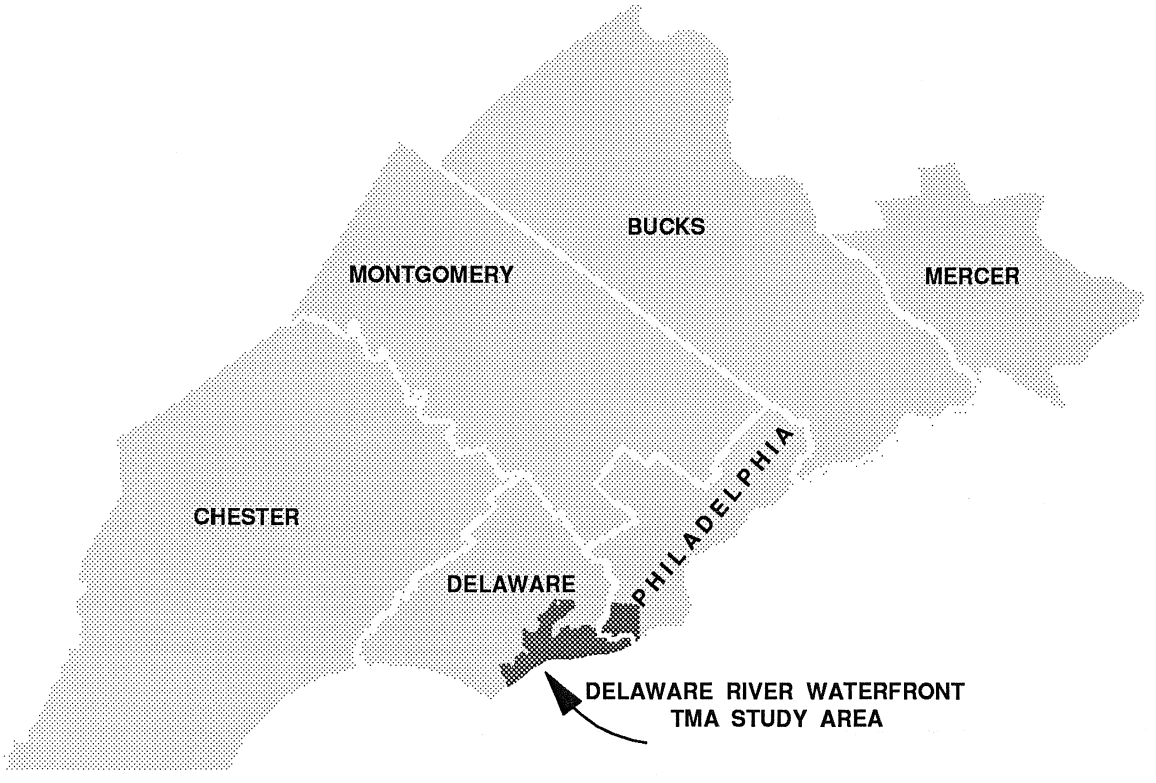
DELAWARE RIVER WATERFRONT
TRANSPORTATION NEEDS ASSESSMENT



Travel Demand Management Issue and Program Identification Report

A Publication of the

Delaware Valley Regional Planning Commission

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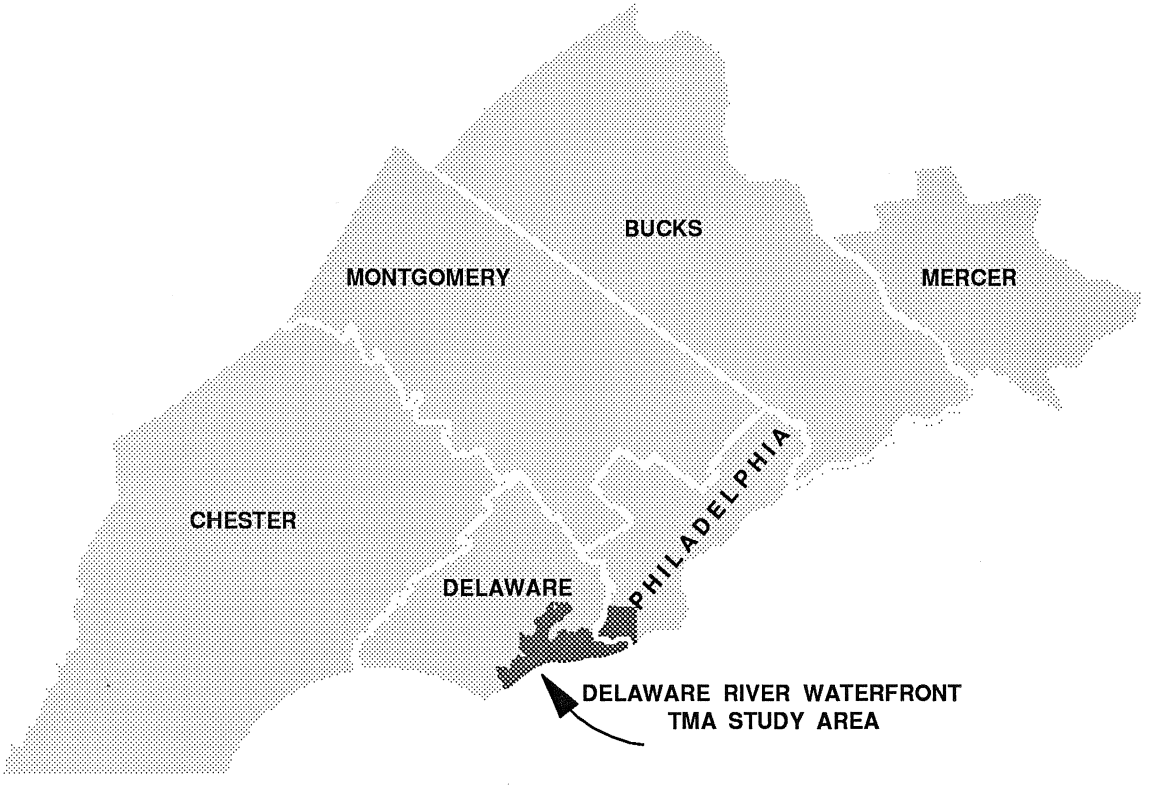

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Created in 1965, the Delaware Valley Regional Planning Commission (DVRPC) is an interstate, intercounty and intercity agency which provides continuing, comprehensive and coordinated planning for the orderly growth and development of the Delaware Valley 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. The Commission is an advisory agency which divides its planning and service functions among the Office of the Executive Director, the Office of Public Affairs, and three line divisions: Transportation Planning, Regional Information Services Center (which includes the office of Regional Planning), Finance and Administration. DVRPC's mission for the 1990s is to emphasize technical assistance and services and to conduct high priority studies for member state and local governments, while determining and meeting the needs of the private sector.

The DVRPC logo is adapted from the official seal of the Commission 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 flowing through it. The two adjoining crescents represent the Commonwealth of Pennsylvania and the State of New Jersey. The logo combines these elements to depict the areas served by DVRPC.

DELAWARE VALLEY REGIONAL PLANNING COMMISSION

Publication Abstract

TITLE	Date Published: June 1992
Delaware River Waterfront Transportation Needs Assessment: Travel Demand Management Issue and Program Identification Report	Publication No. 92013

Geographic Area Covered:

Chester City, Eddystone Borough, Ridley Township, and Tinicum Township portions of Delaware County and Philadelphia International Airport in Philadelphia.

Key Words:

Transportation, Mass Transit, Ridesharing, Parking Management, Travel Demand Management, Guaranteed Ride Home, Employer Subsidies, Transportation Management Association.

ABSTRACT

DVRPC surveyed employers, developers, and municipalities to determine transportation needs and attitudes. Based on the survey, DVRPC recommends various employer-based and transportation management association-based programs to reduce traffic congestion, improve labor access, comply with the Clean Air Act, and reduce parking lot costs.

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EXECUTIVE SUMMARY

The Delaware River waterfront between Chester and Philadelphia International Airport has strategic importance as a manufacturing, employment, and international transportation center. It is currently in transition from an intensive manufacturing corridor to a mixture of service and hospitality industries as well as some manufacturing. However, the transportation infrastructure established decades or centuries ago is inadequate to serve today's transportation needs.

This report assesses the transportation needs of this area and advances programs to address those needs. Questionnaires sent to employers, developers, and municipalities, and personal interviews of a small group of these individuals, helped to identify transportation problems. The major problems that require attention include highway congestion and accessibility, lack of highway construction, lack of transit, bus transit frequency and routing, rail links to activity areas, and labor access.

A menu of programs to deal with the above problems is discussed in Chapter II. The overall thrust of these programs is to reduce the number of vehicles on the roads. These programs, if successfully implemented, will reduce traffic congestion, air pollution and parking lot costs, and will improve labor access.

The programs recommended include improved access to SEPTA rail service, custom transit and ridesharing, shuttles, guaranteed ride home, parking management, employee transit and ridesharing subsidies, a commuter assistance center, and other programs to comply with the Clean Air Act. Also promoted are transportation evaluations, local standards to meet transportation goals, and local financing of transportation improvements.

CHAPTER I - ISSUE IDENTIFICATION

A. INTRODUCTION

Historical Perspective

The Delaware River waterfront between Chester and Philadelphia International Airport has a long history as an economic center, having been the site of the first European settlement in Pennsylvania [see Figure I]. It was discovered in 1609 by Dutch settlers and later conquered by the Swedes. The first permanent European settlement in Pennsylvania was established in 1643 on Tinicum Island. The waterfront contains the sites of the first two European colonial capitols in the area and the first United States public works project—the 1785 diamond-shaped stone ice breakers built just off the waterfront of McClure Park in Marcus Hook. William Penn established his first assembly and courts in the City of Chester in the late 17th century.

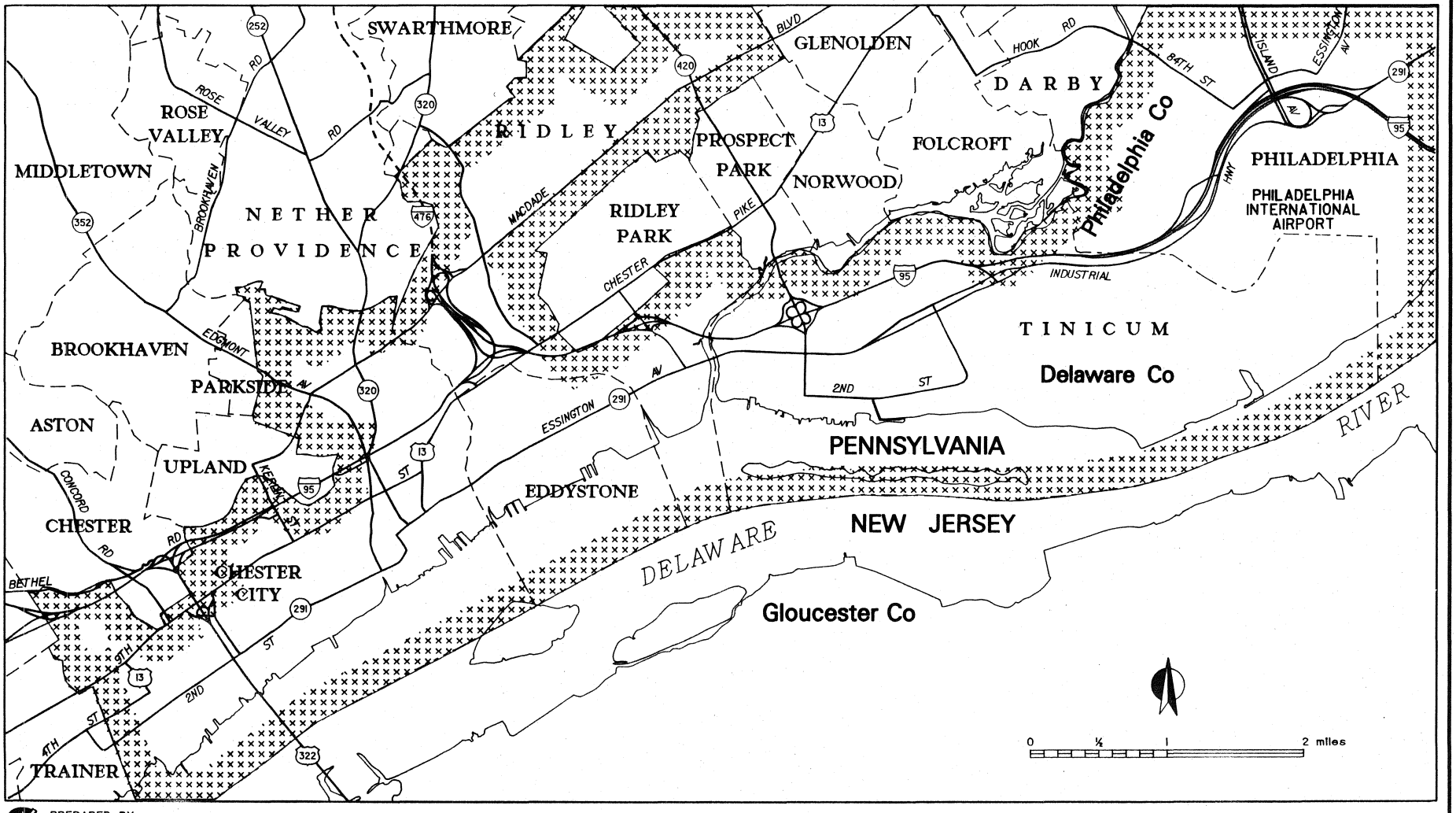
Historically, the waterfront was strategically located. It served as the primary trade route and site for forts, trading posts, government houses, and schools. The Great Post Road [now US Route 13] was the main north-south link between the thirteen original states in the Union. Backed by navigable north-south creeks, the waterfront became a focal point not only for government but also for economic activities. Farming thrived until the removal of the county seat from Chester to Media in 1850. Farmers sold their lands to commercial interests. Other early activities included creation of resort hotels, boat clubs, [such as Riverside, West End, and Corinthian], shipbuilding, and other maritime activities. Later shipbuilding became a major economic activity.

Despite these diversified activities, the waterfront remained primarily agricultural and recreational until the latter part of the 19th century, when the growing technology of steam power encouraged the dependence of industry on water power, enabling businesses to locate next to a transportation system. Thus, the Delaware River waterfront became increasingly industrial as factories took advantage of the river, the three major rail systems [Pennsylvania Central, Reading, and Baltimore, Ohio and Western], and the excellent national road system [the King's Highway and, later, US Route 13 and I-95]. Major industrial giants which located their plants on the waterfront include Scott Paper Company, the Remington Arms, Philadelphia Electric Company [PECO], Baldwin Locomotives, Boeing, Westinghouse Turbines, Sun [later Penn] Ship Company [home to the largest floating dry dock in the world and the first supertanker], Reynolds Company, and Fisher Body Company.

More recently, major technological developments and international business competitiveness caused most of these companies to close down or move elsewhere. These developments include use of electric power [instead of steam power], less use of

Figure I

DELAWARE RIVER WATERFRONT TMA STUDY AREA



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steel and other heavy metals, computerization of operations, strong competition from abroad, union strikes and skyrocketing wages, regional economic downturns, and inability of labor to adjust structurally to these changes. Despite these developments and vacant or underutilized properties, many companies such as Scott Paper Company, Boeing, and PECO remain at the waterfront.

The Delaware River waterfront has witnessed major technological developments, has served as a major port of entry for immigrants throughout the centuries, and has developed Delaware County's industrial backbone. Although industries are no longer totally dependent on access to the water either for supplies, shipments, or a power source, the waterfront still has the opportunity to use its maritime resources and human, business, and transportation potential, and to build a better future.

Transportation Perspective

It is an understatement to say that transportation has played a major role in the Delaware River waterfront area between Chester and Philadelphia International Airport. Since the 1600s, water, road—and later—rail and air transportation, have carried persons in this area and have been major employers, as well.

In the early days, the Delaware River was the primary means of transportation; it still is a major freight mode. As roads connecting towns and colonies developed, major roads such as the Great Post Road and King's Highway were built between Philadelphia, Chester, and Wilmington, paralleling the Delaware River. In the railroad area, major lines—today's Amtrak, CSX, and Southeastern Pennsylvania Transportation Authority [SEPTA], were built to carry passengers and freight between New York City, Philadelphia, Chester, Wilmington, Baltimore, and Washington. More recently, Philadelphia International Airport serves Pennsylvania, New Jersey, and Delaware residents and businesses with flights to United States and foreign destinations.

From an employment point of view, several area industries provided and still provide the world with essential transportation equipment. For example, the Baldwin locomotives plant in Eddystone, the Sun [later Pennsylvania] Shipbuilding Company in Chester, and the Fisher Body Company were industrial giants. Today, Boeing Helicopters continues to be a major transportation company, employing 6,800 persons.

Even though an established transportation infrastructure exists, it does not perform adequately. Most roadways and mass transit facilities are old, not well maintained, and deteriorating. In addition, mass transit does not provide most commuters with direct and frequent service. As a result of these problems, traffic congestion on many area roads is common.

In addition, new developments which will materialize in the next several years will add to the traffic volumes. Much of this development will occur in vacant manufacturing

facilities and underutilized "infill" development. This type of development is much preferred to developing the fringes of the urban area, because it uses existing infrastructure and does not destroy farmland or wildlife habitats. However, unless adequate transportation services are provided, the quality of life in the Waterfront area will decline.

The Delaware County Coalition for Roadway Improvement and Economic Redevelopment [Delco CRIER], in its draft position paper of January 2, 1991, defines five major transportation problems in this area:

1. Delaware River Waterfront Corridor Access

   Inadequate access to and through Chester along the riverfront has prohibited the development of the port. It has also precluded the redevelopment of Chester as a viable and attractive industrial park and office park alternative to more suburban sprawl.

2. I-95 Chester Crush

   The section of I-95 in the vicinity of I-476 [Mid-County Expressway] where the highway narrows from six and eight lanes to four creates a dangerous safety hazard, creating traffic congestion and delays. These delays can be a problem for air travelers who need to arrive at Philadelphia International Airport by a certain time.

3. Route 322 [Conchester Road]

   This highway has resulted in numerous traffic deaths and injuries and carries a huge traffic volume.

4. Routes 1 and 202 [Painter's Crossroads]

   This area is approaching gridlock and needs major changes to improve traffic flow and access.

5. Mass Transit

   The absence of adequate park and ride lots drives passengers from public transit systems onto the highway system. In addition, current transit routes do not conveniently serve the majority of Waterfront residents, businesses, and employees.

In 1989, the Delaware Valley Regional Planning Commission [DVRPC] published its report Delaware County Waterfront Communities Transit Service Improvements, which examined the adequacy of transit service to the riverfront area. It recommended several

transit service improvements and the establishment of a transportation management association [TMA] to direct transit, ridesharing, and highway improvements.

Travel Demand Management and TMAs

Travel demand management is a concept whereby commuters are encouraged to travel to work by any means except driving alone during peak travel periods [rush hour]. Typically, employers encourage their employees to use mass transit, car pool, van pool, work flexible hours, bicycle, or walk to work. They can reserve the best parking spaces for car pools and van pools, provide subsidies to transit users and poolers, provide bicycle parking and showers, charge solo drivers for parking, or provide a shuttle bus to a nearby train station, for example. Programs like this can cost only a fraction of the cost of new highway and parking facilities that would be needed if everyone drove alone.

In some areas of the country, municipalities are adopting ordinances which mandate trip reductions; this is sometimes done if the voluntary programs described above are unsuccessful. Trip reduction ordinances require that employers reduce the number of peak hour vehicular trips by a certain percentage, or face fines. The employers start various ridesharing, transit, and flextime programs to comply with the law.

Transportation Management Associations [TMAs] are public-private partnerships to manage the transportation system more efficiently and improve mobility for current and future employees. Typically, members include local governments, employers, and developers, the agencies that have the most impact on how employees commute. A TMA can be thought of as a membership organization: members pay dues in exchange for customized services. If an employer wanted its employees to car pool more, it could pay the TMA to set up an employee matching program. This type of fee-for-service arrangement is a typical business transaction; if the TMA can provide quality services which are effective, it can reduce traffic volumes, improve mobility and, most important, increase labor market accessibility.

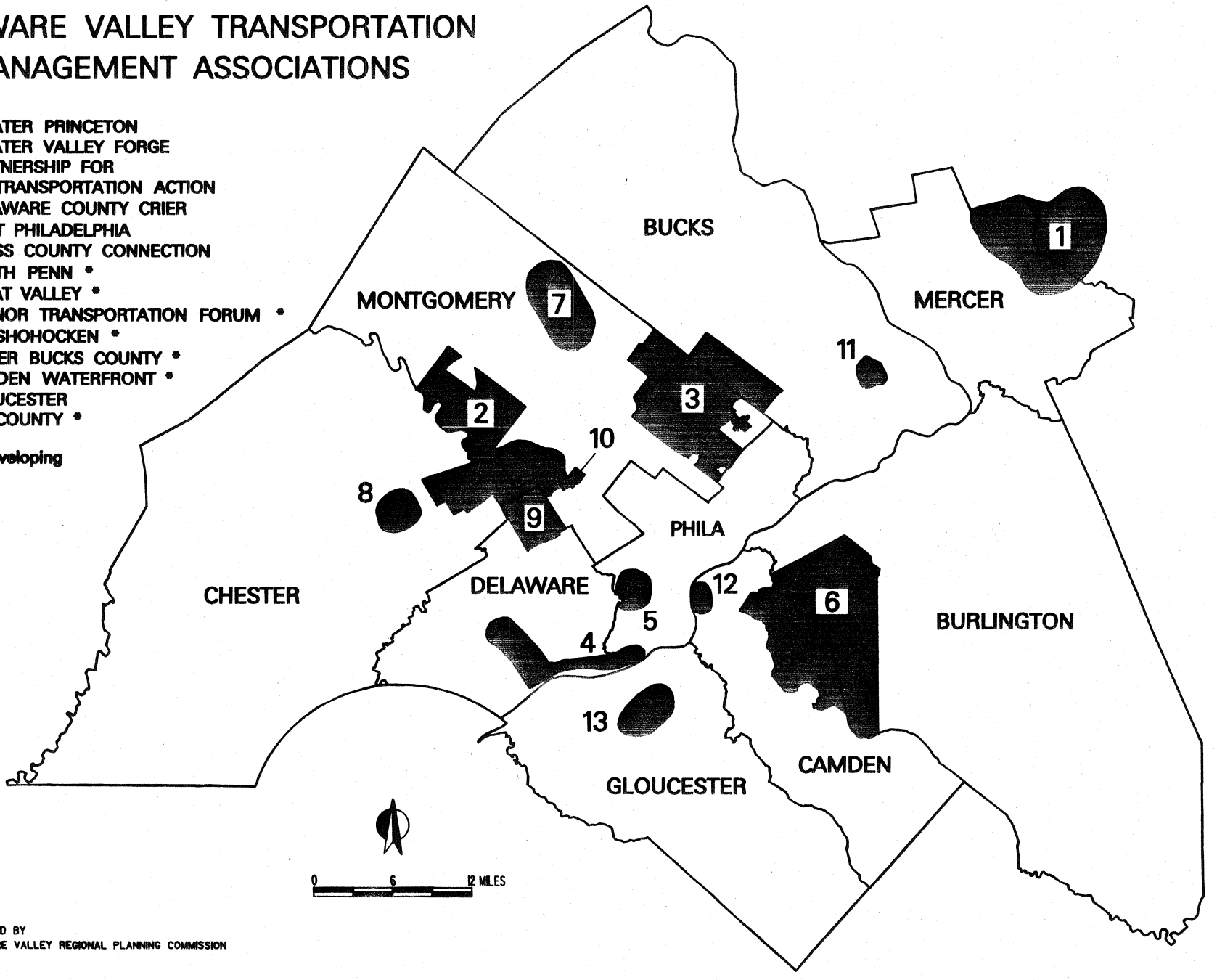
Several TMAs already are operating in the Philadelphia area [see Figure II]. The Greater Princeton TMA is the oldest; it was established in 1984. In 1990 the Greater Valley Forge TMA in the King of Prussia area and the Cross County Connection TMA in the Cherry Hill area of Burlington and Camden counties were established and staffed. In 1991, the Partnership for Transportation Action TMA [Willow Grove] began operating with staff. Other emerging TMAs which have incorporated are the Delaware County CRIER [Coalition for Roadway Improvement and Economic Redevelopment] in the Philadelphia International Airport/Chester area, West Philadelphia TMA, and Lower Bucks County TMA [Oxford Valley]. Other potential TMAs are in Conshohocken/West Conshohocken, Great Valley, North Penn, Gloucester County, Radnor [Delaware/Montgomery counties], and Camden City Waterfront.

