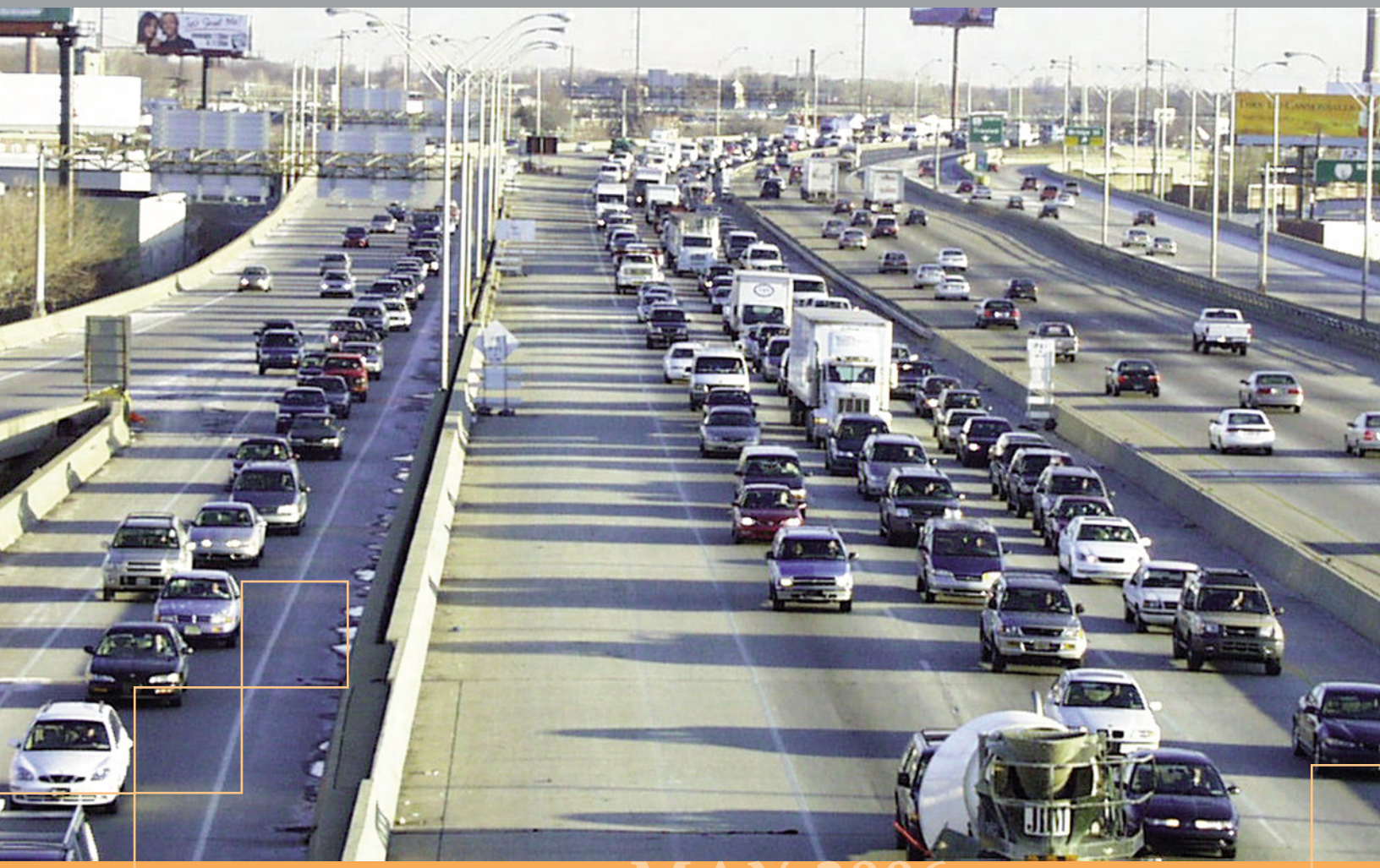
I-95 Interchange Enhancement and Reconstruction

I-95 SECTION AFC (ANN STREET TO FRANKFORD CREEK) INTERCHANGE TRAFFIC STUDY



MAY 2006

Prepared for Pennsylvania Department of Transportation by

Delaware Valley Regional Planning Commission

PENNDOT

I-95 SECTION AFC (ANN STREET TO FRANKFORD CREEK) INTERCHANGE TRAFFIC STUDY

May 2006

Prepared for
Pennsylvania Department of Transportation
By
Delaware Valley Regional Planning Commission
190 North Independence Mall West, 8th Floor
Philadelphia, PA 19106-1520

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

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

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

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF FIGURES (CONTINUED)

LIST OF MAPS

LIST OF TABLES

EXECUTIVE SUMMARY

This report summarizes traffic forecasts for nine alternatives for the I-95 Section AFC (Ann Street to Frankford Creek) Interchange Traffic Study area. This study area includes the existing Allegheny Avenue, Westmoreland Street, and Castor Avenue I-95 ramps. Because large portions of I-95 are being rehabilitated over the next several years, detailed studies of several of the interchanges are being conducted as a precursor to any changes. Average daily and peak hour traffic forecasts are prepared for each alternative for 2025.

The limits of the study area run from the Frankford Creek, south of the Betsy Ross Bridge, to Ann Street north of Lehigh Avenue. In this section, the alignment of I-95 is approximately northeast/southwest, generally following the alignment of the Delaware River. In the study area the mainline of I-95 is elevated, with a residential neighborhood to the west and the industrial activities which line the Delaware River to the east.

Nine improvement alternatives were identified for local roads and ramps in the study area, all of which involve construction. All alternatives include widening of I-95 to five lanes northbound from Girard Avenue to the Betsy Ross Bridge, and to five lanes southbound from Allegheny Avenue to Girard Avenue. Some alternatives include a Delaware Avenue Extension from Richmond Street at Lehigh Avenue to Allegheny Avenue. These alternatives were grouped into four sets; 1) the No-Build without Delaware Avenue Extension, including only the above I-95 mainline widening, keeping existing southbound I-95 access at Allegheny Avenue and northbound access via Westmoreland Street and Castor Avenue. 2) Build alternatives at Allegheny Avenue without the Delaware Avenue Extension. These alternatives replace the existing I-95 northbound ramps at Westmoreland Street and Castor Avenue with new ramps at Allegheny Avenue. 3) Build alternatives at Allegheny Avenue with Delaware Avenue Extension. These alternatives concentrate I-95 access at Allegheny as in 2 above, but also include the proposed Delaware Avenue Extension as a proposed relief route for I-95 northbound ramp traffic on Richmond Street and within the Girard Avenue Interchange. 4) additional build alternatives with Delaware Avenue Extension and the existing Section AFC ramps that test, depending on the alternative, widening of I-95 southbound to five lanes between the Betsy Ross Bridge and Allegheny Avenue and a new northbound access ramp from Castor Avenue to the Betsy Ross Bridge approaches.

For each alternative identified, DVRPC'S regional travel simulation model was used to forecast future travel patterns. The model utilizes a system of traffic zones that follow Census boundaries and rely on demographic and employment data, land use, and transportation network characteristics to simulate trip-making patterns throughout the study area and region.

Objectives for improvements, which guided the development of the build alternatives, included making improvements to safety and capacity on I-95; improved access to and from I-95; including better signage; minimizing the traffic and truck impacts on local streets; minimizing the barrier effect of I-95 on the community; and implementing incident management technology.

Projected traffic volumes for selected highway links within the study area are presented and analyzed. Average daily traffic volumes and AM and PM peak hour volumes at selected intersections are included for each alternative. The Appendix to this report include current traffic counts of the various roadways and intersections examined in the study area.

I. INTRODUCTION

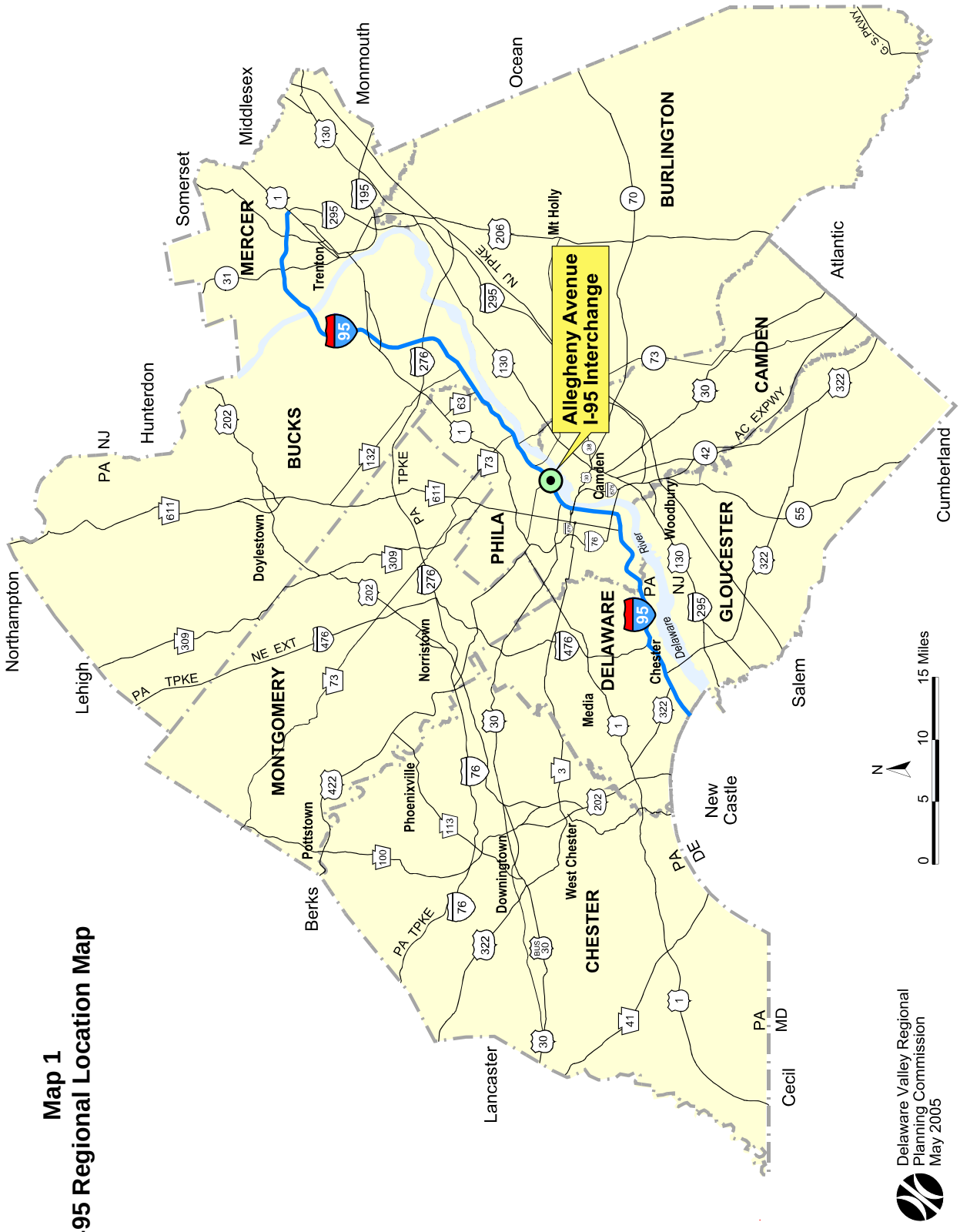
This report summarizes traffic forecasts for a No-Build and eight different build alternatives for I-95 ramp access within the Section AFC (Ann Street to Frankford Creek) Study Area. This area encompasses the I-95 ramps at Allegheny Avenue, Westmoreland Street, and Castor Avenue in the Port Richmond Section of Philadelphia **(*maps 1 and 2*)**. It was prepared at the request of the Pennsylvania Department of Transportation (PENNDOT) and their consultants, who are conducting a Point of Access Study for the interchange area. Because large portions of I-95 are being rehabilitated over the next several years, detailed studies of all of the interchanges between Vine Street and Street Road were conducted as a precursor to any changes. The forecasts in this report are prepared for 2025.

The Pennsylvania portion of I-95 (Delaware Expressway) was constructed in sections beginning in the middle 1960s, and it was not until the 1990s that a continuous roadway between the State of Delaware and New Jersey boundaries was available to travelers. Traveling north from Delaware, the highway enters Pennsylvania in Lower Chichester Township, Delaware County, and follows the Delaware River corridor. North of the City of Chester, I-476 branches off as a spur heading northwest toward the Pennsylvania Turnpike interchange in Plymouth Meeting. I-95, which is at-grade to this point, continues past the Philadelphia International Airport, where it enters the City of Philadelphia.

Once past the Airport, the highway becomes elevated; passing the Philadelphia stadium complex, the Walt Whitman Bridge, and the Penn's Landing areas. The section within Center City is depressed until just south of the Benjamin Franklin Bridge where it emerges to become elevated once again. The highway remains elevated until well north of the study area, giving access to the various port-related industrial and commercial activities, which are the traditional land uses along the Delaware River, as well as to adjacent residential areas. North of Pennypack Creek I-95 returns to an at-grade alignment and continues at-grade through the residential and commercial areas of Philadelphia and Bucks County until it crosses over the Delaware River out of Pennsylvania at the Scudder Falls Bridge northwest of Trenton, New Jersey.

In recent years, pavement, bridges, and overpasses have begun to deteriorate. Beginning in 2000 PENNDOT began a four-phase series of repairs of I-95 from Center City Philadelphia northward into Bucks County. Planned projects include rebuilding numerous bridges, expanding the Intelligent Transportation System (ITS) by installing closed circuit TV cameras, dynamic message signs, and microwave sensors, and upgrading the following interchanges:

- I-676 (Vine Expressway)
- Girard Avenue
- Allegheny/Castor Avenue
- Betsy Ross Bridge
- Bridge Street
- Cottman (PA 73) /Princeton Avenue, and
- PA 132 (Street Road)



Map 1
I-95 Regional Location Map

Map 2. I-95 Section AFC (Ann Street To Frankford Creek) Traffic Study Area

Delaware Valley Regional Planning Commission
May 2005

This report focuses on the I-95 Section AFC (Ann Street to Frankford Creek) Study Area. Approaching this study area from the south, at Ann Street, I-95 is a four-lane by direction limited access highway on viaduct. The first set of ramps is a southbound on-ramp from Allegheny Avenue to I-95 and a southbound off-ramp to Allegheny Avenue from I-95. Next is a northbound off-ramp from I-95 to Westmoreland Street. Proceeding north of Westmoreland, a two lane northbound off-ramp diverges from I-95 towards the Betsy Ross Bridge and Aramingo Avenue. This is followed by a northbound on-ramp to the I-95 northbound inner lanes from Castor Avenue, with no provision for accessing the Betsy Ross Bridge. Finally, at the Frankford Creek a southbound on-ramp merges onto I-95 from the Betsy Ross Bridge and Aramingo Avenue. The build alternative options tested in this study are focused on optimizing and rationalizing the existing ramp configuration, for local traffic accessing I-95, providing appropriate truck routes to minimize commercial vehicle impacts on residential areas, and creating a smooth merge and diverge conditions on the I-95 mainline.

A focused travel simulation was conducted using DVRPC's regional travel forecasting models. The traffic zones in the study area were subdivided into smaller zones to better reflect the highway network and land use characteristics of the study area. The model's highway network within the study area was reviewed and modified as needed to reflect the detailed nature of the traffic improvements to be tested.

Chapter II of this report documents the physical characteristics of the study area. Included are a description of the land uses and surrounding roadway network, along with a discussion of current traffic volumes and levels of service. The nine alternatives of the study are described in detail in Chapter III. Chapter IV explains the travel forecasting methodology, with a brief discussion of the focused traffic simulation model used to develop the traffic projections. The regional demographic and employment forecasts and corridor-specific future development proposals which form the basis for the forecasts are also presented in this chapter. Chapter V presents an analysis of the travel forecasts for this study area. The forecasts represent projected 2025 daily and peak hour traffic volumes for I-95 and surrounding roadways under the No-Build and eight I-95 Section AFC access alternatives. In addition, the impact of extending Delaware Avenue to eliminate the missing section between Allegheny Avenue and Richmond Street is examined for selected Section AFC access alternatives, and opening year (2010) traffic forecasts are provided. The appendix contains current traffic counts.

