. During the same morning shift time the outbound vehicles also accounted for about 27 percent of the surveyed vehicles. The evening survey shift from 4:30 p.m. to 8:00 p.m. had the second greatest share with about 25 percent in both the inbound and outbound directions.

- Disaggregated, the greatest single time period was about 16 percent of the surveys outbound during the morning peak between 6:30 a.m. and 8:30 a.m. Similarly, about a 15 percent share was surveyed inbound during the same time. Nearly equal shares were recorded during the evening peak time between 4:30 p.m. to 6:00 p.m.

Trip Stops by Vehicle Type

Survey Period	Passenger Vehicle Stopping	Commercial Vehicle Stopping	Total Stopping
Inbound Trips			
6:30 a.m. - 10:30 a.m.	2.4%	2.5%	2.4%
10:30 a.m. - 1:00 p.m.	3.3%	2.2%	3.1%
1:00 p.m. - 4:30 p.m.	3.9%	4.7%	4.1%
4:30 p.m. - 8:00 p.m.	3.1%	2.7%	3.0%
Outbound			
6:30 a.m. - 10:30 a.m.	3.2%	2.4%	3.0%
10:30 a.m. - 1:00 p.m.	3.4%	4.0%	3.5%
1:00 p.m. - 4:30 p.m.	4.5%	3.3%	4.3%
4:30 p.m. - 8:00 p.m.	3.0%	2.9%	3.0%
TOTAL	**3.3%**	**3.1%**	**3.3%**

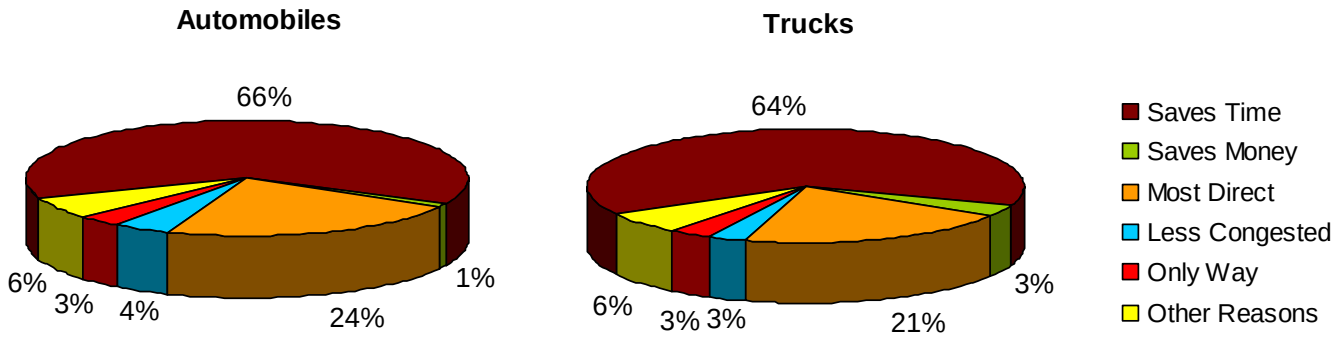
- There were 15,476 passenger vehicles and 3,101 commercial vehicles of the 18,577 total responding to the question “Will you stop before arriving at your destination?” The numbers in the table above were aggregated from the complete data set shown in Table A-2 in the Appendix.

- Only 609 of the 18,577 total vehicles surveyed responded that they were going to stop before arriving at their destination. This is about 3 percent of those surveyed (513 automobiles and 96 trucks). The greatest share of those saying that they would be stopping, occurred at the same time (1:00 p.m. to 4:30 p.m.) in both inbound and outbound directions with similar 4 percent shares.

- Only 243 stop responses from passenger vehicles were recorded inbound and 270 stop responses recorded outbound. The smallest share, about 2 percent of the total responses occurred between 6:30 a.m. and 10:30 a.m. in the inbound direction. The largest share of stop responses from passenger vehicle about 5 percent of the total responses occurred from 1:00 p.m. to 4:30 p.m. in the outbound direction.

- Only 96 trucks recorded stop responses and these were evenly divided between inbound and outbound vehicle direction. The smallest share occurred inbound between 10:30 a.m. and 1:00 p.m. when “stop” was about 2 percent of the responses. The largest share outbound 10:30 a.m. and 1:00 p.m. when about 4 percent of the responses were “stop”.

Reason for Using Highway Facilities by Automobile and Truck Drivers



*Totals may exceed 100% due to multiple answers

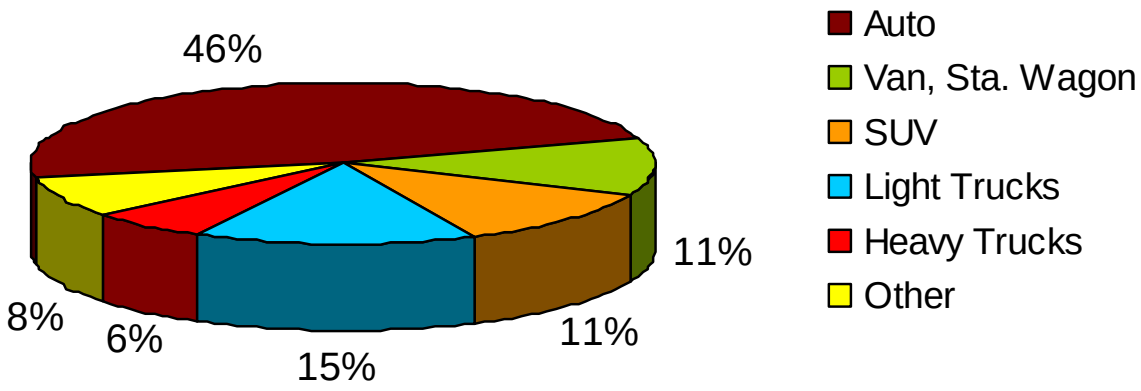
- There were 15,175 passenger and 3,017 commercial vehicles responding to the question, “Why are you using this road?” The drivers were permitted more than one answer, permitting totals more than 100 percent. The complete data sets are in Tables A-3 and A-4 in the Appendix.

- “Saves Times” was the dominant response for both vehicle types with about 66 percent and 64 percent of the automobile and truck responses. The second most tallied response was “most direct” for automobile and truck drivers (24% and 22%, respectively).

- The remaining responses have single digit shares. The smallest share of responses was about 1 percent of the automobile drivers stating “saves money”, while about 3 percent of the truck drivers used a specific facility because it was “less congested”.

- “Other” garnered about 6 percent and 7 percent shares of the responses for automobiles and trucks, respectively. Only about 3 percent of both vehicle categories responded with the particular facility was the only way to reach their destination.

Type of Vehicles Surveyed



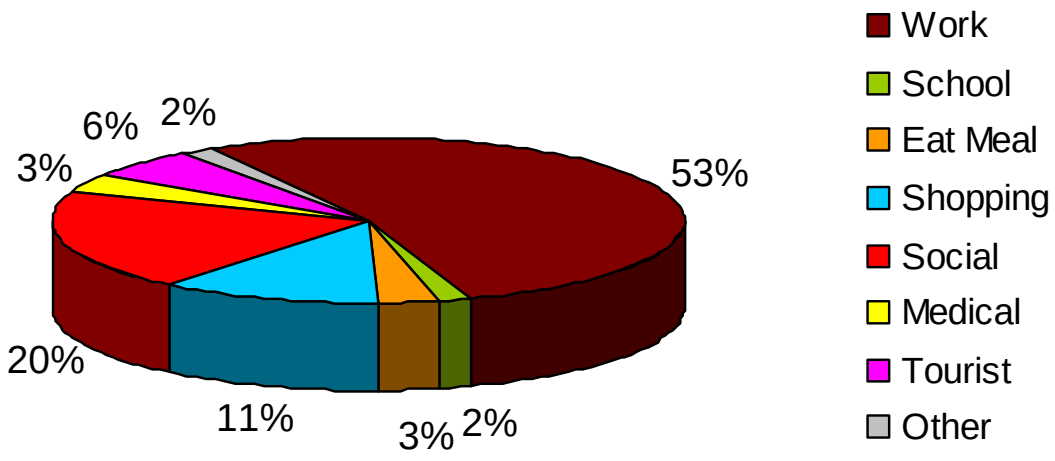
- The response to this question was obtained from observation rather than questioning the 18,577 drivers in the survey sample. The passenger vehicle categories have been broken out for this description, while the commercial vehicle categories have been grouped together into light and heavy trucks. "Other" was collected from the miscellaneous "Other" vehicles in each vehicle category. This might include vehicles not falling into a specific category or hybrid combinations of truck and automobile. The complete data set is in Table A-5 in the Appendix.

- About two-thirds of the surveyed vehicles (68%) were passenger vehicles (automobiles, vans and station wagons, and SUVs). Automobiles constitute the greatest share of surveyed vehicles with about 46 percent of the total. Vans and station wagons, and SUVs both have about 11 percent shares of the surveyed vehicles.

- Light and heavy trucks together make up about 22 percent of the vehicle mix with 15 percent and 6 percent shares respectively. The miscellaneous "other" category was about 8 percent of the surveyed vehicles.

- There was little difference between the aggregate distribution of vehicle types and time specific counts, except for automobiles. During the inbound and the outbound PM peak periods (4:30 p.m. to 6:00 p.m.) automobiles make up about 57 percent of the vehicle type surveyed. This 11 percent difference is the greatest between all the vehicle categories.

Trip Purpose of Passenger Vehicles



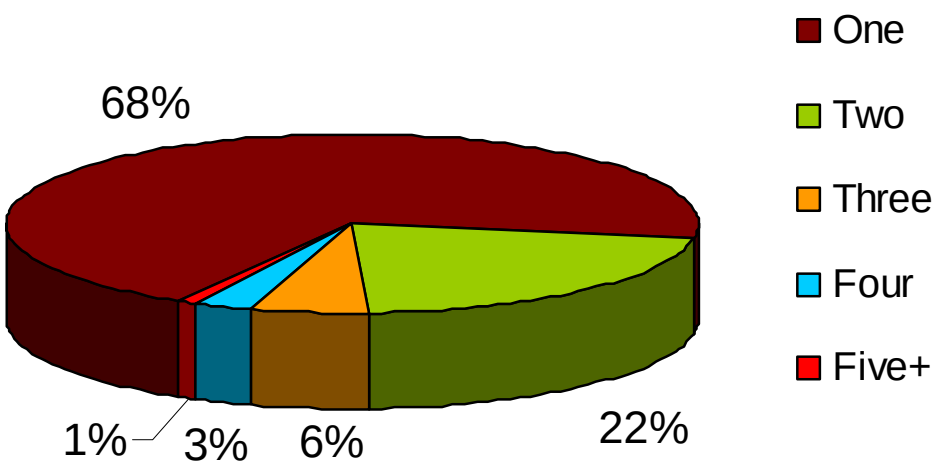
- Drivers in passenger vehicles were asked the question "what is the purpose of this trip?" Commercial vehicles were not asked this question as their purpose was evident. Due to rounding the totals may exceed 100 percent. The complete data set is in Table A-6 in the Appendix.

- The work trip was the most commonly reported trip purpose with a 53 percent share of the total trips. Work trips dominate the peak morning time (between 6:30 a.m. and 8:30 a.m.) with inbound and outbound shares of about 83 percent. The afternoon peak (4:30 p.m. to 6:00 p.m.) had a less dominating share with inbound and outbound shares of about 60 percent and 53 percent, respectively.

- The social trip was the second greatest response with about a 20 percent share. The greatest share of these responses (29%) occurred during the outbound morning off-peak between 10:30 a.m. and 1:00 p.m. The shopping trip garnered an 11 percent share overall. The greatest share of these trips (17%) occurred at different off-peak times inbound (1:00 p.m. to 4:30 p.m.) and outbound (10:30 a.m. and 1:00 p.m.)

- The remaining five categories are divided among the remaining 17 percent of the survey responses. Tourism has the largest share with about 6 percent, while medical, eat meal, school, and other have 4 percent, 3 percent, 2 percent and 2 percent, respectively.