Figure II

DELAWARE VALLEY TRANSPORTATION MANAGEMENT ASSOCIATIONS

1. GREATER PRINCETON
2. GREATER VALLEY FORGE
3. PARTNERSHIP FOR TRANSPORTATION ACTION
4. DELAWARE COUNTY CRIER
5. WEST PHILADELPHIA
6. CROSS COUNTY CONNECTION
7. NORTH PENN *
8. GREAT VALLEY *
9. RADNOR TRANSPORTATION FORUM *
10. CONSHOHOCKEN *
11. LOWER BUCKS COUNTY *
12. CAMDEN WATERFRONT *
13. GLOUCESTER COUNTY *

* Developing



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Based on the DVRPC/Delaware County Planning Department [DCPD] report and the types of problems outlined by Delco CRIER, DCPD requested DVRPC to do a transportation needs assessment of the Delaware River waterfront area. The area of coverage for the needs assessment was between the Delaware River and I-95 [Delaware Expressway], and inclusive of Chester and Philadelphia International Airport [see Figure I]. This is a two county area, since a portion of the airport is in Philadelphia County/City.

Needs Assessment Process

In order to identify the transportation issues of the employers in the Riverfront area, DVRPC and DCPD staffs undertook a survey as part of an overall issue identification process. This process had three parts: [1] review existing transportation conditions, [2] interview the largest Riverfront area employers, and [3] survey the community's employers.

B. EXISTING TRANSPORTATION CONDITIONS

Riverfront Area Growth Analysis

The Waterfront area's residential population is fairly stable; no growth is predicted through the Year 2010 [see Table I]. In contrast, the Waterfront area's employment levels have the potential to increase because several major developments and employment sites have been built recently, are being built, and are proposed. Table II shows DVRPC 1988 employment forecasts for 1990, 2000, and 2010.

Please note that both Table I and Table II show population and employment for the entire municipality; breakdowns for the portions of the municipalities in the study area are not readily available.

Table I
WATERFRONT POPULATION

Municipality	1980 Population	1990 Population	% Change	2010 Population Forecast	1990-2010 % Change
Chester City	45,794	41,856	- 8.6%	35,990	- 14.0%
Eddystone Borough	2,555	2,446	- 4.3%	2,620	+ 7.1%
Ridley Township	33,771	31,169	- 7.7%	28,810	- 7.6%
Tinicum Township	4,291	4,440	+3.5%	4,180	- 5.9%
Philadelphia City	1,688,210	1,585,577	- 6.1%	1,545,100	- 2.6%
Total	1,774,621	1,665,488	- 6.1%	1,616,700	- 2.9%

Source: U. S. Census, DVRPC 1988 Forecast

Note: Figures show population and employment for the entire municipality; breakdown for the portions of the municipalities in the study area are not readily available.

Table II
WATERFRONT EMPLOYMENT

Municipality	1990	2000	2010	1990-2010 % Change
Chester City	19,690	20,550	20,740	+ 5.3%
Eddystone Borough	1,760	1,730	1,690	- 4.0%
Ridley Township	10,800	10,710	10,800	0.0%
Tinicum Township	9,660	9,470	9,420	- 2.5%
Philadelphia City	865,800	871,900	878,000	+ 1.4%
Total	907,710	914,360	920,650	+ 1.4%

Note: Figures show population and employment for the entire municipality; breakdown for the portions of the municipalities in the study area are not readily available.

These forecasts, made in 1988, did not anticipate some of the proposed development. Some of the developments that were underway in 1988, are being developed, or are proposed, include the following:

Philadelphia International Airport Cargo City
United Parcel Service
U. S. Postal Service Airmail Facility
Tinicum Industrial Park
Airport Business Center
Baldwin Towers
Independence Center
Tinicum Waterfront
RDC Office/Hotel Complex in Chester
Numerous hotels

The Mid-County Expressway [I-476], was completed in late 1991; there will be a great potential for other developments in the waterfront area now that this highway is open. The expressway links the Waterfront area with northern Delaware County, King of Prussia, Conshohocken, and Plymouth Meeting. Conversely, it provides quicker access to Philadelphia International Airport from the northern and western Philadelphia suburbs. This improved access will help development of the Waterfront area.

This potential development and the additional employment and traffic it will bring means that a program to reduce traffic volumes should be employer based. Employers have the greatest control over how their employees commute to work.

Traffic Analysis

The Waterfront area is served by several major roads which carry significant volumes of traffic. These roads include Interstate 95 [Delaware Expressway], Interstate 476 [Mid-County Expressway], US 13 [Chester Pike], US 322 [Commodore Barry Bridge and Conchester Road], PA 291 [Industrial Highway], PA 420 [Wanamaker Avenue], PA 320 [Providence Road/Upland Street/Madison Street], and PA 352 [Edgmont Avenue/Avenue of the States].

There are quite a few Waterfront roads that carry major traffic volumes and become heavily congested at rush hours. Appendix I shows average daily traffic volumes on most major roads in the area.

Highways in the Delaware River Waterfront Area

PA Route 291

Route 291 is the main access to the manufacturing, transportation, and petroleum plants in the waterfront area. It also provides access to the Philadelphia International Airport and its local industries and hotels.

Approximately 21 miles long, Route 291, code named the Industrial Highway, Essington Avenue, and Governor Printz Boulevard, varies from a two-lane, 25 mph urban street in Chester City to a four-lane divided highway in Tinicum and Ridley townships, Eddystone Borough, and Philadelphia. It operates parallel and in close proximity to I-95, between I-95 and the Delaware River. Average daily traffic volume is 6300 on the two-lane sections [from Kerlin Street to Edgmont Avenue] and 52,600 on the four-lane section from Edgmont Avenue to Platt Bridge in Philadelphia. In Chester, Route 291 follows congested city streets with residential, commercial, and industrial structures very close to the road. Improvement to this portion of Route 291 [realignment and widening] is programmed in PennDOT's Twelve Year Highway Program. Engineering design has been completed; right-of-way acquisition [at a cost of $23 million] is programmed in the first four years of the program [1990-1994] and construction [at a cost of $19.2 million] in the second four years [1994-1998]. The reconstruction of Route 291 to a four-lane modern highway will assist Chester City's depressed economy, improve port development, and spur economic growth in the entire Waterfront area.

Interstate 95

I-95 is the major north-south expressway serving the Philadelphia metropolitan region and the east coast of the United States from Maine to Florida. The section that serves the waterfront is the 19 mile length from Broad Street in Philadelphia to the Delaware state line. It is a four to eight lane highway which runs parallel to the Delaware

River. It carries a traffic volume in excess of 145,000 vehicles per day. It serves as the major access to Philadelphia International Airport and port facilities as well as a primary commuter and freight route to Central Philadelphia and Wilmington and its port.

Congestion occurs on I-95, particularly south of the I-476 interchange to US Route 322. Operating with eight lanes north of the interchange, I-95 drops to four lanes at I-476 and six lanes in the City of Chester. With poor pavement conditions, poor and inadequate ramps at the Routes 352 and 320 interchanges, and intense residential and industrial development along the road, I-95 tends to be severely congested in the City of Chester. In this heavily congested section, truck volume approaches 15,000 trucks per day. In spite of these problems, I-95 represents the best north-south access route for waterfront development and the best route to New Jersey via the Commodore Barry Bridge. Access via I-95 is a major reason industrial, hotel and office development is attracted to the Waterfront. Later in this decade, a major reconstruction of the entire length of I-95 in Pennsylvania will occur; this work will include park and ride lots and better connections to mass transit lines.

PA Routes 320, 352, and 420

Routes 320 and 352 are two-lane highways providing the north-south link between the Chester City waterfront and other parts of the county and region. Route 420, a four-lane road in the study area, links Route 291 in the Tinicum Township industrial area with the northern sections of the county. Average daily traffic volume on Route 320 in both directions is 18,700 vehicles. On Route 420 it is 35,100 vehicles per day.

US Route 322

This is the most direct link for all traffic between I-95 and US 1 or US 202. It directly connects the Delaware County townships of Upper Chichester, Bethel, and Concord with New Jersey through the Commodore Barry Bridge. It also serves to connect the Waterfront area to both New Jersey and other parts of Pennsylvania.

Code-named the Conchester Highway, US 322 is a four-lane limited access corridor [from I-95 to PA 452] with a posted speed limit of 45 mph. From PA 452 to US 1 it is a two-lane road. It carries heavy traffic volumes, including significant numbers of trucks, with an average daily traffic volume of 33,300 vehicles in both direction. It has a high accident rate because of the large volume of high speed through-traffic; this has earned it the name "Killer Highway." It is programmed in PennDOT's 12-Year Program to be widened to four lanes. Delaware County requested that $2.8 million be programmed in the first four years of the program for preliminary engineering. Engineering and right-of-way acquisition are listed in the first four years [1990-94] and construction is programmed in the second four years [1994-98].

Interstate 476

I-476, code-named the Mid-County Expressway, is a 21.5 mile stretch of modern highway from Interstate 95 in Delaware County to the Pennsylvania Turnpike in Montgomery County. It is four lanes from West Chester Pike [Route 3] to I-95 and six lanes north of West Chester Pike. It serves as a major north-south link and as the main access to the Philadelphia International Airport and industrial establishments in the Waterfront area. I-476 is expected to attract commercial developments to the area. This highway was completed in late 1991.

DVRPC predicts that by the Year 2010 the four-lane and six-lane sections will carry 65,000 and 80,000 vehicles per day, respectively. Five park and ride lots are planned at points where the highway intersects major rail or bus lines. Intelligent vehicle highway system [IVHS] technologies are also planned. These include electronic sensors, ramp metering, a television surveillance system, incident management techniques, and a computer controlled monitoring and traffic signal system.

Road Improvements

Eleven roadway improvements are programmed for construction in the Waterfront area on the Pennsylvania Department of Transportation's Twelve Year Program [see Figure III]. See Appendix II for a description of these projects.

Public Transit Availability

Current SEPTA service to the Waterfront area includes two commuter rail lines and ten bus routes [see Figure IV]. The rail lines and six of the bus routes are oriented to Philadelphia, Upper Darby, or Darby. The other four bus routes run between Chester and Middletown and Newtown townships and West Chester. A description of this service follows:

R1 Regional Rail Line. The R1 travels between North Philadelphia [North Broad Street Station] and Philadelphia International Airport. It is known as the Airport High Speed Line and is dedicated to on-time service for air travelers. The line is 12.8 miles in length and carries 2,500 weekday passengers. It currently stops at eight stations, three in downtown Philadelphia and three at the Airport. Three additional stations are being planned: one at the Civic Center in West Philadelphia [also on the R2 Wilmington line] and two in the Eastwick section of Philadelphia. This train operates with 37 trips from 5:15 AM to 12:45 AM on thirty minute headways seven days a week. It stops at Airport terminals A, B, C, D, and E. It takes 36 minutes for the train to run from one end of the line to the other; it takes 19 minutes from Suburban Station in downtown Philadelphia to the Airport. Amtrak service is also available at the 30th Street Station stop.

Figure III

PENNDOT TWELVE YEAR PROGRAM
PROJECT LOCATIONS–see appendix II

DELAWARE RIVER WATERFRONT TMA STUDY AREA

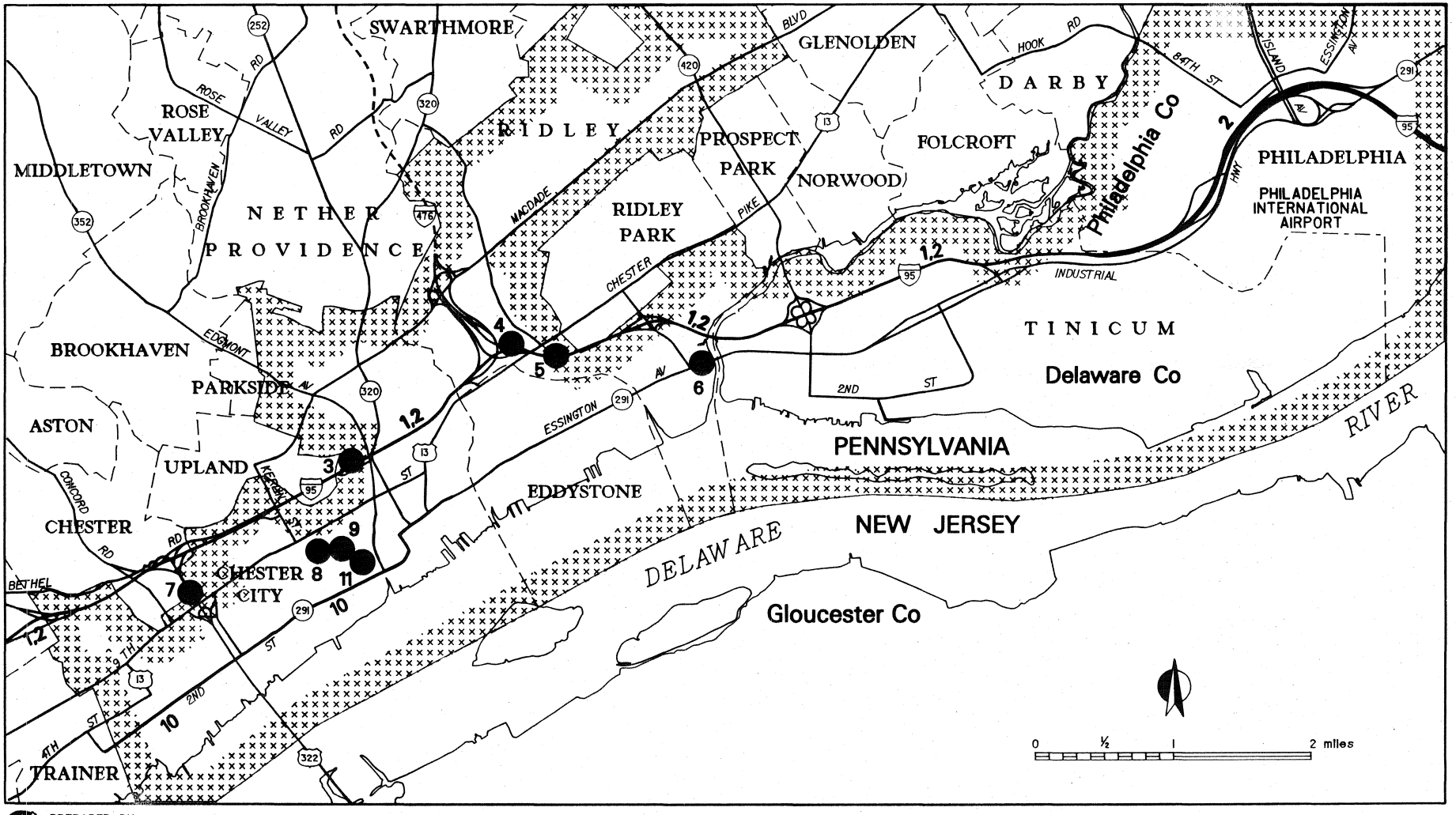

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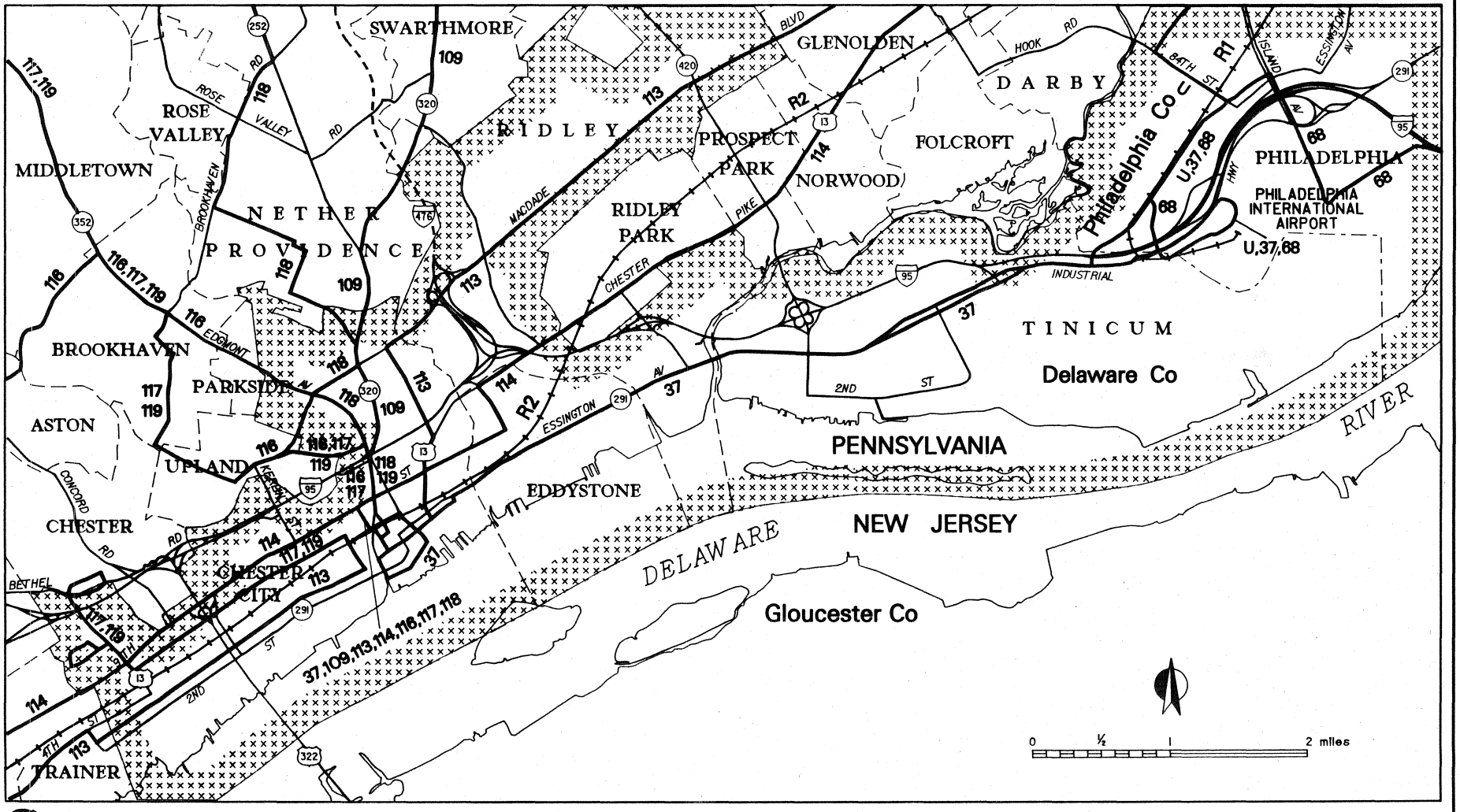
Figure IV

DELAWARE RIVER WATERFRONT TMA STUDY AREA
TRANSIT ROUTES



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R2 Regional Rail Line. The R2 runs between Wilmington, Delaware and Warminster, Pennsylvania, covering 94.8 round trip miles. It serves 3,005,028 annual passengers and has an average trip length of 12.5 miles. It has thirty-three stations, five of which are in the study area. These five stations are Highland Avenue [Chester], Lamokin Street [Chester], Chester, Eddystone, and Crum Lynne. None of these stations has significant park and ride facilities. There are eleven peak and four base vehicles operating on twenty-minute peak service and sixty-minute base headways. Running time is 105 minutes for peak service and 97 minutes for base service, while cycle time is 270 minutes for peak service and 250 minutes for base service. There are 29 daily trips and service is operated seven days a week from 5:00 a.m to 1:00 AM Total vehicle miles for the route is 2,285 and total vehicle hours is 83.3. Riders on this route can board Amtrak intercity trains at 30th Street Station in Philadelphia and at the Wilmington Station.

Route 37 Bus. This bus runs from the Broad Street Subway's Snyder Avenue station to the Chester Transportation Center traveling through Southwest Philadelphia and serving Philadelphia International Airport as well as many industrial plants and corporate offices around the airport. Route 37 carries 940,064 passengers annually. There are approximately thirty stops made in the Waterfront area. Peak headway is thirty minutes while base headway increases to sixty minutes. Running time for both peak and base service is sixty minutes. Service is provided seven days a week from 5:30 AM to 1:00 AM

Route 109 Bus. This bus travels between 69th Street Terminal in Upper Darby and the Chester Transportation Center along Baltimore Pike, Chester Road, and Providence Avenue serving the Springfield Mall and Widener University. Route 109 carries 1,302,107 passengers annually with a 3.6 mile average passenger trip length over the 23.3 mile round trip route. The bus makes approximately 204 stops during its route. There are seven peak and six base vehicles operating at fifteen- and twenty-minute headways. Running time for the route is forty-seven minutes for peak service and fifty-seven minutes for base service. Cycle times are 117 minutes for peak service and 134 minutes for base service. There are seventy daily trips. Service is provided seven days a week from 4:00 AM to 1:45 AM The route covers 1,367 total daily vehicle miles and 113.1 total vehicle hours are accumulated.

Route 113 Bus. Traveling between 69th Street Terminal and Marcus Hook, this route passes through Lansdowne, Darby and Chester. This route carries 1,479,556 passengers annually, each having an average trip length of 2.6 miles over the 33.8 round trip mile route. There are seven peak and six base vehicles with a thirty-minute headway for both peak and base service. The bus makes approximately 361 stops during its journey. Running time is ninety minutes for peak service and eighty-one minutes for base service. Cycle time is 173 minutes for both peak and base service. There are forty-six daily trips. The line operates seven days a week from 5:30 AM to 12:30 AM There are 1,188 daily vehicle miles and 103.4 daily vehicle hours.

Route 114 Bus: Operating between Darby and Boothwyn/Gardendale in Upper Chichester Township, Route 114 passes through Chester traveling along Chester Pike

and 9th Street. It carries 683,223 passengers annually. Average passenger trip length is 2.7 miles and round trip route mileage is 30.3. Approximately 269 stops are made during each run. Seven peak and six base vehicles are operated over a thirty-minute headway. Running time is sixty-three minutes for peak and base service; cycle time is 151 minutes for peak service and 144 minutes for base service. There are forty daily trips. Service is provided seven days a week from 5:15 AM to 10:15 PM There are 1,065 daily vehicle miles and 75.9 daily vehicle hours.