II. DESCRIPTION OF I-95 SECTION AFC STUDY AREA

The limits of the study area run for approximately 1.7 miles from a southern boundary at Ann Street to northern limits at the Frankford Creek near the base of the Betsy Ross Bridge. The east-west boundaries are the Delaware River to the east and Aramingo Avenue to the west. In Section AFC, the alignment of I-95 is approximately northeast/southwest, generally following the Delaware River. The mainline of the highway is elevated, and is located between the residential neighborhood of Port Richmond to west and industrial activities which line the Delaware River on the east.

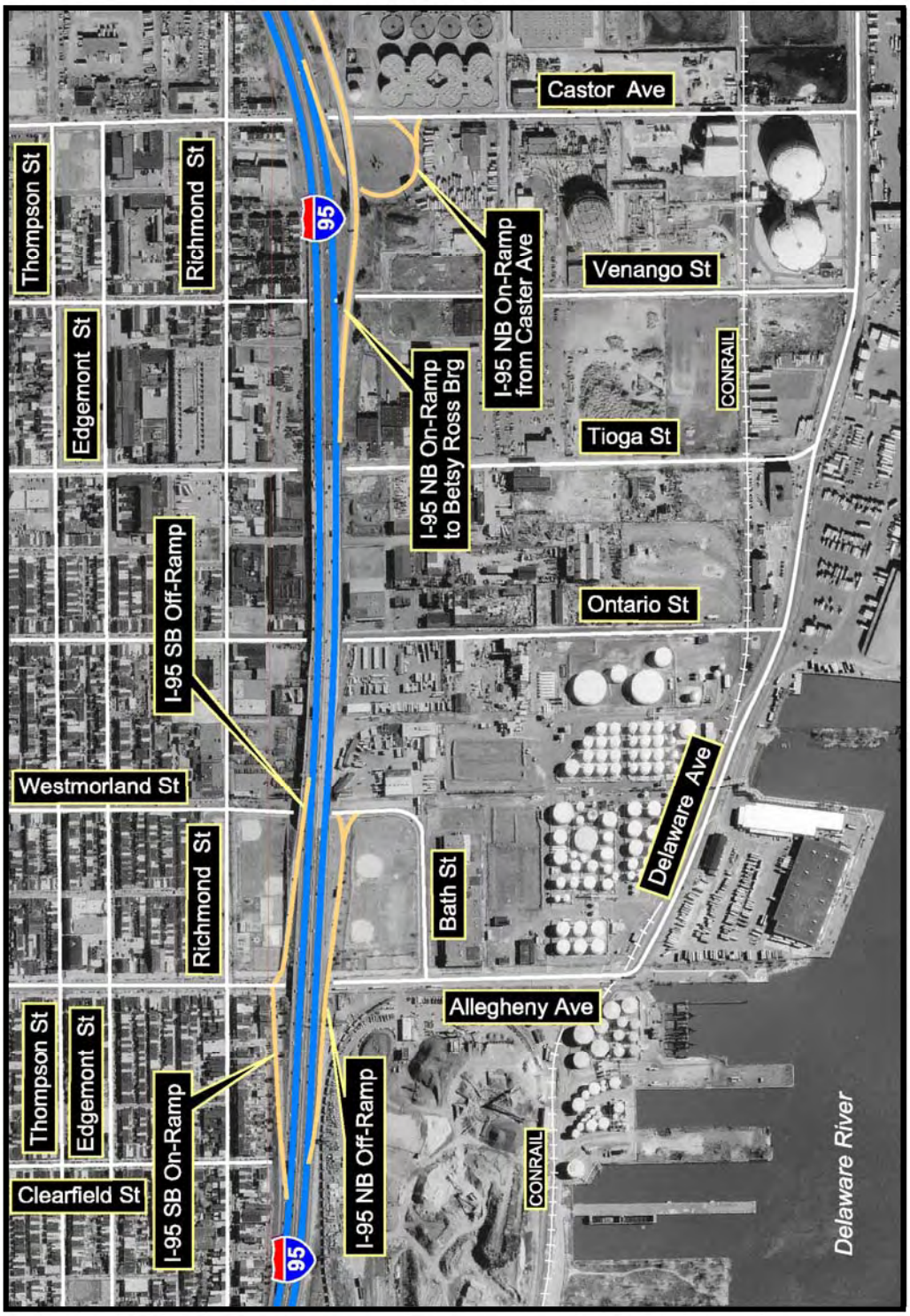
A. Existing Highway Facilities and Land Use

The northern limits of Section AFC at Frankford Creek within the Betsy Ross Bridge (BRI) interchange. The nearest I-95 interchange to the south is at Girard Avenue about 0.8 miles from Ann Street. The main line of I-95 is limited access, four lanes by direction both approaching and departing the Allegheny/Westmoreland Avenue interchange. ***Map 3*** displays the existing ramp configurations within the Section AFC traffic study area. The first set of ramps going north on I-95 are the southbound on-ramp from Allegheny Avenue to I-95 and a southbound off ramp to Allegheny Avenue from I-95. These ramps provide access for Port Richmond and the Tioga Marine Terminal area by users of the Betsy Ross Bridge and I-95 southbound. Next is a northbound off-ramp from I-95 to Westmoreland Street. Access to the riverfront is provided via Bath Street and Allegheny Avenue. Access to the Port Richmond neighborhood is via both Allegheny Avenue and Westmoreland Streets. Proceeding north, a two lane northbound off-ramp diverges from I-95 towards the Betsy Ross Bridge and Aramingo Avenue. This is followed by a northbound on-ramp to I-95 from Castor Avenue, providing access from the Port Richmond neighborhood and waterfront industry to I-95 but with no access to the Betsy Ross Bridge. Traffic bound for the Betsy Ross Bridge must instead use Richmond Street north. Finally, at the northern study limits, a southbound on-ramp merges onto I-95 from the Betsy Ross Bridge and Aramingo Avenue.

Major arterials in the study area, running parallel to I-95, include Richmond Street, Aramingo Avenue, and Delaware Avenue. Other parallel roadways include Belgrade Street, Thompson Street, and Bath Street. The parallel roads vary in configuration. Major arterials such as Richmond Street, Delaware Avenue, and Aramingo Avenue south of Westmoreland Street are one lane by direction. However, Aramingo Avenue north of Westmoreland Street is two lanes in each direction with a continuos left turn lane. Thompson and Belgrade streets, each a two lane collector roadway through residential blocks, form a one-way couplet to serve local neighborhood traffic parallel to I-95.

Principal perpendicular arterial roadways directly connected to I-95 include Allegheny Avenue and Castor Avenue, with Westmoreland Street and Wheatsheaf Lane acting as collector roadways for I-95 traffic. Local east-west roads not directly connected to I-95 include Somerset Street, Ann Street, Clearfield Street, and Tioga Street. All perpendicular roadways are configured as two lanes, with Allegheny Avenue having a continuous left turn lane.

Map 3. I-95 Section AFC (Ann Street to Frankford Creek) Interchange Area Ramp Configurations



Delaware Valley Regional Planning Commission
May 2005

Land uses within the study area tend to be predominately residential and light commercial on the western side of I-95 and heavy industrial to the east, particularly between Richmond Street and the Delaware River. The Port Richmond neighborhood is very dense, with schools, churches, and a hospital interspersed amongst row-homes on the west of I-95. There is a significant auto-oriented retail component along Aramingo Avenue. Prime traffic generators east of I-95 include the Tioga Marine Terminal, warehousing and trucking facilities, chemical storage facilities, and construction suppliers. Industrial/commercial land uses in the study area generate high volumes of truck traffic, much of which is destined for I-95.

B. Existing Traffic Volumes

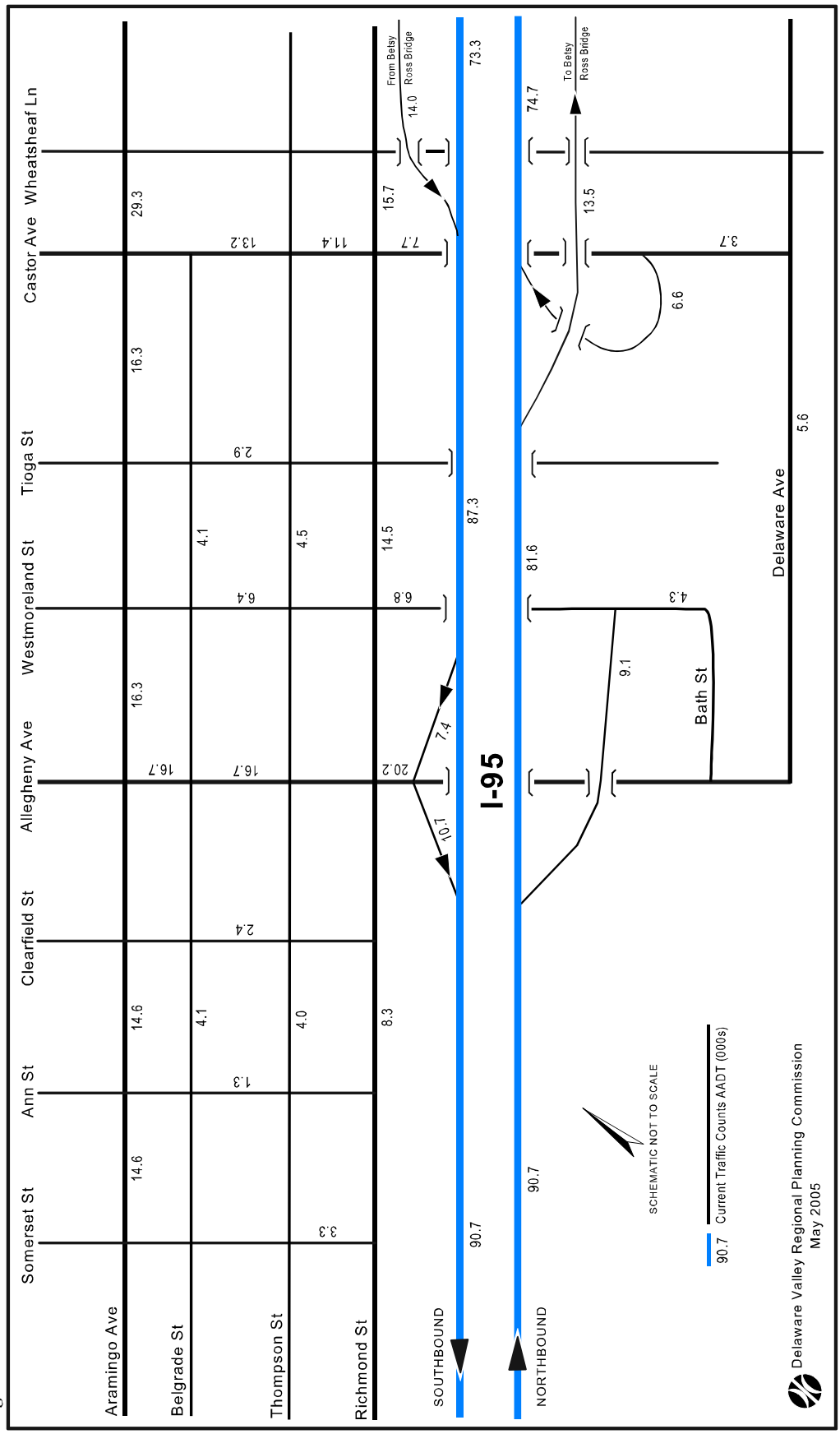
While there has been little new development in the study area since this section of I-95 opened, intensive development has taken place in greater Northeast and Center City Philadelphia**,** Bucks County, Montgomery County, and New Jersey which has generated significant additional traffic volumes at this interchange complex. Also, during the same time, main line volumes on I-95 have increased significantly because of general traffic growth throughout the region. When these The general overall increase in I-95 traffic volumes makes the related congestion on the I-95 mainline and surrounding street system is a recurring issue.

Traffic counts were collected on mainline I-95 and all ramps to and from I-95 within the study area. Additional traffic counts were taken on impacted arterials and local roads within the study area including: Somerset Street, Ann Street, Clearfield Street, Allegheny Avenue, Westmoreland Street, Tioga Street, Castor Avenue, Delaware Avenue, Bath Street, Richmond Street, Thompson Street, Belgrade Street and Aramingo Avenue. Current Annual Average Daily Traffic Volumes (AADT) are shown in ***Figure 1***. Detailed traffic counts for all locations, including hourly counts are included in the appendix of this report.

Usage of the I-95 mainline is currently 90,700 vehicles per day (vpd) in each direction at the southern limit of the study area, for a two-way total of 181,400 vpd. At the study area northern limit, 148,000 vpd use the mainline of I-95 with an additional 14,000 vpd traversing the I-95 Southbound on-ramps and 13,500 using Northbound off-ramps from and to the Betsy Ross Bridge. These northern limit I-95 volumes are approximately equal by direction, and sum to 175,500 vpd. Traffic volumes on I-95 through the study area are approaching the capacity of the existing four lane by direction cross section. Further to the south at Girard Avenue a lane drop occurs and only three through lanes continue, causing a bottleneck in southbound AM peak traffic that propagates upstream through Section AFC. This Southbound congestion is exacerbated by traffic from the Betsy Ross Bridge merging onto the mainline of I-95 at the northern limit of the section. Both Aramingo Avenue and Richmond Street are used as bypass routes by drivers wishing to avoid this congestion.

Current study area traffic count volumes along the adjacent roadways parallel to I-95 range from a high of 29,300 vpd on Aramingo Avenue between Castor Avenue and Wheatsheaf Lane to a low of 4,000 vpd on Thompson Street between Ann and Clearfield streets. Aramingo Avenue is the most-traveled arterial in the study area, never falling below 14,600 vpd. Other heavily traveled roadway segments in the area include Allegheny Avenue (16,700 to 20,200 vpd),

Figure 1. Current Traffic Counts



Richmond Street (8,300 to 15,700 vpd), and Castor Avenue (3,700 to 13,200 vpd). Collector roadways include Belgrade Street (4,100 vpd), Thompson Street (4,000 to 4,500 vpd), Westmoreland Street (4,300 to 6,800 vpd), and Delaware Avenue (5,600 vpd). Local street traffic counts include Somerset Street (3,300 vpd), Ann Street (1,300 vpd), Clearfield Street (2,400 vpd), and Tioga Street (2,900 vpd).

It should also be noted that significant peak hour volumes have been recorded along I-95 and at many street intersection within the study area ***(see figures 2A and 2B)***. Manual AM and PM peak hour turning movement counts were collected at all signalized intersections on Allegheny Avenue between I-95 and Aramingo Avenue. Similarly, peak hour turning counts were obtained at most signalized intersections along both Richmond Street and Aramingo Avenue from Cambria Street through Wheatsheaf Lane. Additional counted intersections include Westmoreland Street at the I-95 southbound off-ramp, and Belgrade Street at Cambria Street, Ann Street, Clearfield Street and Venango Street, and also the intersections of Thompson Street with Cambria Street, Clearfield Street, and Castor Avenue.

Current peak hour vehicular volumes on I-95 mainline were also estimated. South of Allegheny Avenue, I-95 southbound has 5,910 vehicles in the AM peak hour and 5,740 vehicles in the PM peak hour. In the southbound direction, 817 vehicles enter I-95 in the AM peak hour using the southbound on-ramp from Allegheny Avenue, with the corresponding PM peak hour count at 752 vehicles. The southbound off-ramp to Allegheny Avenue is used by 405 vehicles in the AM peak and 550 vehicles in the PM peak hours. I-95 southbound mainline traffic volumes from the Betsy Ross Bridge to Allegheny Avenue number 6,482 vehicles in the AM peak hour and 5,310 vehicles in the PM peak hour. These peak volumes represent the combined total of the on-ramp from the Betsy Ross Bridge/Aramingo Avenue and the I-95 southbound mainline. Some 1,072 vehicles in the AM peak hour, and 935 vehicles in the PM peak hour access I-95 from the Betsy Ross Bridge and Aramingo Avenue.