Vehicle Occupancy



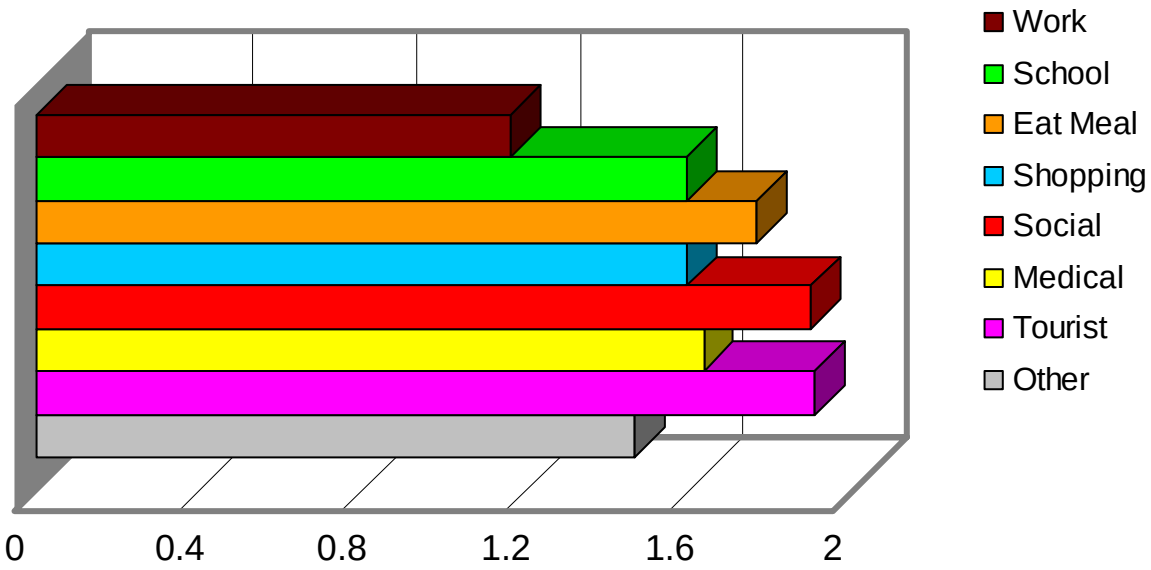
- The question “How many people are in the vehicle?” was answered by observation rather than questioning the 15,414 drivers in the survey sample. This question was for passenger vehicles only. The complete data set is in Table A-7 in the Appendix.

- Single occupant vehicles were about 68 percent of the total passenger vehicles surveyed. The greatest share of these was inbound and outbound between the peak morning time (6:30 a.m. and 8:30 a.m.) with 83 percent and 85 percent, respectively.

- Two occupant vehicles constitute about 22 percent of the surveyed vehicles. They tend to have smaller shares in the morning and larger shares during the morning and evening off-peak periods (about 23 and 25 percent inbound, and 29 and 27 percent outbound, respectively).

- Three and four occupant vehicles combine for about 9 percent of the surveyed vehicles (6% and 3%, respectively). Only about 1 percent or 143 vehicles, had 5+ occupants.

Average Vehicle Occupancy by Trip Purpose



- Average Vehicle occupancy by trip purpose was obtained by Cross tabulating the observed vehicular occupancy with the survey question regarding the trip purpose. The complete data set is in Table A-8 in the Appendix.

- The total average for all vehicle types and all purposes is 1.45 persons per vehicle. Broken out by vehicle type, the van/station wagon has the greatest average occupancy (1.74), while SUVs and automobiles have similarly lower occupancy rates (1.49 and 1.40 respectively).

- Average occupancy for work trips was the lowest in any category with a total of 1.16 persons per vehicle. This rate is greater when the vehicle is a van or station wagon (1.28), but is smaller for the SUV (1.15) and the automobile (1.13).

- The greatest occupancy rates for every trip purpose occurs in the van/station wagon category (2.45 for tourist, 2.38 for social, 2.15 for school). The SUVs' largest occupancy shares occur for social and tourist purposes with 1.96 and 1.95, respectively. The automobile has its greatest shares also in the same trip purposes with 1.80 and 1.78 respectively.

- The trip purposes with the greatest total occupancy rate are tourist and social purposes with 1.90 and 1.89 persons per vehicle. To eat a meal (1.76) or go on a medical visit (1.63) fill in some of the middle values. School and shopping trips have the same occupancy with 1.59 each, while the "other" trip purpose averaged about 1.46 occupants per vehicle.

Vehicle Trip Length Distribution within the DVRPC Region

Trip Length	Work Trips	Auto Trips	Truck Trips
0-5 miles	22%	27%	18%
5-10 miles	17%	18%	14%
10-20 miles	33%	29%	31%
20-50 miles	26%	26%	34%
>50 miles	1%	1%	3%
Average Trip Length	**15.0**	**14.7**	**18.7**

- The results for the trip length distribution were obtained by using GIS to compute distances between the survey station and the reported origins/destinations. This data is broken out by home based work trips, passenger vehicle trips and commercial vehicle trips. The data has been put into five groupings by the distance traveled: 0-5 miles, 5-10 miles, 10-20 miles, 20-50 miles and above 50 miles. The complete data set is in Table A-9a in the Appendix.

- The average trip lengths vary from about 15 miles to about 19 miles, with truck trips having the longest length and work trips and automobile trips posting similar 15 mile average trip lengths. The distributions have two peaks: in the 0-5 mile range and in the 10-20 mile range. The main difference between work and auto trips lies in about 4 percent more in the 10-20 mile range for work trips and that same percent extra in the 0-5 mile range for automobiles. Generally there are more work trips in longer distances.

- Truck trips differ in that their second peak occurs in the 20-50 mile range, though the values in the 10-20 mile range are equal to that in work and automobile trips. The truck distribution resembles a slow build to a peak, albeit with a secondary peak in the 0-5 mile range.

Vehicle Trip Length Distribution for I-95, I-495, and NJ 55 Cordon Stations

Trip Length	Work Trips	Auto Trips	Truck Trips
0-5 miles	13%	13%	9%
5-10 miles	11%	10%	8%
10-20 miles	40%	37%	32%
20-50 miles	34%	38%	49%
>50 miles	1%	1%	2%
Average Trip Length	**17.8**	**18.9**	**21.9**

- The results for the trip length distribution for expressway facilities were obtained by using GIS to compute distances between the survey station and the reported origins/destinations. This data is broken out by home based work trips, passenger vehicle trips and commercial vehicle trips. The data has been put into five groupings by the distance traveled: 0-5 miles, 5-10 miles, 10-20 miles, 20-50 miles and above 50 miles. The complete data set is in Table A-9b in the Appendix.

- The average trip lengths vary from about 18 miles to about 22 miles with truck trips possessing the longest trip length (22 miles) with work trips and automobile trips similar in average distance (about 18 miles and 19 miles).

- Work trips have the greatest share of trips with about 40 percent in the 10-20 mile range and about 34 percent in the 20-50 mile range. Passenger vehicle trips have similar concentrations of trips in the 10-20 mile range and the 20-50 mile range with values of about 37 percent and 38 percent, respectively. Truck trips have about 49 percent of their trips occurring in the 20-50 mile range.

- The smallest share of trips occurs in the shorter distances, 10 miles or less or the very longest with 50 miles or more. In the 10 mile or less category, work trips, passenger vehicle trips and truck trips have about 25 percent, 23 percent and 17 percent shares, respectively. In the 50 mile or more range, the work trips and the passenger vehicle trips have about 1 percent each and truck trips have about 2 percent of the trips.

Vehicle Trip Length Distribution for Naaman's Road ramps, US 202, PA 41, US 30, US 1, NJ 70 Cordon Stations

Trip Length	Work Trips	Auto Trips	Truck Trip
0-5 miles	20%	24%	17%
5-10 miles	19%	21%	15%
10-20 miles	34%	29%	33%
20-50 miles	26%	25%	31%
>50 miles	1%	1%	4%
Average Trip Length	**15.1**	**14.6**	**18.9**

- The results for the trip length distribution for arterials were obtained by using GIS to compute distances between the survey station and the reported origins/destinations. This data is broken out by home based work trips, passenger vehicle trips and commercial vehicle trips. The data has been put into five groupings by the distance traveled: 0-5 miles, 5-10 miles, 10-20 miles, 20-50 miles and above 50 miles. The complete data set is in Table A-9c in the Appendix.

- The average trip lengths vary from about 15 miles to about 19 miles, with truck trips possessing the longest length (19 miles) while work trips and passenger vehicle trips were similar (15 miles). The largest share for each of the trips types occurred in the 10-20 mile range. Work trips, passenger vehicles, and truck trips each have shares of about 34 percent, 29 percent and 33 percent, respectively.

- The share in the 20-50 mile range for all three trips types is only slightly less those values in the 10-20 mile range. Shares of about 26 percent, 25 percent, and 31 percent occur in the longer distance category. The smallest share of trip types fall in the 5-10 mile range with work, passenger vehicle, and truck trips with about 19 percent, 21 percent, and 15 percent, respectively.

- Passenger vehicles (24%) had the largest share among the 0-5 mile trip length, while work trips (20%) and truck trips (17%) had smaller shares in that distance. Truck trips had the largest share among the over 50 mile distance with 4 percent, while work and passenger vehicle trips had about 1 percent each.

Vehicle Trip Length Distribution for Old Bethlehem Pike, Upper Black Eddy Bridge, and NJ 77 Cordon Stations

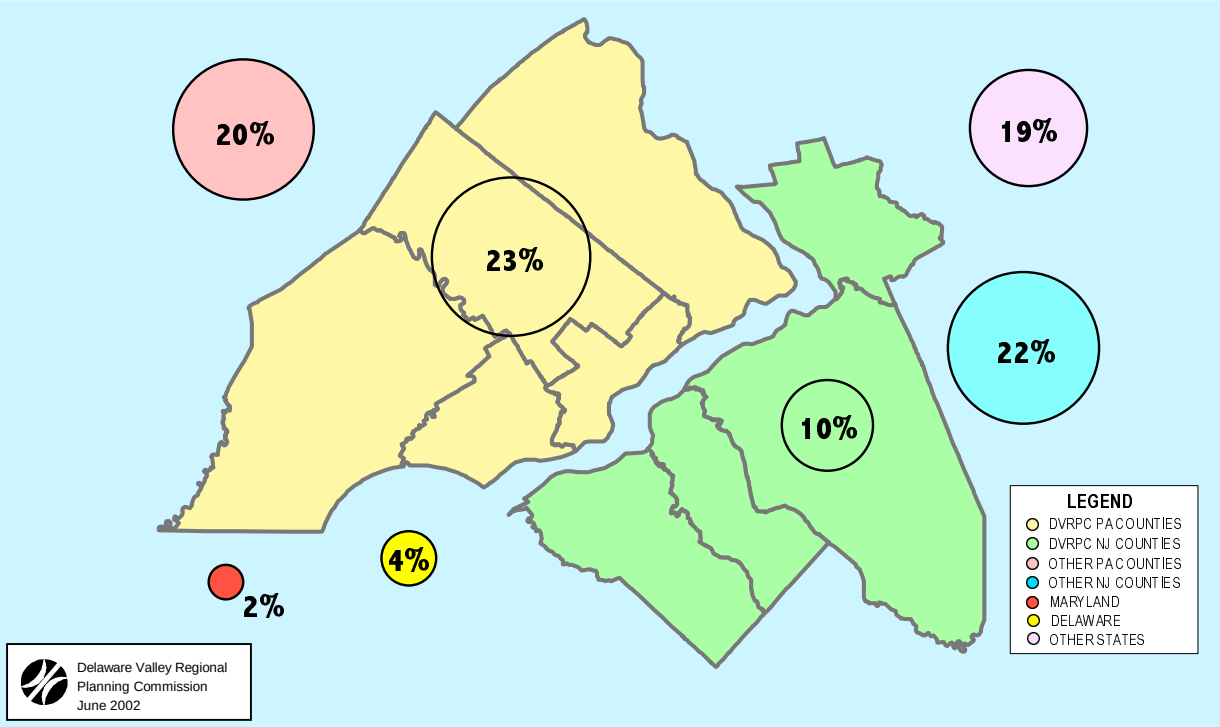
Trip Length	Work Trips	Auto Trips	Truck Trips
0-5 miles	43%	50%	39%
5-10 miles	20%	18%	19%
10-20 miles	22%	19%	23%
20-50 miles	16%	13%	19%
>50 miles	0%	0%	1%
Average Trip Length	**11.0**	**9.7**	**11.7**

- The results for the trip length distribution for local roads were obtained by using GIS to compute distances between the survey station and the reported origins/destinations. This data is broken out by home based work trips, passenger vehicle trips and commercial vehicle trips. The data has been put into five groupings by the distance traveled: 0-5 miles, 5-10 miles, 10-20 miles, 20-50 miles and above 50 miles. The complete data set is in Table A-9d in the Appendix.

- The average trip lengths vary from about 10 miles to about 12 miles, with truck trips possessing the longest length (12 miles) while work trips and passenger vehicle trips were similar (11 miles and 10 miles). The largest share for each of the trips types occurred in the 0-5 mile range. Work trips, passenger vehicles, and truck trips each have shares of about 43 percent, 50 percent and 39 percent, respectively.

- In the middle distances, between 5 miles and 20 miles, the shares of each trip type are close in value. Work trips, passenger vehicles, and truck trips each have shares of about 42 percent, 37 percent and 42 percent, respectively. In the distance of 20 miles and more the truck trip is the greatest with a 20 percent combined share. Work and passenger vehicle trip shares are less with 16 percent and 13 percent respectively.50 mile range. There were 4 and 21 trips respectively in this distance category.