Route 116 Bus: This line travels a sparsely populated route between Chester and the Granite Run Mall. Along the way stops are made at 352 Plaza, Neumann College, Crozer Chester Medical Center, and Riddle Memorial Hospital. Only 125,615 passengers are carried annually. Average passenger trip length is 2.5 miles and 29.9 round trip miles are covered. There are three peak service and two base service vehicles with a sixty-minute headway for both peak and base service. Running time is sixty-three minutes while cycle time is 114 minutes for all hours of service. There are thirteen daily trips. Service is operated Monday through Saturday from 6:30 AM to 5:00 PM Three hundred and thirty-six daily vehicle miles are covered during 23.9 daily vehicle hours of operation.

Route 117 Bus. Traveling from Feltonville in Chester Township through Chester to West Chester, this route stops at the Crozer Chester Medical Center, 352 Plaza, Granite Run Mall, Penn State University's Delaware County Campus, Fair Acres Geriatric Center, and Cheyney University. It also serves the Elwyn train station, the last station on the R3 line. This route previously ran from Chester to the Penn State campus; it was extended to West Chester in September 1991. The route operates Monday through Friday with a one hour headway. Running time is ninety-five minutes and cycle time 202 minutes throughout the day. Thirteen trips operate each day from 5:40 AM to 8:36 PM.

Route 118 Bus. Route 118 originates in Chester and travels through Garden City in Nether Providence Township and Media, stopping at Delaware County Community College on its way to Newtown Square. The route carries 245,102 passengers annually. Average passenger trip length is 2.5 miles and the bus covers 26.6 round trip miles. Approximately 194 stops are made on each run. This service provides three peak and two base vehicles with a thirty-minute peak headway and sixty-minute base headway. Peak and base running time is fifty minutes while cycle time is 120 minutes for both. Twenty daily trips are made and service operates Monday through Saturday from 6:12 AM to 6 PM. Four hundred and ninety-four vehicle miles are covered during 39.1 vehicle hours of operation.

Route 119 Bus. This route connects Chester and West Chester via Painter's Crossroads. It has the same route as Route 117 between Feltonville and Granite Run Mall. However, from the mall Route 119 travels south on Route 1 to Route 202, serving the Franklin Mint, Wawa Dairy Farms, Concord Industrial Park, and State Farm Insurance. It proceeds north on Routes 202 and 322 to West Chester University and West Chester. The route operates seven days a week; however, it operates only between Feltonville and Painter's Crossroads on weekends. Headways are one hour on weekdays and Sundays,

and 30-60 minutes on Saturdays. Running time is 91 minutes and cycle time is 202 minutes on weekdays. On weekends, running time is 73 minutes and cycle time is 172 minutes. Twenty trips operate on weekdays between 4:55 AM and 1:30 AM. On Saturdays, 29 trips operate between 4:55 AM and 2:00 AM. Twenty trips operate on Sundays between 4:55 AM and 1:42 AM.

Route 68 Bus. This bus travels between the Chevron refinery in southwest Philadelphia and Philadelphia International Airport via Penrose and Moyamensing Avenues, Broad Street, and I-95. It stops at the Oregon and Pattison Avenue subway stations as well as all of the Airport terminals. It operates regular service between 5:20 AM and 12:30 AM seven days a week. In addition, two trips per night [Monday through Saturday] are made to the UPS Air Hub facility on Hog Island Road; these trips leave UPS at 2:57 AM and 3:27 AM Running time for a round trip is about 80 minutes. Peak headway is 16-21 minutes while base and weekend headway is 30 minutes. There are 40 weekday trips and 29 weekend trips.

Route U Bus. This bus travels between the Elmwood section of southwest Philadelphia and Philadelphia International Airport via Eastwick. It stops at all of the Airport terminals. It operates between 5:45 AM and 1:20 AM on weekdays and between 6:15 AM and 1:20 AM on weekends. Running time for a round trip is approximately 75 minutes. Peak headway is approximately 30-35 minutes while base headway is 40 minutes. Weekend headways are about 65 minutes. There are 26 weekday trips and 17 weekend trips.

Private Transit Availability

The study area is served by more than 60 private transportation companies, including the Delaware County Transportation Consortium. These carriers provide taxi, paratransit, charter, limousine, airport, van pool, and school services in the Waterfront area. These companies are listed in Appendix III; see DVRPC's Directory of Transportation Service Providers in the Delaware Valley Region for information on the services they provide.

C. INTERVIEWS WITH WATERFRONT AREA EMPLOYERS AND GOVERNMENT OFFICIALS

Another key component of the issue identification phase was a series of interviews with those most directly affected by transportation issues. DVRPC and DCPD staff met with chief executive officers or high-level staff of the largest employers, developers, and public sector agencies in the Waterfront area between May 1990 and May 1991. Appendix IV lists those who were interviewed. If cooperative solutions to transportation problems are to be implemented, those solutions must involve key area employers, developers, municipal managers, and residents. They are, in essence, the clients of any travel demand management [TDM] program for the area.

The interviews drew participants into the TMA process; at the same time, a degree of information was conveyed that a survey alone could not accomplish. It is implicit in the issue identification task that the TMA program be developed to meet the identified needs of the area. The continued participation of those interviewed was sought to ensure that the program emerging from this process is accepted and supported.

In meetings with private sector management staff, DVRPC and DCPD staff not only explained TDM programs and the TMA concept but also gained firsthand knowledge about the operation of each company and the transportation issues affecting its management and employees. These discussions helped to prioritize the issues and identify programs the TMA could implement.

Several aspects of the transportation system were discussed. Inquiries were made about the transportation-related problems their companies were facing, such as traffic congestion, public transit availability, or inability to fill vacancies because of the company's location. Second, each company was asked about the potential solutions to those problems. Third, we asked for their potential participation in programs that help to solve those problems.

The major transportation issues identified in this process are the following:

1. Highways
2. Parking
3. Bus Transit/Ridesharing
4. Commuter Rail
5. Airport Access
6. Areawide Coordination
7. Economic Development

Table III is a matrix showing which of these issues were identified by employers, developers, municipalities, Delaware County and PennDOT. Ten issues were identified by at least four of the groups interviewed: [1] highway congestion, [2] highway accessibility, [3] traffic flow improvements, [4] lack of highway construction, [5] private financing of highway improvements, [6] lack of transit, [7] bus transit frequency, [8] bus transit routing, [9] commuter rail links to activity areas, and [10] labor access.

The first four issues relating to highways [congestion, accessibility, traffic flow improvements, and lack of construction] testify that highway facilities are insufficient for traffic volumes; Routes 291 and 322 improvements are high priorities. While the perception may be that new or wider highways will solve congestion problems, experience shows that new facilities soon become congested as well, and they encourage more congestion–causing development. TDM programs will reduce traffic congestion, as well as air pollution, energy use, and accidents.

Table III
INTERVIEW FINDINGS BY CLIENT GROUP
DELAWARE RIVER WATERFRONT AREA TRANSPORTATION MANAGEMENT ASSOCIATION

Issue Identification Matrix

Issues Raised as of May 1991	Private Sector		Public Sector		
	Employer	Developer	MCD*	County	State
Highways					
Congestion	X	X	X	X	X
Accessibility	X	X		X	X
Financing		X		X	
Traffic Flow Improvements	X	X	X	X	X
Lack of Construction	X	X		X	X
Private Role in Highway Improvements					
Prioritizing					
Financing		X	X	X	X
Building		X	X		
Parking Problems	X	X		X	
Bus Transit/Ridership					
Lack of Transit	X	X	X	X	
Lack of Paratransit	X	X		X	
Frequency	X	X	X	X	
Routing	X	X	X	X	
Rail Linkage	X	X			
Financing	X	X			
Amenities				X	
Increased Use					
Commuter Rail					
Frequency				X	
Links to Activity Areas	X	X	X	X	X
Airport Access			X	X	
Commuter Information/Signage	X	X			X
Areawide Coordination					
Emergency Travel					
Intermodal			X	X	X
Municipal Approval				X	
Lack of Public/Private Foirum					X
Economic Development					
Growth Management					
Labor Access	X	X		X	X
	Employer	Developer	MCD*	County	State

*MCD = Minor Civil Division
(Cities, Boroughs & Townships)

Private financing of highway improvements was given a high priority. The private sector can make a major contribution in the areas of right-of-way preservation and donation for roads and park and ride lots. The private sector can contribute the local share of federally or state funded projects. Special benefit assessments, tax increment financing, and impact fees are methods of collecting this private financing.

Transit services were also important issues to the public and private sector parties interviewed. Much of the Waterfront area lacks transit which conveniently links employees' homes with their job locations. As the study Delaware County Waterfront Communities Transit Service Improvements pointed out, direct service between central/eastern Delaware County and the waterfront is sorely needed; new routes and more frequent service should be implemented to encourage ridership. Shuttle service from area train stations would improve access further and provide an additional commuting option.

Labor access was also cited as a major issue that should be addressed. The current general lack of commuting options limits the labor supply for area employers. TDM programs such as customized transit, van and car pooling, preferential parking for car and van pools, transit and ridesharing subsidies, and guaranteed ride home programs will improve labor access and the supply of labor.

Two matrices were prepared to summarize the interview results: Table III, "Interview Findings by Client Group," lists the major issues from private and public sector viewpoints. Table IV, "Interview Findings by Geographic Area," lists the issues by company site and study area.

D. EMPLOYER SURVEY

Background

The Delaware River Waterfront Employer Mobility Needs Assessment was conducted by Delaware Valley Regional Planning Commission [DVRPC] staff at the request of the Delaware County Planning Department. The objective of this survey was to identify those transportation issues employers felt could best be addressed through a public-private cooperative effort.

As a public-private venture, a viable Delaware River Waterfront travel demand management [TDM] program would provide programs that fulfill the needs of its constituents. The survey is a tool to determine consumer demands and identify a market for specific potential TMA services.

Furthermore, employers are more willing to support and participate in transportation management programs when they feel that they have input into the agenda, and that the programs being developed will solve their own firm's mobility concerns. Therefore,

Table IV
INTERVIEW FINDINGS BY GEOGRAPHIC GROUP
DELAWARE RIVER WATERFRONT AREA TRANSPORTATION MANAGEMENT ASSOCIATION
Issue Identification Matrix

Issues Raised as of May 1991	Site	Area
Highways		
Congestion	X	X
Accessibility	X	X
Financing	X	X
Traffic Flow Improvements	X	X
Lack of Construction	X	X
Private Role in Highway Improvements		
Prioritizing		
Financing	X	X
Building	X	X
Parking Problems	X	X
Bus Transit/Ridership		
Lack of Transit	X	X
Lack of Paratransit	X	X
Frequency	X	X
Routing	X	X
Rail Linkage	X	
Financing	X	
Amenities		X
Increased Use		
Commuter Rail		
Frequency		X
Links to Activity Areas	X	X
Airport Accsss		X
Commuter Information/Signage	X	X
Areawide Coordination		
Emergency Travel		
Intermodal		X
Municipal Approval		X
Lack of Public/Private Forum		X
Economic Development		
Growth Management		
Labor Access	X	X

the survey also serves an informational role, familiarizing employers with the initiative to improve mobility and encouraging dialogue among members of the private and public sectors concerning transportation issues.

The resulting TDM program can take several shapes, from individual employer car pooling programs to public/private transportation management associations [TMAs] to municipal traffic reduction ordinances. A TMA's advantages are that both the public and private sectors are working together cooperatively and can pool resources with each sector doing what it does best.

Objectives

The Delaware River Waterfront Employer Mobility Needs Assessment was designed to achieve certain objectives:

[1] gather basic information about Delaware River Waterfront firms, and establish a data base of local employers
[2] determine employer transportation issues and concerns
[3] examine employer receptivity to broad-based transportation programs
[4] obtain zip code lists of employee residences for origin and destination studies
[5] identify employers who wish to participate in a Delaware River Waterfront TDM program and/or developing transportation management programs for the region.

Survey Instrument

The survey package contained three items. A cover letter introduced the respondent to the questionnaire, and outlined the efforts to relieve transportation problems in the Delaware River Waterfront area. The cover letter was authored by the Eddystone Borough, Ridley Township, or Tinicum Township Manager, or Chester City Planning Director [depending upon the target company's location] in order to underscore to employers the importance of participating in the survey.

The second item was the questionnaire. Questions were tailored to assist planners in formulating strategies for the implementation of transportation demand management programs. Employers were asked to report the types of programs in which they currently participate, their outlook on the effects of transportation conditions on their operations, and what types of transportation management actions they would recommend and/or participate in if offered in the Delaware River Waterfront area. A copy of the questionnaire is included in Appendix V.

A postage paid envelope was also included to speed the return of completed surveys to DVRPC.

Survey Process

Employer mobility questionnaires were mailed to 100 firms in the Delaware River Waterfront area. The survey area is defined as between I-95 and the Delaware River, and between Philadelphia International Airport and Chester, inclusive. The principal source for mailing list information was the Dunn & Bradstreet Employer Directory, which provided the company name, address, telephone number, and contact person for organizations with 25 or more employees. Firms with less than 25 employees were not included in the sample; experience has shown that they generally do not have the resources to take a leadership role in implementing TDM programs, and their needs are fairly identical to those of the larger employers. This omission saves considerable money and doesn't materially affect the results. Any TDM program in the area will of course be open to their participation, and their involvement will be actively solicited at that time. That being said, still 8% of the surveys were returned by firms with less than 25 employees, due to changes at the companies, questionnaires forwarded to different companies, and inaccuracies in the source data base.

The survey was administered between April and November 1990. In addition, three local governments, PennDOT, five firms employing more than 8,000 persons, and two developers participated in personal interviews with DVRPC and DCPD staff. After the initial survey mailing in April 1990, a follow-up mailing to all non-respondents was distributed in June 1990. As part of the follow-up, firms with more than 250 employees were contacted by telephone encouraging them to complete and return the mobility survey. It was also necessary to contact about 10 employers individually by phone in order to clarify some responses and to obtain employee zip code data which had been omitted. This effort increased the return rate to 38%, with 38 total replies.

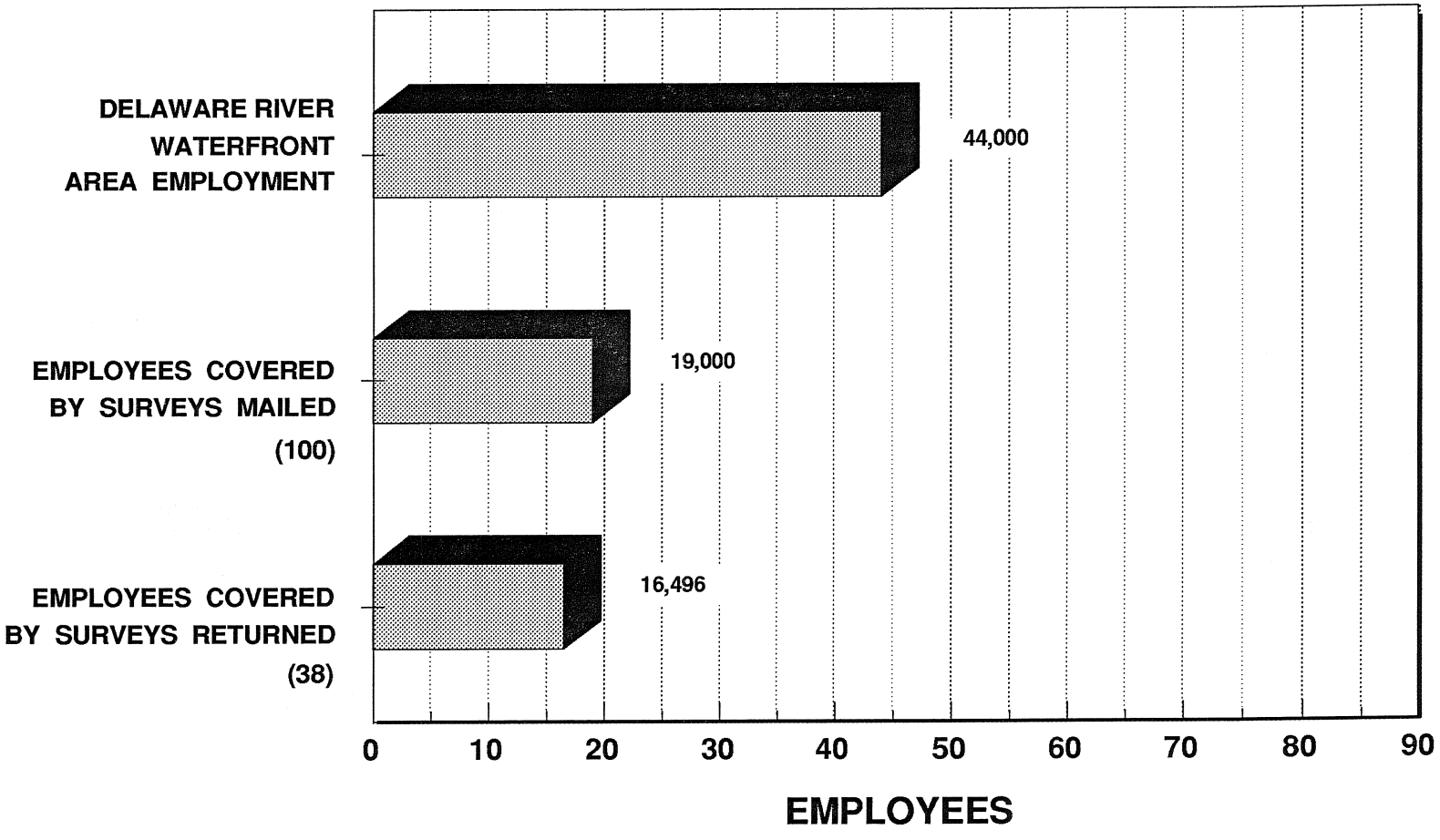
Total employment in the study area is estimated at 44,000 individuals, based on DVRPC forecasts. The 100 employers reached through the survey mailing employ approximately 19,000 persons; the 38 questionnaires that were returned represent 16,496 employees, or about 37% of total employment and 87 % of the sample population. [Figure V]. The response rate means it is highly representative of the overall employment.

Responses to Individual Questions

The initial survey questions serve to characterize the responding firm, identifying the company's principal activity, number of employees, type of work schedule, and extent of parking facilities. Subsequent questions reveal the concerns employers have regarding mobility in the region, now and in the future, probing employers' thoughts on such issues as reducing job vacancies by providing workers with better accessibility to employment sites, and improving highway and public transit systems. Other questions identify the transportation management efforts in which employers are currently engaged, as well as actions they would consider taking to promote mobility.

FIGURE V

EMPLOYER SURVEY STATISTICS



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The results of the survey are presented in the order in which the questions appear on the questionnaire, and a discussion of each response is offered. The responses are expressed according to the number and/or percentage of employers who replied. In some cases, the total number of employees reported to work for those employers is also indicated to better represent the full impact of a given issue or program.

The data are tabulated by three subarea zones to facilitate a more refined analysis. These results are displayed in Appendix VI. The subarea information, relevant in the design of specific transportation management programs, is included to provide a complete reference of survey responses. The three subareas are as follows:

Subarea 100 Chester City
Subarea 200 Eddystone, Ridley Township and Tinicum Township west of [not including] Philadelphia International Airport
Subarea 300 Philadelphia International Airport [portions of Tinicum Township and Philadelphia]

QUESTION 1: TYPE OF FIRM

*RESPONSES**	Number	Percent
Manufacturing	12	28.9%
Business/Professional/Services	9	23.6%
Government	7	21.1%
Construction	6	15.8%
Retail Trade	2	5.3%
Wholesale Trade	2	5.3%
Total	38	100.0%

**Majority of the categories are the original categories that were provided on the survey form. Only a few are hybrid categories, chosen to combine related groups,. Responses given for "other" were disbursed among the related categories.*

DISCUSSION

The types of firms completing the survey were diversified [see Figure VI]. Manufacturing firms and business/professional/services firms each accounted for a quarter of the responses. Government and construction also accounted for large percentages of the responses. The lowest percentage of respondents occurred in the retail and wholesale trade categories.

Figure VII shows that most of the employees of the responding firms work for manufacturing companies. Most of the remaining employees work for business/professional/other services.

FIGURE VI

TYPES OF FIRMS RESPONDING TO SURVEY

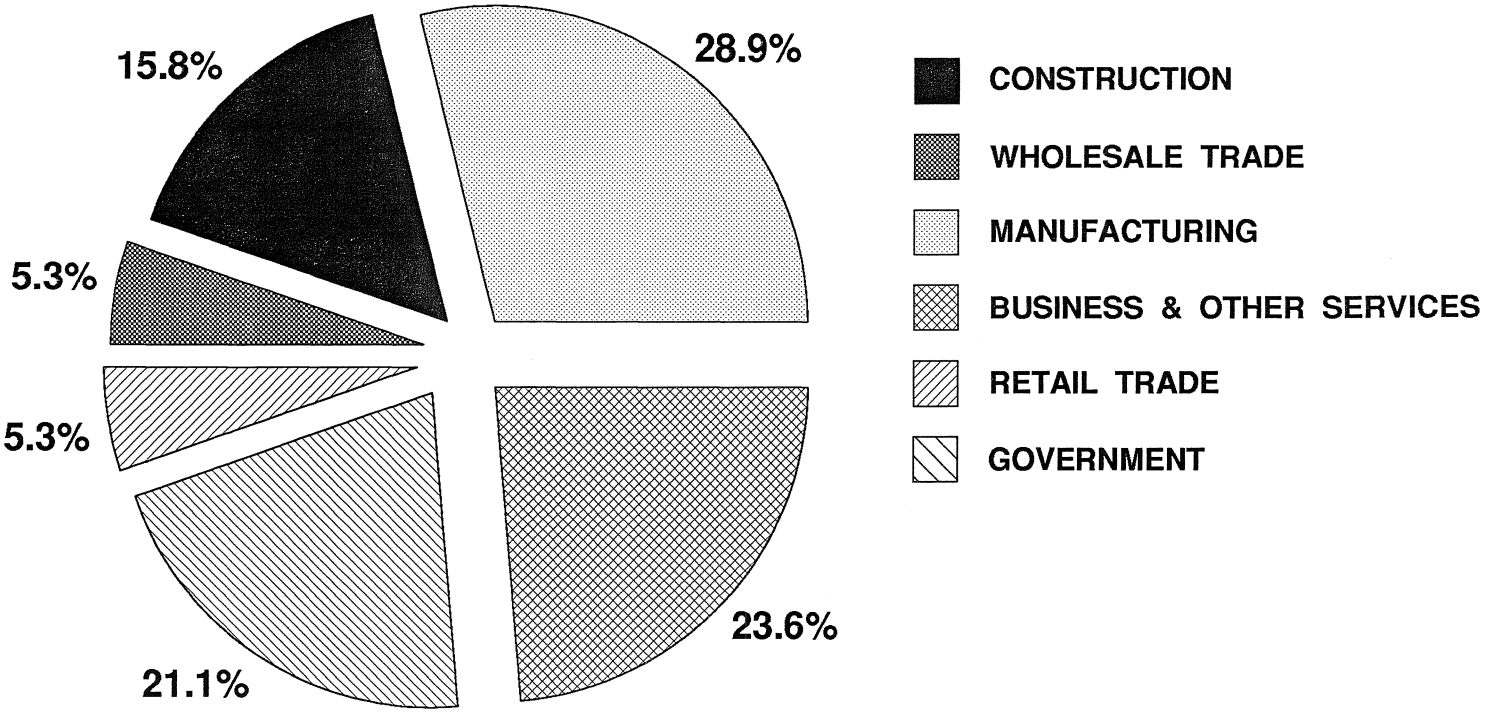

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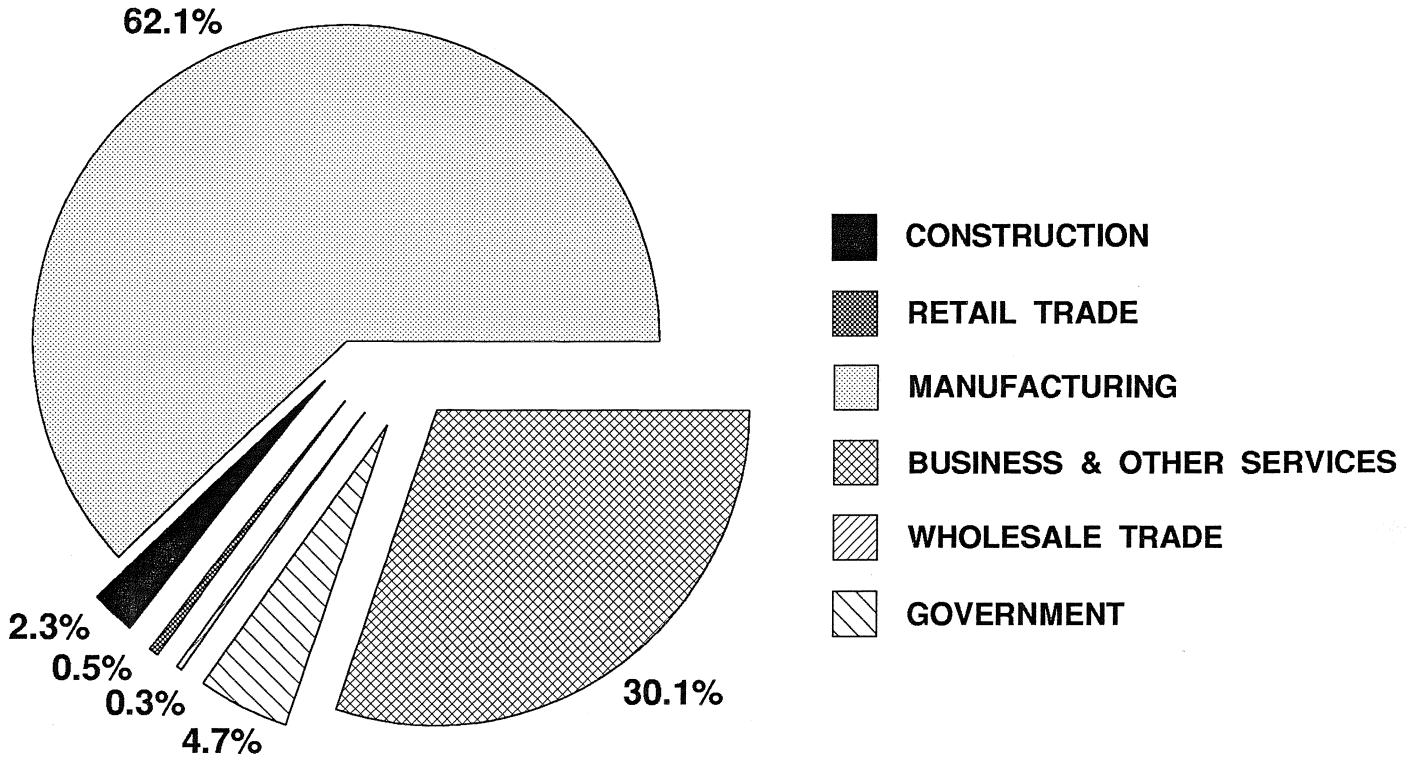
FIGURE VII