Northbound I-95 traffic volumes approaching the Allegheny Avenue ramps are 5,040 in the AM peak hour and 6,930 vehicles in the PM peak hour. At the northbound off-ramp from I-95 to Westmoreland Street, 647 vehicles in the AM peak hour and 388 vehicles in the PM peak hour exit I-95. This is followed by a second northbound off-ramp from I-95 to the Betsy Ross Bridge and Aramingo Avenue, with 891 AM peak hour vehicles and 1,031 PM peak hour vehicles. Immediately north of this second off-ramp, a northbound on-ramp enters I-95 from Castor Avenue, with 467 AM peak hour vehicles and 648 PM peak hour vehicles. These ramp flows result in 4,256 AM peak hour vehicles and 6,634 PM peak hour vehicles on the I-95 northbound mainline at the northern boundary of the study area. Please note that these numbers represent actual traffic counts taken on multiple days. They do not exactly flow along I-95 because of counting error and daily traffic volume variations. The highest observed volumes were used as the basis for model validation.

Figure 2A. Current AM/PM Peak Hour Turning Movements

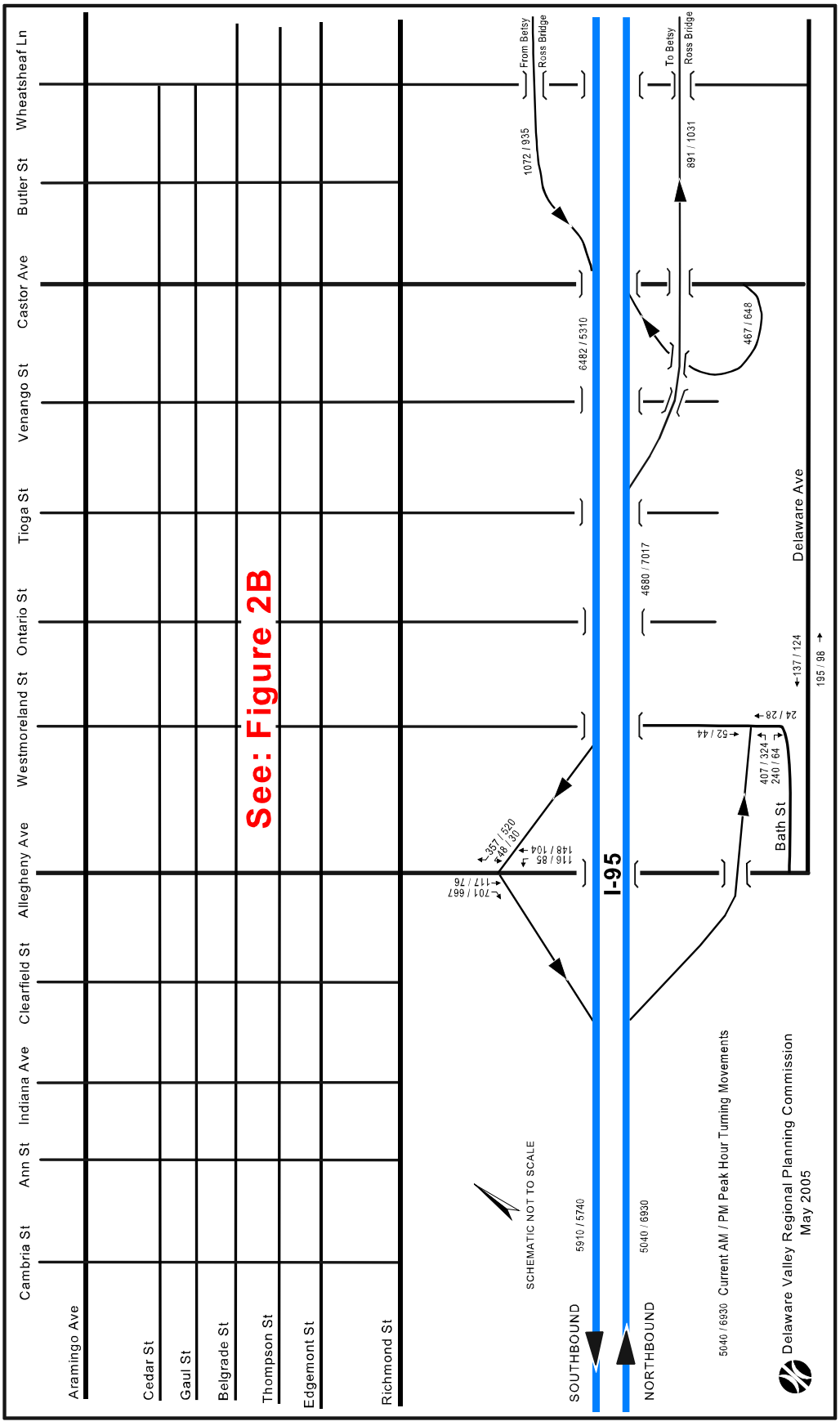
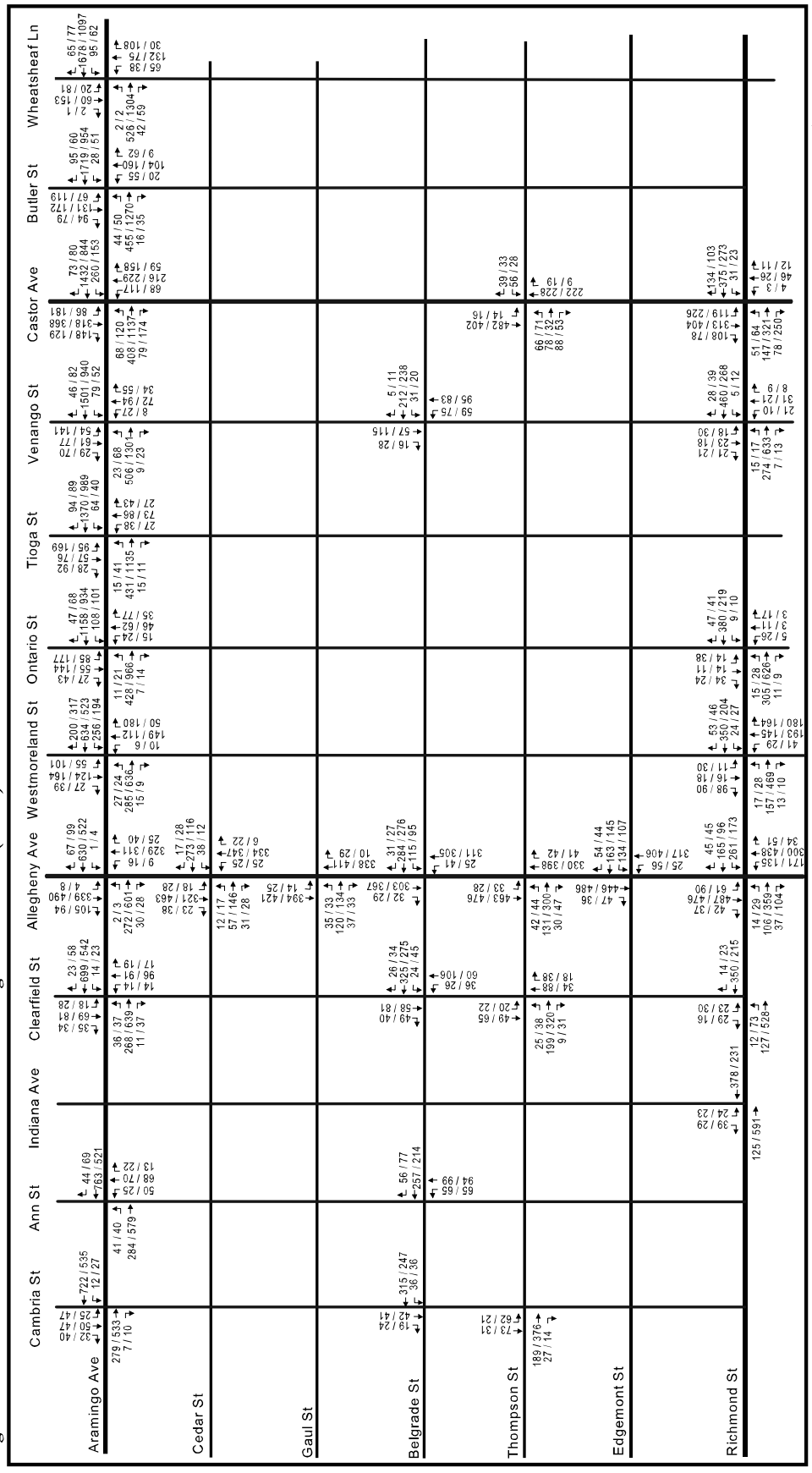


Figure 2B. Current AM/PM Peak Hour Turning Movements (Inset)



Generally, the heaviest AM and PM peak hour traffic volumes are along the intersections at Aramingo Avenue, Richmond Street, and Castor Avenue, with the heaviest intersecting movements occuring at the following five locations: Allegheny Avenue's intersections with Aramingo Avenue, Richmond Street, and the I-95 southbound ramps; and the intersections of Castor Avenue with Aramingo Avenue and Richmond Street. Of particular concern is Allegheny Avenue between the I-95 southbound off-ramps and Richmond Street. There is high demand to turn left from Richmond Street southbound towards I-95 southbound. Some of this demand can be met via Westmoreland and Bath Streets, but this is indirect and requires two left turns. In addition, the distance along Allegheny Avenue between Richmond Street and the I-95 southbound ramps is approximately two hundred and twenty-five feet, leaving little room for turning queue vehicle storage and lane change maneuvers. Inadequate distance and limited capacity can cause traffic backups extending up the I-95 southbound off-ramp to the mainline, and intersection traffic signal cycle failures at Allegheny and Richmond. Severely affected traffic movements include Allegheny Avenue eastbound and Richmond Street southbound. Also of concern is the intersection of Allegheny Avenue with Aramingo Avenue, serving high through traffic volumes and turning movements without dedicated turn lanes. At this location, Aramingo Avenue reduces down from five lanes to two lanes, causing much higher per lane volumes. To compensate for the narrow roadway on Aramingo Avenue, left turns to Allegheny Avenue are prohibited, although some were recorded in the traffic counts.

III. IMPROVEMENT ALTERNATIVES

The project objectives which guided the development of the design alternatives included; improving traffic flows on I-95 by eliminating merge and weave disturbances, reducing adverse neighborhood impacts due to traffic including heavy commercial vehicles on residential streets, and improving intersection performance on the local street network. For both I-95 and the local street network, congestion, noise, and air pollution impacts on the neighborhood are to mitigated as much as possible. Also included were improvements to the safety and capacity of I-95 including better signage, and incident management technology, and also, improved access to and from I-95. In all of the alternatives tested in this study, the preferred alternatives in I-95 sections Cottman/Princeton (CPR), Betsy Ross Bridge (BRI), Bridge Street (BSR), and Girard Avenue/ I-676 Vine Expressway (GIR) are assumed to constructed and opened to traffic.

Nine alternatives were identified for the I-95 mainline and ramps in Section AFC, including two No-Build alternatives, with and without Delaware Avenue Extension. The extension of Delaware Avenue involves filling in the existing gap in this roadway between Richmond Street at Girard Avenue and Allegheny Avenue. ***Table 1*** summarizes the roadway improvement components included in each of the alternatives, numbered one through nine in the descriptions below.

A. Alternative 1 – No-Build without Delaware Avenue Extension

This alternative includes the existing ramp configurations with Section AFC. I-95 is widened to five lanes northbound and five lanes southbound from the Allegheny Avenue interchange complex south to the Girard Avenue Interchange. Northbound I-95 is widened to five lanes between the Allegheny Avenue off-ramp and the Betsy Ross Bridge off-ramp. Southbound I-95 retains its four lane configuration between the Betsy Ross southbound on-ramp and the Allegheny Avenue southbound on-ramp. This represents a base case given construction in other I-95 segments and provides a basis for comparison (see ***Map 4*** page 18).

B. Alternative 2 – Diamond Interchange without Delaware Avenue Extension

The Diamond Interchange without Delaware Avenue Extension Alternative relocates the existing I-95 northbound off and on-ramps so that all movements to and from I-95 are consolidated onto a diamond interchange connected to Allegheny Avenue between Richmond Street and Bath Street. The northbound off-ramp terminus is relocated from Westmoreland to Allegheny and the northnound on-ramp from Caster to Allegheny Avenue. This alternative allows access to Betsy Ross Bridge via the relocated Allegheny Avenue northbound on-ramp and encourages traffic exiting from I-95 northbound to use Allegheny Avenue rather than Westmoreland Street (see ***Map 5*** page 19).

C. Alternative 3 – Single Point Urban Interchange (SPUI) Alternative

The Single Point Urban Interchange (SPUI) Alternative includes the following: 1) relocating the I-95 northbound off-ramp to pass under I-95 and join Allegheny Avenue at the same street intersection as the I-95 southbound ramps. 2) Relocating the I-95 northbound on-ramp from Castor Avenue to Allegheny Avenue between the existing southbound I-95 ramps and Bath Street. This is a derivative of the diamond, allowing simultaneous left turns from the both I-95 off-ramps at Allegheny while maintaining access to the Betsy Ross bridge from Allegheny Avenue (see ***Map 6*** page 19).

Table 1. Summary of Alternatives for I-95 Section AFC (Ann Street to Frankford Creek) Interchange Traffic Study

Alternative / Roadway	Alternatives Without Delaware Avenue Ext				Alternatives With Delaware Avenue Ext				
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8	Alt. 9
	No-Build	Diamond	SPUI	Northside Partial Cloverleaf	Diamond	Southside Partial Cloverleaf	No-Build	Minimum Build	Dual Castor Ave Ramps
I-95 SB Betsy Ross to Allegheny	4 lanes				5 lanes			5 lanes	
I-95 Sb Off-ramp	Allegheny Avenue				Allegheny Avenue				
I-95 SB On-ramp	Allegheny Avenue				Allegheny Avenue				
I-95 SB Allegheny to Girard	5 lanes				5 lanes				
I-95 NB Girard to Allegheny	5 lanes				5 lanes				
I-95 NB Off-ramp	Westmoreland Street	Allegheny Avenue			Allegheny Avenue	Westmoreland Street		Westmoreland Street	
I-95 NB On-ramp	Castor Avenue	Allegheny Avenue			Allegheny Avenue	Castor Avenue		Castor Avenue	
I-95 NB Allegheny to Betsy Ross	5 lanes				5 lanes				
Bath Street	Open			Closed	Open				
Local Access to Betsy Ross	Richmond St.	Allegheny Avenue			Allegheny Avenue	Richmond St.		Richmond St.	Castor Avenue

D. Alternative 4 – Northside Partial Cloverleaf

The Northside Partial Cloverleaf Alternative closes Bath Street, relocates the I-95 northbound off-ramp to form a cloverleaf on the north side of Allegheny Avenue, and relocates the I-95 Northbound on-ramp from Castor Avenue to a direct ramp from Allegheny Avenue. Both northbound ramps share a single intersection near the current junction of Bath Street with Allegheny Avenue. This alternative is an additional permutation of the diamond, with all I-95 traffic with local destinations forced to use Allegheny Avenue. Direct access is provided from the proposed Allegheny Avenue northbound on-ramp to the Betsy Ross Bridge (see ***Map 7*** page 20).

E. Alternative 5 – Diamond Interchange with Delaware Avenue Extension

Alternative 5 enhances the Diamond Interchange from Alternative 2 with the Delaware Avenue Extension. The northbound ramps are relocated so that all movements to and from I-95 occur via a diamond interchange at Allegheny Avenue between Richmond Street and Bath Street. The proposed Delaware Avenue Extension is assumed to be opened to traffic from Richmond Street at Lehigh Avenue to the eastern end of Allegheny Avenue. Existing Richmond Street is reconstructed and realigned and renamed as Delaware Avenue from Girard Avenue to Lehigh Avenue. This alternative determines the impacts of Delaware Avenue on Allegheny Ave and I-95 assuming an interchange at Allegheny Avenue with access in all directions including the Betsy Ross Bridge (see ***Map 8*** page 20).