Trucks Garaged by State and County



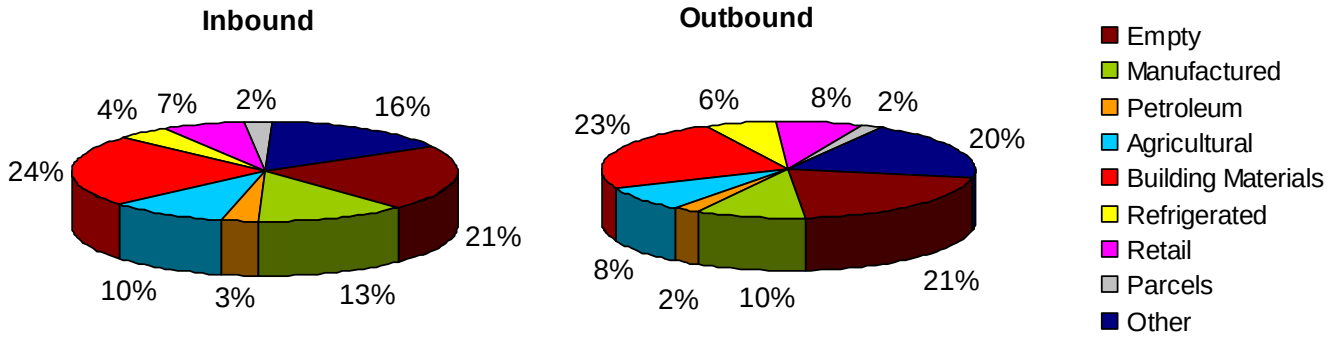
- There were 18,577 truck drivers asked "In what county is your truck garaged or parked when not in service?" Passenger vehicles were not asked this question. The complete data set is in Table A-10 in the Appendix.

- About one-third of the surveyed trucks are garaged inside the DVRPC region (10% in New Jersey and 23% in Pennsylvania). Truck drivers housing their trucks outside the DVRPC region in New Jersey have a larger 22 percent share or outside the DVRPC region in Pennsylvania have a smaller 20 percent share.

- About 4 percent of the trucks were reported garaged in nearby Delaware, while about 2 percent were garaged in Maryland. The remaining 19 percent of the responses are singular miscellaneous locations distributed throughout the United States.

- About 46 percent of the inbound traffic is garaged in Pennsylvania, while about 30 percent of inbound traffic is garaged in New Jersey, with the remaining 24 percent distributed miscellaneously. This distribution of the outbound traffic is about 39 percent garaged in Pennsylvania, while 34 percent did likewise in New Jersey, with the remaining 27 percent share miscellaneous.

Type of Commodities Carried by Trucks



- Truck drivers were asked the question, “What type of commodities are you carrying?” Passenger vehicles were not asked this question. The complete data set is in Table A-11 in the Appendix.

- The number of inbound and outbound surveyed trucks were nearly equal (1,571 versus 1,521 trucks). The inbound and outbound results generally mirror each other, though there are some exceptions.

- The greatest total response was for building materials (about 24% total) with inbound and outbound shares at about 24 percent and 23 percent respectively. Empty was the response of about 21 percent of the truck drivers with similar 21 percent shares inbound and outbound. Agricultural products, retail merchandise, and refrigerated products occupy the middle range of responses with 9 percent, 7 percent, and 5 percent, respectively. Petroleum products (3%) and parcels (2%) constituted the smallest share of driver responses.

- The greatest disparity between inbound and outbound commodities occurs for the “other” responses with 16 percent inbound and 20 percent outbound. There was a 3 percent difference for manufactured products with inbound responses (13%) exceeding outbound responses (10%).

(page intentionally left blank)

APPENDIX A

Survey Responses for the Regional Cordon Line Stations, Delaware Valley Region

Table A-1. Total Regional Survey Interviews by Survey Period

Survey Period	Inbound Traffic		Outbound Traffic		Total Traffic	
	No. of Surveys	% of Total	No. of Surveys	% of Total	No. of Surveys	% of Total
Morning Shift						
6:30 a.m. - 8:30 a.m.	1356	14.6%	1499	16.2%	2855	15.4%
8:30 a.m. - 10:30 a.m.	1149	12.4%	1043	11.2%	2192	11.8%
Subtotal	**2505**	**26.9%**	**2542**	**27.4%**	**5047**	**27.2%**
10:30 a.m. - 12:00 p.m.	1247	13.4%	1240	13.4%	2487	13.4%
12:00 p.m. - 1:00 p.m.	989	10.6%	1035	11.2%	2024	10.9%
Subtotal	**2236**	**24.0%**	**2275**	**24.5%**	**4511**	**24.3%**
Evening Shift						
1:00 p.m. - 2:30 p.m.	1277	13.7%	1212	13.1%	2489	13.4%
2:30 p.m. - 4:30 p.m.	957	10.3%	945	10.2%	1902	10.2%
Subtotal	**2234**	**24.0%**	**2157**	**23.3%**	**4391**	**23.6%**
4:30 p.m. - 6:00 p.m.	1401	15.1%	1366	14.7%	2767	14.9%
6:00 p.m. - 8:00 p.m.	925	9.9%	936	10.1%	1861	10.0%
Subtotal	**2326**	**25.0%**	**2302**	**24.8%**	**4628**	**24.9%**
TOTAL	**9301**	**100%**	**9276**	**100%**	**18577**	**100%**

Table A-2. Stopping Before Arriving at Final Destination

	Passenger Vehicles			Trucks			Total Vehicles		
	No. of	Vehicles	%	No. of	Vehicles	%	No. of	Vehicles	%
Survey Period	Surveyed	Stopping	Stopping	Surveyed	Stopping	Stopping	Surveyed	Stopping	Stopping
Inbound									
6:30 a.m. - 8:30 a.m.	1135	22	1.9%	221	2	0.9%	1356	24	1.8%
8:30 a.m. - 10:30 a.m.	938	28	3.0%	211	9	4.3%	1149	37	3.2%
Subtotal	**2073**	**50**	**2.4%**	**432**	**11**	**2.5%**	**2505**	**61**	**2.4%**
10:30 a.m. - 12:00 p.m.	997	38	3.8%	250	8	3.2%	1247	46	3.7%
12:00 p.m. - 1:00 p.m.	794	21	2.6%	195	2	1.0%	989	23	2.3%
Subtotal	**1791**	**59**	**3.3%**	**445**	**10**	**2.2%**	**2236**	**69**	**3.1%**
1:00 p.m. - 2:30 p.m.	1042	43	4.1%	235	14	6.0%	1277	57	4.5%
2:30 p.m. - 4:30 p.m.	788	29	3.7%	169	5	3.0%	957	34	3.6%
Subtotal	**1830**	**72**	**3.9%**	**404**	**19**	**4.7%**	**2234**	**91**	**4.1%**
4:30 p.m. - 6:00 p.m.	1218	39	3.2%	183	5	2.7%	1401	44	3.1%
6:00 p.m. - 8:00 p.m.	813	23	2.8%	112	3	2.7%	925	26	2.8%
Subtotal	**2031**	**62**	**3.1%**	**295**	**8**	**2.7%**	**2326**	**70**	**3.0%**
Outbound									
6:30 a.m. - 8:30 a.m.	1281	49	3.8%	218	6	2.8%	1499	55	3.7%
8:30 a.m. - 10:30 a.m.	838	18	2.1%	205	4	2.0%	1043	22	2.1%
Subtotal	**2119**	**67**	**3.2%**	**423**	**10**	**2.4%**	**2542**	**77**	**3.0%**
10:30 a.m. - 12:00 p.m.	994	36	3.6%	246	10	4.1%	1240	46	3.7%
12:00 p.m. - 1:00 p.m.	852	26	3.1%	183	7	3.8%	1035	33	3.2%
Subtotal	**1846**	**62**	**3.4%**	**429**	**17**	**4.0%**	**2275**	**79**	**3.5%**
1:00 p.m. - 2:30 p.m.	982	42	4.3%	230	7	3.0%	1212	49	4.0%
2:30 p.m. - 4:30 p.m.	778	38	4.9%	167	6	3.6%	945	44	4.7%
Subtotal	**1760**	**80**	**4.5%**	**397**	**13**	**3.3%**	**2157**	**93**	**4.3%**
4:30 p.m. - 6:00 p.m.	1210	32	2.6%	156	2	1.3%	1366	34	2.5%
6:00 p.m. - 8:00 p.m.	816	29	3.6%	120	6	5.0%	936	35	3.7%
Subtotal	**2026**	**61**	**3.0%**	**276**	**8**	**2.9%**	**2302**	**69**	**3.0%**
TOTAL	**15476**	**513**	**3.3%**	**3101**	**96**	**3.1%**	**18577**	**609**	**3.3%**

Table A-3. Reasons for Using Highway Facilities by Drivers of Passenger Vehicles

Survey Period	Total Drivers	Saves Time		Saves Money		Most Direct		Less Congested		Only Way		Other Reasons	
		No. of Drivers	% of Total	No. of Drivers	% of Total	No. of Drivers	% of Total	No. of Drivers	% of Total	No. of Drivers	% of Total	No. of Drivers	% of Total
Inbound													
6:30 a.m. - 8:30 a.m.	1109	754	68.0%	15	1.4%	263	23.7%	32	2.9%	56	5.0%	37	3.3%
8:30 a.m. - 10:30 a.m.	917	631	68.8%	8	0.9%	221	24.1%	29	3.2%	28	3.1%	36	3.9%
Subtotal	**2026**	**1385**	**68.4%**	**23**	**1.1%**	**484**	**23.9%**	**61**	**3.0%**	**84**	**4.1%**	**73**	**3.6%**
10:30 a.m. - 12:00 p.m.	980	693	70.7%	8	0.8%	214	21.8%	16	1.6%	20	2.0%	59	6.0%
12:00 p.m. - 1:00 p.m.	783	521	66.5%	8	1.0%	220	28.1%	23	2.9%	22	2.8%	40	5.1%
Subtotal	**1763**	**1214**	**68.9%**	**16**	**0.9%**	**434**	**24.6%**	**39**	**2.2%**	**42**	**2.4%**	**99**	**5.6%**
1:00 p.m. - 2:30 p.m.	1000	647	64.7%	7	0.7%	226	22.6%	41	4.1%	49	4.9%	95	9.5%
2:30 p.m. - 4:30 p.m.	766	547	71.4%	7	0.9%	153	20.0%	34	4.4%	20	2.6%	53	6.9%
Subtotal	**1766**	**1194**	**67.6%**	**14**	**0.8%**	**379**	**21.5%**	**75**	**4.2%**	**69**	**3.9%**	**148**	**8.4%**
4:30 p.m. - 6:00 p.m.	1191	748	62.8%	11	0.9%	289	24.3%	69	5.8%	43	3.6%	105	8.8%
6:00 p.m. - 8:00 p.m.	799	424	53.1%	15	1.9%	286	35.8%	37	4.6%	28	3.5%	67	8.4%
Subtotal	**1990**	**1172**	**58.9%**	**26**	**1.3%**	**575**	**28.9%**	**106**	**5.3%**	**71**	**3.6%**	**172**	**8.6%**
Outbound													
6:30 a.m. - 8:30 a.m.	1266	858	67.8%	13	1.0%	275	21.7%	54	4.3%	40	3.2%	62	4.9%
8:30 a.m. - 10:30 a.m.	829	531	64.1%	6	0.7%	212	25.6%	32	3.9%	32	3.9%	39	4.7%
Subtotal	**2095**	**1389**	**66.3%**	**19**	**0.9%**	**487**	**23.2%**	**86**	**4.1%**	**72**	**3.4%**	**101**	**4.8%**
10:30 a.m. - 12:00 p.m.	979	594	60.7%	8	0.8%	265	27.1%	38	3.9%	29	3.0%	74	7.6%
12:00 p.m. - 1:00 p.m.	845	554	65.6%	5	0.6%	193	22.8%	28	3.3%	29	3.4%	53	6.3%
Subtotal	**1824**	**1148**	**62.9%**	**13**	**0.7%**	**458**	**25.1%**	**66**	**3.6%**	**58**	**3.2%**	**127**	**7.0%**
1:00 p.m. - 2:30 p.m.	953	660	69.3%	9	0.9%	186	19.5%	75	7.9%	29	3.0%	54	5.7%
2:30 p.m. - 4:30 p.m.	764	497	65.1%	22	2.9%	172	22.5%	53	6.9%	25	3.3%	58	7.6%
Subtotal	**1717**	**1157**	**67.4%**	**31**	**1.8%**	**358**	**20.9%**	**128**	**7.5%**	**54**	**3.1%**	**112**	**6.5%**
4:30 p.m. - 6:00 p.m.	1185	813	68.6%	10	0.8%	209	17.6%	78	6.6%	43	3.6%	84	7.1%
6:00 p.m. - 8:00 p.m.	809	510	63.0%	9	1.1%	209	25.8%	35	4.3%	30	3.7%	58	7.2%
Subtotal	**1994**	**1323**	**66.3%**	**19**	**1.0%**	**418**	**21.0%**	**113**	**5.7%**	**73**	**3.7%**	**142**	**7.1%**
TOTAL	**15175**	**9982**	**65.8%**	**161**	**1.1%**	**3593**	**23.7%**	**674**	**4.4%**	**523**	**3.4%**	**974**	**6.4%**

