HUNTING PARK TRANSPORTATION CENTER

Exclusive Access Park & Ride Facility Patronage Estimation Study

June 1990

Delaware Valley Regional Planning Commission
21 South Fifth Street, Bourse Building
Philadelphia, Pennsylvania 19106

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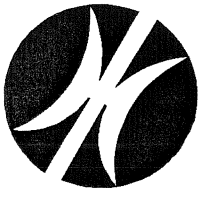
Created in 1965, the Delaware Valley Regional Planning Commission (DVRPC) is an interstate, intercounty and intercity agency which provides continuing, comprehensive and coordinated planning for the orderly growth and development of the Delaware Valley region. The region includes Bucks, Chester, Delaware, 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 four line Divisions: Transportation Planning, Regional Information Services Center, Strategic Planning, and 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

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HUNTING PARK TRANSPORTATION CENTER Exclusive Access Park & Ride Facility Patronage Estimation Study	**Publication No.** 90008

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ABSTRACT

As part of its rehabilitation project for the Frankford Elevated line, SEPTA has proposed building a Transportation Center at Hunting Park Avenue. The Center would be a replacement facility for the present Erie-Torresdale station. The distinguishing feature of the Center, as proposed for this analysis, would be a multi-level parking garage with direct auto access from I-95 via an exclusive elevated ramp along Frankford Creek. The ramp would intersect I-95 within the Betsy Ross Bridge interchange, providing a well defined and highly marketable service to commuters from Northeast Philadelphia, lower Bucks County and New Jersey.

In this study, DVRPC has analyzed the market potential of such a facility to attract new trips to the transit line. Population and employment trends were investigated, as well as the residence area of the commuters presently driving on I-95. Patronage estimates were prepared for two alternative transit systems (one with the Center and one without) for the year 2015 using the DVRPC travel simulation models. DVRPC studied the former modes/stations of the new trips on the Elevated line and the traffic impacts on I-95 and the Betsy Ross Bridge.

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Background

Built in 1922 (after completion of the Market Street portion in 1907), the Market-Frankford Subway Elevated (Blue) Line is SEPTA's most heavily patronized route. The line extends from its eastern terminus at Bridge Street in Northeast Philadelphia to 69th Street in Upper Darby, a distance of 13.2 miles. Daily ridership which declined in recent decades, has stabilized more recently and now stands at approximately 160,000 boardings. Ridership on the Frankford Elevated portion (the section east of Center City, actually running northeastward) currently averages about 52,000 weekday boardings.

SEPTA has begun a major reconstruction of the Frankford Elevated portion of the line between Wildey Street, located one block south of Girard Avenue, and the eastern terminus at Bridge Street. This project is the largest transit capital project now underway in the Philadelphia area. Phase I of the project, which covers reconstruction of the Margaret-Orthodox station and the section of the line from Wildey Street to Somerset Street, has cost $140 million. SEPTA estimates that an additional $650 million will be required to bring the project through the second and final phase.

The Frankford Elevated plays an important role in the region's transportation system. The permanent loss of the line would likely subject area roads, especially those leading to Center City from the Northeast (I-95, US 1, etc.), to tremendous increases in demand. These facilities are already facing serious congestion problems during peak hours and could only be expanded at great capital and community expense. However, since much of the ridership is transit dependent, sizable increases in transit riding could also be expected on other transit routes, notably the Regional Rail lines and the east-west routes feeding the Broad Street line.

Hunting Park Transportation Center

Besides rehabilitating the physical structure, SEPTA has been exploring ways to expand the market of the Frankford Elevated. Recognizing the close proximity of I-95 and the impact that roadway has had on transit ridership from the Northeast to Center City, SEPTA staff initiated discussions of a major Park & Ride facility with direct access from the Interstate highway. Since PennDOT would be constructing new ramps to complete the interchange at the Betsy Ross Bridge and SEPTA would be reconstructing both the Erie-Torresdale and Church Street stations in that vicinity, a proposal was developed for a new Transportation Center at Hunting Park Avenue on the Frankford Elevated line. This center would include a multi-story parking garage with direct limited access from I-95 via an elevated ramp extension from the bridge interchange.