F. Alternative 6 – Southside Partial Cloverleaf with Delaware Avenue Extension

The Southside Partial Cloverleaf Alternative relocates the I-95 northbound on-ramp from Castor Avenue to Allegheny Avenue, forming a cloverleaf on the south side of Allegheny Avenue. Also, the I-95 northbound off-ramp is relocated to be a direct ramp to Allegheny Avenue and both northbound ramps are aligned to share a single intersection with Allegheny Avenue and the existing Bath Street. Build the Delaware Avenue Extension from Richmond Street at Lehigh Avenue to Allegheny Avenue. Rename Richmond Street as Delaware Avenue from Girard Avenue to Lehigh Avenue, including reconstruction and realignment of existing Richmond Street. Moving both northbound I-95 ramps to line up with Bath Street achieves a higher distribution of traffic onto Bath Street and Westmoreland Street. This, combined with Delaware Avenue Extension, is intended to decrease traffic on Allegheny Avenue, while maintaining access to the Betsy Ross Bridge and simplifying the existing ramp scheme (see ***Map 9*** page 21).

G. Alternative 7 – No-Build with Delaware Avenue Extension

Alternative 7 includes the No-Build Alternative plus construction of Delaware Avenue Extension from Richmond Street at Lehigh Avenue to Allegheny Avenue. As in alternatives 5 and 6, existing Richmond Street is renamed as Delaware Avenue from Girard Avenue to Lehigh Avenue and reconstructed and realigned as required. With this scenario, the impacts of extending Delaware Avenue are tested with the No-Build Alternative, allowing an assessment of the

desirability of extending Delaware Avenue (see ***Map 10*** page 21). The preferred alternatives in Sections GIR, BRI, and CPR are assumed to be opened to traffic.

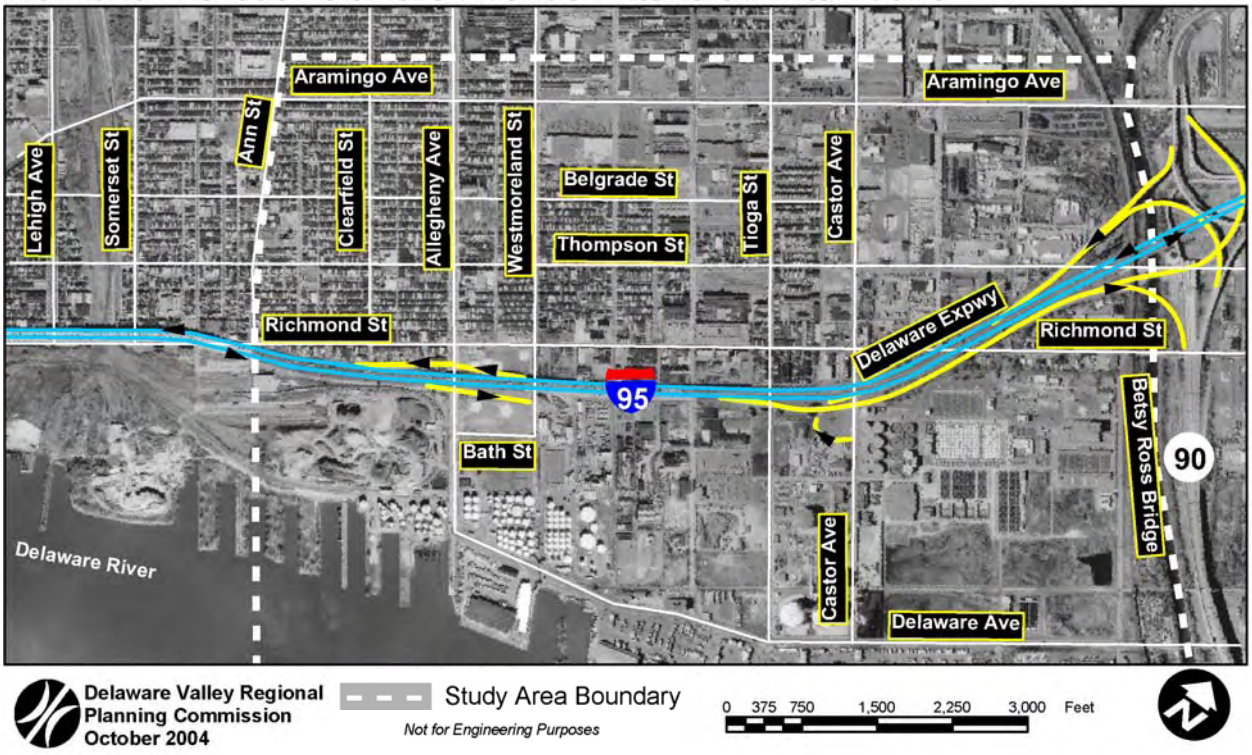
H. Alternative 8 – Minimum Build Alternative

Alternative 8 maintains the existing I-95 ramps, through the Section AFC Study Area, but widens I-95 to five lanes both northbound and southbound from the Betsy Ross Bridge to Girard Avenue. This represents an additional lane on southbound I-95 from the Betsy Ross Bridge to Allegheny Avenue. Delaware Avenue Extension is constructed from Richmond Street at Lehigh Avenue to Allegheny Avenue. Rename Richmond Street as Delaware Avenue from Girard Avenue to Lehigh Avenue, including reconstruction and realignment of existing Richmond Street. This alternative focuses on improvements to the I-95 mainline, and overall south bound capacity, leaving the Section AFC ramp configuration as it currently exists (see ***Map 11*** page 22), but assumes the preferred alternatives in Sections GIR, BRI, and CPR.

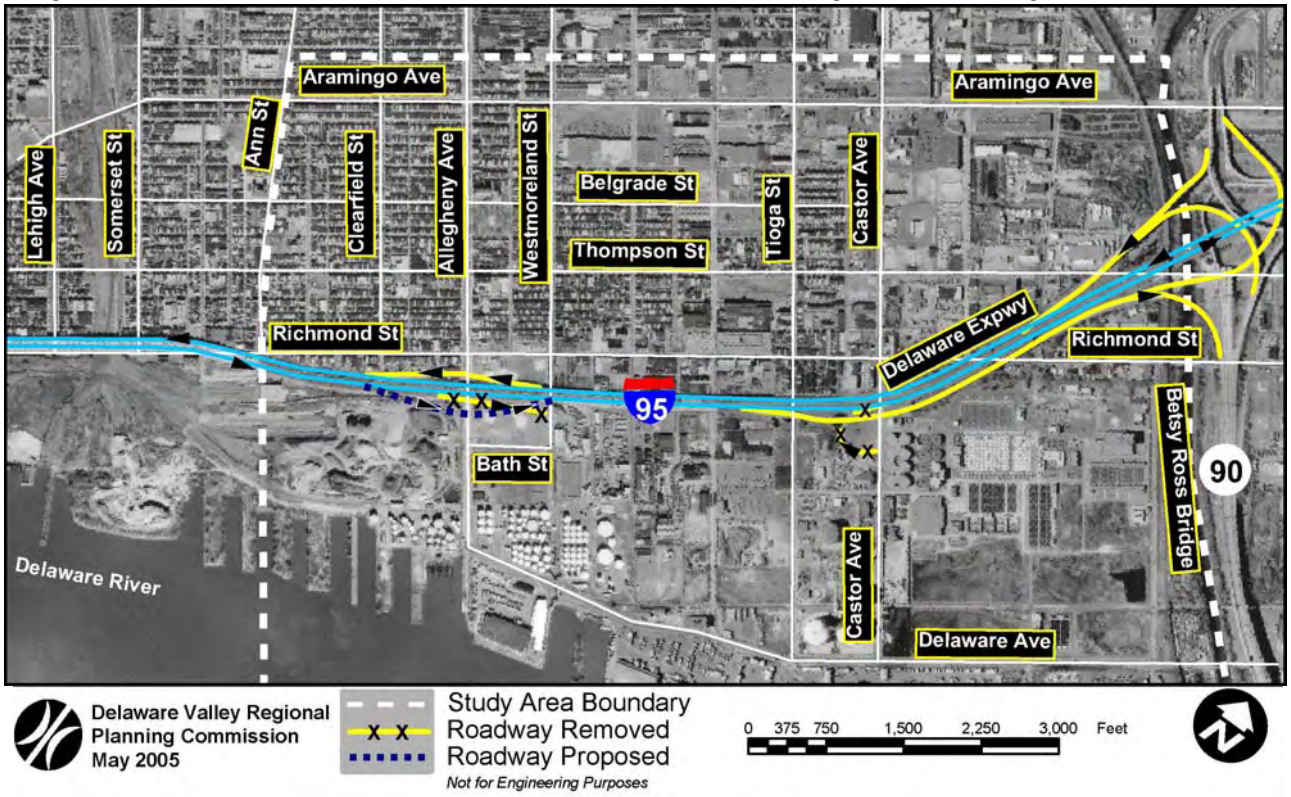
I. Alternative 9 – Dual Castor Avenue Ramps

The Dual Castor Avenue Ramps Alternative maintains the Minimum Build configuration in Section AFC plus an additional ramp from Castor Avenue to the feeder roadway for the Betsy Ross Bridge and Aramingo Avenue. As in the Minimum Build, I-95 is widened to five lanes in both northbound and southbound from the Betsy Ross Bridge to Girard Avenue. Relative to Alternatives 1 through 7, this represents an additional lane on southbound I-95 from the Betsy Ross Bridge to Allegheny Avenue. As before, the Delaware Avenue Extension is constructed from Richmond Street at Lehigh Avenue to Allegheny Avenue. This alternative maximizes I-95 mainline capacity and provides local access to the Betsy Ross Bridge from Castor Avenue, rather than via Richmond Street through a residential neighborhood (see ***Map 12*** page 22).

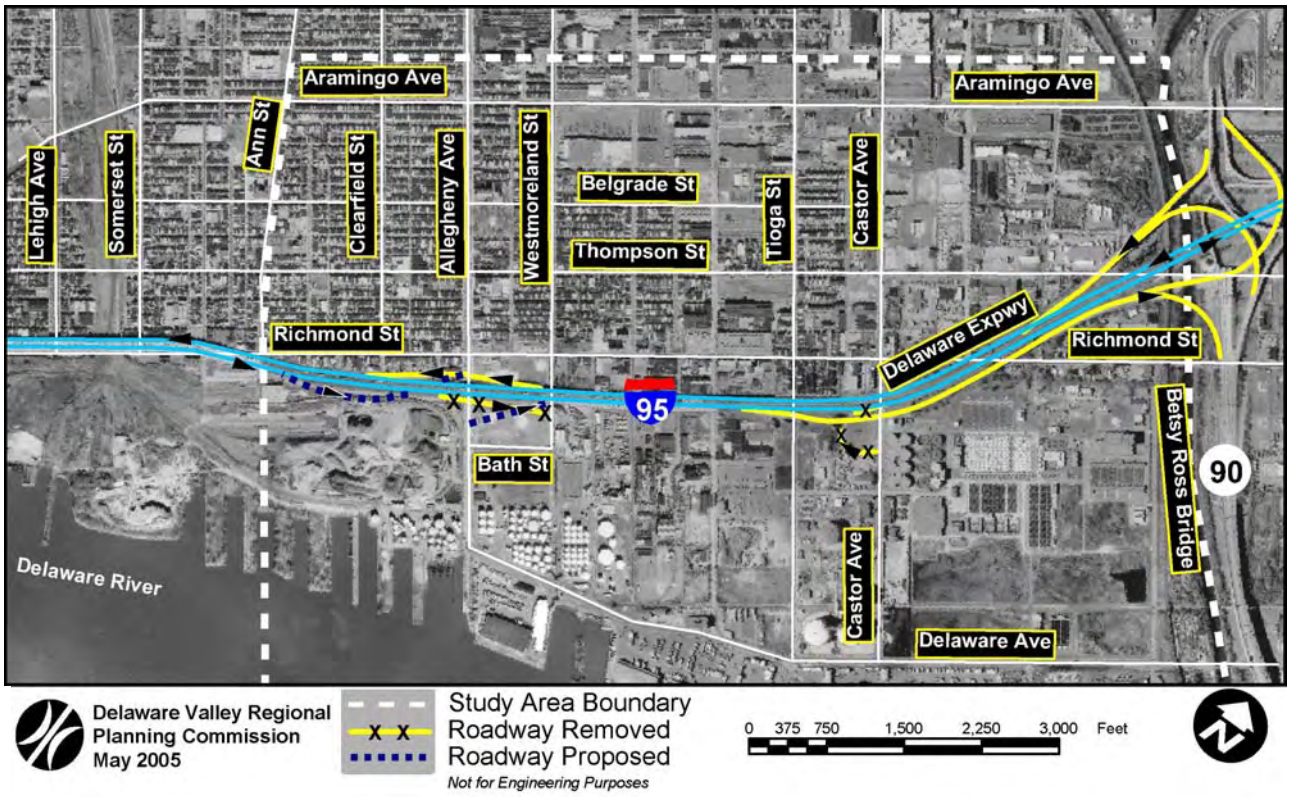
Map 4. No-Build Without Delaware Avenue Extension (Alternative 1)



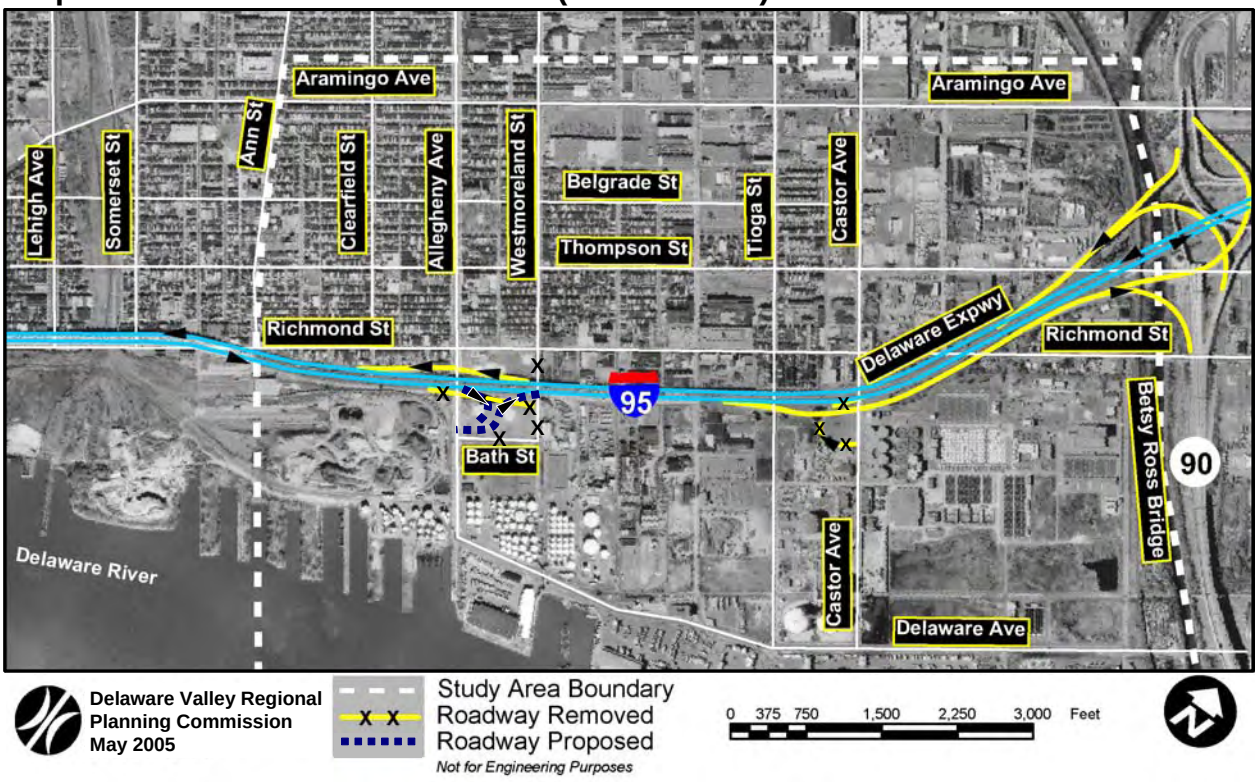
Map 5. Diamond without Delaware Avenue Extension (Alternative 2)