TYPES OF FIRMS RESPONDING TO SURVEY BY EMPLOYEES



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Knowing the survey's composition of firms provides a means for analyzing the types of TDM programs which might be appropriate for some employers, while identifying some of the limitations that would inhibit others from implementing a given program. One possible program is alternative work scheduling, which may be difficult for retail stores to implement since they frequently maintain fixed schedules. The relatively low concentration of retail trade [5.3%] suggests that alternative work schedules, if implemented among employers, could be successful in reducing peak hour congestion. A significant percentage of respondents are manufacturing firms that tend to operate on staggered shifts, which present unique opportunities and constraints for such programs as shuttle services and transit subsidies.

QUESTION 2: NUMBER OF EMPLOYEES AT THIS LOCATION

RESPONSES

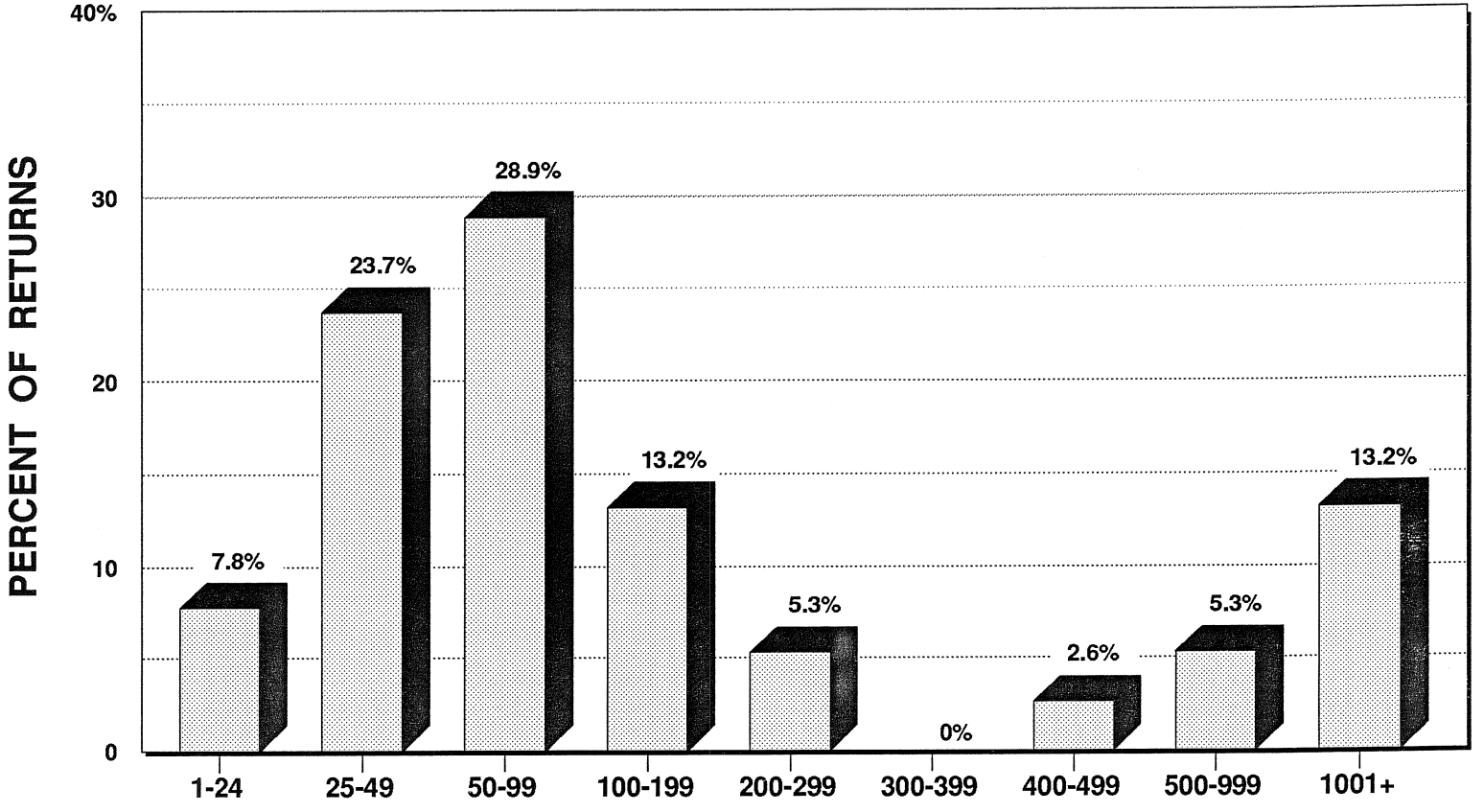
Size of Firm by Number of Employees	Firms	Percent Firms	Total Employed
1 - 24	3	7.8%	52
25 - 49	9	23.7%	329
50 - 99	11	28.9%	687
100 - 199	5	13.2%	643
200 - 299	2	5.3%	470
300 - 399	0	0.0%	0
400 - 499	1	2.6%	440
500 - 999	2	5.3%	1,325
1,000 +	5	13.2%	12,550
Total	38	100%	16,496

DISCUSSION

Two-thirds of the responding firms employ between 25 and 200 persons; however, 76% of the employees in the responding firms work in the five firms that each employ more than 1,000 persons [see Figure VIII]. There are positive implications for these findings, for both the use of TDM programs and for the establishment of a Delaware River Waterfront TMA. Large companies have the requisite resources and organizational structure to facilitate the implementation of transportation programs. The Delco CRIER TMA may wish to target a few big firms in order to reach the largest employee populations, but may also plan for the desires of the mid-size organizations that comprise the majority of employers, if not employees. Additionally, programs should be designed to consider linking firms of similar size and location with comparable problems and mutual solutions.

FIGURE VIII

SURVEY RETURNS BY FIRM SIZE



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QUESTION 3: FIRMS WITH OTHER LOCATIONS IN THE DELAWARE RIVER WATERFRONT AREA

RESPONSES

Number of other locations	11
Number of employees at other locations	3,996
Number of firms with other location	9

DISCUSSION

Among the 38 firms, 9 firms had eleven other offices within the Delaware River Waterfront area employing 3,996 employees at those locations. The firms with more than one location may lean toward greater involvement in TDM programs because of their sizable investment in the region and their need for more complex mobility solutions.

QUESTIONS 4 & 5: PARKING AVAILABILITY

RESPONSES	Firms	Spaces
[4] Approximate number of parking spaces available for use by employees, clients, and visitors	27	5,281
[5] Foresee a need to construct or acquire additional parking spaces within the next three years	8	4,634

DISCUSSION

There are currently 1.36 parking spaces per employee at the responding firms [Figure IX]. The average number of spaces per firm is 196.

Approximately one-quarter of the firms reported that they anticipate the need to expand their parking facilities by a total of 4,634 spaces over the next three years [Figure X]. If the quantity of anticipated parking spaces were factored up to the region as a whole [multiplying by a factor of 2.67], the result would be a startling increase of 12,373 spaces throughout the region during the next three years.*

Those employers who expressed a need to acquire more parking provide a sense of expected economic expansion. Plans for additional parking indicate a firm's anticipated expenditures on infrastructure, representing significant costs for employee parking benefits. The development and construction cost of one parking space [surface lot] in America is currently about $5,000. [ENO Foundation, as reported in "Urban Land," ULI,

FIGURE IX

PARKING SPACES AVAILABLE

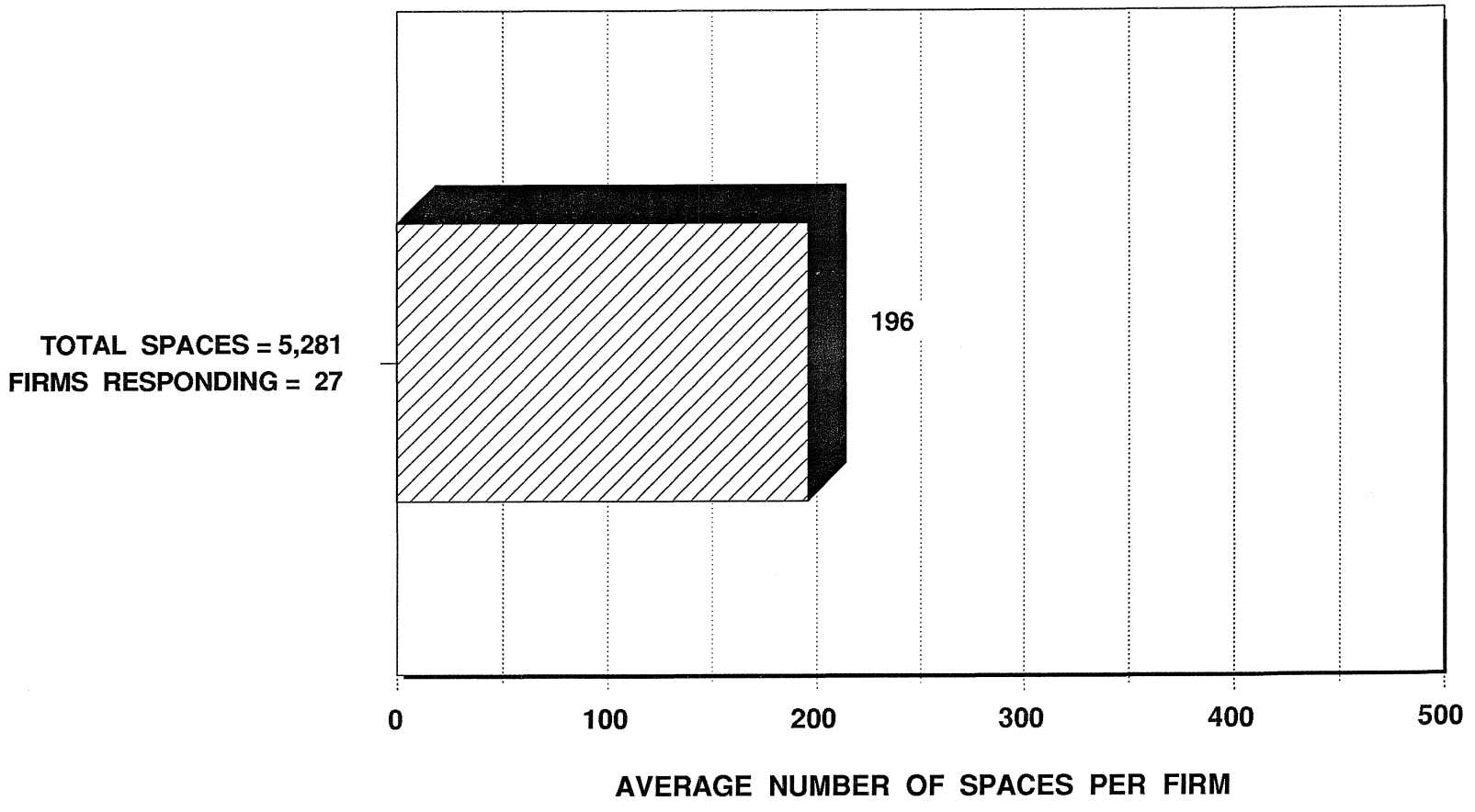

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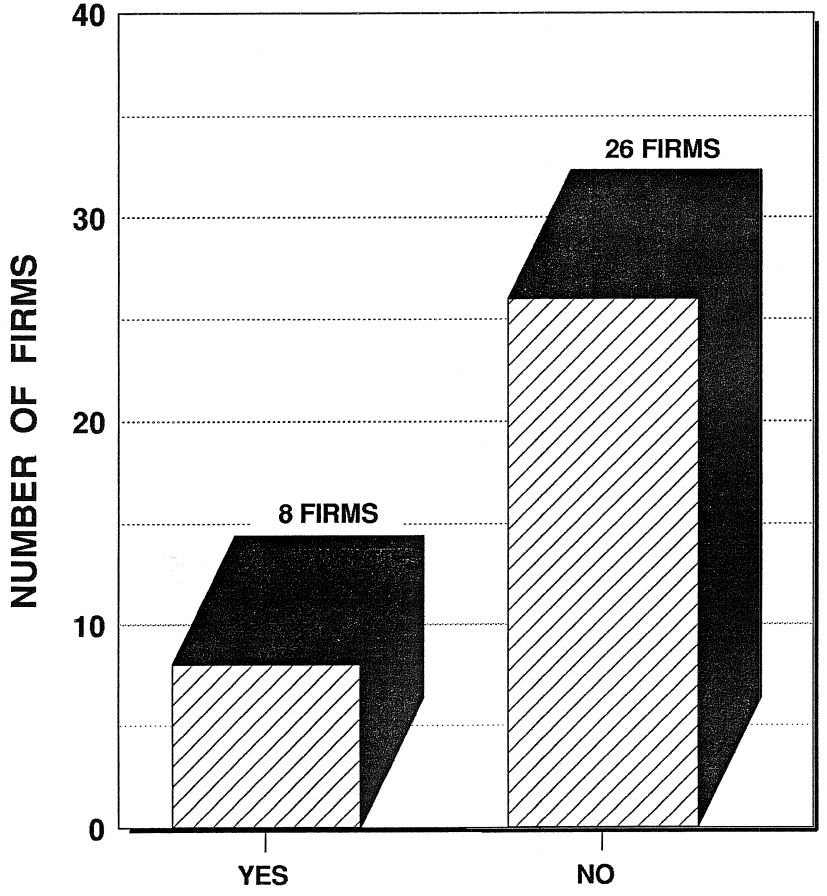
FIGURE X
NEED FOR ADDITIONAL PARKING SPACES WITHIN THREE YEARS



TOTAL ADDITIONAL SPACES = 4634

FIRMS RESPONDING = 34

AVERAGE PER FIRM = 136 SPACES

AVERAGE PER FIRM NEEDING PARKING = 579 SPACES

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February 1990.] This is significant when one considers that 12,373 spaces for the region translate to at least 62 million dollars in capital expenditures for mobility [mainly for solo driving] among the private sector throughout the Delaware River Waterfront region. A fraction of this money could be spent by employers and/or a TMA on TDM programs, and thereby achieve lower levels of congestion and higher levels of mobility. In addition, valuable land which might be used for parking spaces could instead be used for constructive and revenue-generating uses such as office expansion, or services such as day care centers.

**Computed by taking the total employment estimated for the region [44,000] and dividing it by the employment reported in the survey [16,496], resulting in a factor of about 2.67.*

QUESTION 6: TYPE OF WORK SCHEDULE USED BY FIRM

RESPONSES	Employers/Percent		Employees/Percent	
Staggered Shift	25	65.8%	13,229	80.2%
Fixed Schedule	8	21.1%	319	1.9%
Fixed and Flextime*	2	5.3%	2,800	17.0%
Flextime	1	2.6%	48	0.3%
Fixed and Staggered*	1	2.6%	28	0.2%
No Response	1	2.6%	72	0.4%

**The asterisk identifies combination schedules. The questionnaire provided four scheduling types: Staggered Shift, Fixed, Flextime, and Compressed week. A number of employers reported using some combination of these schedules.*

DISCUSSION

Almost two-thirds of the responding employers and 80% of the employees of the responding firms in the Delaware River Waterfront region operate under a staggered shift schedule [Figures XI and XII]. Fixed schedules were reported by eight firms employing 1.9% of employees. Two firms combined a fixed schedule and flextime; they employee 2,800 employees [17%].

Regardless of work schedule, employees commute to and begin work at various times [see end of Appendix VI]. The workday starts at midnight for 2,615 [17.1%] employees. During the morning peak traffic period, approximately 7:00 a.m. to 8:30 a.m., 1,955 or 12.7% of the employees arrive at work. Over 50% [8,400] of the employees' starting times were not reported.

Because so many employees have staggered hours, commuter travel occurs at several different times, as opposed to only two times [morning and afternoon peak periods]. Because of this, traffic volumes have already been spread out and congestion reduced. However, there is still the potential for staggering starting times of some of the employees working under staggered shifts.

FIGURE XI

WORK SCHEDULES BY EMPLOYER

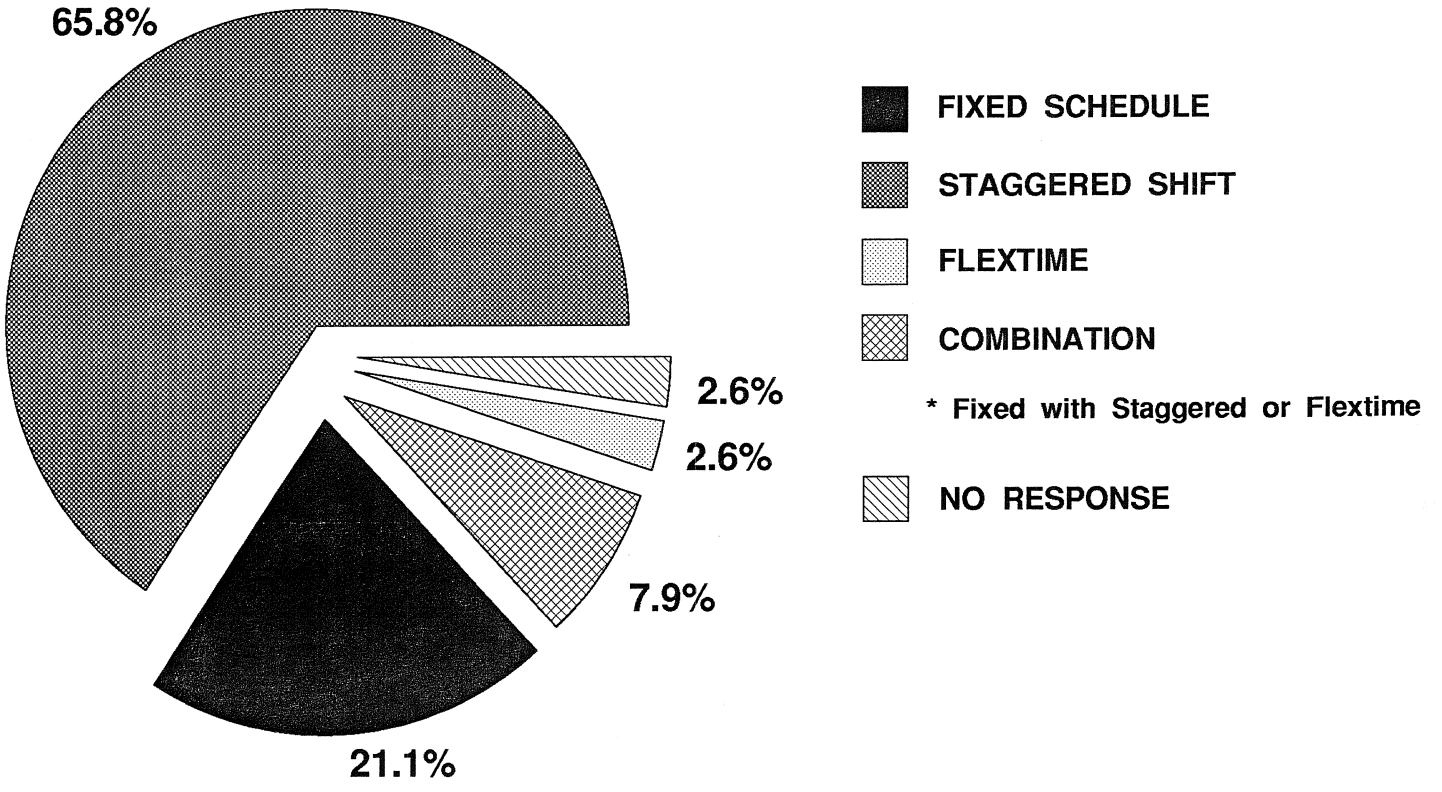

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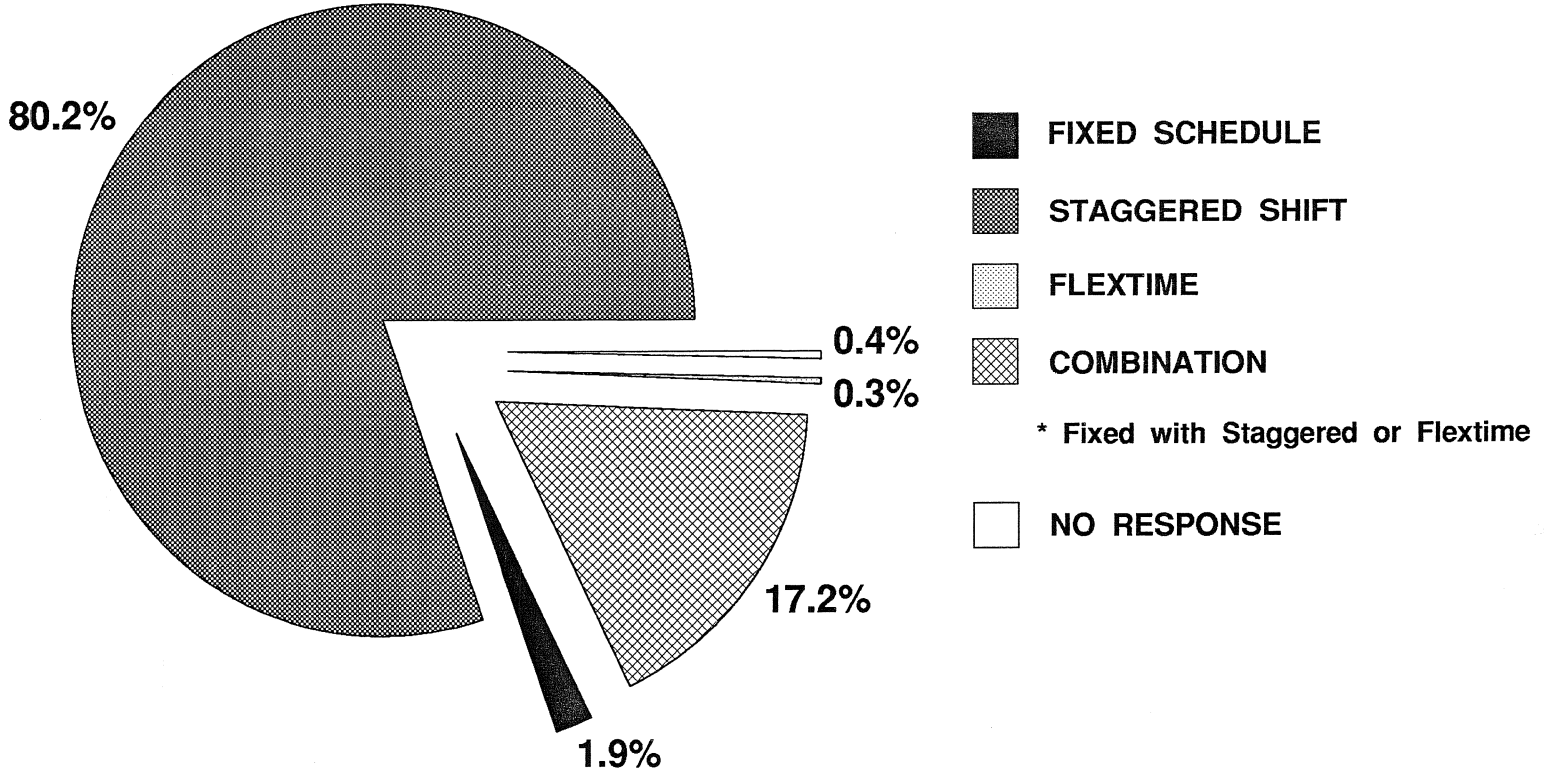
FIGURE XII