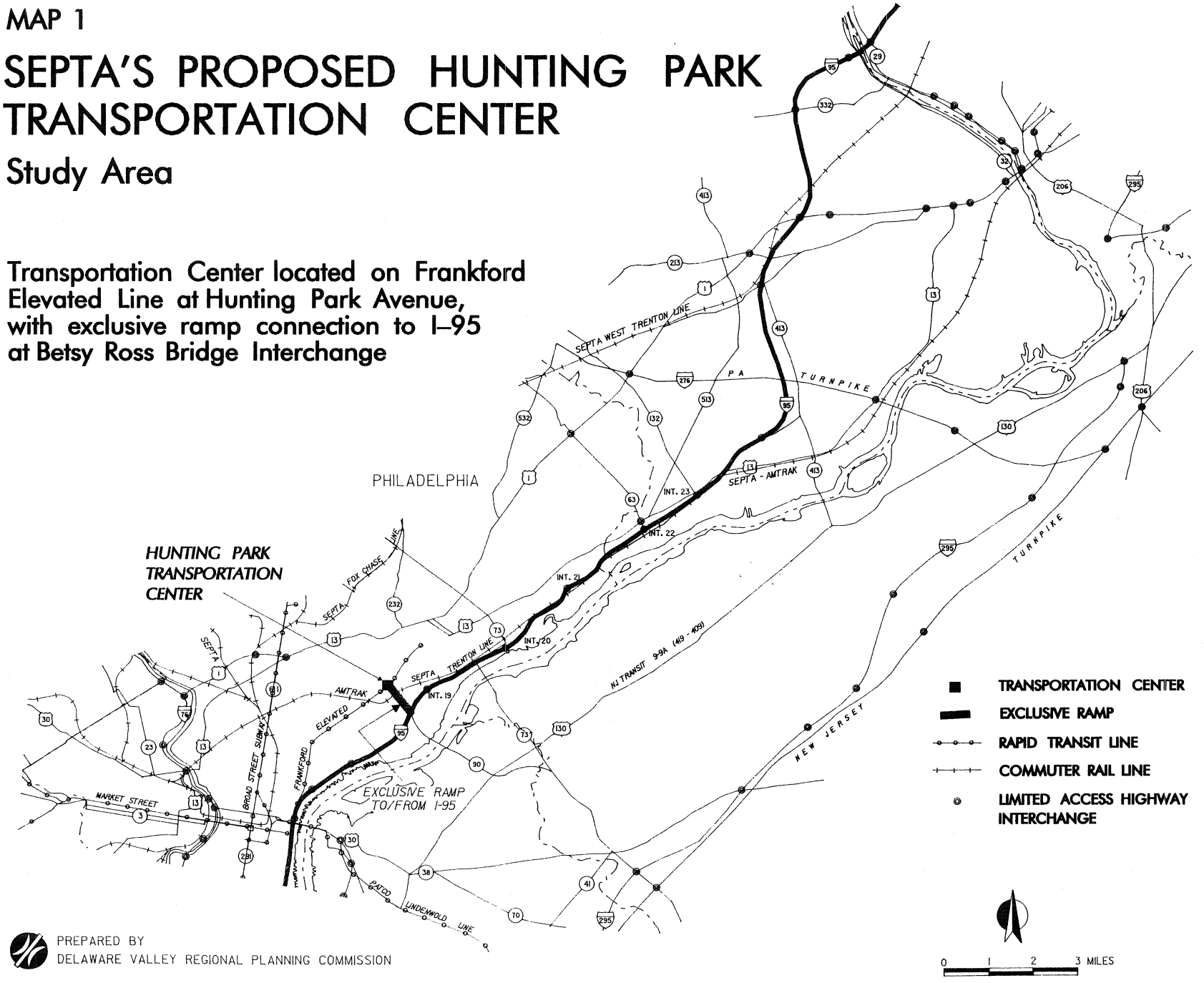
SEPTA requested DVRPC to provide demand estimates for the proposed facility and estimates of the likely impact on I-95 traffic flows. Map 1 shows the location of the Center. This report summarizes the work of DVRPC on this project.

MAP 1

SEPTA'S PROPOSED HUNTING PARK TRANSPORTATION CENTER

Study Area

Transportation Center located on Frankford Elevated Line at Hunting Park Avenue, with exclusive ramp connection to I–95 at Betsy Ross Bridge Interchange



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II. METHODOLOGY

Travel Simulation

The travel simulation models at DVRPC follow the traditional steps of trip generation, trip distribution, modal split and travel assignment, and utilize programs included in the Federally sponsored Urban Transportation Planning System (UTPS). Generally the models are similar to those used in other large urban areas, but they have been subjected to an extensive validation/recalibration analysis for the Delaware Valley region based on the 1980 Census.

For purposes of travel simulation, the DVRPC region is divided into zones, generally corresponding to census tracts except in the Philadelphia Central Business District (CBD) where they correspond to census block groups. In order to forecast travel demand, demographic and employment data must first be projected to the target year at the census tract level. These projections are based on observed trends, as well as planned residential and commercial development. The variables of interest include total population, household size, auto ownership, number of employed residents and employment in eleven major categories.

Trip generation, the first step in the modeling process, estimates the number of trips that people are likely to make from or to each zone. Person trips are generated from the zone level estimates of households and employment through the use of trip rates stratified by purpose, auto ownership, and area type. Determining the extent of travel between zones, the trip distribution step, is accomplished using a gravity-type model. This model assumes that the propensity to travel increases with the attractiveness of the destination, as measured by employment opportunities, and decreases with the difficulty of traveling between tracts. This travel effort, or impedance, is measured by the travel time and cost between each zone for both highway and transit modes.

The modal split model divides the pool of zone-to-zone person trips between either the transit system or the highway system. Generally, the propensity to use transit increases with the relative frequency of service and decreases as transit becomes less competitive (in terms of time and cost) relative to the auto mode. Other factors which affect the choice of mode include auto ownership, transit submode (bus, rail, etc.) and trip purpose.

The auto occupancy model determines the average number of persons per automobile based on trip purpose and trip length. This value is used to convert the auto person trips output from the modal split model to vehicle trips.

The final step in the process is the assignment of the estimated transit and highway trips to specific facilities. This is accomplished by allocating the zone-to-zone trips to each link along the minimum route through both the transit and highway networks. These minimum paths are defined as the series of links leading from the origin zone to the destination zone which take the least total time and cost. These minimum paths are an essential part of the simulation process and are used in the trip distribution, modal split and assignment models.

A full description of the DVRPC travel simulation process can be found in the report, Year 2000 Travel Forecasts for the Delaware Valley Region, published in March 1987 by DVRPC.

Transit System Alternatives

The DVRPC travel simulation models utilize a computer encoded description of the highway and transit networks. These networks define every route in the regional public transit system and all highways except the smaller local streets. This level of detail enables the models to assign trips to individual links of each system. DVRPC continually updates these network descriptions to reflect current system structure. Additional coding is performed to include those facilities already committed for future construction or various facility alternatives for testing purposes.

The Hunting Park Transportation Center's Park & Ride facility, with its direct access from I-95, will serve those commuters who live along I-95 and/or who can reach I-95 in a reasonable amount of time and can take advantage of the interstate's higher speeds to reach a rail transit line that provides frequent service to the core of the region. Because of the Center's location at the Betsy Ross Bridge interchange, it will also serve residents of the US 130 corridor in New Jersey who commute anywhere in the service area of the Market-Frankford line.