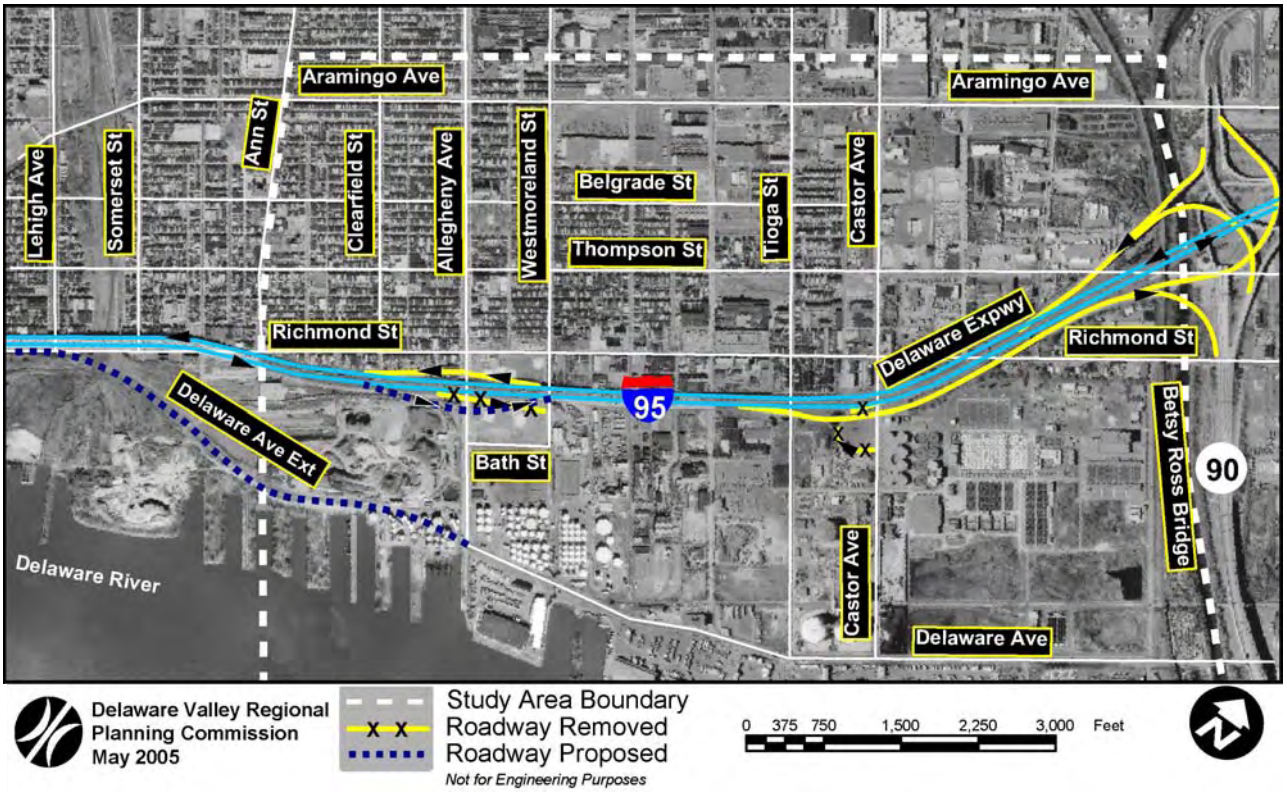
Map 6. Single Point Urban Interchange (SPUI) (Alternative 3)



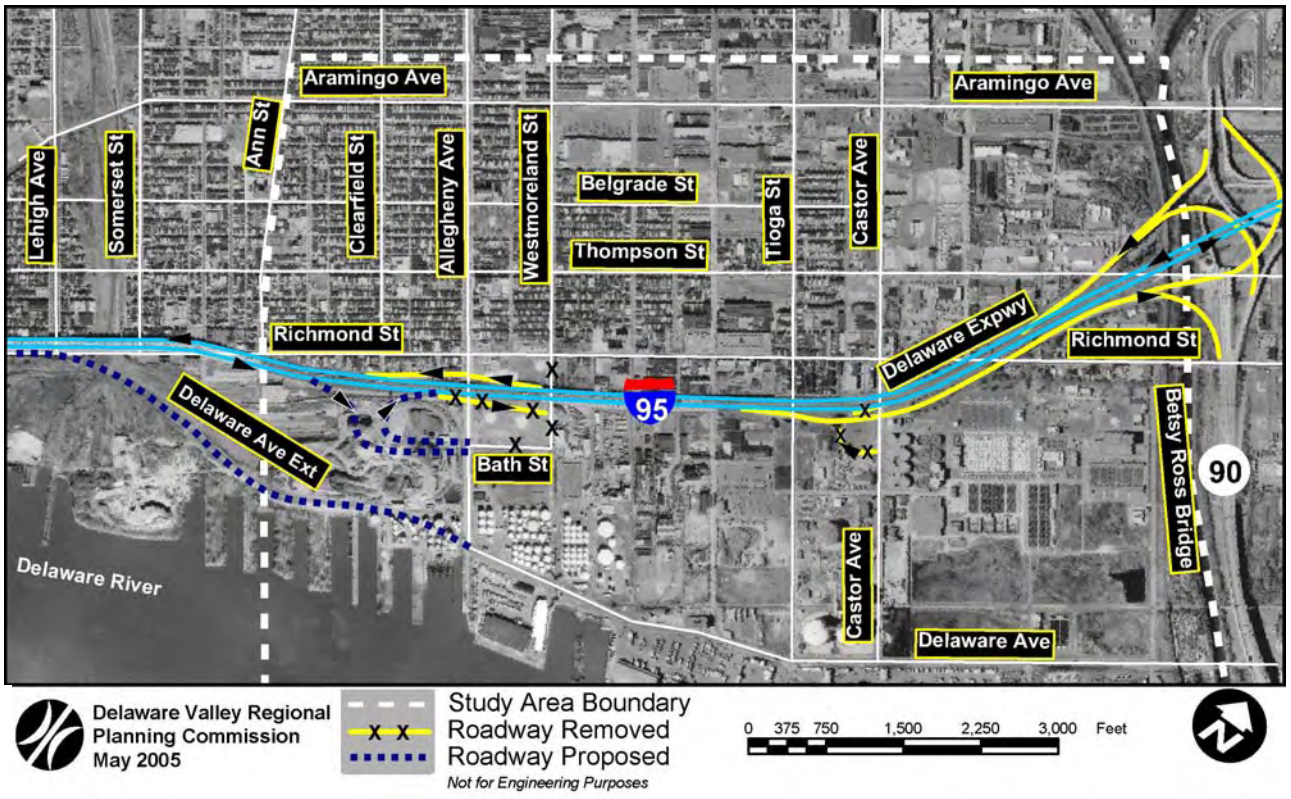
Map 7. Northside Partial Cloverleaf (Alternative 4)



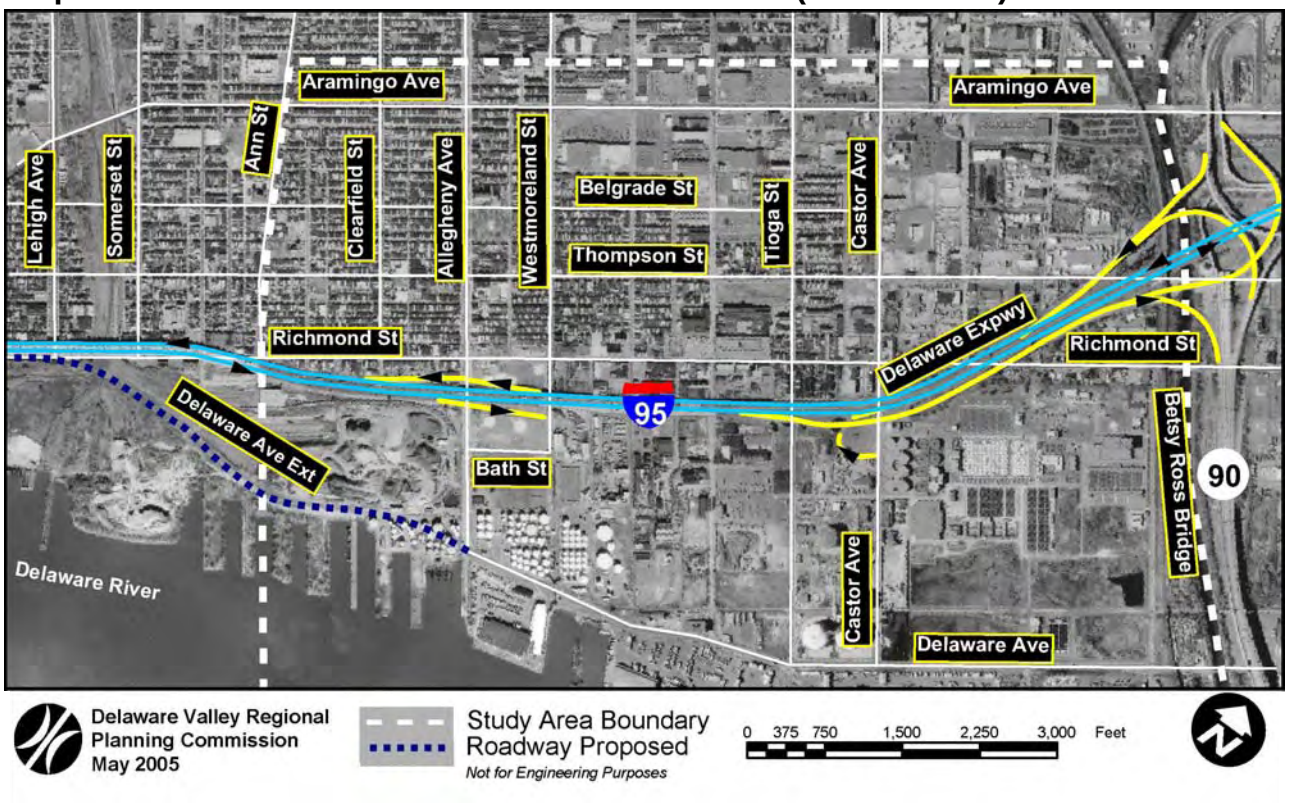
Map 8. Diamond with Delaware Avenue Extension (Alternative 5)



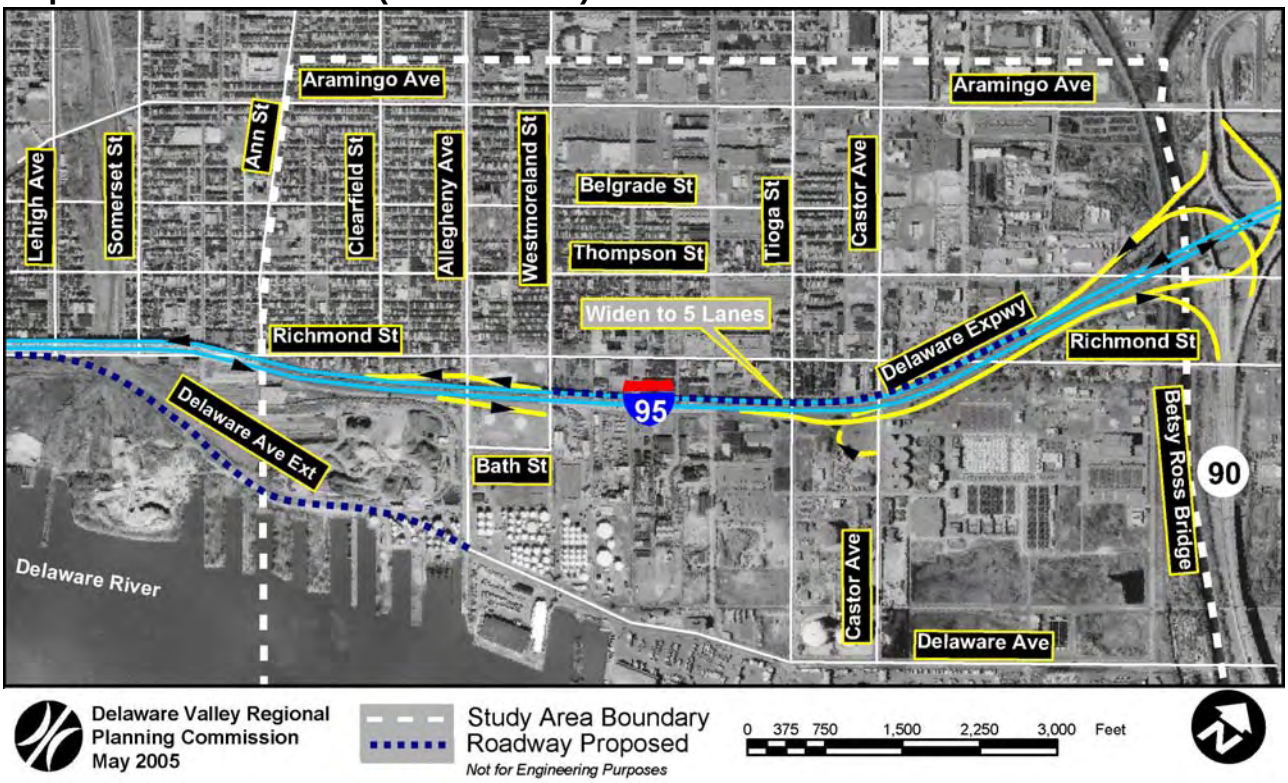
Map 9. Southside Partial Cloverleaf (Alternative 6)



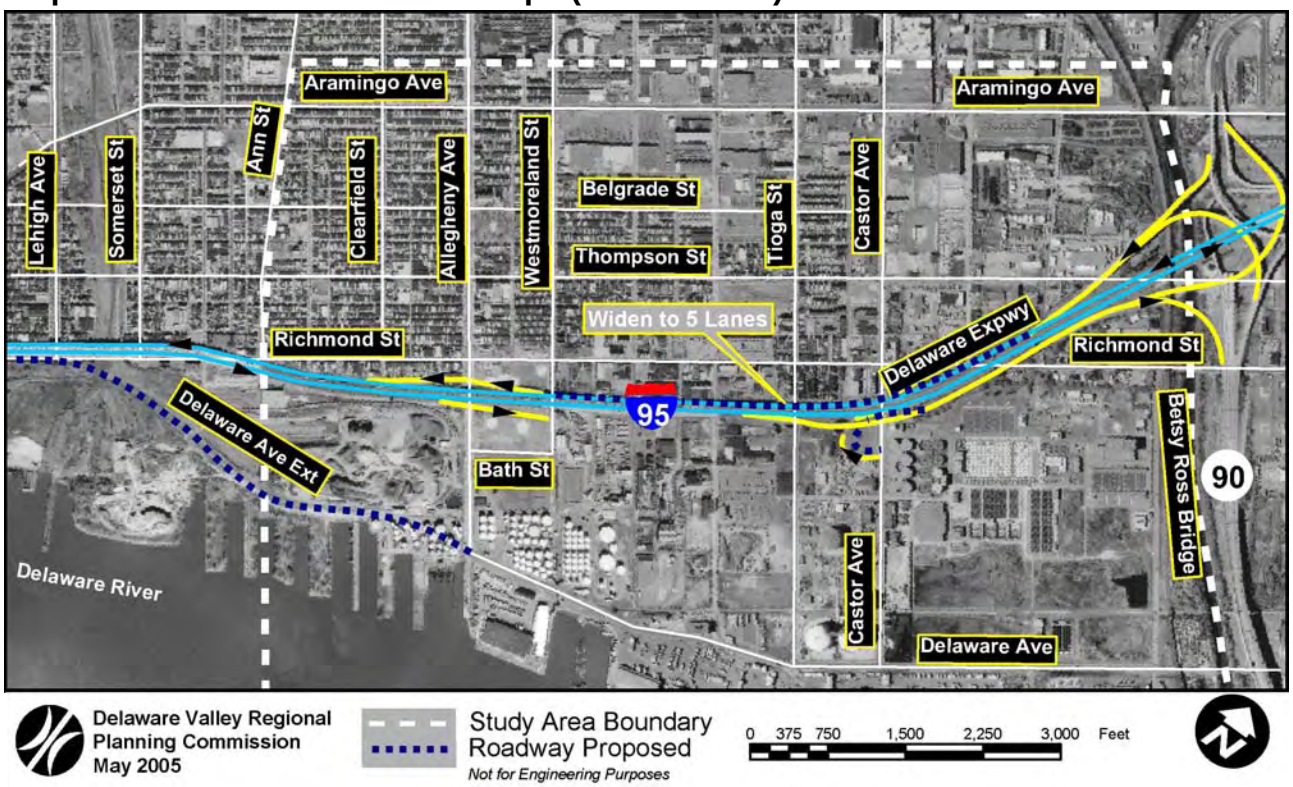
Map 10. No-Build with Delaware Avenue Extension (Alternative 7)



Map 11. Minimum Build (Alternative 8)



Map 12. Dual Castor Avenue Ramps (Alternative 9)



IV. TRAVEL FORECASTING PROCEDURES

Regional travel simulation models are used to forecast future travel patterns. They utilize a system of traffic zones that follow Census boundaries and rely on demographic and employment data, land use, and transportation network characteristics to simulate trip making patterns throughout the region.