Table A-4. Reasons for Using Highway Facilities by Truck Drivers

Survey Period	Total Drivers	Saves Time		Saves Money		Most Direct		Less Congested		Only Way		Other Reasons	
		No. of Drivers	% of Total	No. of Drivers	% of Total	No. of Drivers	% of Total	No. of Drivers	% of Total	No. of Drivers	% of Total	No. of Drivers	% of Total
Inbound													
6:30 a.m. - 8:30 a.m.	214	157	73.4%	5	2.3%	46	21.5%	9	4.2%	7	3.3%	4	1.9%
8:30 a.m. - 10:30 a.m.	206	136	66.0%	2	1.0%	54	26.2%	6	2.9%	5	2.4%	8	3.9%
Subtotal	**420**	**293**	**69.8%**	**7**	**1.7%**	**100**	**23.8%**	**15**	**3.6%**	**12**	**2.9%**	**12**	**2.9%**
10:30 a.m. - 12:00 p.m.	241	165	68.5%	6	2.5%	66	27.4%	1	0.4%	4	1.7%	13	5.4%
12:00 p.m. - 1:00 p.m.	193	145	75.1%	4	2.1%	33	17.1%	6	3.1%	7	3.6%	8	4.1%
Subtotal	**434**	**310**	**71.4%**	**10**	**2.3%**	**99**	**22.8%**	**7**	**1.6%**	**11**	**2.5%**	**21**	**4.8%**
1:00 p.m. - 2:30 p.m.	226	149	65.9%	8	3.5%	45	19.9%	10	4.4%	4	1.8%	34	15.0%
2:30 p.m. - 4:30 p.m.	165	107	64.8%	8	4.8%	34	20.6%	10	6.1%	5	3.0%	24	14.5%
Subtotal	**391**	**256**	**65.5%**	**16**	**4.1%**	**79**	**20.2%**	**20**	**5.1%**	**9**	**2.3%**	**58**	**14.8%**
4:30 p.m. - 6:00 p.m.	170	118	69.4%	6	3.5%	33	19.4%	2	1.2%	3	1.8%	9	5.3%
6:00 p.m. - 8:00 p.m.	107	57	53.3%	3	2.8%	31	29.0%	3	2.8%	3	2.8%	12	11.2%
Subtotal	**277**	**175**	**63.2%**	**9**	**3.2%**	**64**	**23.1%**	**5**	**1.8%**	**6**	**2.2%**	**21**	**7.6%**
Outbound													
6:30 a.m. - 8:30 a.m.	211	133	63.0%	9	4.3%	50	23.7%	2	0.9%	15	7.1%	9	4.3%
8:30 a.m. - 10:30 a.m.	202	132	65.3%	7	3.5%	51	25.2%	3	1.5%	7	3.5%	6	3.0%
Subtotal	**413**	**265**	**64.2%**	**16**	**3.9%**	**101**	**24.5%**	**5**	**1.2%**	**22**	**5.3%**	**15**	**3.6%**
10:30 a.m. - 12:00 p.m.	241	162	67.2%	3	1.2%	47	19.5%	5	2.1%	11	4.6%	17	7.1%
12:00 p.m. - 1:00 p.m.	176	117	66.5%	8	4.5%	40	22.7%	6	3.4%	7	4.0%	9	5.1%
Subtotal	**417**	**279**	**66.9%**	**11**	**2.6%**	**87**	**20.9%**	**11**	**2.6%**	**18**	**4.3%**	**26**	**6.2%**
1:00 p.m. - 2:30 p.m.	228	150	65.8%	7	3.1%	60	26.3%	12	5.3%	7	3.1%	14	6.1%
2:30 p.m. - 4:30 p.m.	165	118	71.5%	10	6.1%	23	13.9%	8	4.8%	6	3.6%	17	10.3%
Subtotal	**393**	**268**	**68.2%**	**17**	**4.3%**	**83**	**21.1%**	**20**	**5.1%**	**13**	**3.3%**	**31**	**7.9%**
4:30 p.m. - 6:00 p.m.	154	113	73.4%	11	7.1%	29	18.8%	2	1.3%	6	3.9%	6	3.9%
6:00 p.m. - 8:00 p.m.	118	84	71.2%	10	8.5%	17	14.4%	3	2.5%	2	1.7%	9	7.6%
Subtotal	**272**	**197**	**72.4%**	**21**	**7.7%**	**46**	**16.9%**	**5**	**1.8%**	**8**	**2.9%**	**15**	**5.5%**
TOTAL	**3017**	**2043**	**67.7%**	**107**	**3.5%**	**659**	**21.8%**	**88**	**2.9%**	**99**	**3.3%**	**199**	**6.6%**

Table A-5. Type of Vehicles Used for the Trip

	Inbound Traffic					Outbound Traffic					
Vehicle Type	AM Peak (% of Total)	AM Off-Peak (%. of Total)	PM Off-Peak (% of Total)	PM Peak (% of Total)	Inbound Traffic (% of Total)	AM Peak (% of Total)	AM Off-Peak (% of Total)	PM Off-Peak (% of Total)	PM Peak (% of Total)	Outbound Traffic (% of Total)	TOTAL Traffic (% of Total)
Passenger Vehicles											
Auto	51.2%	46.6%	48.8%	56.8%	51.0%	52.4%	49.2%	2.9%	56.8%	41.1%	46.1%
Van, Sta. Wagon	10.4%	13.3%	12.1%	10.3%	11.5%	10.6%	12.1%	12.0%	10.2%	11.2%	11.3%
SUV	11.6%	10.9%	10.1%	11.7%	11.1%	11.4%	11.9%	11.1%	11.4%	11.5%	11.3%
Other	0.4%	0.5%	0.5%	0.3%	0.4%	0.2%	0.3%	49.8%	0.8%	11.9%	6.2%
Subtotal	**73.6%**	**71.3%**	**71.5%**	**79.2%**	**74.0%**	**74.6%**	**73.4%**	**75.8%**	**79.2%**	**75.7%**	**74.8%**
Light Trucks											
Pickup	9.6%	9.0%	10.4%	9.2%	9.6%	9.9%	8.7%	2.9%	9.7%	7.9%	8.8%
Panel	1.7%	2.6%	2.0%	1.7%	2.0%	2.3%	2.4%	0.6%	1.2%	1.6%	1.8%
Single Unit	3.2%	3.9%	4.1%	2.1%	3.3%	3.2%	4.1%	9.7%	1.9%	4.7%	4.0%
Other	0.5%	0.5%	0.3%	0.3%	0.4%	0.3%	0.5%	9.4%	0.2%	2.4%	1.4%
Subtotal	**15.0%**	**16.0%**	**16.9%**	**13.3%**	**15.2%**	**15.7%**	**15.7%**	**22.6%**	**13.0%**	**16.7%**	**15.9%**
Heavy Trucks											
Tractor-Trailer	9.4%	10.8%	9.8%	6.7%	9.1%	8.3%	9.4%	1.5%	6.8%	6.7%	7.9%
Double-Trailer	1.8%	1.9%	1.7%	0.8%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%
Other	0.2%	0.0%	0.1%	0.0%	0.1%	1.4%	1.4%	0.1%	0.9%	1.0%	0.5%
Subtotal	**8.4%**	**6.1%**	**9.8%**	**4.2%**	**7.1%**	**5.5%**	**5.7%**	**6.4%**	**4.4%**	**5.5%**	**6.3%**
TOTAL	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table A-6. Trip Purpose by Direction

Survey Period	Work (% of Total)	School (% of Total)	Eat Meal (% of Total	Shopping (% of Total)	Social Recreation (% of Total)	Medical (% of Total)	Visitor/ Tourist (% of Total)	Other (% of Total)	All Purposes
Inbound									
6:30 a.m. - 8:30 a.m.	82.5%	2.7%	0.6%	2.0%	6.8%	2.0%	2.5%	0.9%	100%
8:30 a.m. - 10:30 a.m.	62.4%	3.1%	0.8%	3.8%	18.2%	5.9%	4.1%	1.8%	100%
Subtotal	**73.4%**	**2.9%**	**0.7%**	**2.8%**	**11.9%**	**3.8%**	**3.2%**	**1.3%**	**100%**
10:30 a.m. - 12:00 p.m.	39.9%	1.8%	3.1%	15.5%	24.1%	5.4%	7.4%	2.8%	100%
12:00 p.m. - 1:00 p.m.	41.2%	2.3%	6.1%	13.0%	22.6%	4.6%	8.8%	1.3%	100%
Subtotal	**40.5%**	**2.0%**	**4.4%**	**14.4%**	**23.5%**	**5.1%**	**8.0%**	**2.1%**	**100%**
1:00 p.m. - 2:30 p.m.	42.4%	1.4%	3.6%	18.6%	22.1%	3.8%	6.5%	1.7%	100%
2:30 p.m. - 4:30 p.m.	47.9%	1.9%	2.4%	14.0%	19.2%	4.6%	7.6%	2.4%	100%
Subtotal	**44.8%**	**1.6%**	**3.1%**	**16.6%**	**20.8%**	**4.2%**	**6.9%**	**2.0%**	**100%**
4:30 p.m. - 6:00 p.m.	60.0%	1.7%	1.6%	8.7%	20.4%	1.4%	4.9%	1.2%	100%
6:00 p.m. - 8:00 p.m.	48.4%	0.7%	4.9%	12.0%	25.0%	2.9%	3.9%	2.2%	100%
Subtotal	**55.4%**	**1.3%**	**2.9%**	**10.0%**	**22.2%**	**2.0%**	**4.5%**	**1.6%**	**100%**
Outbound									
6:30 a.m. - 8:30 a.m.	82.9%	1.7%	0.7%	2.4%	8.4%	1.3%	1.7%	0.9%	100%
8:30 a.m. - 10:30 a.m.	64.0%	2.4%	1.2%	7.3%	14.9%	2.9%	5.5%	1.8%	100%
Subtotal	**75.4%**	**2.0%**	**0.9%**	**4.3%**	**11.0%**	**2.0%**	**3.2%**	**1.3%**	**100%**
10:30 a.m. - 12:00 p.m.	36.3%	0.5%	3.4%	17.4%	28.1%	4.5%	7.6%	2.2%	100%
12:00 p.m. - 1:00 p.m.	34.6%	1.7%	5.0%	17.2%	29.1%	6.4%	4.7%	1.4%	100%
Subtotal	**35.5%**	**1.0%**	**4.1%**	**17.3%**	**28.5%**	**5.3%**	**6.3%**	**1.9%**	**100%**
1:00 p.m. - 2:30 p.m.	40.4%	1.4%	3.0%	18.4%	21.2%	3.7%	9.4%	2.4%	100%
2:30 p.m. - 4:30 p.m.	47.4%	2.9%	1.8%	12.7%	22.4%	4.6%	5.5%	2.6%	100%
Subtotal	**43.5%**	**2.1%**	**2.5%**	**15.9%**	**21.7%**	**4.1%**	**7.7%**	**2.5%**	**100%**
4:30 p.m. - 6:00 p.m.	52.5%	2.0%	3.4%	12.0%	20.1%	2.4%	6.1%	1.4%	100%
6:00 p.m. - 8:00 p.m.	42.7%	1.5%	5.0%	12.7%	28.2%	2.1%	5.2%	2.7%	100%
Subtotal	**48.5%**	**1.8%**	**4.0%**	**12.3%**	**23.4%**	**2.3%**	**5.7%**	**2.0%**	**100%**
TOTAL	**53.0%**	**1.9%**	**2.8%**	**11.4%**	**20.1%**	**3.5%**	**5.6%**	**1.8%**	**100%**