For this project, DVRPC coded two alternative transit networks: a No-Build Alternative representing the existing configuration of the transit system; and, a Center Alternative with special auto approach links to the Hunting Park Transportation Center. All zones along the I-95 and US 130 corridors were given this auto access. The I-95 corridor extended from the vicinity of the Center to Newtown Township, Bucks County, encompassing an area from the Delaware River to two miles west of Roosevelt Boulevard (US 1). The US 130 corridor in New Jersey included all zones from the river to a mile and a half east of US 130, from northern Pennsauken Township, Camden County to Burlington City, Burlington County. Willingboro Township was included in its entirety.

Highway speeds on these links were set according to observed speeds during the morning peak periods, the convention generally used by DVRPC in the coding of highway networks. DVRPC was advised by SEPTA to assume a $1.00 parking fee for the facility, which was also coded into the network. DVRPC also had to code into the auto approach links a toll for the Betsy Ross Bridge crossing for the New Jersey zones. A toll of $.60 was assumed, based on the DRPA commutation sticker rates. This fee represents the minimum possible fee for a single individual, and is therefore somewhat generous toward transit in the Center Alternative. The Center Alternative, however, does not consider other factors that might make transit even more attractive. For example, higher parking charges in the CBD, though not within SEPTA's control, would most certainly cause increased use of the Hunting Park center, as well as all other transit facilities.

The travel simulation models were run for both alternatives, beginning with highway and transit path building and modal choice, to determine the extent to which the Center will attract new trips to transit and divert trips from the auto mode. Trips were then loaded on the transit networks to determine if any other lines or stations were affected by the inclusion of the Center. A highway loading was unnecessary in this case, since the coding of the auto approach links in the transit network was sufficiently detailed to permit identification of the volume changes on the major links of the highway system.

III. TRAVEL MARKETS

Population and Employment Trends

While the simulation process provides a trip assignment to the individual links in the transit network, it is useful to take a macroscopic look at the market area of the Frankford Elevated line. In July 1988, DVRPC prepared "Year 2000 Ridership Forecast for the Frankford Elevated Line". The following discussion draws on that report and data developed by DVRPC for the National Transportation Study.

The largest market segment of line patronage is comprised of residents of Northeast Philadelphia who travel to and from jobs in Center City. The factors which determine the potential order of magnitude of this market segment are the population in the Northeast and the employment in Center City.

A second market segment consists of those traveling to employment locations in the Northeast, often called the reverse commuters. The potential of this segment is determined by the magnitude of employment in the Northeast portion of the city in close proximity to the line and by the populations of workers in areas accessible to the Northeast via the line. These commuters may come from other parts of the City, either riding through on the Market-Frankford line from West Philadelphia, or connecting to it from other lines in the City or the suburbs.

The third and forth market segments include Northeast residents traveling to jobs outside of Center City and those traveling for non-work purposes.

Table 1 identifies changes in population and employment that have taken place between 1970 and 1980 and those that DVRPC has projected to occur by the year 2015 in its work for the National Transportation Study (1989). Though recent decades have brought declines in the population and employment of those areas immediately adjacent to El stations, those declines are expected to moderate by the year 2015. Meanwhile, the Bensalem-Bristol area of lower Bucks County, an area that could possibly contribute to the patronage of the proposed transportation center, has been and is expected to continue growing significantly. Employment in Center City is expected to remain healthy and grow slightly, while the population remains stable.

Frankford Elevated Market Area

Traditional access to Frankford Elevated stations is made primarily by either walking from surrounding neighborhoods, or by transferring from a connecting bus, trackless trolley, or trolley route. Most of the connecting trips come from Northeast Philadelphia, either via Bridge-Pratt or Margaret-Orthodox, but important crosstown connections exist at Erie-Torresdale, Allegheny, and Girard. Parking is extremely limited along the line because of the dense nature of the urban development. Only the Bridge-Pratt station offers off-street parking for nearly 500 cars.

The changes in population in the areas within walking distance of the line accounts for most of the decline in Frankford Elevated ridership. SEPTA is therefore trying to widen the market area of the line by providing for increased, whether as additional connecting bus/trolley service or park and ride facilities for an increasingly auto-oriented society.

TABLE 1

POPULATION AND EMPLOYMENT TRENDS
Market Areas of the Frankford Elevated

	1970[1]	1980[1]	2015[2]	Percent Change 1970-80	Percent Change 80-2015
Areas within Walking Distance of Frankford El (½ mile)					
Population	139,085	111,983	103,969	-19.5%	-6.0%
Employment	77,452	49,895	46,392	-35.6%	-4.5%
Carless Households	20,965	18,369	17812	-12.4%	-7.4%
Northeast Philadelphia					
Population	438,238	411,922	390,451	-6.0%	-4.9%
Employment	135,002	129,393	142,788	-4.2%	+9.9%
Carless Households	25,497	30,113	29,730	+18.1%	-1.5%
Center City					
Population	43,465	43,502	43,350	+0.1%	-0.3%
Employment	271,454	263,549	287,253	-2.9%	+8.7%
Carless Households	15,321	16,513	17,195	+7.8%	+4.5%
Lower Bucks County					
Population	196,915	208,393	314,186	+5.8%	+53.7%
Employment	65,537	79,172	157,171	+20.8%	+119.0%
Carless Households	3,486	4,887	9,214	+40.2%	+124.1%

Sources: [1] US Bureau of the Census
[2] DVRPC, "National Transportation Study", 1989

I-95 Market Area

Interstate 95 is a 6-8 lane highway which parallels the Frankford Elevated from Center City to the lower Northeast, but continues along the Delaware River in Philadelphia, through lower Bucks County and into New Jersey. Constructed during the 1960's and 1970's, this highway experiences traffic volumes exceeding 100,000 vehicles per day, serving motorists from Northeast Philadelphia, Bucks County and the entire eastern seaboard. Peak period traffic is reaching the capacity limits of the facility as regional commuters use the limited access roadway to avoid congested city streets.