A. Socio-Economic Projections

DVRPC's long-range population and employment forecasts are revised periodically to reflect changing market trends, development patterns, local and national economic conditions, and available data. The completed forecasts reflect all reasonably known current information and the best professional judgement of predicted future conditions. The revised forecasts reflect an update to municipal forecasts that were last completed in June 1993.

DVRPC uses a multi-step, multi-source methodology to produce its forecasts at the county-level. County forecasts serve as control totals for municipal forecasts, which are disaggregated from county totals. Municipal forecasts are based on an analysis of historical data trends adjusted to account for infrastructure availability, environmental constraints to development, local zoning policy, and development proposals. Municipal population forecasts are constrained using density ceilings and floors. County, and where necessary, municipal input is used throughout the process to derive the most likely population forecasts for all geographic levels.

1. Population Forecasting

Population forecasting at the regional level involves review and analysis of six major components: births, deaths, domestic in-migration, domestic out-migration, international immigration, and changes in group quarters populations (e.g. dormitories, military barracks, prisons, and nursing homes). DVRPC uses both the cohort survival concept to age individuals from one age group to the next, and a modified Markov transition probability model based on the most recent US Census and the US Census' recent Current Population Survey (CPS) research to determine the flow of individuals between the Delaware Valley and the outside world. For movement within the region, Census and IRS migration data coupled with CPS data are used to determine migration rates between counties. DVRPC relies on county planning offices to provide information on any known, expected, or forecasted changes in group quarters populations. These major population components are then aggregated and the resulting population forecasts are reviewed by member counties for final adjustments based on local knowledge.

In these forecasts, the study area was considered to be in the Near Northeast section of the City of Philadelphia. This section, in 2000, had a population of 225,200, about 14.7 percent of the total City of Philadelphia population. By 2025, that figure is expected to grow by only 0.1 percent, or 300 persons, to 225,500. In 2025, that will be 15.0 percent of the total City of Philadelphia population, which will have shrunk 2.0 percent to 1,500,000 residents as shown below:

Area	2000 Population Forecast	2025 Population Forecast	Change Absolute	Change %Change
Near Northeast Section Philadelphia	225,200	225,500	300	0.1%
City of Philadelphia	1,530,950	1,500,000	-30,950	-2.0%

2. Employment Forecasting

Employment is influenced by local, national, and global political and socio-economic factors. The Bureau of Economic Analysis provides the most complete and consistent time series data on county employment by sector, and serves as DVRPC's primary data source for employment forecasting. Employment sectors include mining, agriculture, construction, manufacturing, transportation, wholesale, retail, finance/insurance, service, government, and military. Other supplemental sources of data include the US Census, Dun & Bradstreet, Bureau of Labor Statistics, Occupational Privilege tax data, and other public and private sector forecasts. The OBERS shift-share model in combination with the Woods and Poole Economics' sectoral forecasts provides the basis for DVRPC's employment forecasts. As in the population forecasts, county level total employment is used as a control total for sector distribution and municipal level forecasts. Forecasts are then reviewed by member counties for final adjustments based on local knowledge.

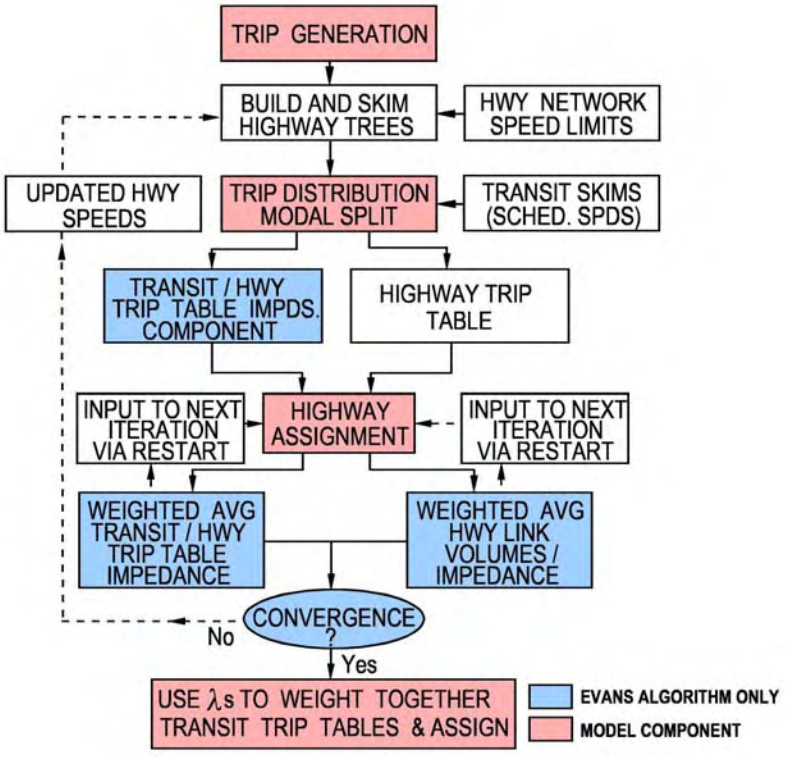
The Near Northeast section, in 2000, had employment of 69,350, about 9 percent of the City of Philadelphia total employment. By 2025, that figure is expected to grow by almost 10 percent, to 76,250, which will also be about 9 percent of the City's total. Employment figures are shown below:

Area	2000 Employment Forecast	2025 Employment Forecast	Change Absolute	Change % Change
Near Northeast Section Philadelphia	69,350	76,250	6,900	9.9%
City of Philadelphia	786,150	840,250	54,100	6.9%

B. DVRPC's Travel Simulation Process

For the I-95 study, a focused simulation process was employed **(*see below*)**. A focused simulation process allows the use of DVRPC's regional simulation models but includes a more detailed representation of the study area. Local streets not included in the regional network, but of interest in this study, are added to the highway network. Traffic zones inside the study area are subdivided so that traffic from existing and proposed land use developments may be loaded more precisely on the network. The focusing process increases the accuracy of the travel forecasts within the detailed study area. At the same time, all existing and proposed highways throughout the region and their impact on both regional and interregional travel patterns become an integral part of the simulation process.

EVANS ITERATIVE TRAVEL SIMULATION PROCESS



DVRPC's travel models follow the traditional steps of trip generation, trip distribution, modal split, and traffic assignment. However, an iterative feedback loop is employed from traffic assignment to the trip distribution step. The feedback loop ensures that the congestion levels used by the models when determining trip origins and destinations are equivalent to those that result from the traffic assignment step. Additionally, the iterative model structure allows trip making patterns to change in response to changes in traffic patterns, congestion levels, and improvements to the transportation system.

The DVRPC travel simulation process uses the Evans Algorithm to iterate the model. Evans re-executes the trip distribution and modal split models based on updated highway speeds after each iteration of highway assignment and assigns a weight (λ) to each iteration. This weight is then used to prepare a convex combination of the link volumes and trip tables for the current iteration and a running weighted average of the previous iterations. This algorithm converges rapidly to the equilibrium solution on highway travel speeds and congestion levels. About seven iterations are required for the process to converge to the equilibrium state for I-95 travel patterns. After equilibrium is achieved, the weighted average transit trip tables are assigned to the transit networks to produce link and route passenger volumes.

1. Separate Peak, Midday, and Evening Models

The DVRPC travel simulation models are disaggregated into separate peak period, midday, and evening time periods. This disaggregation begins in trip generation where factors are used to separate daily trips into peak, midday, and evening travel. The enhanced process then utilizes completely separate model chains for peak, midday, and evening travel simulation runs. Time of day sensitive inputs to the models such as highway capacities and transit service levels are disaggregated to be reflective of time-period specific conditions. Capacity factors are used to allocate daily highway capacity to the peak, midday, and evening time periods. Separate transit networks were required to represent the difference in transit service.

The enhanced model is disaggregated into separate model chains for the peak (combined AM and PM), midday (the period between the AM and PM peaks), and evening (the remainder of the day) periods for the trip distribution, modal split, and travel assignment phases of the process. The peak period is defined as 7:00 AM to 9:00 AM and 3:00 PM to 6:00 PM. Peak period and midday travel are based on a series of factors which determine the percentage of daily trips that occur during those periods. Evening travel is then defined as the residual after peak and midday travel are removed from daily travel.

External-local productions at the nine-county cordon stations are disaggregated into peak, midday, and evening components using percentages derived from the temporal distribution of traffic counts taken at each cordon station.

2. The Model Chain

The first step in the process involves generating the number of trips that are produced by and destined for each traffic zone and cordon station throughout the nine-county region.

a. Trip Generation

Both internal trips (those made within the DVRPC region) and external trips (those which cross the boundary of the region) must be considered in the simulation of regional travel. For the simulation of current and future travel demand, internal trip generation is based on zonal forecasts of population and employment, whereas external trips are extrapolated from cordon line traffic counts and other sources. The latter also include trips which pass through the Delaware Valley region. Estimates of internal trip productions and attractions by zone are established on the basis of trip rates applied to the zonal estimates of demographic and employment data. This part of the DVRPC model is not iterated on highway travel speed. Rather, estimates of daily trip making by traffic zone are calculated and then disaggregated into peak and off-peak time periods.

b. Evans Iterations

The iterative portion of the Evans forecasting process involves updating the highway network restrained link travel speeds, rebuilding the minimum time paths through the network, and skimming the interzonal travel time for the minimum paths. Then the trip distribution, modal split, and highway assignment models in sequence for each pass through the model chain. After convergence is reached, the transit trip tables for each iteration are weighted together and the weighted average table assigned to the transit network. The highway trip tables are loaded onto the network during each Evans iteration. For each time period, seven iterations of the Evans process are performed to ensure that convergence on travel times is reached.

c. Trip Distribution

Trip distribution is the process whereby the zonal trip ends established in the trip generation analysis are linked together to form origin-destination patterns in the trip table format. Peak, midday, and evening trip ends are distributed separately. For each Evans iteration, a series of seven gravity-type distribution models are applied at the zonal level. These models follow the trip purpose and vehicle type stratifications established in trip generation.

d. Modal Split

The modal split model is also run separately for the peak, midday, and evening time periods. The modal split model calculates the fraction of each person-trip interchange in the trip table which should be allocated to transit, and then assigns the residual to the highway side. The choice between highway and transit usage is made on the basis of comparative cost, travel time, and frequency of service, with other aspects of modal choice being used to modify this basic relationship. In general, the better the transit service, the higher the fraction assigned to transit, although trip purpose and auto ownership also affect the allocation. The model subdivides highway trips into auto drivers and passengers. Auto driver trips are added to the truck, taxi, and external vehicle trips in preparation for assignment to the highway network.

e. Highway Assignment

For highway trip, the final step in the focused simulation process is the assignment of current or future vehicle trips to the highway network representative of the appropriate scenario. For peak, midday, and evening travel, the assignment model produces the future traffic volumes for individual highway links that are required for the evaluation of the alternatives. The regional nature of the highway network and trip table underlying the focused assignment process allow the diversion of travel into and through the study area to various points of entry and exit in response to the improvements made in the transportation system.

For each Evans iteration, highway trips are assigned to the network representative of a given alternative by determining the best (minimum time) route through the highway network for each zonal interchange and then allocating the interzonal highway travel to the highway facilities along that route. This assignment model is “capacity restrained” in that congestion levels are considered when determining the best route. The Evans equilibrium assignment method is used to implement the capacity constraint. When the assignment and associated trip table reach equilibrium, no path faster than the one actually assigned can be found through the network, given the capacity restrained travel times on each link.

f. Transit Assignment

After equilibrium is achieved, the weighted average transit trip tables (using the λs calculated from the overall Evans process as weights) are assigned to the transit network to produce link and route passenger volumes. The transit person trips produced by the modal split model are "linked" in that they do not include any transfers that occur either between transit trips or between auto approaches and transit lines. The transit assignment procedure accomplishes two major tasks. First, the transit trips are "unlinked" to include transfers, and second, the unlinked transit trips are associated with specific transit facilities to produce link, line, and station volumes. These tasks are accomplished simultaneously within the transit assignment model, which assigns the transit trip matrix to minimum impedance paths built through the transit network. There is no capacity restraining procedure in the transit assignment model.

C. Traffic Assignment Validation

Before a focused simulation model can be used to predict future trip making patterns, its ability to replicate existing conditions is validated. The simulated highway assignment outputs are compared to current traffic counts taken on roadways serving the study area. The focused simulation model was executed with current conditions and the results compared with recent traffic counts collected by DVRPC. Based on this analysis, the focused model produced accurate traffic volumes. The validated model was then executed for each alternative with socio-economic and land use inputs reflective of future conditions.

V. PROJECTED TRAFFIC VOLUMES

Projected average daily traffic volumes for selected highway links within the study area are presented and analyzed here. Also, future peak hour turning movement volumes are presented. Forecasts are for the horizon year 2025.

A. No-Build without Delaware Avenue Extension

The No-Build without Delaware Avenue Extension Alternative traffic volumes (*see **Figure 3** and **Table 2***) in the I-95 Section AFC Study area are projected to grow significantly over current values, with the highest growth occurring in the north-south direction. This growth is led by I-95 itself, which is forecast to gain 15,600 and 16,500 vehicles per day (vpd) in South and Northbound directions, respectively, just south of the Betsy Ross Bridge. This is 17.2 percent and 18.2 percent growth over existing conditions. Total daily traffic volume on I-95 is projected to be very heavy – 213,500 vpd south of Allegheny Avenue, split evenly by direction. North of the Westmoreland Street ramps, the 2025 forecast on the I-95 mainline is 102,600 vpd southbound and 97,000 vpd northbound, for a total of 209,600 vpd. I-95 ramps to neighborhood streets are forecast to experience similar growth rates, ranging from 11.5 percent to 23.1 percent. This represents an increase of between 1,040 vpd and 1,522 vpd above existing counts of 6,578 vpd to 14,000 vpd.

At the northern boundary of the study area, the preferred alternative for I-95 Section BRI (Betsy Ross Interchange) has significant impacts on I-95 mainline and ramp flow. These flows through the Betsy Ross Interchange, north of the I-95 ramps, grow minimally at 181 vpd (0.2 percent) and 1,284 vpd (1.7 percent). This results from the closure of the existing Harbison Avenue/Bridge Street ramps to and from the south. This traffic is diverted onto the I-95 ramps serving Aramingo Avenue and the Betsy Ross Bridge to and from the south. Traffic on these ramps is forecast to more than double, to 29,200 vpd (116.3 percent) on the I-95 southbound on ramp, and 29,100 vpd (107.9 percent) on the I-95 northbound off-ramp because of projected traffic growth and the diversion of Harbison Avenue and Bridge Street traffic onto these ramps.

Local roads parallel to I-95 are forecast to experience the significant growth, averaging 11.1 percent increase in traffic volume. The largest changes from current conditions are projected for Aramingo Avenue, Belgrade Street, and Delaware Avenue. Projected increases in traffic volume on Aramingo Avenue increases with proximity to the new Betsy Ross Bridge interchange assumed for I-95 Section BRI at Aramingo Avenue, from a minimum of 1,054 vpd additional at Ann Street, the southern boundary of the study area, to a maximum of 5,335 vpd additional vehicles at Wheatsheaf Lane, the northern boundary of the study area. This increase is also seen on Belgrade Street, which is forecast to gain an additional 1,655 vpd between Tioga Street and Westmoreland Street. Finally, traffic on Delaware Avenue from Allegheny Avenue to Venango Street is projected to rise by 1,386 vpd over current volumes. However, traffic on Richmond Street is not expected to rise significantly -- 992 additional vehicles at the southern boundary of the study area, and a decrease of 27 vehicles relative to the current volumes approaching the Betsy Ross Bridge ramps in I-95 Section BRI.