Table A-7. Vehicle Occupancy by Traffic Direction and Time Period

Survey Period	One Occupant	% of Total	Two Occupants	% of Total	Three Occupants	% of Total	Four Occupants	% of Total	Five+ Occupants	% of Total	Total Passenger Vehicles	Average Vehicle Occupancy
Inbound												
6:30 a.m. - 8:30 a.m.	936	82.8%	148	13.1%	36	3.2%	11	1.0%	0	0.0%	1131	1.22
8:30 a.m. - 10:30 a.m.	674	72.2%	176	18.9%	58	6.2%	17	1.8%	8	0.9%	933	1.40
Subtotal	**1610**	**78.0%**	**324**	**15.7%**	**94**	**4.6%**	**28**	**1.4%**	**8**	**0.4%**	**2064**	**1.30**
10:30 a.m. - 12:00 p.m.	652	65.8%	235	23.7%	70	7.1%	28	2.8%	6	0.6%	991	1.49
12:00 p.m. - 1:00 p.m.	537	68.0%	177	22.4%	43	5.4%	23	2.9%	10	1.3%	790	1.47
Subtotal	**1189**	**66.8%**	**412**	**23.1%**	**113**	**6.3%**	**51**	**2.9%**	**16**	**0.9%**	**1781**	**1.48**
1:00 p.m. - 2:30 p.m.	671	64.8%	269	26.0%	62	6.0%	27	2.6%	6	0.6%	1035	1.48
2:30 p.m. - 4:30 p.m.	535	68.2%	180	23.0%	43	5.5%	17	2.2%	9	1.1%	784	1.45
Subtotal	**1206**	**66.3%**	**449**	**24.7%**	**105**	**5.8%**	**44**	**2.4%**	**15**	**0.8%**	**1819**	**1.47**
4:30 p.m. - 6:00 p.m.	898	73.9%	214	17.6%	62	5.1%	29	2.4%	12	1.0%	1215	1.39
6:00 p.m. - 8:00 p.m.	519	64.0%	200	24.7%	55	6.8%	28	3.5%	9	1.1%	811	1.53
Subtotal	**1417**	**69.9%**	**414**	**20.4%**	**117**	**5.8%**	**57**	**2.8%**	**21**	**1.0%**	**2026**	**1.45**
Outbound												
6:30 a.m. - 8:30 a.m.	1079	84.6%	155	12.1%	28	2.2%	11	0.9%	3	0.2%	1276	1.20
8:30 a.m. - 10:30 a.m.	626	75.0%	148	17.7%	39	4.7%	11	1.3%	11	1.3%	835	1.37
Subtotal	**1705**	**80.8%**	**303**	**14.4%**	**67**	**3.2%**	**22**	**1.0%**	**14**	**0.7%**	**2111**	**1.27**
10:30 a.m. - 12:00 p.m.	586	59.1%	296	29.8%	64	6.5%	37	3.7%	9	0.9%	992	1.58
12:00 p.m. - 1:00 p.m.	514	60.5%	232	27.3%	64	7.5%	35	4.1%	5	0.6%	850	1.57
Subtotal	**1100**	**59.7%**	**528**	**28.7%**	**128**	**6.9%**	**72**	**3.9%**	**14**	**0.8%**	**1842**	**1.57**
1:00 p.m. - 2:30 p.m.	596	60.9%	271	27.7%	57	5.8%	39	4.0%	15	1.5%	978	1.57
2:30 p.m. - 4:30 p.m.	500	64.6%	198	25.6%	51	6.6%	17	2.2%	8	1.0%	774	1.50
Subtotal	**1096**	**62.6%**	**469**	**26.8%**	**108**	**6.2%**	**56**	**3.2%**	**23**	**1.3%**	**1752**	**1.54**
4:30 p.m. - 6:00 p.m.	846	70.3%	215	17.9%	89	7.4%	38	3.2%	16	1.3%	1204	1.48
6:00 p.m. - 8:00 p.m.	488	59.9%	232	28.5%	53	6.5%	26	3.2%	16	2.0%	815	1.59
Subtotal	**1334**	**66.1%**	**447**	**22.1%**	**142**	**7.0%**	**64**	**3.2%**	**32**	**1.6%**	**2019**	**1.52**
TOTAL	**10657**	**69.1%**	**3346**	**21.7%**	**874**	**5.7%**	**394**	**2.6%**	**143**	**0.9%**	**15414**	**1.45**

Table A-8. Average Vehicle Occupancy by Trip Purpose

Trip Purpose	Auto (Persons Per Vehicle)	Van/ Station Wagon (Persons Per Vehicle)	SUV (Persons Per Vehicle)	Total (Persons Per Vehicle)
Work	1.13	1.28	1.15	1.16
School	1.47	2.15	1.68	1.59
Eat Meal	1.74	1.98	1.78	1.76
Shopping	1.56	1.78	1.65	1.59
Social/Recreation	1.80	2.38	1.96	1.89
Medical	1.60	1.86	1.60	1.63
Visitor/Tourist	1.78	2.45	1.95	1.90
Other	1.38	1.92	1.63	1.46
All Purposes	**1.40**	**1.74**	**1.49**	**1.45**

Table A-9a. External-Internal and Internal-External Trip Length Frequency Distribution Within The DVRPC Region

Trip Length (Miles)	Home-Based Work Trips		Passenger Vehicle Trips		Truck Trips	
	No. of Trips	% of Total	No. of Trips	% of Total	No. of Trips	% of Total
<1	79	1.9%	282	2.5%	21	1.1%
1-2	241	5.9%	758	6.7%	115	5.8%
2-3	191	4.7%	574	5.1%	68	3.4%
3-4	214	5.2%	779	6.9%	94	4.7%
4-5	190	4.6%	606	5.3%	60	3.0%
5-6	141	3.4%	529	4.7%	65	3.3%
6-7	99	2.4%	286	2.5%	43	2.2%
7-8	149	3.6%	375	3.3%	45	2.3%
8-10	315	7.7%	803	7.1%	124	6.2%
10-12	300	7.3%	680	6.0%	109	5.5%
12-14	265	6.5%	664	5.9%	143	7.2%
14-16	252	6.1%	663	5.9%	145	7.3%
16-18	199	4.9%	522	4.6%	100	5.0%
18-20	346	8.4%	778	6.9%	126	6.3%
20-23	241	5.9%	587	5.2%	127	6.4%
23-26	234	5.7%	541	4.8%	87	4.4%
26-29	180	4.4%	444	3.9%	86	4.3%
29-32	139	3.4%	381	3.4%	70	3.5%
32-36	92	2.2%	302	2.7%	73	3.7%
36-40	80	2.0%	261	2.3%	87	4.4%
40-45	65	1.6%	218	1.9%	75	3.8%
45-50	50	1.2%	171	1.5%	68	3.4%
50-60	27	0.7%	99	0.9%	44	2.2%
60-70	6	0.1%	19	0.2%	10	0.5%
70-80	2	0.0%	7	0.1%	2	0.1%
> 80	1	0.0%	1	0.0%	0	0.0%
Average Trip Length	**15.04**	**100%**	**14.71**	**100%**	**18.65**	**100%**

Table A-9b. External-Internal and Internal-External Trip Length Frequency Distribution Within The DVRPC Region

Trip Length (Miles)	Home-Based Work Trips		Passenger Vehicle Trips		Truck Trips	
	No. of Trips	% of Total	No. of Trips	% of Total	No. of Trips	% of Total
<1	11	1.1%	15	0.6%	1	0.2%
1-2	47	4.5%	112	4.2%	17	3.5%
2-3	16	1.5%	39	1.5%	7	1.4%
3-4	42	4.0%	107	4.0%	9	1.8%
4-5	24	2.3%	75	2.8%	10	2.0%
5-6	15	1.4%	44	1.6%	5	1.0%
6-7	16	1.5%	35	1.3%	10	2.0%
7-8	34	3.2%	71	2.6%	8	1.6%
8-10	54	5.2%	127	4.7%	18	3.7%
10-12	49	4.7%	96	3.6%	17	3.5%
12-14	67	6.4%	173	6.5%	26	5.3%
14-16	85	8.1%	204	7.6%	33	6.7%
16-18	75	7.2%	197	7.4%	31	6.3%
18-20	142	13.6%	329	12.3%	48	9.8%
20-23	96	9.2%	239	8.9%	60	12.3%
23-26	54	5.2%	163	6.1%	26	5.3%
26-29	84	8.0%	203	7.6%	34	7.0%
29-32	58	5.5%	154	5.7%	37	7.6%
32-36	25	2.4%	92	3.4%	19	3.9%
36-40	15	1.4%	69	2.6%	26	5.3%
40-45	18	1.7%	66	2.5%	25	5.1%
45-50	8	0.8%	38	1.4%	12	2.5%
50-60	12	1.1%	30	1.1%	9	1.8%
60-70	0	0.0%	2	0.1%	1	0.2%
70-80	0	0.0%	0	0.0%	0	0.0%
> 80	0	0.0%	0	0.0%	0	0.0%
Average Trip Length	**17.79**	**100%**	**18.88**	**100%**	**21.88**	**100%**

Table A-9c. External-Internal and Internal-External Trip Length Frequency Distribution Within The DVRPC Region

Trip Length (Miles)	Home-Based Work Trips		Passenger Vehicle Trips		Truck Trips	
	No. of Trips	% of Total	No. of Trips	% of Total	No. of Trips	% of Total
<1	49	2.1%	191	2.9%	18	1.5%
1-2	141	6.0%	511	7.8%	82	6.7%
2-3	143	6.1%	417	6.4%	50	4.1%
3-4	89	3.8%	319	4.9%	37	3.0%
4-5	52	2.2%	159	2.4%	23	1.9%
5-6	95	4.1%	377	5.8%	44	3.6%
6-7	54	2.3%	167	2.6%	20	1.6%
7-8	90	3.8%	256	3.9%	32	2.6%
8-10	207	8.8%	543	8.3%	90	7.3%
10-12	183	7.8%	434	6.6%	67	5.4%
12-14	163	7.0%	401	6.1%	101	8.2%
14-16	155	6.6%	403	6.2%	107	8.7%
16-18	111	4.7%	273	4.2%	59	4.8%
18-20	178	7.6%	390	6.0%	72	5.9%
20-23	126	5.4%	296	4.5%	54	4.4%
23-26	161	6.9%	335	5.1%	52	4.2%
26-29	80	3.4%	205	3.1%	48	3.9%
29-32	67	2.9%	198	3.0%	27	2.2%
32-36	52	2.2%	175	2.7%	51	4.1%
36-40	50	2.1%	150	2.3%	53	4.3%
40-45	43	1.8%	138	2.1%	45	3.7%
45-50	31	1.3%	111	1.7%	54	4.4%
50-60	13	0.6%	64	1.0%	33	2.7%
60-70	5	0.2%	15	0.2%	9	0.7%
70-80	2	0.1%	7	0.1%	2	0.2%
> 80	1	0.0%	1	0.0%	0	0.0%
Average Trip Length	**15.06**	**100%**	**14.61**	**100%**	**18.87**	**100%**

Table A-9d. External-Internal and Internal-External Trip Length Frequency Distribution Within The DVRPC Region

Trip Length (Miles)	Home-Based Work Trips		Passenger Vehicle Trips		Truck Trips	
	No. of Trips	% of Total	No. of Trips	% of Total	No. of Trips	% of Total
<1	19	2.7%	76	3.6%	3	1.1%
1-2	53	7.5%	135	6.4%	16	5.9%
2-3	32	4.5%	118	5.6%	11	4.1%
3-4	83	11.7%	353	16.7%	48	17.8%
4-5	114	16.1%	372	17.6%	27	10.0%
5-6	31	4.4%	108	5.1%	16	5.9%
6-7	29	4.1%	84	4.0%	13	4.8%
7-8	25	3.5%	48	2.3%	5	1.9%
8-10	54	7.6%	133	6.3%	16	5.9%
10-12	68	9.6%	150	7.1%	25	9.3%
12-14	35	4.9%	90	4.3%	16	5.9%
14-16	12	1.7%	56	2.6%	5	1.9%
16-18	13	1.8%	52	2.5%	10	3.7%
18-20	26	3.7%	59	2.8%	6	2.2%
20-23	19	2.7%	52	2.5%	13	4.8%
23-26	19	2.7%	43	2.0%	9	3.3%
26-29	16	2.3%	36	1.7%	4	1.5%
29-32	14	2.0%	29	1.4%	6	2.2%
32-36	15	2.1%	35	1.7%	3	1.1%
36-40	15	2.1%	42	2.0%	8	3.0%
40-45	4	0.6%	14	0.7%	5	1.9%
45-50	11	1.5%	22	1.0%	2	0.7%
50-60	2	0.3%	5	0.2%	2	0.7%
60-70	1	0.1%	2	0.1%	0	0.0%
70-80	0	0.0%	0	0.0%	0	0.0%
> 80	0	0.0%	0	0.0%	0	0.0%
Average Trip Length	**10.95**	**100%**	**9.73**	**100%**	**11.68**	**100%**