To better understand the area served by I-95 and to see where its market might overlap the market area of the Frankford Elevated, DVRPC conducted a license plate survey. The survey provided guidance in defining the potential market area of the new transportation center and in the coding of the simulation network. The license plates of vehicles exiting I-95 at the Callowhill Street (Center City) ramp during the morning peak period from 7 to 9 AM were identified and processed through both the Pennsylvania and New Jersey motor vehicle registration files. The data were then aggregated to ZIP code-based analysis districts for further study. Though vehicle registration data is not a completely valid surrogate for vehicle trip origins, it is sufficient for defining the market area of a transit facility.

Map 2 shows the analysis districts which cover the study area. Table 2 on the page following the map shows the license plate data for all districts. The data reveal that three-fourths (76%) of the morning peak period vehicles exiting the Callowhill ramp are registered within the study area (denoted in the table by an asterisk). Only 9% of the peak vehicles are from New Jersey. The distribution of registrations is fairly evenly divided among the Pennsylvania study districts, though somewhat higher proportions were found in the Torresdale, Holmesburg and Bensalem areas. An additional 620 vehicles were identified that are registered in locations beyond the DVRPC region.

The survey indicates that the market area of I-95 for trips to central Philadelphia is quite extensive both in length and width. No one particular origin area stands out from the rest. Rather, a very long and complex corridor exists from which new transit patrons could be drawn. As can be seen on the map, there are numerous connecting highways that can link this broad area to I-95 and thus to the transportation center. There are also two major rail lines which traverse the corridor parallel to I-95.

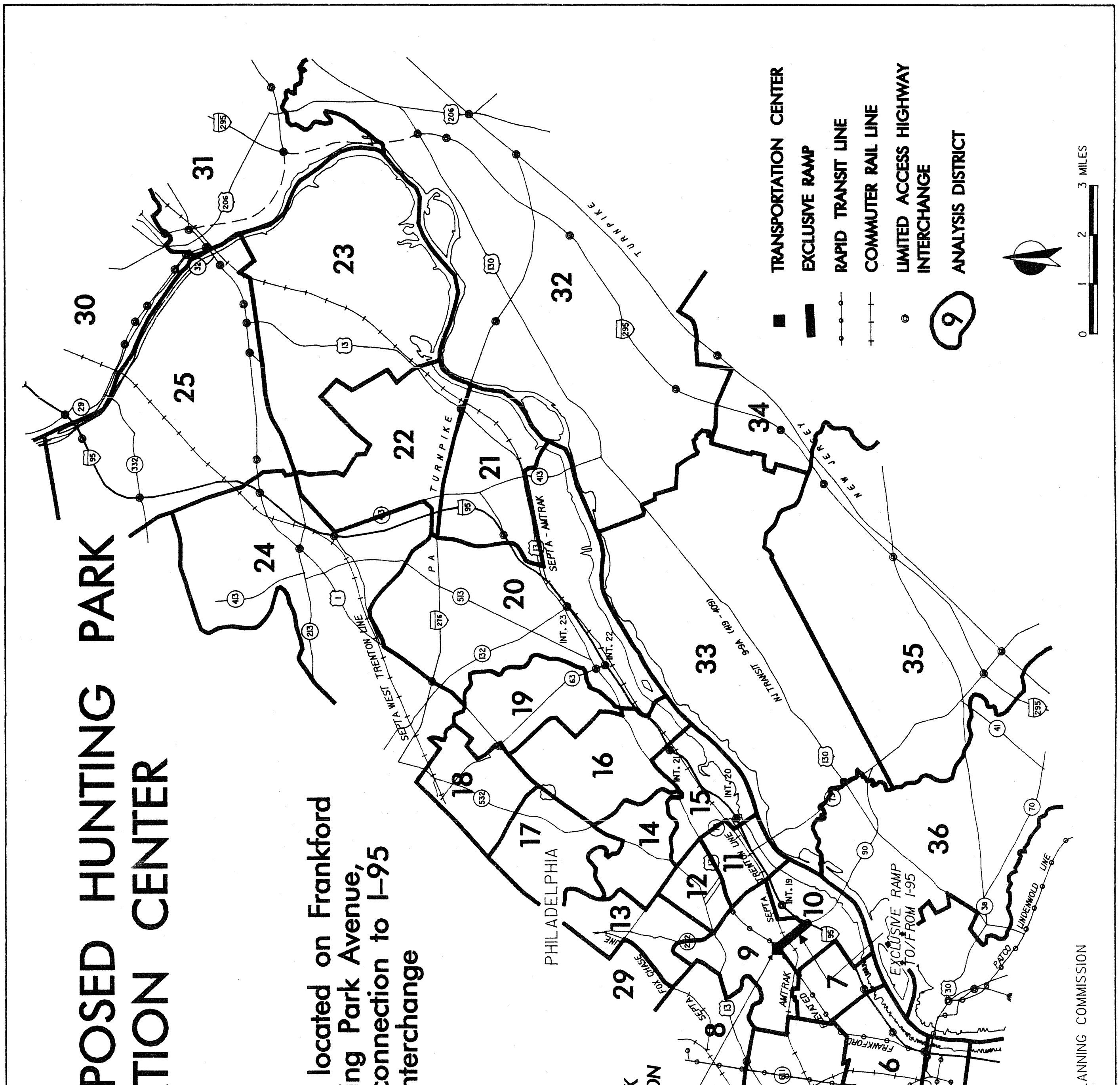
MAP 2
SEPTA'S PROPOSED HUNTING PARK TRANSPORTATION CENTER
Analysis Districts
Transportation Center located on Frankford Elevated Line at Hunting Park Avenue, with exclusive ramp connection to I-95 at Betsy Ross Bridge Interchange
TRANSPORTATION CENTER
EXCLUSIVE RAMP
RAPID TRANSIT LINE
COMMUTER RAIL LINE
LIMITED ACCESS HIGHWAY INTERCHANGE
ANALYSIS DISTRICT
0 1 2 3 MILES
HUNTING PARK TRANSPORTATION CENTER
EXCLUSIVE RAMP TO/FROM I-95
PHILADELPHIA
NEW JERSEY
TURNPIKE
PA TURNPIKE
SEPTA WEST TRENTON LINE
SEPTA - AMTRAK
NJ TRANSIT
BROAD STREET SUBWAY
FRANKFORD ELEVATED
MARKET STREET
FOX CHASE LINE
PATCO LINDENWOLD LINE
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TABLE 2