Figure 3. Current and 2025 No-Build without Delaware Avenue Extension (Alternative 1) Average Daily Traffic Volumes

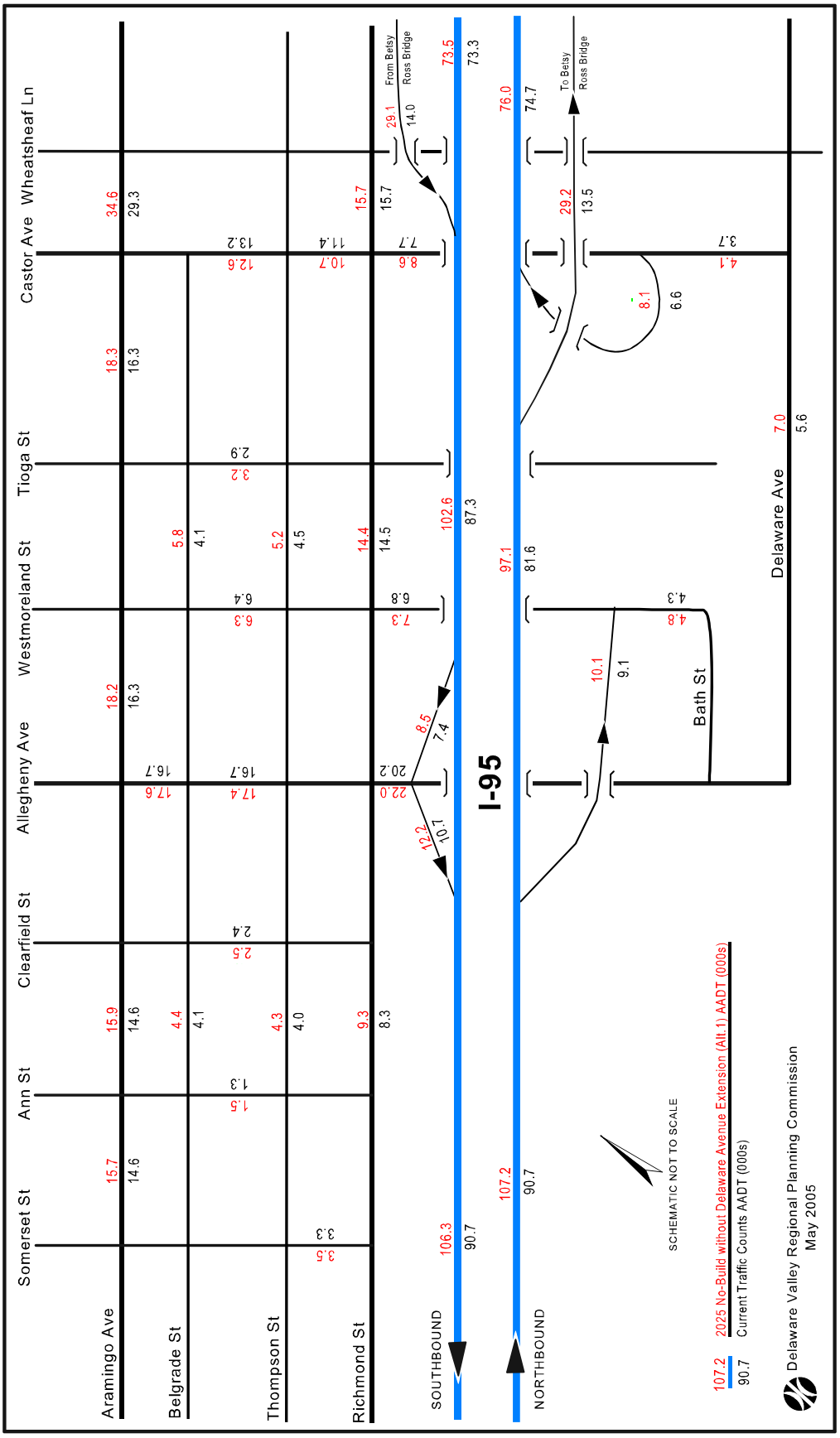


Table 2. Current, and 2025 Forecast for the No-Build without Delaware Avenue Extension (Alternative 1) Average Daily Traffic Volumes

Highway Facility	Location From	To	Current Traffic Count	2025 No-Build	No-Bld Without Delaware Ave. Ext. Versus Current Diff.	% Dff.
I-95 Mainline						
I-95 NB*	Aramingo Ave.	Allegheny Ave.	90,700	107,200	16,500	18.2%
I-95 SB*	Aramingo Ave.	Allegheny Ave.	90,700	106,300	15,600	17.2%
I-95 NB*	Alegheny Ave.	Castor Ave	81,640	97,100	15,460	18.9%
I-95 SB*	Alegheny Ave.	Castor Ave.	87,319	102,600	15,281	17.5%
I-95 NB*	Castor Ave.	Bridge St.	74,716	76,000	1,284	1.7%
I-95 SB*	Betsy Ross Bridge	Allegheny Ave.	73,319	73,500	181	0.2%
I-95 Ramps						
I-95 NB Off-ramp	I-95	Westmoreland St. or Allegheny Ave.	9,060	10,100	1,040	11.5%
I-95 SB On-ramp	I-95	Allegheny Ave.	10,748	12,200	1,452	13.5%
I-95 NB On-ramp	I-95	Allegheny Ave.	n/a	n/a	n/a	n/a
I-95 NB On-ramp	I-95	Castor Ave.	6,578	8,100	1,522	23.1%
I-95/Betsy Ross Brdg	Betsy Ross Bridge NB On-ramp	Castor Ave.	n/a	n/a	n/a	n/a
I-95 SB Off-ramp	I-95	Allegheny Ave.	7,367	8,500	1,133	15.4%
I-95 NB Off-ramp	I-95	Aramingo Ave./Betsy Ross Bridge	13,502	29,200	15,698	116.3%
I-95 NB Off-ramp	Castor Ave.	Betsy Ross Bridge	n/a	n/a	n/a	n/a
I-95 SB On-ramp	I-95	Aramingo Ave./Betsy Ross Bridge	14,000	29,100	15,100	107.9%
Sub-total			**559,649**	**659,900**	**100,251**	**17.9%**
Crossing Streets						
Somerset St.	Belgrade St.	Thompson St.	3,265	3,500	235	7.2%
Ann St.	Belgrade St.	Thompson St.	1,343	1,500	157	11.7%
Clearfield St.	Belgrade St.	Thompson St.	2,400	2,500	100	4.2%
Allegheny Ave.	Aramingo Ave.	Belgrade St.	16,685	17,600	915	5.5%
Allegheny Ave.	Belgrade St.	Thompson St.	16,685	17,400	715	4.3%
Allegheny Ave.	Richmond St.	I-95 SB ramps	20,198	22,000	1,802	8.9%
Allegheny Ave.	Bath St.	Delaware Ave.	5,614	7,000	1,386	24.7%
Westmoreland St.	Belgrade St.	Thompson St.	6,427	6,300	-127	-2.0%
Westmoreland St.	Richmond St.	I-95	6,841	7,300	459	6.7%
Westmoreland St.**	I-95	Bath St.	4,300	4,800	500	11.6%
Tioga St.	Belgrade St.	Thompson St.	2,946	3,200	254	8.6%
Castor Ave.	Aramingo Ave.	Thompson St.	13,224	12,600	-624	-4.7%
Castor Ave.	Thompson St.	Richmond St.	11,355	10,700	-655	-5.8%
Castor Ave.	Richmond St.	I-95 ramp	7,678	8,600	922	12.0%
Castor Ave.	I-95 ramp	Delaware Ave.	3,720	4,100	380	10.2%
Sub-total			**122,681**	**129,100**	**6,419**	**5.2%**
Parallel Streets						
Aramingo Ave.	Somerset St.	Ann St.	14,646	15,700	1,054	7.2%
Aramingo Ave.	Ann St.	Allegheny Ave.	14,646	15,900	1,254	8.6%
Aramingo Ave.	Allegheny Ave.	Tioga St.	16,276	18,200	1,924	11.8%
Aramingo Ave.	Tioga St.	Castor Ave.	16,276	18,300	2,024	12.4%
Aramingo Ave.	Castor Ave.	Aramingo Ave. Conn.	29,265	34,600	5,335	18.2%
Belgrade St.	Clearfield St.	Ann St.	4,098	4,400	302	7.4%
Belgrade St.	Tioga St.	Westmoreland St.	4,145	5,800	1,655	39.9%
Thompson St.	Ann St.	Clearfield St.	4,023	4,300	277	6.9%
Thompson St.	Westmoreland St.	Tioga St.	4,485	5,200	715	15.9%
Richmond St.	Ann St.	Clearfield St.	8,308	9,300	992	11.9%
Richmond St.**	Westmoreland St.	Tioga St.	14,454	14,400	-54	-0.4%
Richmond St.	Castor Ave.	Wheatsheaf Lane	15,673	15,700	27	0.2%
Delaware Ave.	Allegheny Ave.	Richmond St.	n/a	n/a	n/a	n/a
Delaware Ave.	Allegheny Ave.	Venango St.	5,614	7,000	1,386	24.7%
Sub-total			**151,909**	**168,800**	**16,891**	**11.1%**
TOTAL			**834,239**	**957,800**	**123,561**	**14.8%**

* Counts dirived by flowing nearby counts ** estimated by consultant TMC

Local roads perpendicular to I-95 are forecast to experience small growth in traffic into the future – 5.2 percent overall. The largest projected traffic increases are along Allegheny and Castor Avenues. Immediately west of I-95, Allegheny Avenue increases by 1,802 vpd to a 2025 total of 22,000 vpd and Castor grows by 922 vpd to a daily total of 8,600 vpd. Allegheny Avenue will also experiences a notable increase in traffic volumes on east side of I-95; to 7,000 vpd between I-95 and Delaware Avenue,1,386 vpd more than current counts. The remainder of east-west links change by less than 1,000 vpd, with Castor Avenue experiencing a slight net reduction of around 655 vpd due to a reconfigured interchange between Aramingo Avenue, the Betsy Ross Bridge, and I-95 in the adjoining Section BRI study area.

Turning movement forecasts were prepared for most signalized intersections in the Section AFC Study Area ***(figures 4A and 4B)***, the intersections between major arterial roads and at I-95 ramps are where the network is most likely to fail in the future, and therefore are discussed herein.

I-95 peak hour mainline flows (***Table 3*** page 35) grow substantially from the current counts, with the highest hourly volumes forecast between Girard Avenue and Allegheny Avenue; 8,121 vehicles (37 percent growth) in the AM peak hour southbound, and 8,209 vehicles in the PM peak hour northbound (18 percent growth). Because of planned revisions to the Section BRI interchange complex, The largest changes in ramp volumes are on the northbound off-ramp and southbound on-ramp connecting to I-95 Aramingo Avenue and the Betsy Ross Bridge. The northbound flow peaks in the PM peak hour at 2,376 vehicles, and the southbound flow peaks at 2,527 vehicles in the AM peak hour. These peak hour volumes are more than twice comparable current peak hour traffic counts of 1,031 and 1,072 vehicles, respectively. The remainder of I-95 ramps in the study area are projected to sustain relatively modest increases of between 43 and 128 vehicles in the peak hour (10 to 21 percent) over current conditions. Although these hourly ramp volume increases appear small, significant worsening of existing intersection traffic problems can result.

Peak hour volumes at critical intersections along Allegheny Avenue increase in volume from the current conditions to 2025 for the No-Build without Delaware Avenue Extension (Alternative 1). At southbound I-95 ramps and Allegheny Avenue, increased volumes exiting the intersection towards Richmond Street exacerbate the current poor conditions. From I-95 southbound, 395 vehicles turn right in the AM peak hour, and 565 in the PM peak hour, 38 and 45 more than current. Through traffic westbound on Allegheny increases by 55 vehicles in the AM peak hour to 203, and by 33 vehicles in the AM peak hour to 137. At Richmond Street and Allegheny Avenue, four crucial movements increase. First, is the left turn from westbound Allegheny Avenue to southbound Richmond Street. This increases from 171 vehicles to 204 vehicles in the AM peak hour and from 135 vehicles to 180 vehicles in the PM peak hour. This movement is opposed by a second movement, from eastbound Allegheny Avenue, that increases by 58 vehicles and 36 vehicles to 545 vehicles in the AM peak hour and 512 vehicles in the PM peak hour. The final two key movements are the left turn from Richmond Street southbound towards I-95 via Allegheny Avenue eastbound and the opposing northbound movements on Richmond