Table A-10. County Where Trucks Are Garaged or Parked When Not in Service

County	Inbound Traffic		Outbound Traffic		Total Traffic	
	No. of Trucks	% of Total	No. of Trucks	% of Total	No. of Trucks	% of Total
Bucks	134	8.5%	79	5.2%	213	6.9%
Chester	112	7.1%	75	4.9%	187	6.0%
Delaware	60	3.8%	51	3.3%	111	3.6%
Montgomery	43	2.7%	27	1.8%	70	2.3%
Philadelphia	66	4.2%	57	3.7%	123	4.0%
Other PA	309	19.6%	308	20.2%	617	19.9%
Subtotal	**724**	**46.0%**	**597**	**39.1%**	**1321**	**42.6%**
Burlington	36	2.3%	35	2.3%	71	2.3%
Camden	37	2.4%	35	2.3%	72	2.3%
Gloucester	51	3.2%	61	4.0%	112	3.6%
Mercer	32	2.0%	31	2.0%	63	2.0%
Other NJ	309	19.6%	356	23.3%	665	21.5%
Subtotal	**465**	**29.6%**	**518**	**34.0%**	**983**	**31.7%**
Delaware	55	3.5%	76	5.0%	131	4.2%
Maryland	33	2.1%	32	2.1%	65	2.1%
Other States	296	18.8%	302	19.8%	598	19.3%
Subtotal	**384**	**24.4%**	**410**	**26.9%**	**794**	**25.6%**
TOTAL	**1573**	**100%**	**1525**	**100%**	**3098**	**100%**

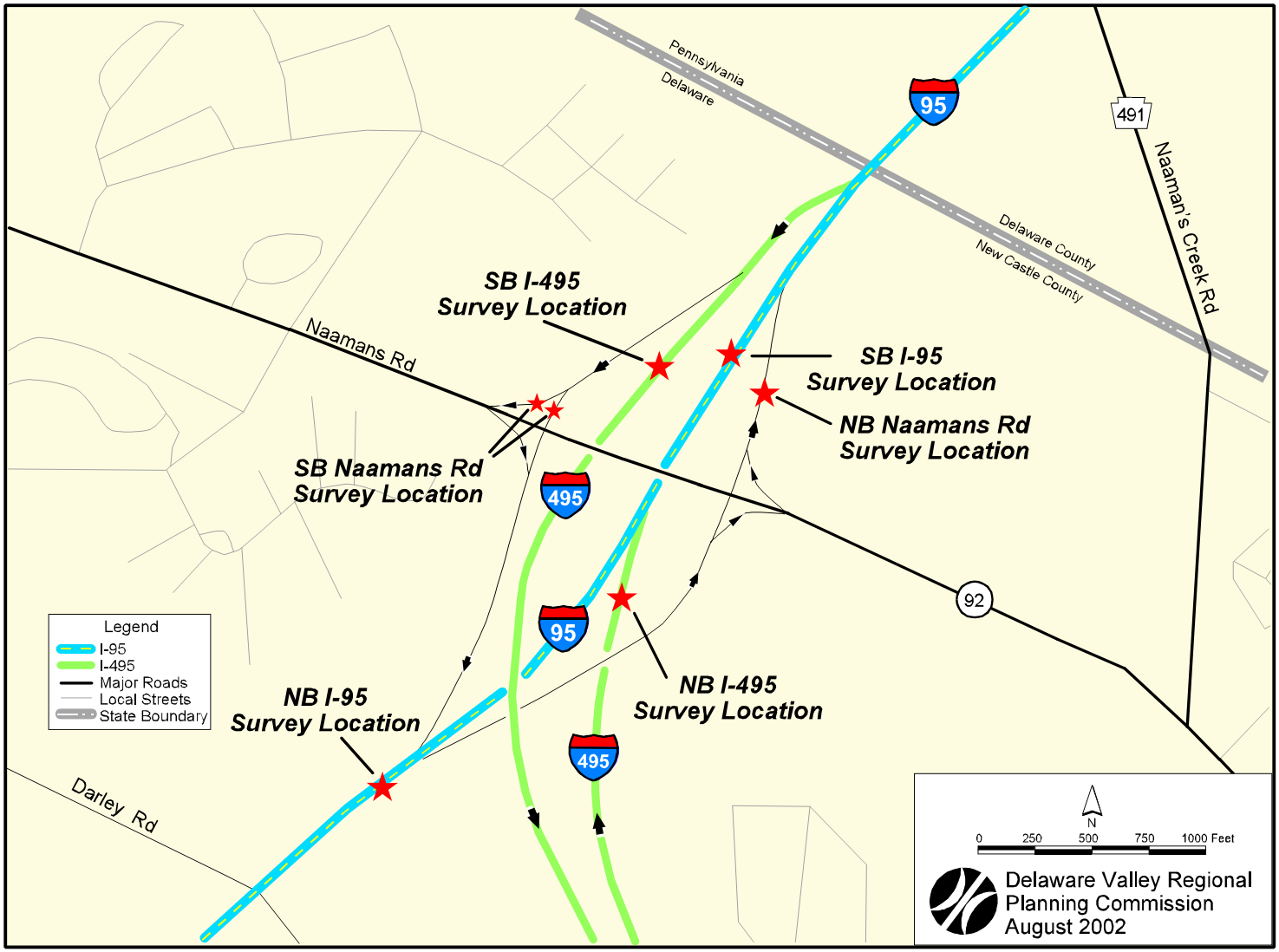
Table A-11. Type of Commodities Carried by Trucks

Commodity Carried	Inbound Traffic		Outbound Traffic		Total Traffic	
	No. of Trucks	% of Total	No. of Trucks	% of Total	No. of Trucks	% of Total
Empty	331	21.1%	316	20.8%	647	20.9%
Manufactured Products	202	12.9%	145	9.5%	347	11.2%
Petroleum Products	45	2.9%	35	2.3%	80	2.6%
Agricultural Products	160	10.2%	127	8.3%	287	9.3%
Building Materials	364	23.2%	367	24.1%	731	23.6%
Refrigerated Products	70	4.5%	91	6.0%	161	5.2%
Retail Store Merchandise	110	7.0%	117	7.7%	227	7.3%
Parcels	36	2.3%	27	1.8%	63	2.0%
Other	253	16.1%	296	19.5%	549	17.8%
TOTAL	**1571**	**100%**	**1521**	**100%**	**3092**	**100%**