LICENSE PLATE SURVEY
Vehicle Registrations by District

ANALYSIS DISTRICT	VEHICLES COUNTED	PERCENT OF SURVEY
1	47	2.5%
2	24	1.3%
3	11	0.6%
4	16	0.9%
5	37	2.0%
6	28	1.5%
* 7	34	1.8%
8	27	1.4%
* 9	47	2.5%
* 10	10	0.5%
* 11	61	3.3%
* 12	85	4.6%
* 13	75	4.0%
* 14	70	3.8%
* 15	94	5.0%
* 16	101	5.4%
* 17	76	4.1%
* 18	87	4.7%
* 19	94	5.0%
* 20	113	6.1%
* 21	10	0.5%
* 22	35	1.9%
* 23	17	0.9%
* 24	83	4.4%
* 25	43	2.3%
26	31	1.7%
27	87	4.7%
28	51	2.7%
29	24	1.3%
30	20	1.1%
31	5	0.3%
** 32	5	0.3%
** 33	57	3.1%
** 34	10	0.5%
** 35	21	1.1%
** 36	20	1.1%
37	31	1.7%
38	81	4.3%
39	98	5.3%
TOTAL	1866	100.0%

Note: Analysis Districts (see Map 2): * PA Districts, ** NJ Districts

IV. PARK & RIDE PATRONAGE

Sources of Users

The Hunting Park Transportation Center's park and ride facility with an exclusive ramp from I-95, could potentially attract users from a number of different sources. Understanding the reasons why users would be attracted from these different sources to the Elevated due to added benefits of the Park & Ride is critical to the estimation of the demand on the Center Alternative.

It should be understood that for both alternatives, the No-Build and the Center, the same transit service is assumed to be provided by SEPTA. That is, no changes in the level of service on either the Frankford Elevated, the Regional Rail lines or any of the connecting bus/trolley routes were coded into the networks of either alternative. The only differences between the alternatives are the more convenient access to the Frankford Elevated service provided by the exclusive ramp and the additional (unspecified) parking capacity at the new Hunting Park station.

Given these two enhancements to the transit system, access and parking, DVRPC staff postulated groups of commuters who could be attracted to the Frankford Elevated from the existing pool of commuters: current highway users and current transit users. The identification of these groups is based on a logical analysis of the factors affecting the commuting market in the I-95 corridor and is not limited to the parameters considered in the DVRPC modelling process.

Current Highway Users

A1 Auto drivers/passengers who are looking to reduce their costs (individual share of parking and auto milage charges) and who have not been able to use the El because of insufficient parking.

A2 Auto drivers/passengers who spend more time in traffic congestion south of the Betsy Ross Bridge Interchange than it would take to use the Center and whose destinations are within a reasonable distance of the Market-Frankford line.

Current Transit Users

B1 Park & ride patrons of a Regional Rail line who are looking to reduce their commuting costs (fares) and who have not been able to use the El because of insufficient parking.

B2 Park & ride patrons of a Regional Rail line who would prefer more frequent service and who have not been able to use the El because of insufficient parking.

B3 Park & ride patrons of a Regional Rail line who would prefer to park their vehicle in a more secure facility.

C1 Park & ride patrons of the El who are currently parking at Bridge-Pratt who would find the Center more convenient or who are forced to park on streets because of insufficient off-street parking capacity.

C2 Bus and trolley transferees with an auto available that could be used for commuting and who have the financial resources to pay the additional expense of changing access mode.

D1 NJ TRANSIT park & ride patrons who are looking to reduce their costs (fares) and who have not been able to use the El because of insufficient parking.

D2 NJ TRANSIT park & ride patrons who would prefer more frequent service and who have not been able to use the El because of insufficient parking.

D3 NJ TRANSIT park & ride patrons who would prefer to park their vehicle in a more secure facility and who have not been able to use the El because of insufficient parking.

D4 NJ TRANSIT park & ride patrons who currently transfer to the Market-Frankford line in Center City to travel to areas west of Center City.

The postulation of these groups of potential patrons of the park & ride facility provided guidance to staff during the review of the patronage produced by the simulation models.

Patronage Estimates

DVRPC ran its travel simulation models for the two alternatives: No-Build and Center. The models produced tables of transit and highway trips for all trip purposes that were assigned to the respective networks. Analysis of the network loadings shows which routes are taken by trips between the various zones. Comparing the loadings from the two assignments indicates the impacts or shifts induced by the enhancements offered by the Center alternative over the No-Build case.