WORK SCHEDULE BY EMPLOYEES



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QUESTION 7: TRANSPORTATION ACTIVITIES CURRENTLY SPONSORED

RESPONSES	*Employers/Percent*		*Employees/Percent*	
Shuttles to bus/rail	5	13.2%	4,880	29.6%
Preferential parking	4	10.5%	8,315	50.4%
Other	3	7.9%	913	5.5%
Car pooling	2	5.3%	7,280	44.1%
Van pooling	0	0	0	0
Alternative Work Schedule	0	0	0	0
Transit assistance	0	0	0	0

DISCUSSION

Less than half of the respondents are currently sponsoring transportation activities [see Figure XIII]. However, Figure XIV indicates that a large number of employees are employed at firms which have a shuttle service, a car pooling program, or preferential parking for car pools and van pools. The small number of firms which provide these programs have a large number of employees. These figures do not mean that all employees of these firms participate in the programs; in all likelihood, few employees participate.

The results indicate that TDM approaches are currently underutilized for improving area mobility. The fact that some employers are providing some of these programs suggests the opportunity for expanded development, marketing, and implementation among other companies in the region.

QUESTION 8: EFFECTS OF VARIOUS TRANSPORTATION CONDITIONS ON FIRMS' MOBILITY

RESPONSES	No Effect	Negative/ Very Negative Effect
Rush hour congestion	40.5%	59.5%
Inadequate access by transit	51.4%	48.6%
Poor highway access	62.2%	37.8%
Insufficient parking	70.3%	29.7%
Inadequate circulation	70.3%	29.7%

DISCUSSION

Nearly 60% of the firms responded that rush hour congestion negatively impacted on the mobility of their employees. Almost half of the employers said inadequate transit access negatively affected their mobility. Thirty to forty percent of the employers said

FIGURE XIII
TRANSPORTATION ACTIVITIES CURRENTLY SPONSORED

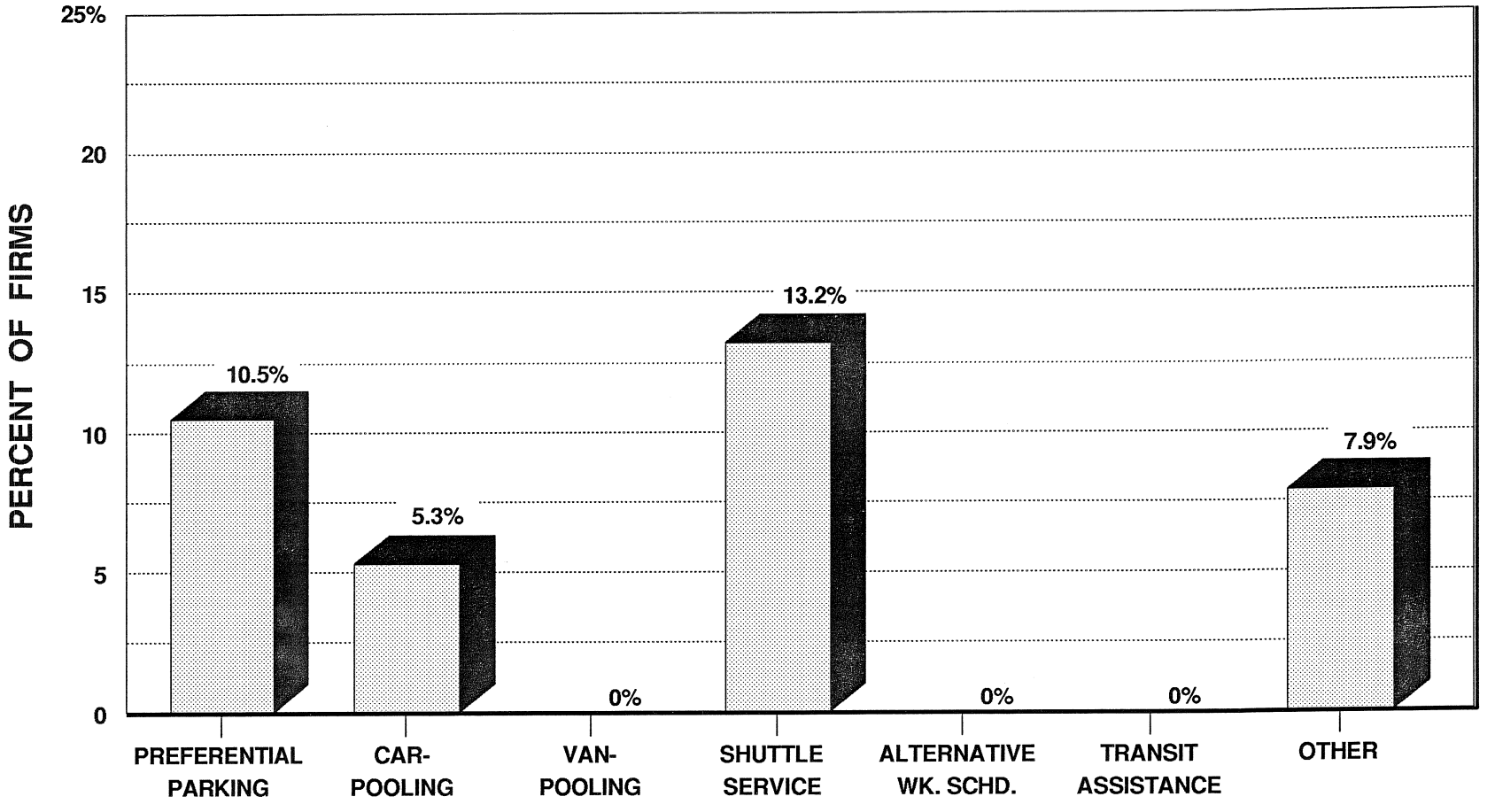

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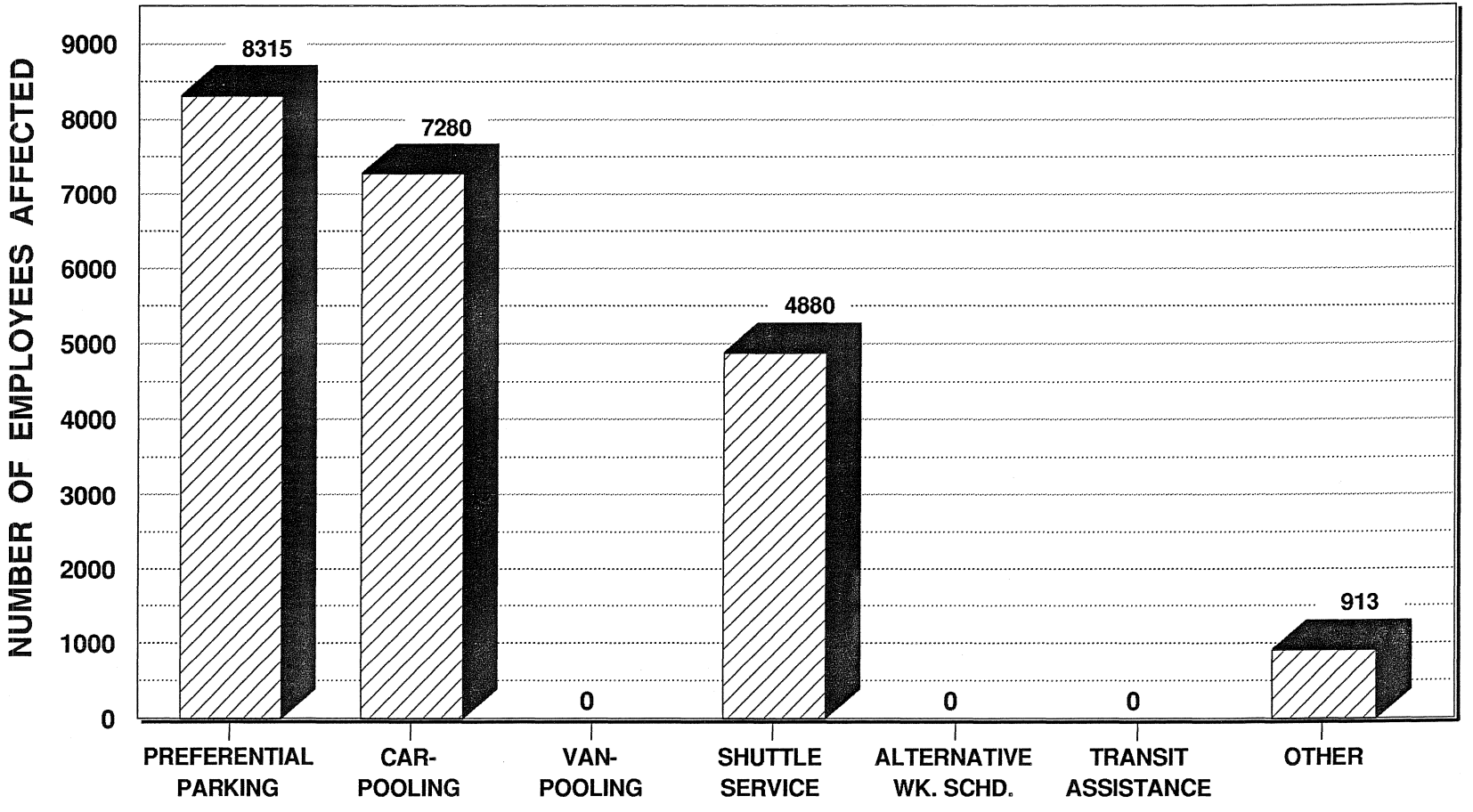
FIGURE XIV

EMPLOYEES AFFECTED BY TRANSPORTATION ACTIVITIES CURRENTLY SPONSORED



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poor highway access, insufficient parking, and inadequate circulation negatively affected their mobility [see Figure XV].

QUESTION 9: VIEWS ON TRANSPORTATION CONDITIONS FIVE YEARS FROM NOW

RESPONSES	Better	Same	Worse
Peak hour congestion	22.2%	27.8%	50.0%
Adequacy of public transit	5.6%	55.5%	38.9%
Adequacy of parking	5.6%	69.4%	25.0%
Circulation within the area	8.6%	68.6%	22.8%
Highway access	19.5%	61.1%	19.4%

DISCUSSION

Employers were asked to give their views on transportation conditions five years into the future [Figure XV]. Fifty percent of employers said peak hour congestion will worsen while only 22.2% said congestion will get better [be reduced]. Many more felt that area circulation and the adequacy of public transit and parking would worsen than the number who felt that those three conditions would improve. The number of employers predicting highway access would improve was similar to the number of employees predicting it would worsen. These opinions indicate potential for effectively pursuing TDM programs. Many employers believe transportation problems will worsen; therefore, any TDM programs will likely have a receptive market.

QUESTION 10: FIRMS' LOCATIONS IN TERMS OF ACCESS TO PUBLIC TRANSIT

RESPONSES	*Firms*	*Employees Affected*	
Excellent	13.2%	228	1.4%
Adequate	36.8%	4,978	30.2%
Poor	34.2%	2,280	13.8%
None Available	10.5%	8,630	52.3%
[No response]	[5.3%]	[380]	[2.3%]

DISCUSSION

Approximately 45% of the responding firms employing 66% of the employees rate public transit access to their locations as poor or unavailable [Figure XVI]. This confirms the findings of the report Delaware County Waterfront Communities Transit Service

FIGURE XV
EMPLOYER TRANSPORTATION CONCERNS OVER TIME

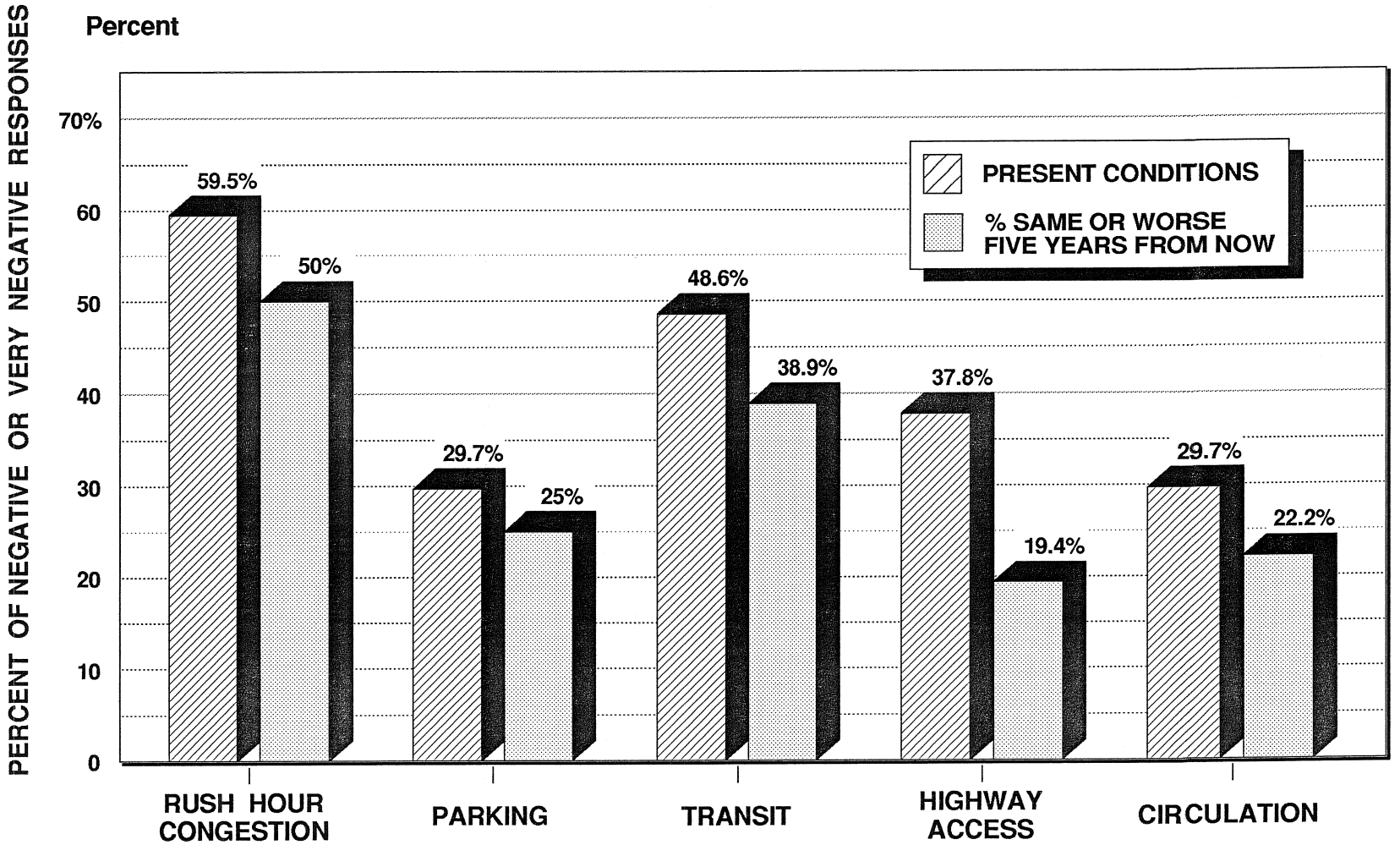

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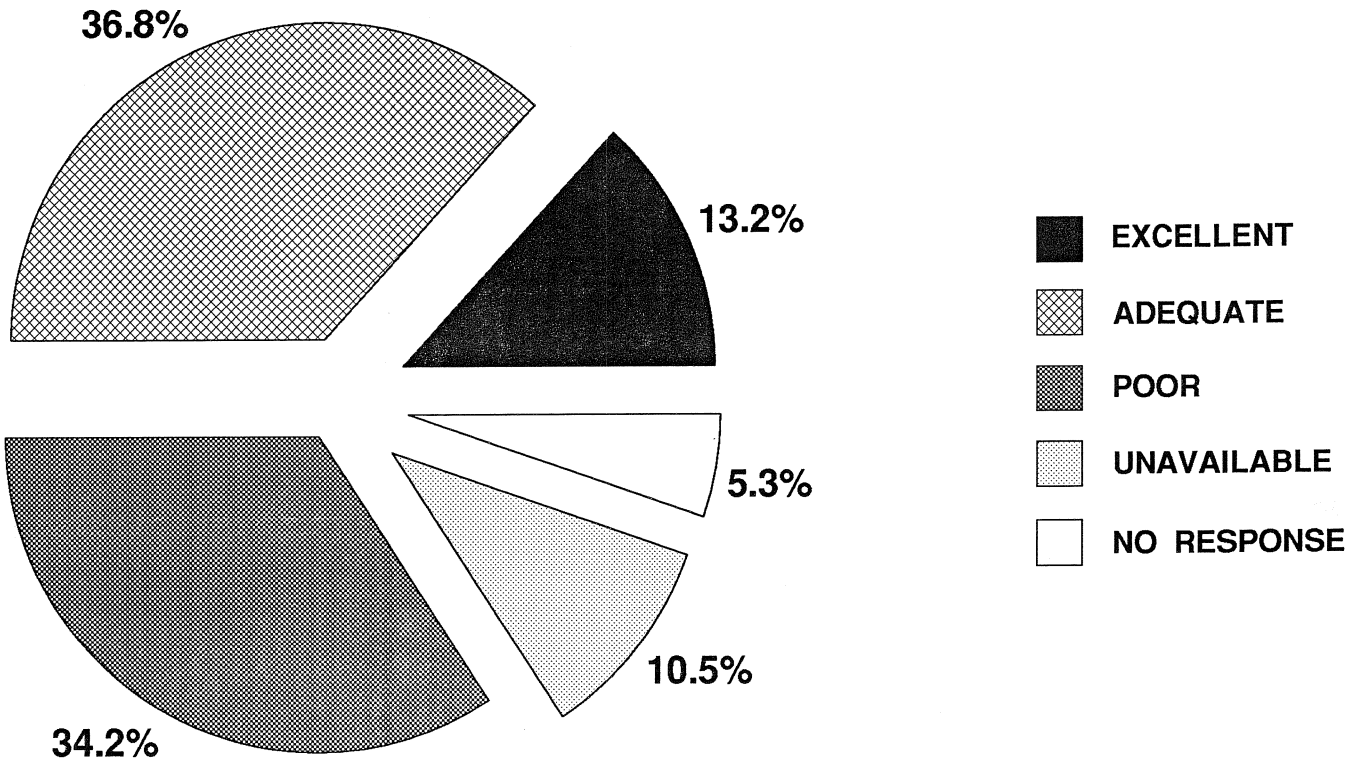
FIGURE XVI

TRANSIT ADEQUACY



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Improvements. Fifty percent of the firms employing 31.6% of the employees rated transit access as excellent or adequate.

The fact that almost half of the respondents consider public transit access to be poor or unavailable suggests that new transit service, such as shuttles to transit stations or subscription bus routes, would be well received.

QUESTION 11: EFFECTS OF LACK OF PUBLIC TRANSIT ACCESS

RESPONSES	No Effect	Negative/ Very Negative Effect
Obtaining entry level personnel/trainees	63.8%	36.2%
Parking	75.0%	25.0%
Positions at all levels	80.6%	19.4%
Employee turnover	86.1%	13.9%

DISCUSSION

Nearly 20% of employers attributed their firms' job vacancies, at all levels, to a lack of access to public transportation [Figure XVII]. Moreover, when asked specifically about entry level personnel and trainees, 36.2% of these employers felt that entry level positions went unfilled due to a lack of access to public transportation.

Twenty-five percent of employers believed that lack of transit affected their parking situations; perhaps they felt if good transit service existed fewer parking spaces would be needed, or some spaces would be freed up. Fourteen percent of employers attribute high employee turnover to lack of access to public transit. These views indicate that, while the majority of firms believe a lack of public transit access has no effect on any of these issues, some firms are negatively affected. Transit service should be provided to address these needs.