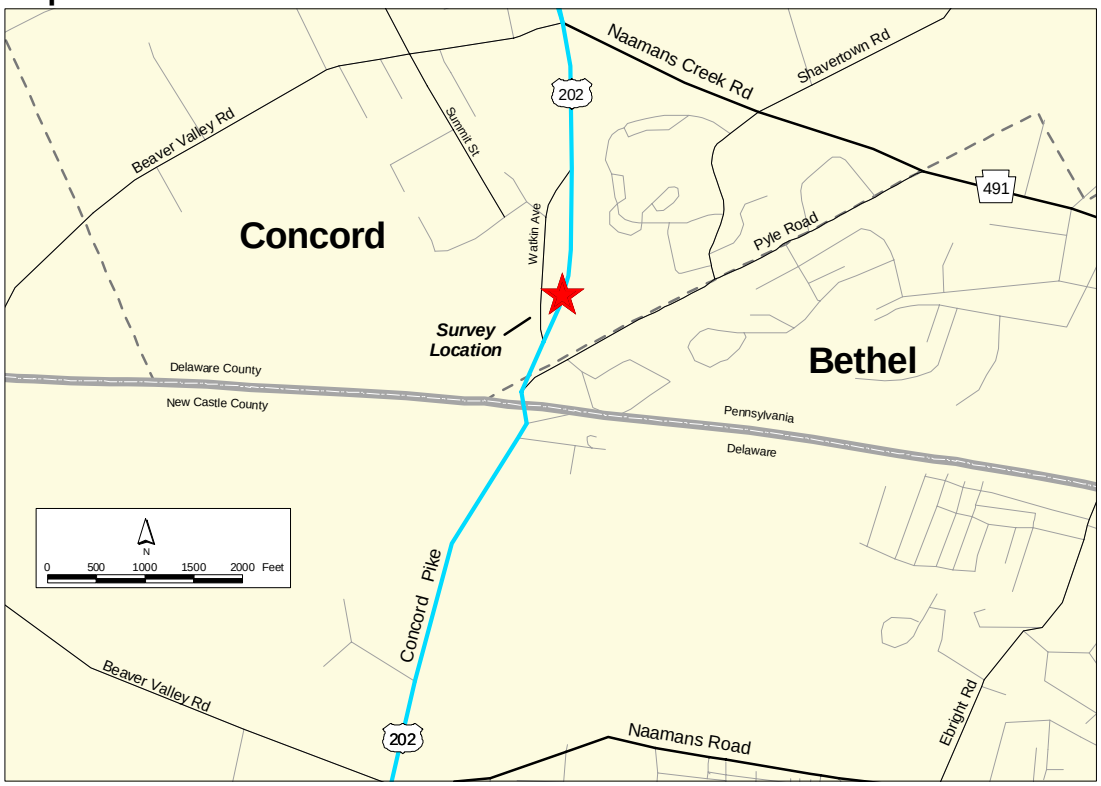
APPENDIX B

Survey Locations for the Regional Cordon Line Stations, Delaware Valley Region

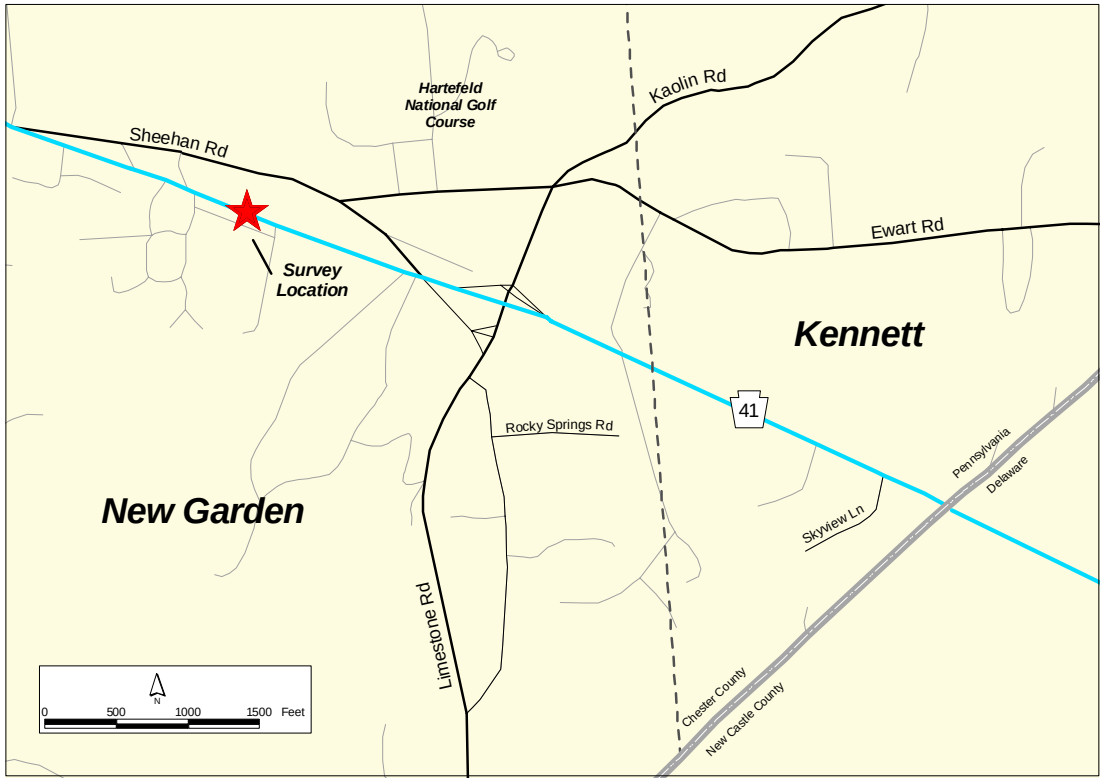
Map B-1. I-95 Delaware Expressway



Map B-2. US 202

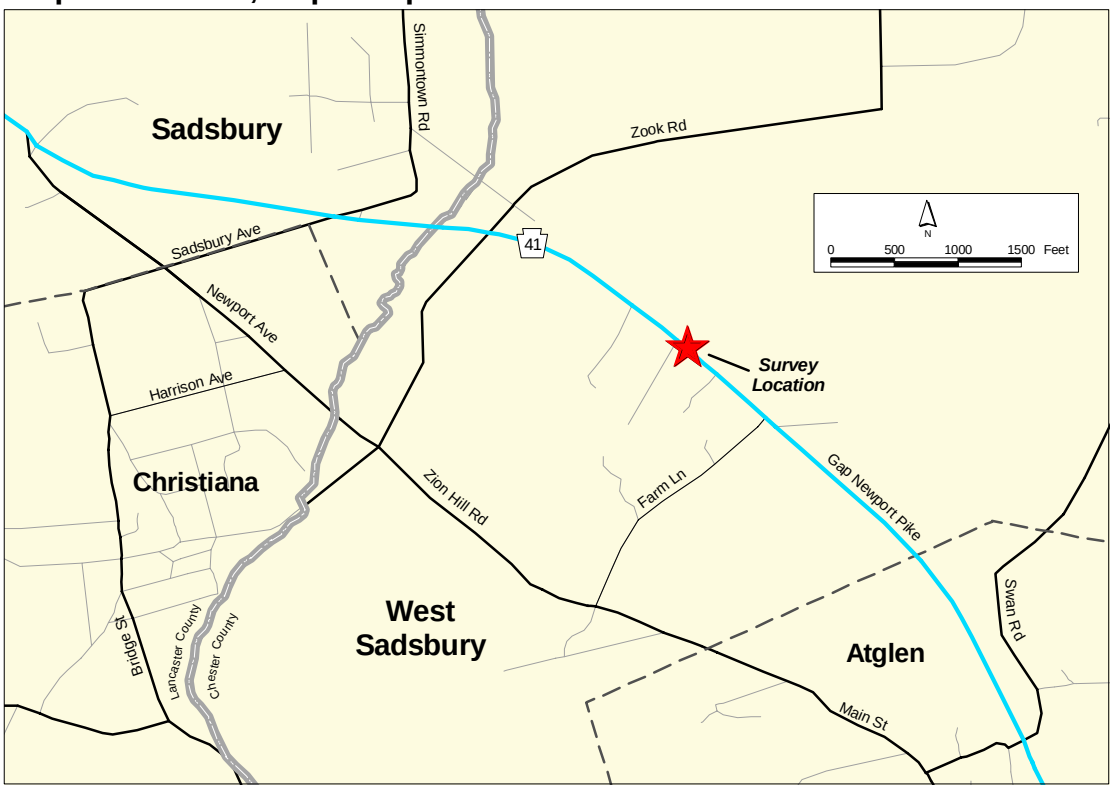


Map B-3. PA 41

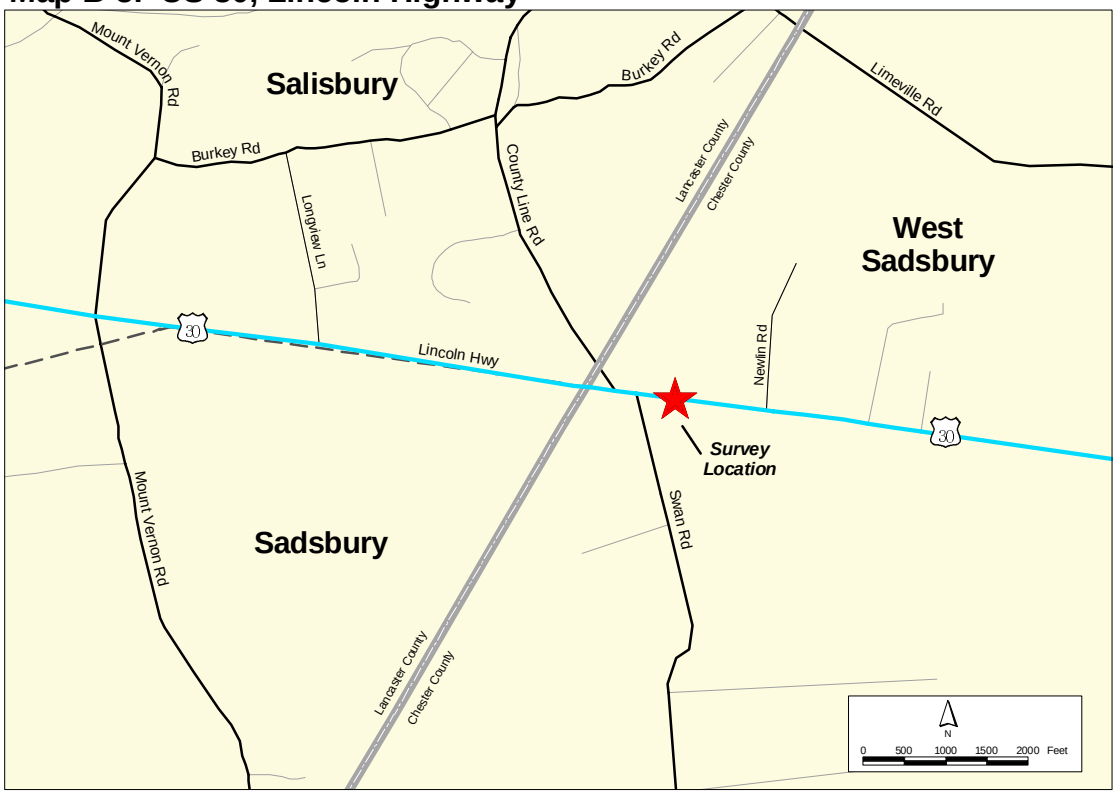


Delaware Valley Regional
Planning Commission
September 2002

Map B-4. PA 41, Gap Newport Pike

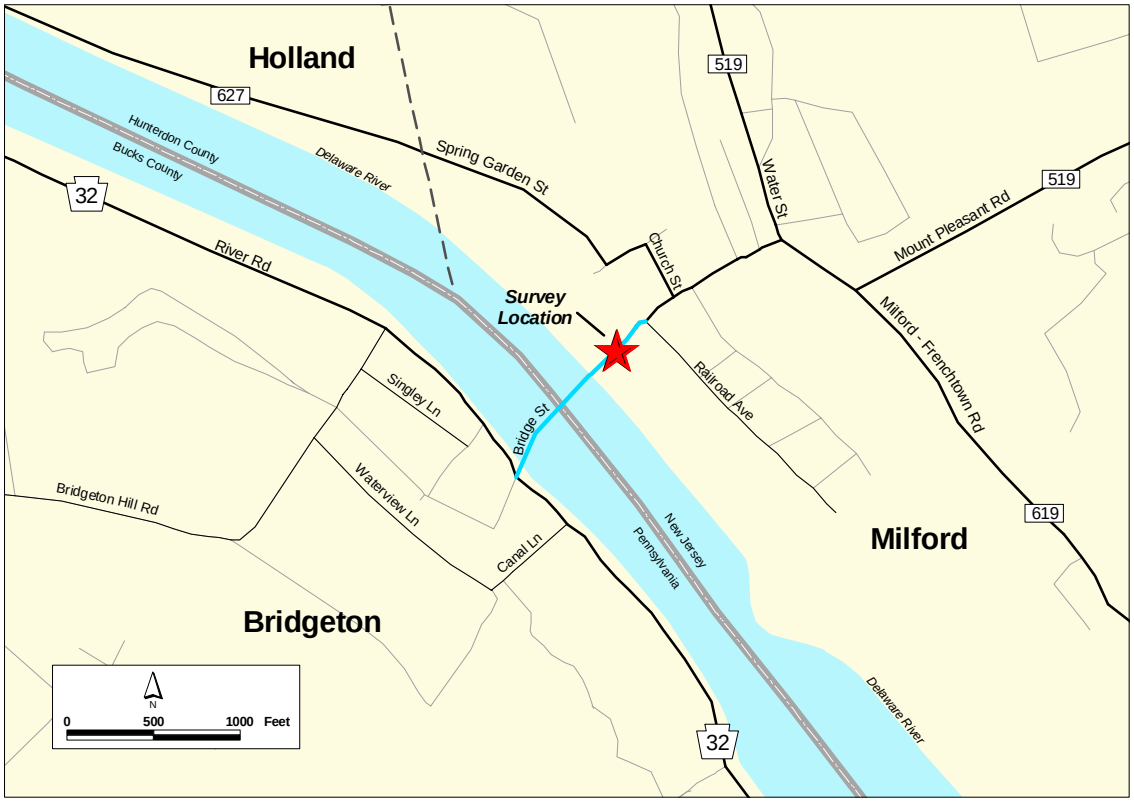


Map B-5. US 30, Lincoln Highway



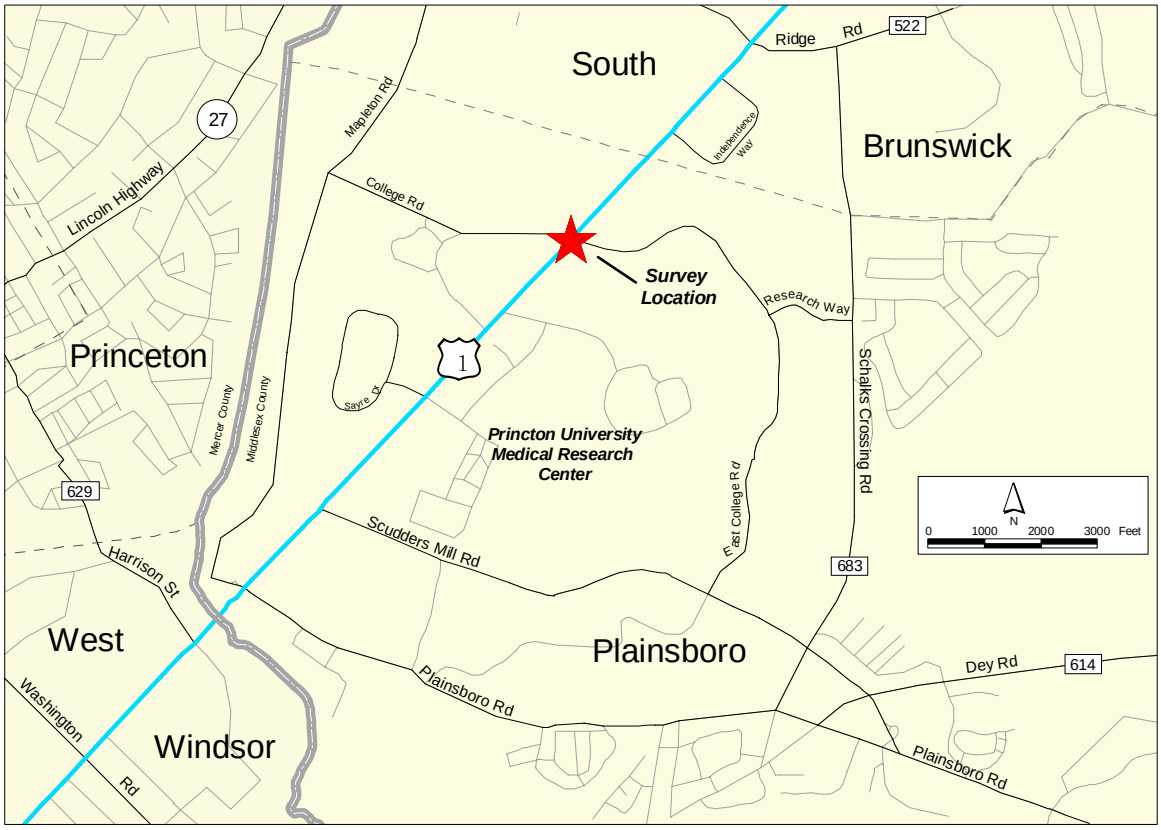
Map B-6. Old Bethlehem Pike

Map B-7. Upper Black Eddy Bridge



Map B-8. US 202 Toll Bridge

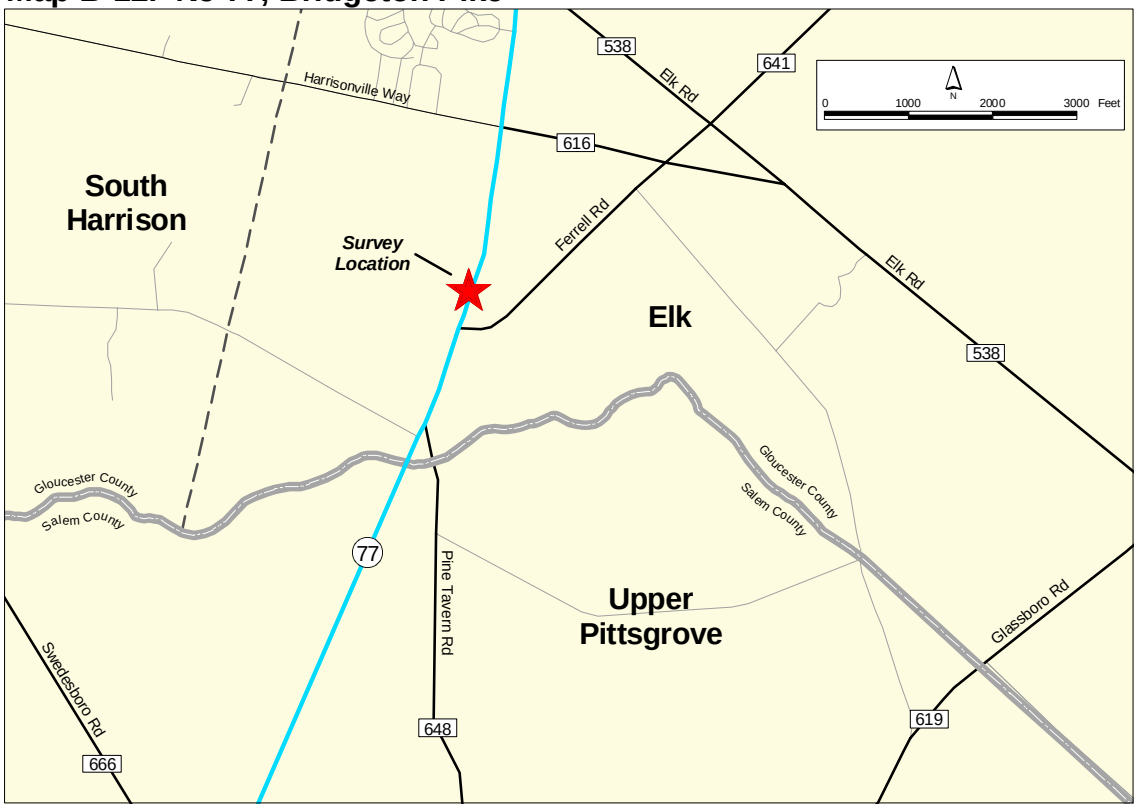
Map B-9. US 1, Brunswick Pike



Map B-10. NJ 70

Map B-11. NJ 55 Freeway

Map B-12. NJ 77, Bridgeton Pike



APPENDIX C

Survey Responses for the Regional Cordon Line Station Traffic Counts, Delaware Valley Region