Table 3 shows the patronage estimates for each alternative as produced by the models for the year 2015. The upper part of the table shows the average weekday boardings for the line segment between the Erie-Torresdale and Bridge-Pratt stations. The difference between the alternatives, shown under the heading "P&R Impact", reveals that the introduction of the Center's parking facility with its exclusive ramp connection to I-95 will attract 900 new riders to the line (or 1,800 daily trips). The Center itself will actually attract 1,200 new riders, 300 of whom will switch from the Bridge-Pratt station.

The middle portion of Table 3 shows where the Center's riders will come from in terms of their former modes. Obviously, the largest group of riders at the Center will be former users of the Erie-Torresdale station. The table identifies two other major categories of riders: parkers from Pennsylvania and parkers from New Jersey. Each of these groups are further identified by their former mode. The sum of the PA and NJ parkers totals 1,200 persons. If parking spaces were to be provided for each person, a 1,200 space facility would be required.

TABLE 3

PATRONAGE ESTIMATES
Hunting Park Transportation Center - 2015

Frankford Elevated Station Volumes - (Boardings for end of line segment)

Station	No-Build	Center	P&R Impact
Bridge-Pratt	21,300	21,000	-300
Margaret-Orthodox	5,150	5,150	0
Church	890	890	0
Hunting Park Center *	4,480	5,680	+1,200
(No-Build = Erie-Torresdale)			
Segment Total	31,820	32,720	+900

Hunting Park Transportation Center Patronage

Patronage Sources	No-Build	Center	P&R Impact
Existing E-T Riders	4,480	4,480	0
Parkers From PA			
Ex-Auto Only		290	290
Ex-SEPTA Rail Riders		380	380
Ex-SEPTA Bus Access		300	—
Total From PA		970	670
Parkers From NJ			
Ex-Auto Only		120	120
Ex-NJT Bus Riders		110	110
Total From NJ		230	230
Parking Total		1,200	—
Center Total	4,480	5,680	900

New Transit Trips - Ex-Auto Only

Source	One-way	Daily
By PA Parkers	290	580
By NJ Parkers	120	240
Total New Transit Trips	410	820

The first group of riders from Pennsylvania are identified as Ex-Auto Only. This is the primary market sought by the Center, since each one of these individuals represents a new source of revenue and a proportional reduction of highway congestion on some sections of I-95. The DVRPC models estimate that 290 Pennsylvania auto-only travellers will be attracted to the Elevated by the enhancements offered in the Hunting Park Transportation Center. These travellers have always had the option of using either the Elevated or a Regional Rail line, but have heretofore chosen to drive. The introduction of the exclusive-ramp parking facility on the Elevated provides enough of an incentive to cause these people to finally make the switch to transit.

The second group of new patrons are those the Center will attract from the Regional Rail system. These 380 park & ride patrons will find it more advantageous to drive to the Elevated than to a Rail station, either because it is closer, cheaper, offers a higher frequency of service or for all of these reasons. However, these riders are not new transit riders, only new to the Market-Frankford line.

It is also estimated that the Center's exclusive ramp parking facility will attract 300 riders from Pennsylvania who formerly used a SEPTA bus to access the Market-Frankford line at Bridge-Pratt station, but who would find it more convenient to use an auto to access the Hunting Park station. Since these riders are merely switching their boarding station, they are not counted in the impact of the Center on line ridership.

The three groups of riders from Pennsylvania discussed above contribute 970 users to the Center, of which 670 are new riders on the Frankford Elevated line.

It is estimated that 230 new riders will come to the Elevated line from New Jersey as a result of the exclusive-ramp parking facility at the Hunting Park Center. These new riders consist of 120 former New Jersey auto-only travellers and 110 former riders of NJ TRANSIT buses that served Center City from along the US 130 / River Road corridor. The ex-bus riders are not new transit users, only a gain to one carrier and a loss to another. However, the ex-auto group represents a totally new set of riders on transit. Both of these groups always had the option of using the Elevated, or for that matter the PATCO High Speed Line, yet chose not to. The introduction of the direct access ramp from the Betsy Ross Bridge to the Elevated is a sufficient incentive to attract these commuters away from their former modes. Again, the discussion concerning the difficulty of attracting more people to transit from a pool of travellers already exhibiting high percentages of transit usage applies here.

Though added convenience and general improvement of the system are important reasons for implementing a transit project, UMTA imposes a criteria based on the total number of new transit trips generated by the improvement for major investments. The last section of Table 3 indicates that the Hunting Park Transportation Center, with an exclusive, direct access ramp from I-95 into a multi-level park & ride facility, will generate 820 new transit trips daily. Approximately two-thirds of these new trips will come from the I-95 corridor north of the Center and one third from New Jersey over the Betsy Ross Bridge.

Modal Impacts

Table 4 shows how the diversion of trips from the auto mode to transit will affect traffic volumes on I-95 and which other transit routes are affected when riders switch to using the Hunting Park Transportation Center's Park & Ride facility.

DVRPC recently prepared traffic estimates for PennDOT for the year 2015 for I-95. Those peak hour estimates are shown as the "No-Build" volumes. North of the Center, traffic will be increased by 680 vehicles as former bus access and Regional Rail park & ride patrons drive their autos to the Transportation Center's Park & Ride facility. However, traffic south of the Center will be decreased by 290 vehicles as those who formerly drove all the way into Center City exit I-95 at the SEPTA ramp. Finally, the Betsy Ross Bridge will experience an increase of 230 vehicles as former NJ TRANSIT bus riders and auto-only travellers who drove along New Jersey highways to Center City via the Ben Franklin Bridge would cross at this bridge to access the Center.