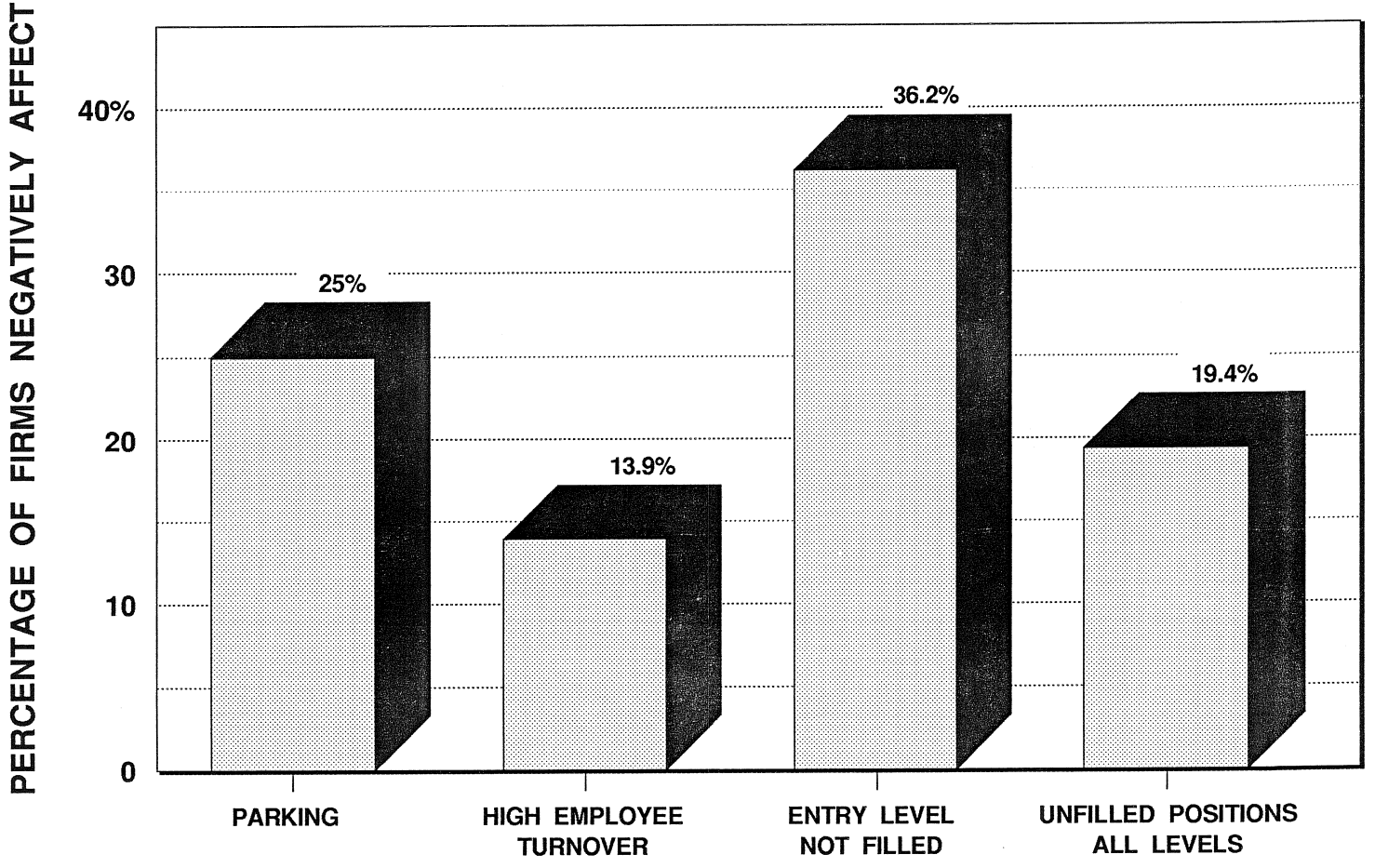
QUESTION 12: JOB VACANCIES ATTRIBUTABLE TO POOR TRANSIT ACCESS

RESPONSES

Jobs unfilled	82+
Number of firms	8

FIGURE XVII

TRANSIT EFFECTS ON EMPLOYERS



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DISCUSSION

Eight firms reported that more than 82 jobs are unfilled due to poor access to public transportation. If the 82 vacancies reported by employers are extrapolated to the Delaware River Waterfront area, at least 219 positions that have gone unfilled [82 vacancies multiplied by 2.67] are associated with a lack of public transit access.* These estimates are conservative, but merit attention and investigation because of their implications for Transportation Management Association efforts. A TMA can bridge the gap between employers' personnel needs by getting involved with organizations such as the Private Industry Council [PIC]. The Delco CRIER TMA could work with a PIC to provide potential new employees and transportation for them to firms needing employees. This would be very valuable service to employers.

*Computed by taking the total employment estimated for the region [44,000] and dividing it by the employment reported in the survey [16,496], resulting in a factor of about 2.67.

QUESTION 13: ACTIONS THAT WOULD HELP RELIEVE TRANSPORTATION BOTTLENECKS

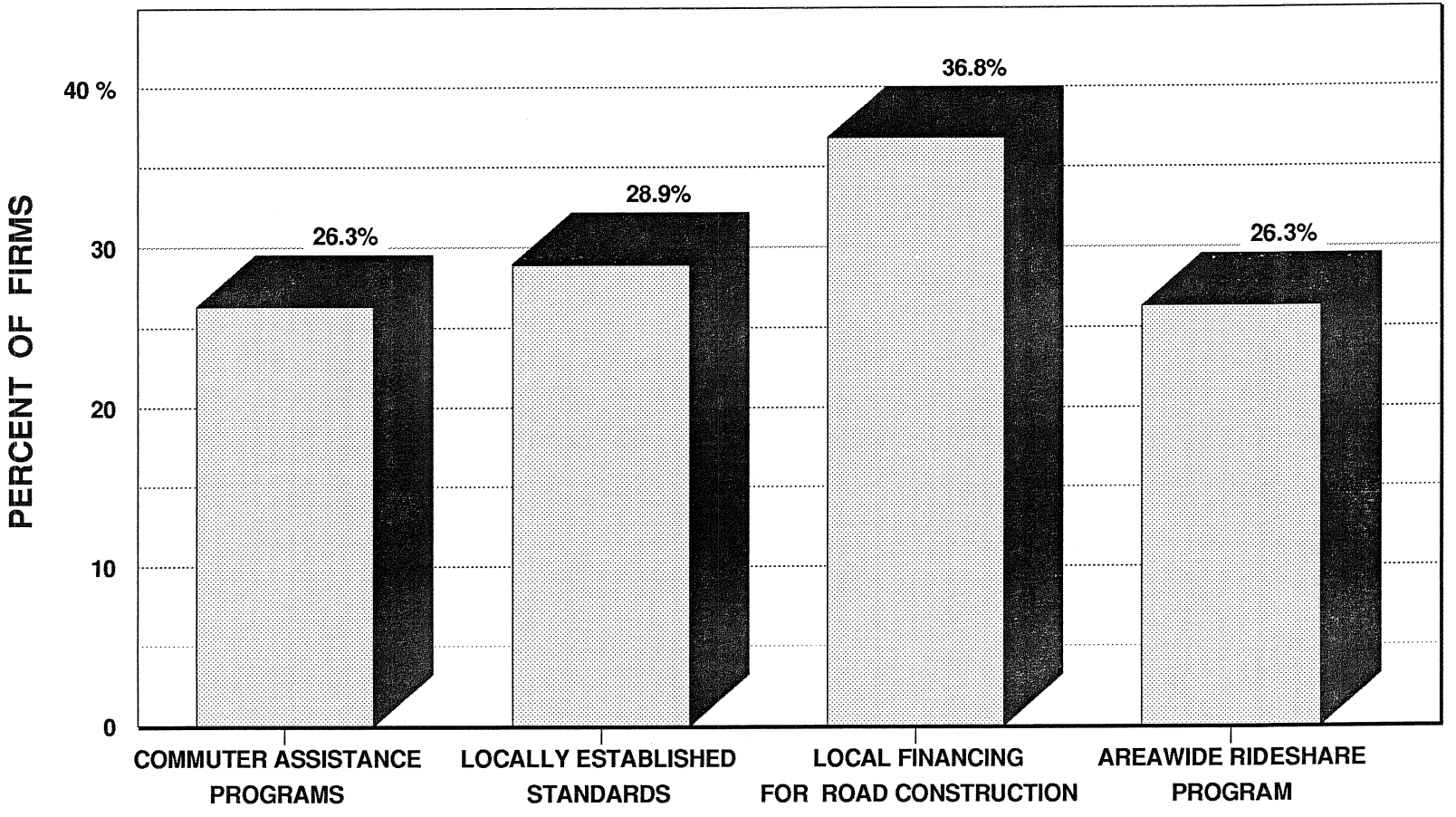
RESPONSES	Firms	Employees
Locally established standards to encourage meeting goals	11	10,113
Locally based financing for road construction	14	6,539
Car pool/van pool program	10	2,864
Commuter assistance program	10	2,791
[No response]	[11]	[842]

DISCUSSION

Financing to enhance road funding was favored slightly more than the other possible actions [Figure XVIII]. But the locally based established standards to encourage meeting goals, which were preferred by 11 employers, have the potential to benefit 61.3% [10,113] of the employees who work for the responding firms.

Commuter assistance programs and an areawide ridesharing program are each favored by 26% of the firms. These methods to enhance mobility represent a fairly diverse cross section of programs, both voluntary and mandatory. These companies feel that these types of actions could be undertaken in the area to improve mobility.

FIGURE XVIII
ACTIONS RELIEVING TRANSPORTATION BOTTLENECKS



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QUESTION 14: TYPES OF TRANSPORTATION ACTIONS FIRMS WOULD CONSIDER IMPLEMENTING IF GIVEN TECHNICAL ASSISTANCE

RESPONSES	Firms	Employees
Adopt variable work schedule	7	9,767
Construct remote parking facilities	4	990
Encourage or subsidize car/van pools	8	3,948
Reserve car/van pool preferential parking	9	2,732
Encourage employee use of public transit	14	3,279
Subsidize employee use of public transit	2	1,655
Establish shuttle service to rail stations	3	6,874
Participate in areawide highway evaluation	16	13,263
Participate in areawide commuter center	8	10,686
Assist in planning for commuter-related transportation improvements	8	5,235

DISCUSSION

A total of 29 employers, or 76%, representing 16,823 employees checked off one or more programs they would consider implementing [Figures XIX and XX]. The action that had the widest support was participation in an areawide highway needs evaluation; 16 firms employing over 13,000 persons would consider participating in this evaluation.

Many employers showed an interest in providing a range of TDM programs. Fourteen respondents employing over 3,000 employees would consider encouraging use of public transit. Significant interest was also expressed in variable work hours, encouraging or subsidizing car pools or van pools, providing preferential parking for car pools or van pools, establishing shuttle service to rail stations, subsidizing employee use of public transit, participating in an areawide commuter information and assistance center, and planning commuter-related transportation improvements.

The employers' interest in subsidizing car pools, van pools, and transit is very significant because these programs explicitly involve employer expenditure. This is a clear indication of their desire to solve a problem. This broad support also indicates a very positive environment in which to successfully implement TDM programs.

These results are valuable in indicating the degree of support expressed for the transportation management options offered. Even some of the less popular strategies may have noticeable impacts on peak hour traffic. Company locations in terms of subarea are also important in evaluating the potential for implementing strategies appropriate to various sites.

FIGURE XIX

PROGRAMS FIRMS WOULD CONSIDER

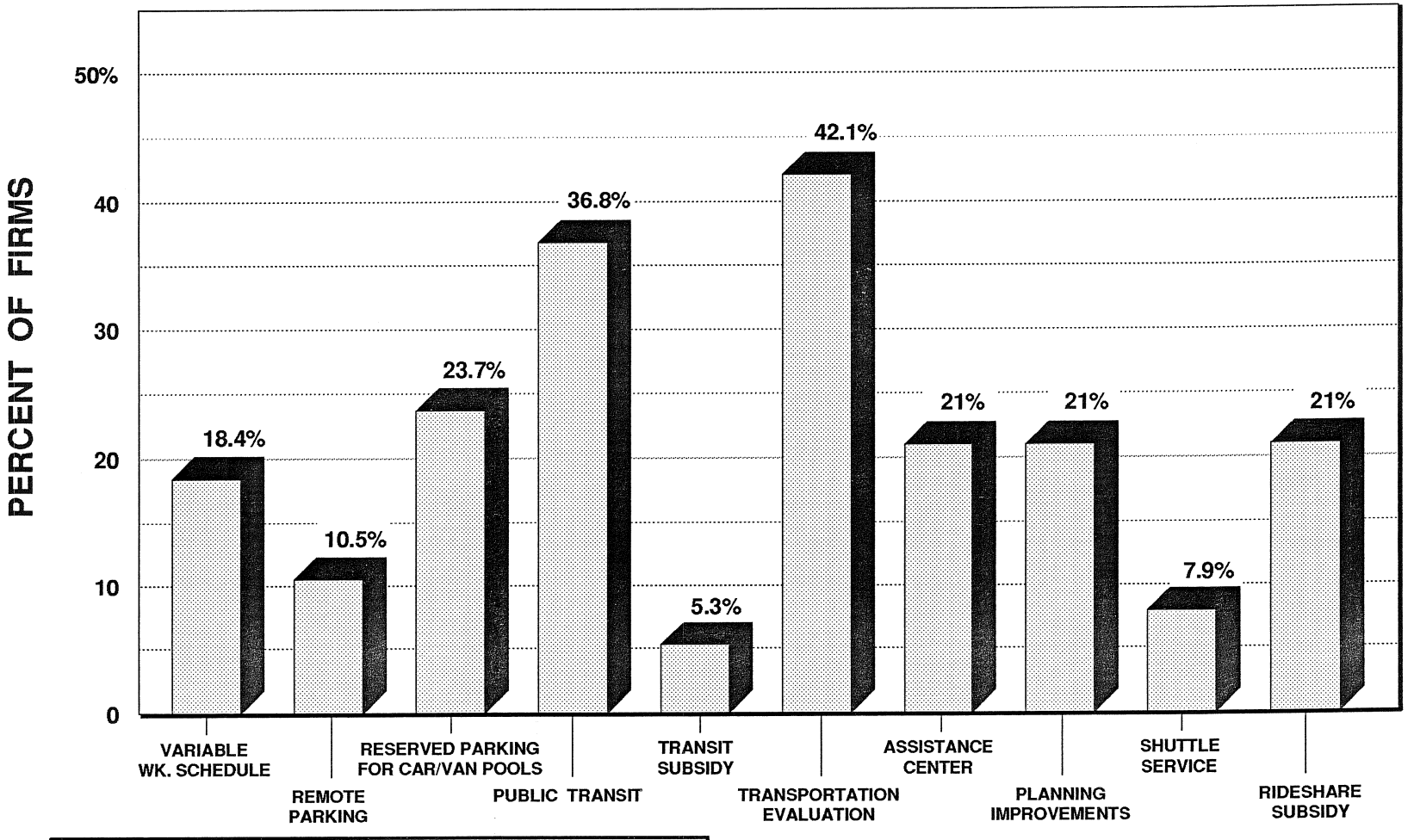

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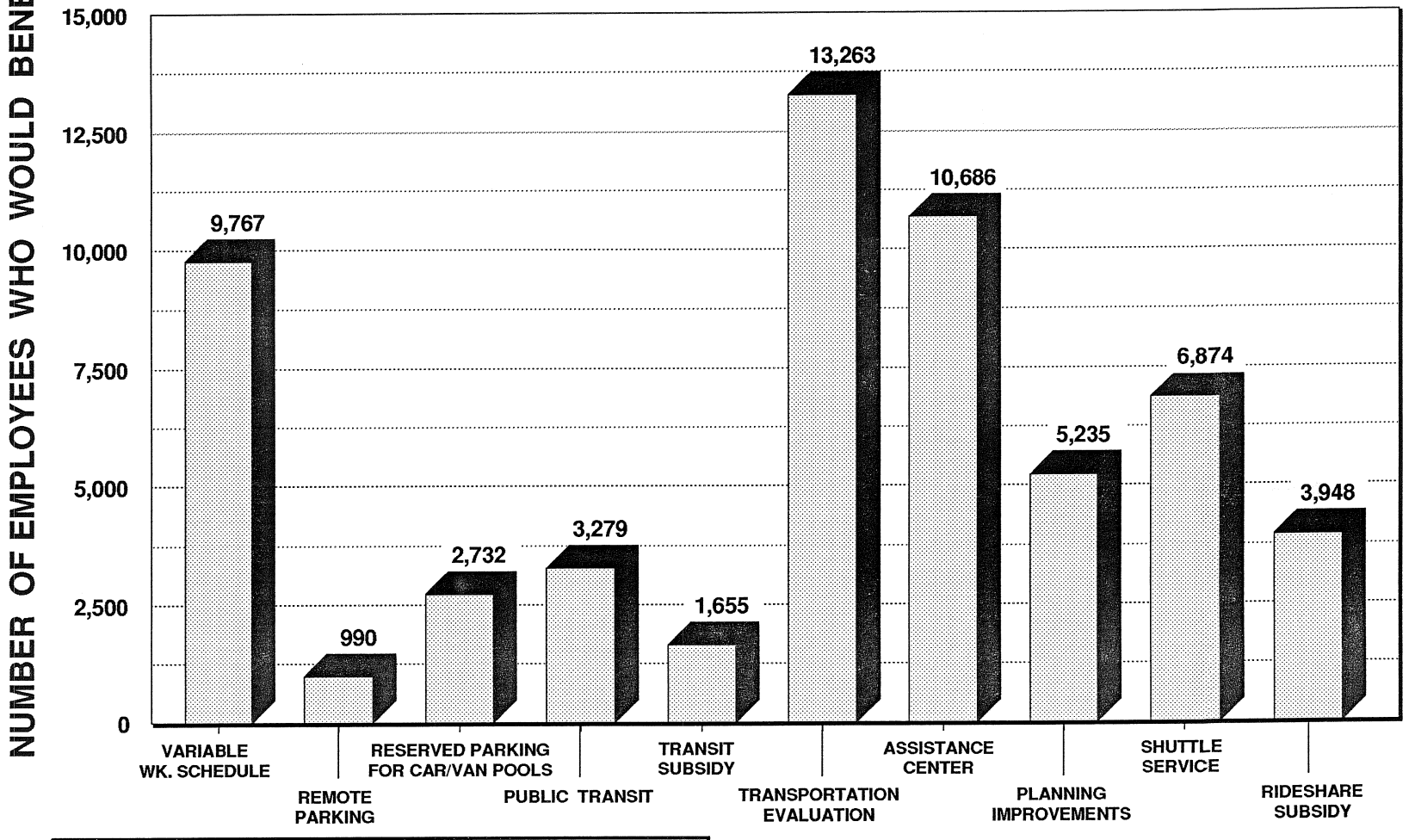
FIGURE XX

PROGRAMS FIRMS WOULD CONSIDER BY NUMBER OF EMPLOYEES AFFECTED



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The number of employees covered by each strategy should not imply that all of these employees will in fact participate in a given program. However, if a single program or, ideally, a combination of programs were to be implemented, it could affect a major portion of the work force and would express an important level of commitment on the part of employers.

The response to this question indicates that these companies would consider paying a TMA to implement these programs. These fees could be a major funding source for Delco CRIER TMA operations.

QUESTION 15: EMPLOYEE WORK TRIP ORIGINS

RESULTS

Home zip codes were received for about 12,000 employees, 73% of the employees reported by employers. Computer maps have been generated to illustrate the origins of employee work trips based on an employment area that attracts 44,000 workers [see Figure XXI].

DISCUSSION

Employers were asked to provide employee residence zip codes for the purpose of analyzing the locations and concentration of residences of Delaware River Waterfront area employees. The origin of work trips [employees' homes] reveals the commuting patterns. These data are valuable to planners in determining the potential market for various transportation demand management strategies.

Specifically, these maps and data assist transit, car pool, and van pool planning. For example, in zip code areas where up to 50 employees live, car pools could be formed. In areas with densities that fall between 50 and 1,000 employees, a wide range of options could be utilized, such as shuttles, buses, van pools and paratransit. In areas of more than 1,000 employees, express or subscription bus routes could be established. These are all programs Delaware River Waterfront area employers are interested in supporting, as expressed in their responses to Question 14.

QUESTION 16: WILLINGNESS TO WORK WITH OTHER ORGANIZATIONS IN THE DELAWARE RIVER WATERFRONT AREA TO ASSIST COMMUTERS

RESPONSES

Yes - 15 Firms
No - 23 Firms

Figure XXI

DELAWARE RIVER WATERFRONT TMA LABOR MARKET

Reading

Pottstown

Doylestown

Trenton

Norristown

Philadelphia

Camden

Wilmington

LEGEND

Residence location of TMA employees by zip code

- OVER 1000
- 501 - 1000
- 251 - 500
- 101 - 250
- 51 -100
- 1 - 50

★ DELAWARE RIVER WATERFRONT AREA

0 2 4 6
MILES

DELAWARE VALLEY REGIONAL PLANNING COMMISSION
AUGUST 1991

QUESTION 17: INTEREST IN PARTICIPATING IN DELAWARE RIVER WATERFRONT TRANSPORTATION MANAGEMENT STEERING COMMITTEE

RESPONSES

Yes - 12 Firms
No - 26 Firms

DISCUSSION

About 40% of the 38 responding employers would be interested in working with other organizations to assist commuters in getting to work and to reduce congestion. Thirty-two percent of the firms are willing to participate in the Transportation Management Steering Committee [Delco CRIER] planning process.

It is encouraging that so many employers are willing to become involved in working with other organizations and employers at such an early stage in the process. This indicates that there should be sufficient interest in improving mobility and in a transportation management association [the Delco CRIER].

QUESTION 18: IDENTIFYING THE MOST IMPORTANT TRANSPORTATION IMPROVEMENTS

RESULTS

Employers were asked to reveal their own preferences for improvements to the area's highway and transit systems. These open-ended responses are reported in Appendix VI.

DISCUSSION

Six employers listed the need to improve Route 291. Responding firms also identified several other improvements such as completion of I-476 [Blue Route] and building access roads and ramps.

The majority of the transit issues discussed by employers involved expanding and improving public transit service, including starting feeder routes to rail stations, more bus service from southeastern Delaware County, Media, and West Chester, and 24-hour transit service.

These issues could make up the agenda of the Delco CRIER TMA. If the TMA were to address these issues, these firms would likely become members of the TMA, thus creating a funding source for TMA operations.

CHAPTER II - PROGRAM IDENTIFICATION

Based upon the issues that were identified in Chapter I, programs that address those issues can be identified for the study to determine their feasibility, scale, function, cost, etc. The major issues cited were highway congestion, private financing of highway improvements, lack of transit, and labor access.

The following programs can potentially address those issues:

1. Custom transit and ridesharing services
2. Shuttle to stores, restaurants, train stations, and Philadelphia International Airport
3. Guaranteed ride home programs
4. Parking management programs
5. Employee transit and ridesharing subsidies
6. Transportation evaluation
7. Commuter assistance center
8. Local standards to meet transportation goals
9. Local financing of transportation improvements
10. Programs to comply with Clean Air Act

These programs should be evaluated for implementation as a total package or in clusters so that they can complement each other. One of these programs by itself will not have a large impact. For example, encouraging car pooling alone will not be successful at reducing traffic congestion and air pollution because most employees believe that car pooling is less convenient than driving alone, they have errands to do with their cars, and work place parking is free. To get more employees to car pool, a car pool program should be undertaken at the same time as a guaranteed ride home program, shuttles to stores and restaurants, parking management, and subsidies.

A. CUSTOM TRANSIT AND RIDESHARING

Traditional fixed-route transit cannot conveniently serve the vast majority of Waterfront employees, who primarily reside in low-density suburban areas; see residence location on map [Figure XXI]. In addition, as the Delaware County Waterfront Communities Transit Service Improvements discovered, current fixed route transit service does not serve most trips from central Delaware County to the Waterfront. The Delco CRIER TMA can design and provide ridesharing and transit services that are customized to individual employees' needs. In conjunction with the other programs that are recommended, these ridesharing and transit services will be better used than conventional fixed-route transit.