Year 2000 Average Daily Traffic Volumes for the Cordon Stations of the Delaware Valley Region

PENNSYLVANIA CORDON STATIONS (83)		2000 AADT
DELAWARE COUNTY		
OC - 1	US 13, POST RD	6,089
OC - 2	RIDGE RD	7,815
OC - 3	PA 491, NAAMANS CREEK RD	3,361
OC - 4	I-95, DELAWARE EXPY	105,230
OC - 5	CARPENTER RD	7,544
OC - 6	ZEBLEY RD	4,849
OC - 7	PA 261, FOULK RD	7,181
OC - 8	EBRIGHT RD	3,378
OC - 9	US 202, WILMINGTON - W CHESTER PIKE	34,945
OC - 10	BEAVER VALLEY RD	602
OC - 11	SMITH BRIDGE RD	1,556
OC - 12	RIDGE RD	661
	TOTAL	**183,213**
CHESTER COUNTY		
OC - 13	PA 100, CHADDS FORD RD	2,103
OC - 14	PA 52, KENNETT PK	12,242
OC - 15	CENTER MILL RD	346
OC - 16	OLD KENNETT RD	2,180
OC - 17	PA 82, CREEK RD	974
OC - 18	EWART RD	2,128
OC - 19	PA 41, GAP - NEWPORT RD	13,454
OC - 20	LIMESTONE RD	11,544
OC - 21	NEWARK RD	4,911
OC - 22	YEATMANS STATION RD	1,175
OC - 23	PA 896, NEW LONDON RD	6,963
OC - 24	ELKTON RD	1,555
OC - 25	PA 841, WEST GROVE - LEWISVILLE RD	3,156
OC - 26	STATE RD	420
OC - 27	PA 272, CHROME - CALVERT RD	6,725
OC - 28	US 1, CONOWINGO RD	8,234
OC - 29	FREEMONT RD	628
OC - 30	PA 272, CHRISTINE RD WEST	4,511
OC - 31	FORGE RD	659
OC - 32	PA 472, LANCASTER PK	5,865
OC - 33	STREET RD	290
OC - 34	PA 896, NEWARK RD	2,582
OC - 35	SCHOFF RD	448
OC - 36	PA 372, GERMANTOWN AVE	2,005
OC - 37	ZION HILL RD	2,699
OC - 38	PA 41, NEWPORT - LANCASTER PK	15,279
OC - 39	STRASBURG RD	1,489
OC - 40	US 30, LINCOLN HWY	18,286
OC - 41	PA 340, PHILADELPHIA PK	4,114
OC - 42	BEAVER DAM RD	572

OC - 43	MAIN ST	849
OC - 44	US 322, WHITE HORSE PK	11,885
OC - 45	PA 10, CONESTOGA RD	7,592
OC - 46	MORGANTOWN RD	1,814
OC - 47	I-76, PA TPKE	39,152
OC - 48	PA 401, CONESTOGA RD	4,341
OC - 49	PA 23, MAIN ST	7,364
OC - 50	PA 82, WATER ST	924
OC - 51	PA 345, PINE SWAMP RD	1,077
OC - 52	UNIONVILLE RD	758
OC - 53	PA 724, SCHUYLKILL RD	4,834
	TOTAL	**218,127**

BERKS COUNTY

OC - 54	US 422, POTTSTOWN BYP	25,468
OC - 55	BENJAMIN FRANKLIN HWY	10,918
OC - 56	PINE FORGE RD	906
OC - 57	PA 562, READING AVE	7,116
OC - 58	PA 73, W PHILADELPHIA AVE	11,232
OC - 59	PA 100	17,629
	TOTAL	**73,268**

MONTGOMERY COUNTY

OC - 60	HOFFMANSVILLE RD	1,994
OC - 61	NIANTIC RD	2,218
OC - 62	PHILADELPHIA - KUTZTOWN RD	1,261
OC - 63	PA 29, GRAVEL PK	10,426
OC - 64	WASSER RD	188
	TOTAL	**16,087**

BUCKS COUNTY

OC - 65	GERYVILLE PK	2,493
OC - 66	SPINNERSTOWN RD	2,259
OC - 67	I-476, PA TPKE NE EXT	38,295
OC - 68	CASSELL RD	503
OC - 69	ALLENTOWN RD	3,099
OC - 70	OLD BETHLEHEM PK	3,512
OC - 71	PA 309, BETHLEHEM PK	32,466
OC - 72	STATE RD	2,366
OC - 73	RICHLANDTOWN PK	4,822
OC - 74	PA 412 HELLERTOWN RD	5,022
OC - 75	SPRINGTOWN RD	787
OC - 76	DURHAM RD	668
OC - 77	PA 611 EASTON RD	5,786
OC - 78	RIEGELSVILLE BRIDGE	4,055
OC - 79	MILFORD - UPPER BLACK EDDY BRIDGE	4,284
OC - 80	FRENCHTOWN - UHLERSTOWN BRIDGE	4,644
OC - 81	CENTER BRIDGE - STOCKTON BRIDGE	5,064

OC - 82	US 202 BRIDGE	9,779
OC - 83	PA 179, NEW HOPE - LAMBERTVILLE BRIDGE	15,949
	TOTAL	**145,855**
	Pennsylvania Subtotal	**636,550**

NEW JERSEY CORDON STATIONS (72)		**2000 AADT**
MERCER COUNTY		
OC - 84	NJ 29, RIVER RD	12,571
OC - 85	HUNTER RD*	1,200
OC - 86	CR 518, LAMBERTVILLE - HOPEWELL TPKE	5,843
OC - 87	CR 579, HARBOURTON - ROCKTOWN RD	5,126
OC - 88	NJ 31	16,138
OC - 89	CR 607, HOPEWELL - WERTZVILLE RD	3,751
OC - 90	CR 518, HOPEWELL - ROCKY HILL RD	14,120
OC - 91	CR 601, GREAT RD	9,170
OC - 92	US 206	22,826
OC - 93	PRINCETON AVE	5,190
OC - 94	CR 605, RIVER RD	2,764
OC - 95	NJ 27, LINCOLN HWY	11,755
OC - 96	US 1, BRUNSWICK PK	74,571
OC - 97	CR 615, CRANBURY RD	5,783
OC - 98	SOUTHFIELD RD	4,311
OC - 99	CR 535, OLD TRENTON RD	8,739
OC - 100	US 130	29,589
OC - 101	CR 539, N MAIN ST	7,798
OC - 102	NJ TPKE	123,900
OC - 103	NJ 33, FREEHOLD RD	24,098
OC - 104	CR 571, ETRA RD	4,509
OC - 105	HERBERT RD	5,685
OC - 106	I-195	37,545
OC - 107	CR 526, ROBBINSVILLE - ALLENTOWN RD	13,614
OC - 108	CR 524, YARDVILLE - ALLENTOWN RD	2,208
OC - 109	OLD YORK RD	1,555
	TOTAL	**454,360**

BURLINGTON COUNTY		
OC - 110	ELLISDALE RD	540
OC - 111	CR 664, CHESTERFIELD - ARNEYTOWN RD	1,371
OC - 112	CR 537, MONMOUTH RD	7,061
OC - 113	CR 528, JACOBSTOWN - NEW EGYPT RD	4,125
OC - 114	CR 616, COOKSTOWN - NEW EGYPT RD	5,128
OC - 115	BUNTING BRIDGE RD	1,607
OC - 116	NJ 70	9,928
OC - 117	NJ 72, BARNEGAT RD	7,038
OC - 118	ANDREWS RD*	300
OC - 119	GARDEN STATE PKWY	66,800
OC - 120	STAGE RD	1,878

OC - 121	US 9, NEW YORK RD	10,340
OC - 122	CR 563, GREEN BANK - CHATSWORTH RD	732
OC - 123	GARDEN STATE PKWY	57,700
OC - 124	CR 542, NESCO - BATSTO RD	2,502
OC - 125	US 206	12,128
	TOTAL	**189,177**

CAMDEN COUNTY

OC - 126	CR 536, CHEW RD	1,042
OC - 127	UNION RD	404
OC - 128	US 30, WHITE HORSE PK	12,310
OC - 129	CR 724, WILTSEYS MILL RD	2,111
OC - 130	CR 561, CEDARBROOK RD	5,430
OC - 131	ATLANTIC CITY EXPY	49,063
OC - 132	CR 561 SPUR MAYS LANDING RD	5,556
	TOTAL	**75,916**

GLOUCESTER COUNTY

No Number	CR 557, TUCKAHOE RD	-
OC - 133	US 322, BLACK HORSE PK	12,263
OC - 134	JACKSON RD	541
OC - 135	US 40, HARDING HWY	8,345
OC - 136	CR 555, MAIN RD	9,262
OC - 137	CR 615, WEST BLVD	5,381
OC - 138	NJ 47, DELSEA DR	10,172
OC - 139	NJ 55 FRWY	35,100
OC - 140	US 40, HARDING HWY	12,593
OC - 141	WILLOW GROVE RD	766
OC - 142	CR 553, CENTERTON - GLASSBORO RD	5,124
OC - 143	CR 604, FRANKLINVILLE - MONROEVILLE RD	1,676
OC - 144	CR 609, ELMER - BARNSBORO RD	1,407
OC - 145	NJ 77, BRIDGETON PK	5,530
OC - 146	CR 694, MONROEVILLE RD	1,897
OC - 147	CR 581, COMMISSIONERS RD	1,472
OC - 148	CR 617, MULLICA HILL RD	789
OC - 149	NJ 45, WOODSTOWN - MULLICA HILL RD	3,183
OC - 150	CR 605, WOODSTOWN RD	2,958
OC - 151	NJ TPKE	42,912
OC - 152	CR 551, AUBURN RD	1,979
OC - 153	I-295	49,728
OC - 154	CR 601, PEDRICKTOWN - CENTER SQUARE RD	1,393
OC - 155	US 130, CROWN POINT RD	7,946
	TOTAL	**222,417**
	New Jersey Subtotal	**941,870**
	REGIONAL TOTAL	**1,578,419**

Cordon Line Highway Survey for the Delaware Valley Region - Report No. 6
Regional Cordon Line Stations for the Delaware Valley Region

Publication No. : 02044

Date Published: September 2002

Geographic Area Covered: Delaware Valley metropolitan region comprised of five counties in Pennsylvania (Bucks, Chester, Delaware, Montgomery, and Philadelphia); and four counties in New Jersey (Burlington, Camden, Gloucester and Mercer) and includes some counties adjoining the region: (Lancaster, Berks, and Lehigh in PA; Hunterdon, Middlesex, Ocean, Cumberland and Salem in NJ; and New Castle County in Delaware).

Key Words: Traffic count, geocoding, cordon line, survey station, travel trends, vehicle trips, person trips, AM and PM peak hour, origin and destination, average vehicular occupancy, commodities.

ABSTRACT
A cordon line survey of traffic entering and leaving the Delaware Valley region was conducted during the summer of 2001. This is a summary report describing the characteristics of traffic crossing the regional cordon line at all stations involved with this study. This includes information regarding the data collection, data summaries, and complete data tables in the Appendices.

Delaware Valley Regional Planning Commission
8th Floor - The Bourse Building
111 South Independence Mall East
Philadelphia, PA 19106-2582

Phone: 215-592-1800
Fax: 215-592-9125
Internet: www.dvrpc.org

Staff contact: Joseph F. Hacker, Ph.D., AICP
Direct phone: 215-238-2935
E-mail: jhacker@dvrpc.org

September 2002

The Bourse Building, 8th Floor
111 South Independence Mall East
Philadelphia, PA 19106-2582

215.592.1800
www.dvrpc.org

Delaware Valley Regional Planning Commission