The traffic data in Table 4 are based on the assumption that all users of the Park & Ride facility access/egress the Center during the I-95 peak hour. This assumption results in an estimate of the maximum potential relief on I-95 south of the Center. It should be noted that actual usage would be spread over two or more hours and, therefore, traffic relief would be less than shown in the table. Total daily traffic impacts would be twice the numbers shown.

Table 4 also shows which other transit routes are affected by riders switching to the Park & Ride facility. Both the SEPTA R3 and the R7 Regional Rail lines will experience a loss of 190 riders. Also affected are SEPTA bus routes 20 and 58 serving the Bustleton Avenue and Roosevelt Boulevard corridors from Neshaminy Mall to Bridge-Pratt station and route 73 which connects the Port Richmond area with Bridge-Pratt station. These three routes loose a combined total of 300 riders in each direction. Two NJ TRANSIT routes, the 409 and 419 (formerly the 9A and 9) which serve the US 130 - River Road corridor from Center City Philadelphia to Burlington and Trenton, will loose a combined total of 110 trips in each direction. The data shown for each of these routes are inbound boardings, comparable to the data in Table 3.

It is important to focus on the percent of travel by transit in the corridor served by the facility. Table 5 shows the percent transit at the district level for trips destined to the Philadelphia CBD, assuming the inclusion of the Hunting Park Transportation Center in the regional transit network. The table also shows those districts that are predicted to experience at least a 1% change in percent transit usage as a result of the Center. The most significant gains are shown to occur in the Pennsylvania Districts 20, 21, 22, the Bensalem-Bristol area of lower Bucks County. In New Jersey, the largest gains are predicted to occur in Districts 33 and 36 along US 130.

Note that the percent transit is nearly 80% for those districts within the City but drops significantly outside of the City. It is the districts just outside the City that gain the most in transit market share due to the new accessibility to frequent, lower cost transit provided by the Park & Ride facility. With the percentage of trips by transit already between 50 and 80 percent for many zones in the Northeast, it becomes more and more difficult to attract the remaining trips to transit. Virtually everyone who would consider transit has already been attracted to it; the rest have such strong reasons for not using transit that only major system changes can sway them to it. Some will never use transit under any circumstances.

TABLE 4

MODAL IMPACTS
I-95 and Other Transit Routes - 2015

Interstate 95 Volumes - (Peak Hour Volumes in Heavy Direction) *

Section	No-Build	Center	P&R Impact
North of Center	8,154	8,834	+680
South of Center	8,320	8,030	-290
Betsy Ross Bridge (prelim. est. for No-Build)	2,204	2,434	+230

* Assumes all users of the Park & Ride facility access/egress the Center during the I-95 peak hour. This shows maximum relief on I-95. Actual usage would be spread over two or more hours and relief would be less.

Other Transit Routes Affected

Route	No-Build	Center	P&R Impact
SEPTA R3 West Trenton	4,570	4,380	-190
SEPTA R7 Trenton	5,670	5,480	-190
SEPTA Bus Routes (20,58,73)	6,980	6,680	-300
NJ TRANSIT Bus Routes 409,419 (9A,9)	5,490	5,380	-110

TABLE 5

TRANSIT MARKET SHARE - With the Hunting Park Transportation Center For Trips Destined to the Philadelphia CBD - 2015

	ANALYSIS DISTRICT	WORK TRIPS	% GAIN	ALL TRIPS	% GAIN
	1	74%		64%	
	2	64%		57%	
	3	75%		66%	
	4	66%		62%	
	5	79%		71%	
	6	69%		58%	
*	7	87%		80%	
	8	75%		71%	
*	9	90%		82%	
*	10	79%		68%	+1%
*	11	83%		77%	
*	12	85%		78%	
*	13	77%		72%	
*	14	85%		79%	
*	15	80%		74%	
*	16	78%		71%	
*	17	79%		73%	
*	18	79%		74%	
*	19	73%		69%	
*	20	54%	+3%	50%	+3%
*	21	54%	+5%	51%	+5%
*	22	54%	+5%	53%	+5%
*	23	48%		46%	
*	24	54%		52%	
*	25	54%		52%	
	26	42%		40%	
	27	44%		41%	
	28	51%		48%	
	29	56%		53%	
	30	58%		55%	
	31	68%		68%	
**	32	43%		40%	+1%
**	33	54%	+2%	50%	+2%
**	34	43%		38%	
**	35	71%		66%	
**	36	73%	+2%	67%	+2%
	37	65%		60%	
	38	59%		54%	
	39	48%		43%	
	TOTAL	67%		61%	

Notes: Analysis Districts (see Map 2): * PA Districts, ** NJ Districts
Percent Gain shown only for districts exceeding a 1% increase.

IV. CONCLUSIONS

Summary of Findings

As part of its rehabilitation project for the Frankford Elevated line, SEPTA has proposed building a Transportation Center at Hunting Park Avenue. The Center would be a replacement facility for the present Erie-Torresdale station. The distinguishing feature of the Center, as proposed for this analysis, would be a multi-level parking garage with direct auto access from I-95 via an exclusive elevated ramp along Frankford Creek. The ramp would intersect I-95 within the Betsy Ross Bridge interchange, providing a well defined and highly marketable service to commuters from Northeast Philadelphia, lower Bucks County and New Jersey. Access to the Park & Ride facility would be restricted to this ramp, thereby creating no additional traffic impact on the local neighborhood.

DVRPC has analyzed the market potential of such a facility to attract new trips to the transit line. Population and employment trends were investigated, as well as the residence area of the commuters presently driving on I-95. Patronage estimates were prepared for two alternative transit systems (one with the Center and one without) for the year 2015 using the DVRPC travel simulation models. DVRPC studied the former modes/stations of the new trips on the Elevated line and the traffic impacts on I-95 and the Betsy Ross Bridge. The findings are summarized below:

- The introduction to the Frankford Elevated line of the Hunting Park Transportation Center, with an exclusive, direct access ramp from I-95 into a multi-level park & ride facility, will attract 900 new riders (or 1,800 daily trips) to the line. The Center will attract a total of 1,200 riders, 300 of whom will have switched from the Bridge-Pratt station. Therefore, a 1,200 space facility would be required if each person using the garage were provided with a space.