The types of programs the TMA can design and provide are car pools, van pools, bus pools, and express buses. To deliver these services, the TMA must determine the starting points [homes] and ending points [work sites] of individual employees' morning

commutes [See Figure XXI]. The density of the starting points and distance from home to work determines the type of service that can be supported. For example, Figure XXI indicates that between 101 and 250 Waterfront employees live in the Bensalem Township area of Bucks County. This may be enough to fill a bus pool or express bus to the Waterfront; it probably would support a van pool or two; the distance [30 miles] is great enough for employees to find these modes of travel more convenient and cheaper than driving alone. By comparison, a commute using conventional transit would require driving to a Bensalem train station, taking a SEPTA R7 train to downtown Philadelphia, transferring to an R1 or R2 train to the Waterfront, and finally getting from the train station to the work site. This is why few, if any, Waterfront employees who live in Bensalem take conventional transit to work. This particular proposal should be coordinated with plans for a Bensalem park and ride lot and the I-95 reconstruction project.

Looking at Delaware County, over 1,000 employees live in a large zip code area in the central part of the County. Considering the distance these employees commute each day [5 - 15 miles], a bus pool or two and van pools could pick up employees in the northern part of the Zip code area [the longest commutes], and/or many car pools could be established for the shorter trips. Private providers such as the Delaware County Transportation Consortium [DCTC] might be able to provide service in some of these areas.

Several areas in eastern Delaware County have 501 to 1,000 employees' homes. and several areas in southern Delaware County near the Delaware border have more than 1,000 homes. These are all areas referred to in Delaware County Waterfront Communities Transit Service Improvements as lacking adequate transit service to the Waterfront. The county and the TMA should work with SEPTA and private carriers such as DCTC in evaluating the institution of new service here.

Also of note are areas in which many Waterfront employees live in New Jersey, Delaware, Philadelphia, and Chester County. Given the data on residence distribution, the TMA will have many opportunities to design and provide custom ridesharing and transit services for its members and employees in these areas.

DVRPC has done several employee surveys which have shown how many errands employees accomplish with their cars during the day, either on the way to work, at lunch, or on the way home. Most employees seem to combine as many errands as they can into their work trips. This would seem to conflict with employees car pooling every day. So a more acceptable concept to many of these employees would be a one day per week car pool. This would still permit them to run errands with their cars four days per week.

The transit services [bus pools and expresses] should be competitively bid. This would ensure the TMA and its members would get the most for their money.

B. SHUTTLES

In order to provide employee mobility in the immediate TMA area and encourage ridesharing and transit use, shuttle service should be established. The shuttles will have four purposes: [1] connecting SEPTA R1 and R2 train stations with Waterfront work sites, [2] providing service at midday to stores and restaurants, [3] providing transportation for employees who need to go from one work site to another, and [4] providing joint service between the airport and area motels.

SEPTA's regional commuter rail system will be more useful to Waterfront employees if they have a means of getting from a Waterfront train station to work sites not within a convenient walking distance. If a shuttle could carry them to their work sites at the end of their train rides, employees who live near a train station could walk or drive to that station and use transit for their work trips. This would be extremely helpful to residents in the Wilmington area, for example, because they would be able to take SEPTA's R2 train from Delaware to a Waterfront station and then a shuttle. This would remove traffic from I-95; this program should be coordinated with park and ride lot plans and the I-95 reconstruction project.

The shuttles would be used all day, not just during morning and afternoon commuting periods. During midday, shuttles could carry employees to restaurants for lunch and to stores for shopping and errands. This would allow employees who run errands during their breaks to rideshare or take transit to work; the shuttle could substitute for their cars to run such errands.

During the rest of the day, shuttles could be used for transporting employees within the Waterfront area, either to travel between different work sites of the same company or between different companies. Shuttle usage would enable employers to reduce the number of their company owned vehicles.

Area motels, parking lots, and car rental companies could possibly operate joint shuttles to the airport to save money on courtesy shuttle van access fees the airport charges.

C. GUARANTEED RIDE HOME PROGRAM

Guaranteed ride home [GRH] programs are a safety net for employees who car pool, van pool, or use transit. They allow employees to rideshare worry-free, confident that their employers have programs that will provide a ride if they really need one. A GRH program removes the often cited reason for not ridesharing—that they won't have a vehicle in an emergency, or if they have to work late and miss their car pool.

The experience with GRH programs around the country has been that employees rarely use the service. The number of emergencies is extremely low, but a GRH program

is a good insurance policy for those emergencies that do occur, albeit rarely, and an effective incentive for ridesharing.

A GRH program can take many forms: an employer can use company vehicles, a local taxi or paratransit company under contract, or the vehicles that are used in the shuttle service described above. The employer or group of employers also determines policy on eligibility requirements, methods of payment, and other procedures. The costs experienced by operating programs have been extremely low.

D. PARKING MANAGEMENT PROGRAMS

As long as plenty of free parking is available to Waterfront employees, most people will continue to drive alone to work. Incentives to rideshare and use transit, and disincentives to drive alone are needed. One disincentive is to limit parking for solo drivers or charge them a fee to recover the cost of that parking space [not to mention the cost to society of the air pollution they produce and energy they waste]. An incentive would be to allow drivers to park free if they rideshare at least one day per week.

As discussed in Chapter I, more than 12,000 parking spaces at a cost of at least $62,000,000 will be needed in the next three years in the Waterfront area. If a one day per week ridesharing program were in place, 2,400 spaces could be saved. If 2,400 spaces are not built, employers and developers should then be willing to [1] pay the TMA a small portion of this saving to design and implement ridesharing and transit programs, and [2] subsidize their employees to car pool, van pool, or take transit. [See discussion of employee subsidies below.]

A parking incentive that employers can provide is preferential locations for car pool and van pool spaces. Having these spaces near the buildings' entrances will encourage employees to car pool or van pool.

E. EMPLOYEE TRANSIT AND RIDESHARING SUBSIDIES

An incentive to rideshare or use transit is an employer subsidy of employees' car pool, van pool, or transit costs. Most employees are subsidized for the full cost of the parking spaces they use. It is only fair that employers give at least an equal subsidy to modes of travel more efficient and less polluting than the single-occupant car.

The Internal Revenue Service permits employers to give each of their employees $21 per month [$252 per year] tax free to defray the cost of riding transit. Direct payment, or vouchers such as those provided in DVRPC's Commuter Benefit Program, can be provided to employees.

One source of employer revenue for employee transit and ridesharing subsidies can be parking fees. Solo drivers could be charged a fee for driving alone and for the

parking space. The employer could use this money to pay car poolers, van poolers, and transit riders.

F. TRANSPORTATION EVALUATION

The Delco CRIER TMA has already begun to evaluate and prioritize employers' views on transportation needs at the TMA area level and at the work site level. Highway, bridge, high occupancy vehicle facility, transit, bicycle, and pedestrian needs can be determined for commuters in the area. The TMA can then work with state and local governments and transit providers to make appropriate improvements.

At the work site, the TMA can evaluate transportation conditions and design programs on a fee-for-service basis. An evaluation can include an employee survey, a determination of average vehicular occupancy, or a review of current highway and transit access.

G. COMMUTER ASSISTANCE CENTER

The Delco CRIER TMA can provide a commuter assistance center in its offices. Information on commuting alternatives can be provided for employers and individual commuters. This information could include transit routes and schedules, car pool matching, and transit pass sales. A telephone hotline could be installed for those unable to visit. The center should be easily accessible by transit.

H. LOCAL STANDARDS TO MEET TRANSPORTATION GOALS

The Delco CRIER TMA can work with employers, developers, county officials, and others to set goals to improve mobility in the area. These goals can be oriented toward improving labor access, reducing congestion, reducing air pollution and energy use, and reducing parking lot costs.

In order to collectively achieve these goals, the TMA members, working with state and local government agencies, can develop standards that employers can aim for. For example, one standard could be to have 50% of employees commute to work by a means other than driving alone: transit, van pool, car pool, bicycle, walk, or telecommute. Another standard could be raising the average vehicle occupancy 50%. The TMA is the appropriate organization to obtain an agreement on standards, to assist with meeting those standards by designing programs, and by evaluating results.

I. LOCAL FINANCING OF TRANSPORTATION IMPROVEMENTS

There has not been enough funding to make all the highway and transit improvements that businesses and residents want. Additional funding from local businesses and governments would advance these projects. The TMA can provide a

forum for discussing this issue, deciding what actions to take, and serving as an entity to administer any funding programs.

Partnerships, special benefit assessments, tax increment financing districts, and impact fees are some of the local funding methods that can be used. On-site improvements such as bus shelters, sidewalks, and bus pull-offs are another way to pay for improvements. Finally, the advance purchase or reservation of rights-of-way for rail lines, busways, roads, bicycle paths, and sidewalks can save significant sums that would otherwise be spent when a facility is eventually built.

J. PROGRAMS TO COMPLY WITH CLEAN AIR ACT

The federal Clean Air Act Amendments of 1990 require all Waterfront employers with 100 or more employees to get their employees to rideshare and ride transit to work. This is because one of the major causes of air pollution is too many employees driving alone to work. These employers will have to prepare a plan no later than November 1994 that indicates how they will increase their average vehicular occupancy rate [the number of persons in each vehicle] to 25% above the current regional rate. They must achieve the higher rate no later than November 1996.

The Delco CRIER TMA will be able to assist its members with complying with these requirements. The TMA can evaluate current employer commuter characteristics; prescribe, design, and review programs to increase ridesharing and transit use; evaluate programs after they have been established; and undertake periodic surveys of commuter travel.

CHAPTER III - NEXT STEPS TOWARD TMA OPERATION

The issue and program identification work described in this report is the basis for developing travel demand management programs and a transportation management association [see Figure [XXII] for the Delco CRIER TMA development process]. The issues that have been enumerated by the public and private sectors will determine which programs should be established to have the most impact on those problems. Program Identification identified these programs and presented them as a "menu" of potential solutions.

The next step, Program Design, takes the program "menu" and evaluates which of the programs are feasible for the Delaware River Waterfront area, given its unique characteristics. The marketing plan will identify which employers or other groups have expressed an interest in specific programs. The Delco CRIER TMA will then be able to provide these programs for a fee.

The TMA must have a budget and formal structure in order to operate. Care must be taken in developing both of these in order to ensure long-term success.

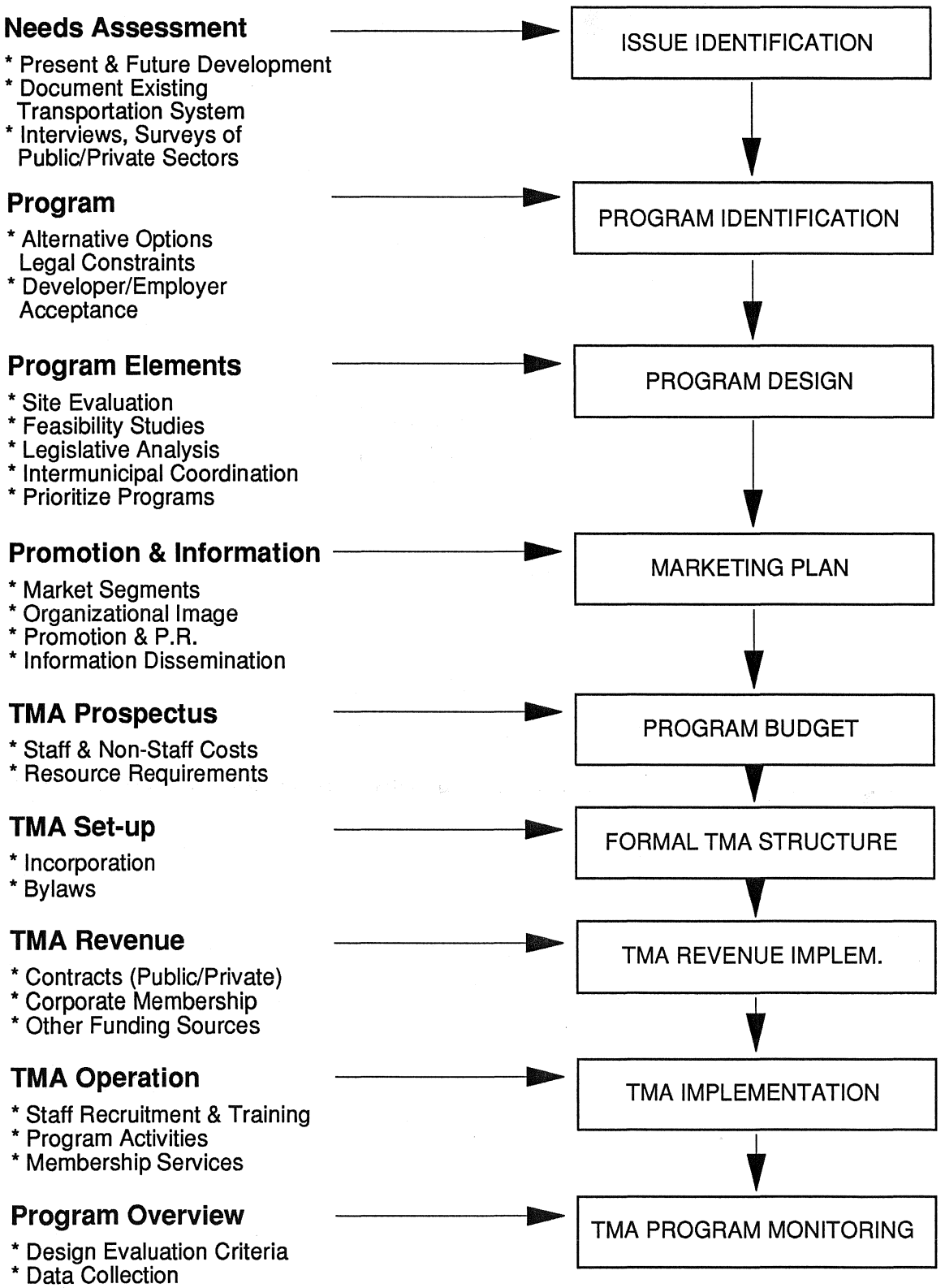
Following budget development, revenue must be secured. Contracts, membership dues, or grants are the major sources of revenue to be sought.

TMA implementation involves hiring staff, running programs, and serving members. Finally, the TMA programs should be monitored to ensure positive results and attain the purpose of the TMA, improving mobility.

Figure XXII

DELAWARE COUNTY COALITION FOR ROADWAY IMPROVEMENT AND ECONOMIC REDEVELOPMENT TRANSPORTATION MANAGEMENT ASSOCIATION

Development Process



APPENDIX I

1989 AADT COUNTS IN THE DELAWARE WATERFRONT TMA AREA

	AADT	AM/PM PEAK %
-COMMODORE BARRY BRIDGE WB OFF RAMP bet. Flower Ramps and TR 322 WB	1,186	16.01/5.78
-FLOWER STREET bet. 4th St. and 6th St.	2,946	7.02/7.88
-FLOWER STREET EB bet. Comm.Barry Bridge Ramp and Flowers Street	341	16.25/6.34
-FLOWER STREET EB bet. Comm.Barry Bridge and Bridge Ramp	834	7.36/7.25
-FLOWER STREET WB bet. Comm.Barry Bridge Off-Ramp and 6th Street	1,235	6.39/9.44
-FLOWER STREET WB bet. 9th St. and Comm. Barry Bridge	1,741	5.88/10.47
-FRANKLIN AVENUE bet. TR 420 and Amosland RD.	8,988	6.99/7.67
-MACDADE BLVD.SB OFF RAMP bet. MacDade Blvd. and Weaving Section	4,256	16.42/6.86
-MACDADE BLVD.NB OFF RAMP bet. MacDade Blvd. and Weaving Section	4,742	18.33/5.60
-MACDADE BLVD.NB ON RAMP bet. Weaving Section and MacDade Blvd.	5,186	4.59/13.84
-MACDADE BLVD.SB ON RAMP bet. Weaving Section and MacDade Blvd.	3,618	3.87/13.68
-MACDADE BLVD.WB bet.Arlington Ave. and Virginia Ave.	10,294	5.97/7.46
-MACDADE BLVD.EB bet.Baltimore Ave. and Virginia Ave.	11,310	5.89/7.94
-MACDADE BLVD.EB bet.Sutton Ave. and TR 420	10,847	5.93/8.01
-MACDADE BLVD.WB bet.Sutton Ave. and TR 420	12,048	5.55/8.37
-MACDADE BLVD.WB bet.TR 420 and Maple Ave.	11,263	5.89/7.80
-MACDADE BLVD.EB bet.TR 420 and Maple Ave.	10,458	5.79/7.88
-MACDADE BLVD.NB bet.TR 476 and TR 320	11,728	9.87/7.37
-MACDADE BLVD.SB bet.TR 476 and TR 320	10,523	5.40/9.40
-MACDADE BLVD.SB bet.TR 476 and Valley Rd.	11,717	9.60/6.93
-MACDADE BLVD.NB bet.TR 476 and Valley Rd.	11,905	5.20/10.40
-NINTH STREET SB bet.Edwards St. and Central Ave.	5,199	5.41/8.88
-NINTH STREET NB bet.Edwards St. and Central Avenue	5,550	6.55/7.69
-NINTH STREET NB bet.Flower St. and Comm.Barry Bridge On Ramp	4,998	11.53/7.56
-NINTH STREET SB bet.Flower St. and Comm.Barry Bridge On Ramp	6,820	5.86/9.04
-NINTH STREET WB bet.Comm.Barry Br.On Ramp and Yarnall Street	6,721	6.03/8.29
-NINTH STREET EB bet.Jeffrey St.& Yarnall St.	6,809	7.28/8.59
-NINTH STREET NB bet.Jeffrey St.& Yarnall St.	7,076	6.36/8.55
-NINTH STREET SB bet.Jeffrey St.& Yarnall St.	5,385	5.94/8.54
-TR 13 POST ROAD NB bet.Del.State Line and Allied General Exit	3,005	10.52/7.51
-TR 13 POST ROAD SB bet.Allied General Exit Blueball Ave.	3,073	7.06/11.13

1989 AADT COUNTS IN THE DELAWARE WATERFRONT TMA AREA

	AADT	AM/PM PEAK %
-TR 95 NB OFF RAMP bet.TR 95 NB & Kerlin St.	6,657	11.62/7.85
-TR 95 SB ON RAMP bet.Kerlin St.& TR 95 SB	10,367	8.34/8.45
-TR 95 SB 322 EB WEAVER bet.Kerlin Ramp and TR 322 EB On Ramp	13,174	8.16/9.26
-TR 95 SB OFF RAMP TO COMM.BARRY BRIDGE bet.TR 95 SB & TR 322 EB On Ramp	4,145	8.98/11.27
-TR 95 NB ON RAMP bet.Weaving Section & I 95	4,989	21.27/5.05
-TR 95 SB ON RAMP bet.Weaving Section & I 95	4,030	12.69/9.19
-TR 95 SB OFF RAMP bet.I 95 & Weaving Section	4,721	3.68/16.11
-TR 95 NB OFF RAMP bet.I 95 & Weaving Section	3,842	5.61/12.34
-TR 95 NB ON RAMP bet.TR 420 NB & TR 95 NB	2,016	7.63/7.50
-TR 95 NB OFF RAMP bet.TR 95 NB & TR 420 SB	2,565	9.61/7.28
-TR 95 SB OFF RAMP bet.TR 95 SB & TR 420 NB	7,499	4.77/10.79
-TR 95 SB ON RAMP bet.TR 420 SB & TR 95 SB	5,674	11.15/6.10
-TR 291 EB bet.Sellers Ave & TR 420 Wanamaker	4,672	6.42/10.89
-TR 291 WB bet.Sellers Ave & TR 420 Wanamaker	7,256	7.53/7.41
-TR 291 WB bet.TR 420 Wanamaker & Jansen Ave.	9,762	6.30/9.19
-TR 291 EB bet.TR 420 Wanamaker & Jansen Ave.	6,657	6.99/8.02
-TR 322 EB ON RAMP bet.TR 95 NB & TR 322 EB	6,023	8.94/10.64
-TR 420 SB bet.MacDade Blvd. and 6th St.	11,764	6.49/6.74
-TR 420 NB bet.MacDade Blvd. and 6th St.	11,453	5.51/8.55
-TR 420 bet.MacDade Blvd. and 16th Ave.	22,700	6.59/7.42
-TR 420 SB bet.TR 95 and Ward Ave.	18,390	10.77/5.87
-TR 420 NB bet.TR 95 and Ward Ave.	16,697	5.03/9.35
-TR 420 NB bet.TR 291 and TR 95	4,709	6.60/8.52
-TR 420 SB bet.TR 291 and TR 95	10,083	7.08/6.68

1979 AADT COUNTS IN THE DELAWARE WATERFRONT TMA AREA

	AADT	AM/PM PEAK %
-KERLIN ST bet.5th St & 6th St	3,708	6.29/8.52
-KERLIN STREET bet.14th St & 13 St	30,714	6.82/8.22
-MACDADE BLVD bet.Arlington & Virginia	22,529	6.17/7.18
-MACDADE BLVD bet.Fairview & Jefferson	20,488	6.14/7.53
-MACDADE BLVD bet.Hibbs Ave & Dalmas Ave	19,716	6.03/8.00
-MACDADE BLVD bat.Maple & PA 420	19,926	5.79/7.74
-MACDADE BLVD bet.Monta Vista & Linda Vista	20,219	5.63/7.95
-NINTH STREET bet.Upland & Potter	7,747	6.33/7.90
-NINTH STREET bet.Kerlin & Parker	10,352	6.09/8.90
-NINTH STREET bet.Norris & Lamokin	10,450	6.01/7.67
-NINTH STREET bet.Yarnall & Jeffrey	13,850	5.93/9.06
-NINTH STREET bet.Crosby & Madison	11,985	6.72/7.63
-TENTH STREET bet.Naamans & Blue Ball Ave	6,163	9.64/10.44
-TINICUM ISLAND RD bet.4th & Industrial Hwy	3,396	11.37/22.99
-TR 95 SB bet.US 322 & Highland Ave	39,896	6.76/7.85
-TR 95 NB bet.US 322 & Highland Ave	37,441	8.09/7.71
-TR 95 NB bet.Edgemont & Kerlin	29,406	7.58/7.25
-TR 95 SB bet.Edgemont & Kerlin	24,127	7.16/9.29
-TR 291 bet.Highland & Grace	3,180	7.93/9.57
-TR 291 bet.Highland & Lewis	4,265	7.58/10.00
-TR 291 bet.Upland & Madison	8,120	7.30/8.68
-TR 291 EB bet.2nd St & I 95	7,192	9.51/9.54
-TR 291 WB bet.2nd St & I 95	6,429	9.82/8.83
-TR 291 SB bet.PA 420 & Sellers Ave	6,572	12.92/8.87
-TR 291 NB bet.PA 420 & Sellers Ave	13,265	15.66/10.24
-TR 291 SB bet.Jansen & Saude	10,834	6.59/13.71
-TR 291 NB bet.Jansen & Saude	8,710	12.96/8.50
-TR 320 bet.22nd St & 23rd St	10,510	7.41/8.50
-TR 420 bet.PA 291 & I 95	20,447	10.15/8.36

APPENDIX II

DELAWARE RIVER WATERFRONT STUDY AREA
HIGHWAY IMPROVEMENTS ON
PennDOT'S 1990-2002 TWELVE YEAR PROGRAM

Map No.	Municipal Code No.*	Location and Description of Project
1	LC, UC, CC, CT, V, R, RP, TT	I-95 from Delaware State Line to Lester Signs
2	CC, CT, U, RT, RP, TT, P	I-95 from Delaware State to New Jersey Reconstruction and preconstruction improvements
3	CC	I-95 at PA 352 Southbound I-95 On Ramp Construction
4	R	I-476/I-95 Interchange Ramps Noise Wall Construction
5	R	I-95 at Amtrak Northeast Corridor and SEPTA Wilmington Rail Lines Park & Ride Lot Construction
6	R	PA 291 at Sellers Avenue Signal Improvement
7	CC, CT	US 322 at US 13, I-95 Interchange Improvement
8	CC	Concord Road over Amtrak Northeast Corridor and SEPTA Wilmington Rail Lines Bridge Replacement
9	CC	Fifth Street over Chester Creek Bridge Replacement
10	TB, CC	PA 291 from Price Street to Ridley Creek Four-Lane Relocation
11	CC	Third Street over Chester Creek Bridge Replacement

*Municipal Codes

LC - Lower Chichester Township
UC - Upper Chichester Township
CC - Chester City
CT - Chester Township
U - Upland Borough
R - Ridley Township
RP - Ridley Park Borough
TT - Tinicum Township
TB - Trainer Borough

APPENDIX III

PRIVATE TRANSPORTATION CARRIERS IN THE DELAWARE RIVER WATERFRONT AREA*

A-1 Limousine, Inc.
Accessible Transportation for the Disabled
Admiral Limousine Service
Alert Transportation Service
Brian Cab, Inc.
Kathleen Burman
Care and Emergency Systems
Carol Lines, Inc.
Carver Cab Company
Chelden Radio Cab
Colombia Taxi Company
Commuter Express
Crescent Cab Company
DAV-EL Limousine Service
Delaware County Transportation Co., Inc.
Delaware County Transportation Consortium, Inc.
Delco Yellow Cab
Dudley G. Brown and Co., Inc.
Evangelical Community Services
Fahey's Limousine Service
Falcon Service Corporation
HSS-Paratransit, Inc.
Hamilton Motor Coaches
Holland Industries, Inc.
Hospital Ambulance Service, Inc.
Hudson General Corporation
Janes Cab, Inc.
Jo-Ra Cab Company
Krapf's Coaches, Inc.
Lamm Corporation
Limelight Limousine, Inc.
Major Tours, Inc.
Marino, Inc.
Marlene & Joe, Inc.
Marty's Cab Services
Medi-Call Ambulance Service/
Keystone Transportation Service
Metropolitan Ambulance, Inc.
National Van Pools, Inc.
Need-A-Ride Transportation Company
O'Steen Transportation Corp.
Pacifico Luxury Limousine
Parker Cab Company
Nick Pepe
Philadelphia Double Deck Tours, Ltd.
Point-to-Point
Quality Transportation Services, Inc.
R. C. Medical Carrier Service
R & S Cab Co., Inc.
RES Cab Co., Inc.
Rainbow Cab, Inc.
Red Ball Cab
Romano's School Bus Service
Ryan Travel, Inc.
Salem Transportation Company
Mark Sandlow
Self Bus Service, Inc.
Semper Paratus Corporation
Shun-Pike, Ltd.
Starr Transit Co., Inc.
Swing Transportation and Tours
Transportation Services, Inc.
Tyson Taxicab Co., Inc.
Van Pool of New Jersey, Inc.
Joseph R. Weil
Wertz Motor Coaches, Inc.
Whiteline Transportation, Inc.
Yellow Cab Co.
Yellowbird Bus Co., Inc.