- The Transportation Center will generate 820 new transit trips daily. Approximately two-thirds of these new trips will come from the I-95 corridor north of the Center and one third from New Jersey over the Betsy Ross Bridge.

- The DVRPC models estimate that 290 Pennsylvania former auto-only travellers will be attracted to the Elevated by the enhancements offered in the Hunting Park Transportation Center. These travellers have always had the option of using either the Elevated or a Regional Rail line, but have heretofore chosen to drive. The introduction of the exclusive-ramp parking facility on the Elevated provides enough incentive to cause these commuters to finally make the switch to transit.

- DVRPC estimates that the Center will attract 380 riders from the Regional Rail system, equally split between the R3 (West Trenton) and the R7 (Trenton) lines. These park & ride patrons will find it more advantageous to drive to the Elevated than to a Rail station, either because it is closer, cheaper, offers a higher frequency of service or for all of these reasons. However, these riders are not new transit riders, only new to the Market-Frankford line.

- It is estimated that 230 new riders will come to the Elevated line from New Jersey. These new riders consist of 120 former New Jersey auto-only travellers and 110 former riders of NJ TRANSIT buses that served Center City from along the US 130 / River Road corridor. The ex-bus riders are not new transit users, only a gain to one carrier and a loss to another. However, the ex-auto group represents totally new riders on transit. Both of these groups always had the option of using the Elevated, or for that matter the PATCO High Speed Line, yet chose not to.

- North of the Center, peak hour traffic on I-95 will be increased by 680 vehicles as former bus access and Regional Rail park & ride patrons drive their autos to the Hunting Park facility. However, peak hour traffic south of the Center will be decreased by 290 vehicles as those who formerly drove all the way into Center City exit I-95 at the SEPTA ramp. The Betsy Ross Bridge will see an increase of 230 vehicles as former bus riders and auto travellers who drove along New Jersey highways to Center City via the Ben Franklin Bridge will cross at this bridge to access the Center. These figures assume all users of the Park & Ride facility access/egress the Center during the peak traffic hour on I-95, an assumption which indicates the <u>maximum potential</u> traffic relief on the section of I-95 closest to Center City, not the expected relief.

- The most significant gains in market share for transit occur in the Bensalem-Bristol area of lower Bucks County. The percentage of trips using transit to Center City from Northeast Philadelphia is nearly 80%. The percentage drops significantly in areas outside of the City of Philadelphia. The areas just over the City line experience the greatest gains in market share due to the <u>new</u> accessibility to frequent, lower cost transit provided by the Park & Ride. In New Jersey, the largest gains are predicted to occur from the towns along US 130.

Factors That Could Increase Transit Patronage

This study of the ridership potential of the proposed Hunting Park Transportation Center with an exclusive access ramp from I-95 has assumed that transit service on the Elevated and connecting routes would be the same as today. Furthermore, DVRPC has assumed that the societal and economic factors which affect the travellers choice of mode carry the same relative weights in the future as they do today.

However, there are future societal or policy changes could affect the way people choose their travel mode. Some of these factors are completely out of the control of regional policy makers. Some are difficult and require a choice of supporting one mode over another.

For discussion purposes, DVRPC has identified some of these factors that could increase patronage on the Frankford Elevated. They include:

- Traffic congestion on I-95 south of the Transportation Center exceeding that projected in this study.
- Increased fees (via taxes) for parking in the Philadelphia CBD or legislation which "removes" free employee parking from areas with transit service.
- Restrictions on parking space supply and highway access in the CBD.
- No expansion of parking at commuter rail stations or further loss of service on regional rail system.
- Significantly higher fuel costs (perhaps via higher taxes) or persistent fuel shortages.
- Increased CBD employment via a regional policy to discourage suburban employment growth.
- New, quieter, more attractive cars on the Market-Frankford line.
- A new transit ethic in regional society.

Questions Still to be Addressed

DVRPC has provided estimates of patronage and modal impacts for SEPTA to use in further developing its proposal for the Hunting Park Transportation Center. The research of the subject has provided insights to the travel patterns and needs of the I-95 corridor. There are other questions which have been raised in the course of this effort which will need further study. For the record, they are simply listed below:

- What is the cost of the Center with the Park & Ride facility and direct access ramp and are there any obstacles to its construction, either technical, environmental or community?

- How will the internal circulation plan for the garage handle the projected number of vehicles given the restriction of a single access road via the SEPTA ramp?

- What would be the difference in estimated ridership and highway traffic impacts if the Center were built without the exclusive ramp but with access via the local street system and the planned PennDOT/DRPA ramps to Aramingo and Torresdale Avenues?

- What role will the Frankford Elevated line play during the reconstruction of I-95?

- How would these ridership estimates be affected if any or all of the factors mentioned in the preceeding section of this chapter were implemented?

Future Planning Activities

In addition to the studies needed to answer the questions raised above, DVRPC has identified two additional investigations that should also be pursued for the I-95 corridor:

- A study of the ridership potential and costs of a series of modest Park & Ride facilities at a number of stations along the Elevated, including a facility at a Hunting Park Transportation Center and Bridge-Pratt Station, with access from the local street system.

- A study of the ridership potential and costs of a number of large scale Park & Ride facilities at Regional Rail stations along the I-95 corridor, particularly in the Bensalem-Bristol areas, serving the Trenton and West Trenton branches.