*See DVRPC's Directory of Transportation Service Providers in the Delaware Valley Region.

APPENDIX IV

INDIVIDUALS/COMPANIES INTERVIEWED

Governments

PennDOT - Douglas May, Gregory Brown, Harvey Knauer, Randy Wanger, Dutch Eichorn
Philadelphia Commerce Department - Bohdan Korzeniowski, Deputy Director of Aviation
Ridley Township - Anne Howanski, Manager
Eddystone Borough - Mary Howat, Secretary
Delaware County Planning Department - Isaac Takyi, Senior Planner

Employers

Scott Paper Company - Cletus Meyer, Corporate Real Estate; Nick Nigurney, Public Affairs
Boeing Helicopters - David Yoder
PECO - Jack McCarthy, Assistant District Manager
ARA Leisure Services, Inc. - Frank Sweeney, Operations Manager
US Air - Mike Stewart, Manager/Station Administrator

Developers

Landis Group - William King III
DKM Properties Corporation - Russell Richardson

Appendix V

MANAGING TRANSPORTATION: A PUBLIC-PRIVATE PARTNERSHIP
Employer Needs Assessment

Delaware County is sponsoring this survey in order to structure a program that addresses your organization's particular transportation interests and needs. Please take a few minutes to answer the questions that follow. Your answers will be kept in the strictest confidence. Please mail the completed questionnaire to the Delaware Valley Regional Planning Commission, The Bourse Building - 8th Floor, 21 South 5th Street, Philadelphia, PA 19106, to the attention of Mr. Tom Shaffer. Questions may be addressed to Mr. Shaffer at 592-1800. Thank you for your cooperation.

Your name _____ Title_____

Company _____

Company Address _____

Location (if different from above address) _____

Telephone Number _____

1. Type of firm:

___ a. Real estate developer ___ d. Manufacturing ___ g. Wholesale trade

___ b. Service ___ e. Gov't. & institutional ___ h. Professional

___ c. Retail trade ___ f. Construction ___ i. Other _____

2. Number of employees at this location: _____

3. If you have other offices within the Delaware County Waterfront (Chester, Eddystone, Ridley Township, Tinicum Township):

   a. How many other locations? _____ b. How many employees at other locations? _____

4. Approximately how many parking spaces are available for use by your employees, clients and visitors at each facility? _____

5. Do you foresee a need to construct or acquire additional parking spaces within the next three years?

   a. Yes _____ b. No _____ c. If yes, how many? _____

6. Identify the type of work schedule your organization uses.

___ a. Fixed schedule: All employees are assigned the same starting and quitting times each day.

_____ a.m. _____ p.m.

___ b. Staggered Shift: Employees work a standard length day but are assigned staggered starting times.

No. of Employees	Start Time	Finish Time
_____	_____	_____
_____	_____	_____
_____	_____	_____

___ c. Flextime: Flexible starting and quitting times centered around a set of core hours.

Range of times	No. of employees
_____	_____
_____	_____

__ d. Compressed work week: All or some work days are lengthened in order to shorten the work week.

Day(s) not worked	No. of employees
_____	_____
_____	_____
_____	_____

7. What types of transportation activities has your company been involved with, or is currently sponsoring?

___ a. Vanpooling
___ b. Carpooling
___ c. Preferential parking
___ d. Other: _____
___ e. Alternative work scheduling
___ f. Transit assistance
___ g. Shuttles to bus/rail

Comments: _____

_____

8. Please indicate the effect of the following issues upon your company and the mobility of your employees (circle one number for each issue):

	No Effect	Negative Effect	Very Negative Effect
Rush hour congestion:	1	2	3
Insufficient parking:	1	2	3
Inadequate access by public transit:	1	2	3
Poor highway access:	1	2	3
Inadequate circulation within the area:	1	2	3

Other: _____

_____

9. Please circle the appropriate number to indicate your views on the state of the following transportation issues in your area 5 years from now:

	Much Better	Better	Same	Worse	Much Worse
Peak hour congestion:	1	2	3	4	5
Adequacy of parking:	1	2	3	4	5
Adequacy of public transportation:	1	2	3	4	5
Highway access:	1	2	3	4	5
Circulation within the area:	1	2	3	4	5

Other: _____

_____

10. How would you assess your company's location(s) in terms of transit/rail access?

a. Excellent ___ b. Adequate ___ c. Poor ___ d. Unavailable ___

11. Please indicate the degree to which the lack of transit access to your company affects the following issues:

	No Effect	Negative Effect	Very Negative Effect
Parking:	1	2	3
High employee turnover:	1	2	3
Difficulty in obtaining entry level personnel/trainees:	1	2	3
Unfilled positions at all levels:	1	2	3

Other: _____

_____

12. If personnel recruitment is affected, how many job openings, in your estimation, can your company attribute to inadequate public transit access? _____

13. What types of actions do you feel would help relieve transportation bottlenecks?

_____ a. Areawide commuter assistance programs

_____ b. Locally based established standards that encourage employers/developers to support and meet transit, ridesharing, flextime, etc. goals

_____ c. Locally based financing mechanisms to enhance the state's road construction program

_____ d. Institution of areawide car pool or van pool program

_____ e. Other: _____

_____

14. What types of transportation actions would your company consider to address the area's transportation needs, if technical assistance were available?

___ a. Adopt a variable work schedule such as flextime

___ b. Construct remote parking facilities

___ c. Encourage or subsidize car or van pooling

___ d. Reserve parking spaces for carpools and vanpools

___ e. Encourage employee use of transit service or shuttles

___ f. Partially subsidize employee use of transit service

___ g. Establish shuttle service to train/trolley stations

___ h. Participate in an areawide highway needs evaluation

___ i. Participate in an areawide commuter assistance center that would promote a variety of measures

___ j. Assist in planning for commuter related transportation improvements

___ k. Other programs

15. Please indicate below how many of your employees live in which Zip Code area (you may also add a computer printout if convenient, or use the last page if more space is needed):

	Zip Code	No. of Employees
a.	_____	_____
b.	_____	_____
c.	_____	_____
d.	_____	_____
e.	_____	_____

16. Would your company be interested in working with other organizations in the Delaware County Waterfront area to assist commuters in getting to work and reducing congestion?

___ a. Yes ___ b. No

c. If yes, please indicate which transportation issues you would like to work on: _____

_____

_____

_____

17. A Delaware County Waterfront Transportation Management Steering Committee is now forming. Would you like to participate in this planning process?

___ a. Yes ___ b. No

18. Please identify the single most important highway improvement that could be made: _____

_____

_____

_____

Also, the single most important transit or rail service improvement: _____

_____

_____

_____

_____

Thank you for taking the time to answer these questions. Indicate below the name and telephone number of a person at your company whom we may contact in the future, if not yourself.

_____

[EL-PC]
C:\TMA\DELCO.SVY

APPENDIX VI
DELAWARE RIVER WATERFRONT EMPLOYER MOBILITY SURVEYS
Summary of Responses by Subarea

Subarea Key:

[100] City of Chester
[200] Eddystone Borough, Ridley Twp., and Tinicum Twp., (except for Philadelphia Int'l. Airport)
[300] Philadelphia International Airport (portions of Tinicum Twp. and City of Philadelphia)

			Subareas			
			100	200	300	TOTAL
Question #1 - Type of firm	Retail trade:		1	1	-	2
		(employees)	(25)	(48)	-	(73)
	Wholesale trade:		2	-	-	2
		(employees)	(57)	-	-	(57)
	Manufacturing:		5	4	2	11
		(employees)	(328)	(7048)	(2800)	(10,248)
	Professional/services:		1	-	8	9
		(employees)	(795)	-	(4167)	(4962)
	Real estate:		-	-	-	-
		(employees)	-	-	-	-
	Government/institutional:		2	4	2	8
		(employees)	(78)	(202)	(570)	(778)
	Construction:		3	2	1	6
		(employees)	(233)	(95)	(50)	(378)
		TOTAL	14	11	13	38
			(1516)	(7393)	(7587)	(16,496)

			Subareas			
			100	200	300	TOTAL
Question #2 - Number of employees at this location	Employees in firm: (employees in grouping)	1-24	2 (32)	1 (20)	- -	3 (52)
		25-49	4 (131)	4 (158)	1 (40)	9 (329)
		50-99	5 (322)	4 (245)	2 (120)	11 (687)
		100-199	2 (236)	- -	3 (407)	5 (643)
		200-299	- -	1 (220)	1 (250)	2 (470)
		300-399	- -	- -	- -	- -
		400-499	- -	- -	1 (440)	1 (440)
		500-999	1 (795)	- -	1 (530)	2 (1325)
		1000- +	- -	1 (6750)	4 (5800)	5 (12550)
		TOTAL Firms	14	11	13	38
		TOTAL Employees	(1516)	(7393)	(7587)	(16496)

		Subareas			
		100	200	300	TOTAL
Question #3 - Firms with other locations in the Delaware County Waterfront	(a) Number of other locations	3	2	6	11
	(b) Number of employees at other locations	14	20	3962	3996
	[Number of firms with other locations]	[2]	[2]	[5]	[9]
Question #4 - Approximate number of parking spaces available for use by employees, clients, and visitors	At each location	993	1123	3165	5281
	[Number of firms]	[11]	[10]	[6]	[27]
Question #5 - Foresee a need to construct or aquire additional parking spaces within the next three years	(a) Yes	1	2	5	8
	(b) No	12	9	5	26
	(c) If yes, number of spaces	9	20	4605	4634
Question #6 - Type of work schedule used by firm	(a) Fixed schedule:				
	employers applying	4	3	1	8
	(employees covered)	(149)	(120)	(50)	(319)
	(b) Staggered shift:				
	employers	9	6	10	25
	(employees)	(1339)	(7153)	(4737)	(13,229)
	(c) Flextime:				
	employers	-	1	-	1
	(employees)	-	(48)	-	(48)
	(d) Compressed Work:				
	employers	-	-	-	-
	(employees)	-	-	-	-
	(e) Fixed and staggered:				
	employers	1	-	-	1
	(employees)	(28)	-	-	(28)
	(f) Fixed and flextime:				
	employers	-	-	2	2
	(employees)	-	-	(2800)	(2800)
	(g) No response:				
	employers	-	1	-	1
	(employees)	-	(72)	-	(72)

		Subareas			
		100	200	300	TOTAL
Question #7 - Transportation activities currently sponsored	Vanpooling:				
	employers applying	-	-	-	-
	(employees covered)	-	-	-	-
	Carpooling:				
	employers	-	1	1	2
	(employees)	-	(6750)	(530)	(7280)
	Preferential parking:				
	employers	-	2	2	4
	(employees)	-	(6808)	(1507)	(8315)
	Alternative work schedule:				
	employers	-	-	-	-
	(employees)	-	-	-	-
	Transit assistance:				
	employers	-	-	-	-
	(employees)	-	-	-	-
	Shuttles to bus/rail:				
	employers	-	-	5	5
	(employees)	-	-	(4880)	(4880)
	Other:				
	employers	1	1	1	3
	(employees)	(795)	(48)	(70)	(913)

		Subareas			
		100	200	300	TOTAL
Question #8 - Effect of present transportation conditions on employee mobility [by firm]	Rush hour congestion:				
	No effect	7	4	4	15
	Negative effect	4	6	3	13
	Very negative effect	3	1	5	9
	Insufficient parking:				
	No effect	11	9	6	26
	Negative effect	3	1	4	8
	Very negative effect	-	1	2	3
	Inadequate access by public transportation:				
	No effect	8	6	5	19
	Negative effect	5	1	4	10
	Very negative effect	1	4	3	8
	Poor highway access:				
	No effect	7	10	6	23
	Negative effect	5	1	4	10
	Very negative effect	2	-	2	4
	Inadequate circulation within area:				
	No effect	10	8	8	26
	Negative effect	1	3	4	8
	Very negative effect	3	-	-	3

Question #9 - Views on transportation conditions five years from now [by firm]

	Subareas 100	200	300	TOTAL
Peak hour congestion:				
Much better	-	-	-	-
Better	4	4	-	8
Same	5	3	2	10
Worse	5	1	6	12
Much worse	-	2	4	6
Adequacy of parking:				
Much better	-	-	1	1
Better	1	-	-	1
Same	11	8	6	25
Worse	2	2	3	7
Much worse	-	-	2	2
Adequacy of public transportation:				
Much better	1	-	-	1
Better	-	1	-	1
Same	9	5	6	20
Worse	3	1	4	8
Much worse	1	3	2	6
Highway access:				
Much better	1	1	-	2
Better	3	1	1	5
Same	7	8	7	22
Worse	3	-	1	4
Much worse	-	-	3	3
Circulation within area:				
Much better	1	-	-	1
Better	-	1	1	2
Same	9	7	8	24
Worse	3	1	2	6
Much worse	1	-	1	2

		Subareas			
		100	200	300	TOTAL
Question #10 - Assessment of firm's location in terms of access to public transportation	Excellent:				
	firms	3	2	-	5
	(employees affected)	(96)	(132)	-	(228)
	Adequate:				
	firms	6	3	5	14
	(employees)	(1115)	(323)	(3540)	(4978)
	Poor:				
	firms	5	4	4	13
	(employees)	(305)	(148)	(1827)	(2280)
	None available:				
	firms	-	2	2	4
	(employees)	-	(6790)	(1840)	(8630)
	No response:				
	firms	-	-	2	2
	(employees)	-	-	(380)	(380)
Question #11 - Degree to which lack of public transportation access to firm affects various aspects	Parking:				
	No effect	11	10	6	27
	Negative effect	2	1	4	7
	Very negative effect	-	-	2	2
	Employee turnover:				
	No effect	12	10	9	31
	Negative effect	1	-	2	3
	Very negative effect	-	1	1	2
	Obtaining entry level personnel/trainees:				
	No effect	8	8	7	23
	Negative effect	4	2	5	11
	Very negative effect	1	1	-	2
	Positions at all levels:				
	No effect	11	10	8	29
	Negative effect	2	1	4	7
	Very negative effect	-	-	-	-

		Subareas			
		100	200	300	TOTAL
Question #12 - Job openings attributed to inadequate public transportation access	Number of jobs	10	10	62+	82+
	[Number of firms]	[2]	[1]	[5]	[8]
Question #13 - Actions that would help relieve transportation bottlenecks	Commuter Assistance Program:				
	firms	5	2	3	10
	(employees covered)	(385)	(106)	(2300)	(2791)
	Locally established standards to encourage meeting goals:				
	firms	5	2	4	11
	(employees)	(1023)	(6790)	(2300)	(10113)
	Locally based financing for road construction:				
	firms	4	3	7	14
	(employees)	(257)	(155)	(6127)	(6539)
	Carpool/Vanpool Program:				
	firms	3	3	4	10
	(employees)	(108)	(146)	(2610)	(2864)
	[Number of firms responding]	[10]	[6]	[11]	[27]

Question #14 - Types of transportation actions a firm would consider implementing, given techinical assistance

	Subareas			
	100	200	300	TOTAL
Adopt variable work schedule:				
employers	3	1	3	7
(employees)	(110)	(6750)	(2907)	(9767)
Construct remote parking facilities:				
employers	-	1	3	4
(employees)	-	(40)	(950)	(990)
Encourage or subsidize carpool/vanpool:				
employers	1	1	6	8
(employees)	(30)	(48)	(3870)	(3948)
Reserve carpool/vanpool preferential parking:				
employers	3	2	4	9
(employees)	(196)	(106)	(2430)	(2732)
Encourage employee use of public transit:				
employers	8	1	5	14
(employees)	(461)	(48)	(2770)	(13,279)
Partially subsidize employee use of public transit:				
employers	1	-	1	2
(employees)	(55)	-	(1600)	(1655)
Establish shuttle service to rail stations:				
employers	2	1	-	3
(employees)	(124)	(6750)	-	(6874)
Participate in areawide transportation needs evaluation:				
employers willing	9	2	5	16
(employees covered)	(503)	(6790)	(5970)	(13,263)
Participate in areawide commuter assistance center:				
employers	4	1	3	8
(employees)	(966)	(6750)	(2970)	(10,686)
Assist in planning commuter-related transportation improvements:				
employers	3	-	5	8
(employees)	(135)	-	(5100)	(5235)

		Subareas			
		100	200	300	TOTAL
Question #16 - Interested in working with other organizations in Delaware County Waterfront area	Yes	5	3	7	15
	No	9	8	6	23
Question #17 - Willingness to become involved in planning process of Delaware County Waterfront TMA	Yes	4	3	7	12
	No	10	8	6	26
Question #14 and Question #17 (cumulative data) Number of firms responding affirmatively to some type of TMA service		12	5	13	30

Question #18 - Identifying the most important transportation improvements

	Highway	Transit
Subarea 100	Complete Blue route (2) Access 291 (3) No trucks on route 322 (1) Access I-95N at Kerlin Street(1) Eliminate congestion on I-95 (1) Ramps added on I-95 at Edgemont Ave and Kerlin Street (1)	No SEPTA service cuts (1) Feeder routes to rail stations (1) Rail service through Chester (1) Suburban bus routes (1) More bus from SE Delaware/ Southern Philadelphia County (1) High Speed Line running along Commodore Barry Bridge (1) Bus route to West Chester (1)
Subarea 200	Improve roads and shoulders (1) Widen I-95 at Blue route-intersection in Eddystone, PA (1) Rid of Rt 291 water flood (1) Traffic flow on McDade Blvd (1) Improve Route 291 (1)	Consistant SEPTA service (1) More SEPTA route in Tinicum (1) Bus route from Rt 291/Rt 13 (1) Bus from Media to waterfront (1)
Subarea 300	Widen Route 291 (2) Schedule construction at off-peak (1) More hi-speed roads away from city (1) Complete Blue Route (1) South access from Essington (1) Speed Limit on Hog Island (1)	Bus service from Scott Paper (1) Efficient rail between City/ Subarea into the airport (1) Improve SEPTA service (1) Bus to UPS from Delaware Co. (1) 24 hours transit service (2)

DELAWARE RIVER WATERFRONT EMPLOYEE START TIMES: TOTAL RESPONSE

START TIME	A Fixed	B-1 Shift Stagg.	B-2 Shift Stagg.	B-3 Shift Stagg.	C Flex	TOTALS	Percent
12:00 a.m.	2600			15		2615	17.1
4:45		21		80		101	0.6
5:00					24	24	0.2
5:30		14				14	0.1
6:00		285	15			300	2.0
6:30					200	200	1.3
7:00		377	9			386	2.5
7:30		109	5			114	0.7
7:45		541				541	3.5
8:00	231	190	206	57		684	4.5
8:15	20					20	0.1
8:30	59		130	21		210	1.4
8:45			7			7	0.03
9:00	23			10		33	0.2
10:00		4				4	0.01
10:30		500				500	3.3
11:00				164		164	1.1
11:30			100	50		150	1.0
12:00 p.m.				118		118	0.8
2:00				21		21	0.1
2:30				9		9	0.04
3:00			408	45		453	3.0
4:00			196	10	25	231	1.5
4:30			20			20	0.1
11:00				5		5	0.02
						* 6750	44.1
						* 1400	9.1
						* 250	1.6
TOTALS	2933	2041	1096	605	249	15324	100%

* Did respond to the question but did not indicate the time.

DELAWARE RIVER WATERFRONT EMPLOYEE STOP TIMES: TOTAL RESPONSE

START TIME	A Fixed	B-1 Shift Stagg.	B-2 Shift Stagg.	B-3 Shift Stagg.	C Flex	TOTALS	Percent
12:00 a.m.	2600		216	25	25	2866	18.7
2:30		500				500	3.26
6:00		4				4	0.03
7:00			5			5	0.03
7:30				214		214	1.4
8:00				133		133	0.87
8:30				80		80	0.52
1:30		21				21	0.14
2:00		21	49			70	0.46
2:30		45	100			145	0.94
3:00	40	92				132	0.86
3:30		456	9			465	3.03
3:45		541				541	3.53
4:00	60	207	2	14	24	307	2.00
4:30	92	148	60	3	200	503	3.28
5:00	112	6	235	61		414	2.7
5:15	20		7			27	0.18
5:30	9		10	10		29	0.19
9:40			240			240	1.57
10:00				21		21	0.14
10:30				9		9	0.06
11:00				35		35	0.23
11:30			163			163	1.06
						* 6750	44.05
						* 1400	9.14
						* 250	1.63
TOTALS	2933	2041	1096	605	249	15324	100%

* Did respond to the question but did not indicate the time.