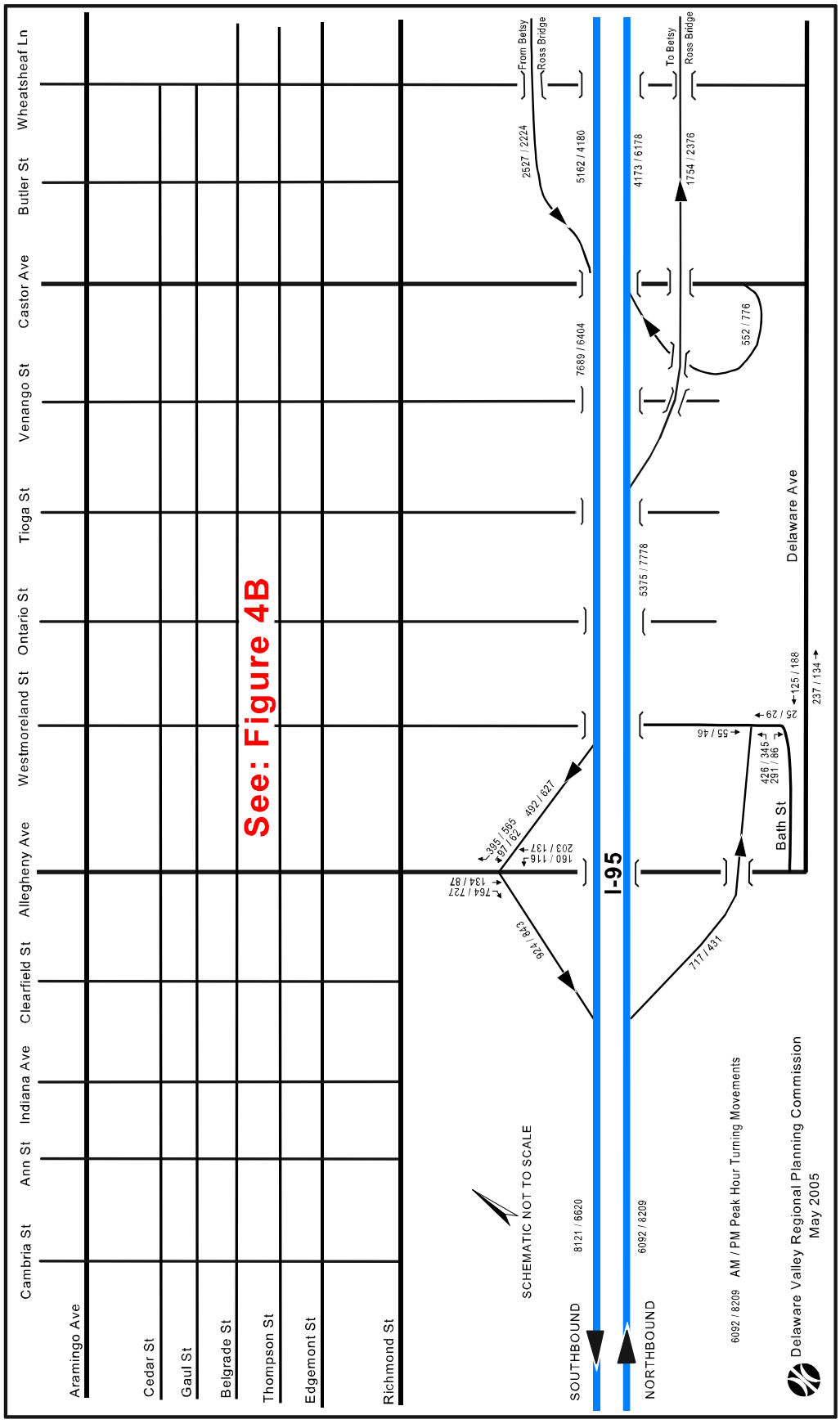
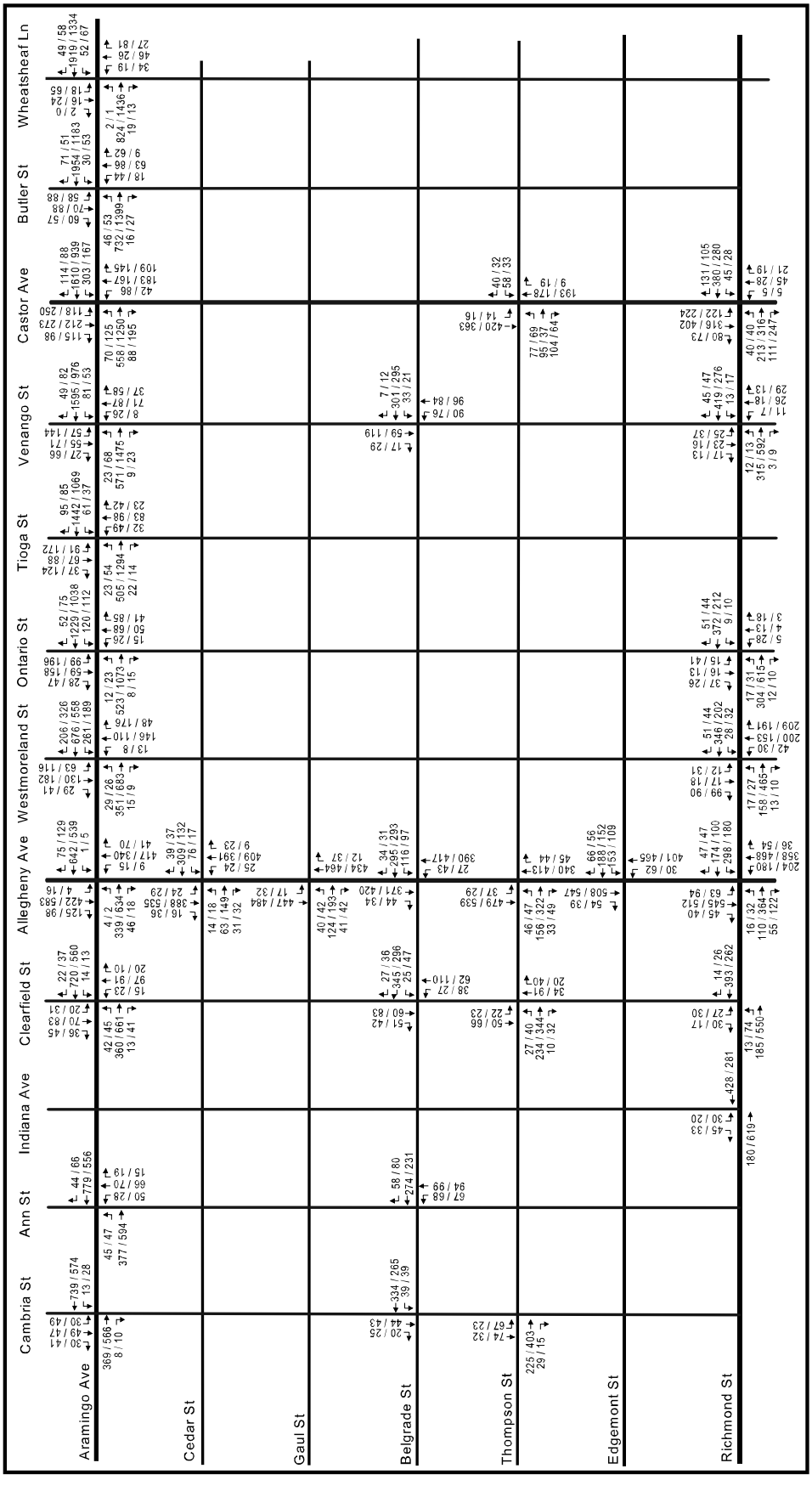


Figure 4A. 2025 No-Build without Delaware Avenue Extension (Alternative 1) AM/PM Peak Hour Turning Movements

Figure 4B. 2025 No-Build without Delaware Avenue Extension (Alternative 1) AM/PM Peak Hour Turning Movements (Inset)



Delaware Valley Regional Planning Commission
May 2005

Table 3. 2025 Forecast Peak Hour Flows on I-95 Mainline and Ramps For Current, and No-Build without Delaware Avenue Extension (Alternative 1)

Location	Current		No-Build w/o Del Ave Ext Alt. 1	
	AM Peak	PM Peak	AM Peak	PM Peak
I-95 Mainline				
I-95 NB- Girard Ave to Allegheny Ave	5,040	6,930	6,092	8,209
I-95 SB- Girard Ave to Allegheny Ave	5,910	5,740	8,121	6,620
I-95 NB- Allegheny Ave to Castor Ave	4,680	7,017	5,375	7,778
I-95 SB- Allegheny Ave to Castor Ave	6,482	5,310	7,689	6,404
I-95 NB- Castor Ave to Bridge St	4,256	6,634	4,173	6,178
I-95 SB- Betsy Ross Bridge to Allegheny Ave	5,815	4,925	5,162	4,180
I-95 Ramps				
I-95 NB off-ramp to Westmoreland St	647	388	717	431
I-95 SB on-ramp from Allegheny Ave	817	752	924	843
I-95 NB on-ramp from Castor Ave	467	648	552	776
I-95 SB off-ramp to Allegheny Ave	405	550	492	627
I-95 NB off-ramp to Aramingo & Betsy Ross Bridge	891	1,031	1,754	2,376
I-95 SB on-ramp from Aramingo & Betsy Ross Bridge	1,072	935	2,527	2,224

Street. The left turn from Richmond Street southbound is forecast to be 298 vehicles in the AM peak hour and 180 vehicles in the PM peak hour, versus current values of 261 and 173, respectively. The opposing northbound movement in 2025, including both the through movement and right turn, is forecast to be 165 vehicles in the AM peak hour and 486 vehicles in the PM peak hour, an increase of 22 vehicles and 23 vehicles, respectively.

The magnitude and direction of changes to forecast peak hour volumes relative to current conditions varies depending on location. Key movements at Allegheny Avenue and Aramingo Avenue all grow by between 75 and 100 vehicles in their respective peak directions. At Aramingo Avenue and Castor Avenue, the largest volume is the southbound AM peak hour forecast for Aramingo Avenue at 1,610 vehicles, an increase of 178 vehicles. However, improvements assumed for I-95 Section BRI cause a reduction in travel on Castor Avenue, with through travel dropping by about 100 vehicles eastbound in both AM and PM peak hours, and by roughly 50 westbound. The southbound through is offset by increased left turns from Castor Avenue to I-95 and the Betsy Ross Bridge via Aramingo Avenue; 32 more vehicles to118 vehicles in the AM peak hour and 69 more vehicles in the PM peak hour for a total of 250 vehicles. Finally, the junction of Castor Avenue with Richmond Street sustains only slight changes in from current traffic volume.

B. Build Alternatives at Allegheny Avenue without Delaware Avenue Extension

The build alternatives at Allegheny Avenue analyzed in this paragraph include the Diamond (Alternative 2), Northside Partial Cloverleaf (Alternative 3), and Single Point Urban Interchange (SPUI) (Alternative 4). Delaware Avenue remains as-is for all three of these alternatives. All of these schemes concentrate I-95 ramp traffic onto Allegheny Avenue between I-95 and Richmond Street, reinforcing its role as primary arterial. While these alternatives provide traffic relief for other, smaller, neighborhood roads, they dramatically increase traffic volumes at the intersections of Allegheny Avenue with I-95, Richmond Street and Aramingo Avenue**.**

Forecast 2025 daily traffic volumes under alternatives 2, 3, and 4 change minimally on I-95 relative to the No-Build without Delaware Avenue Extension (Alternative 1), under any of these alternatives, less than 1,000 vpd. The results are shown in ***Table 4, and figures 5,6,7*** for the Diamond Alternative without Delaware Avenue Extension (Alternative 2), the Northside Partial Cloverleaf (Alternative 3), and the Single Point Urban Interchange (SPUI) (Alternative 4), respectively. The exception is Northbound I-95 from Allegheny Avenue to the Betsy Ross Bridge which gains between 9,100 and 9,400 vpd because of moving the I-95 northbound on-ramp from Castor Avenue southward to Allegheny Avenue**.**

Individual ramps to and from Allegheny Avenue are forecast to have somewhat higher traffic volumes relative to Alternative 1 under the build without Delaware Avenue extension alternatives (2, 3, and 4). The southbound I-95 on-ramp at Allegheny Avenue (about 12,300 vpd) changes by less than 100 vpd relative to the No-Build Alternative. The southbound I-95 off-ramp, forecast to carry between 9,500 vpd and 9,900 vpd, gains from 1,000 vpd to 1,400 vpd relative to the No-Build Alternative under these alternatives. Demand for the Allegheny Avenue variant of this ramp from ranges from 9,200 vpd to 9,600 vpd, versus the 2025 No-Build Alternative 1 forecast of 8,100 at Castor Avenue. The northbound off-ramp to the Besty Ross Bridge and Aramingo Avenue gains 1,300 vpd to 1,400 vpd versus the 29,200 forecast under No-Build Alternative 1. The corresponding southbound I-95 on-ramp values are 700 to 1,100 vehicles above the 29,100 vpd forecast for 2025 under No-Build Alternative 1 (without Delaware Avenue Extension).

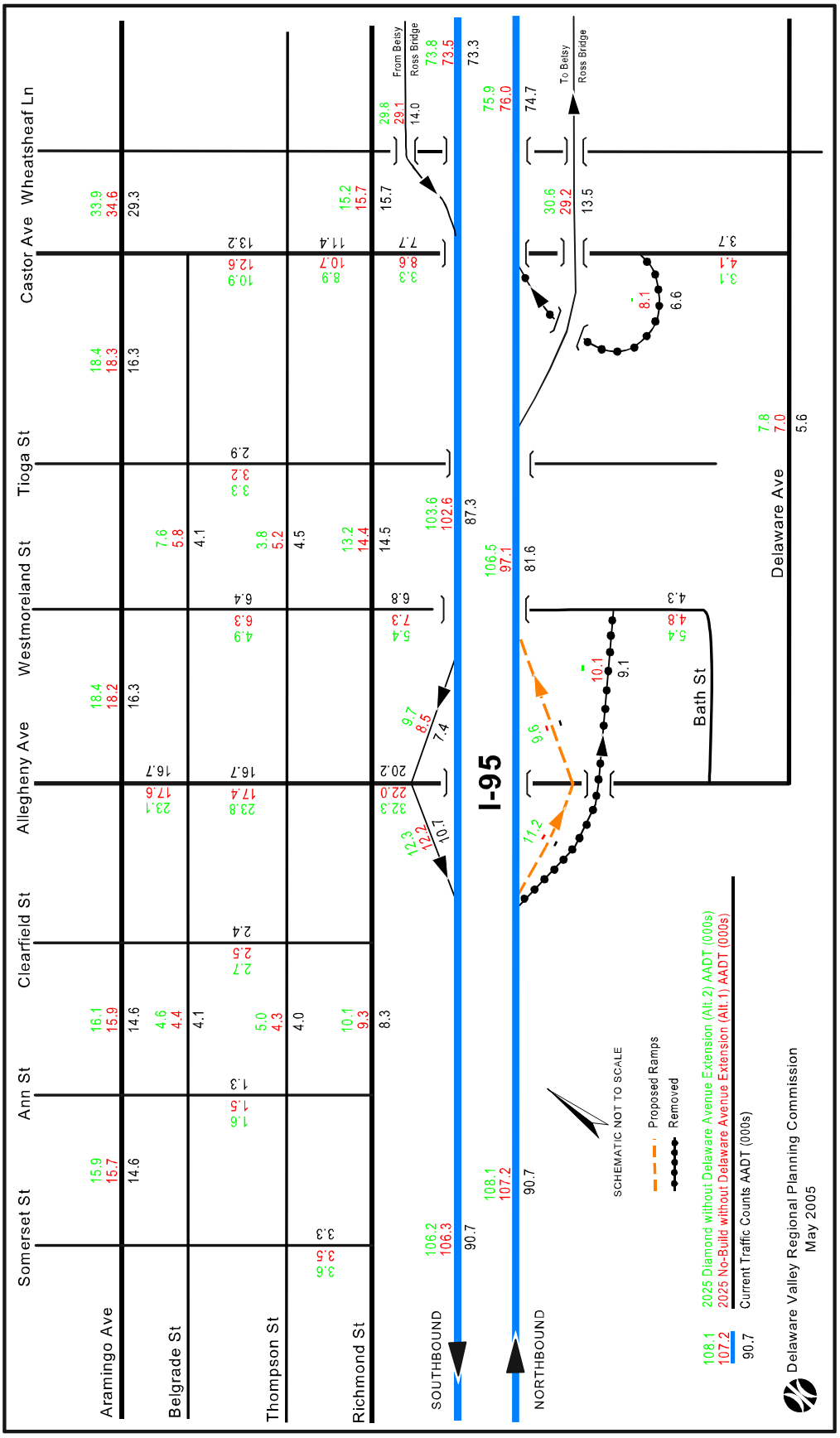
Total travel demand on study area North-South roads is largely unchanged between No-Build Alternative 1 and all of the Allegheny Avenue Build without Delaware Avenue Alternatives (2, 3, and 4), changing by roughly1,000 when summed over all reported roadway links. The largest changes occur on Belgrade , Thompson, and Richmond streets, between Westmoreland and Tioga streets. Belgrade Street at 7,600 vpd in all three alternatives is forecast to have an increase of 1,800 vpd relative to No-Build Alternative 1,with a corresponding decrease of 1,400 vpd to 1,500 vpd on Thompson Street from 5,200 vpd under No-Build Alternative 1. Richmond Street declines 1,200 vpd to 1,400 vpd relative to No-Build (Alternative 1) between Westmoreland Street and Tioga Street with forecasted volumes of 13,000 vpd to 13,200 vpd under the build alternatives. South of Allegheny Avenue, Richmond Street gains 800 vpd to 1,100 vpd above the No-Build Alternative 1 total of 9,300 vpd. All other north-south streets change by less than 1,000 vpd relative to No-Build as a result of consolidating I-95 access at Allegheny Avenue.

Table 4. Current, and 2025 Forecast for the Diamond without Delaware Ave. Ext. (Alt. 2), Single Point Urban Interchange (SPUI) (Alt. 3) and Northside Partial Cloverleaf (Alt. 4) Average Daily Traffic Volumes

Highway Facility	Location From	To	Current Traffic Count	Alt. 2 2025 Diamond w/o Del. Ave. Ext	Alt. 2 Diamond Versus Current Diff.	Alt. 2 Diamond Versus Current % Dff.	Alt. 3 2025 SPUI	Alt. 3 2025 SPUI Versus Current Diff.	Alt. 3 2025 SPUI Versus Current % Dff.	Alt. 4 2025 NSide Partial Cloverleaf	Alt. 4 NSide Prt Cloverleaf Versus Current Diff.	Alt. 4 NSide Prt Cloverleaf Versus Current % Dff.
I-95 Mainline												
I-95 NB*	Aramingo Ave.	Allegheny Ave.	90,700	108,100	17,400	19.2%	107,500	16,800	18.5%	107,400	16,700	18.4%
I-95 SB*	Aramingo Ave.	Allegheny Ave.	90,700	106,200	15,500	17.1%	106,000	15,300	16.9%	106,100	15,400	17.0%
I-95 NB*	Alegheny Ave.	Castor Ave	81,640	106,500	24,860	30.5%	106,300	24,660	30.2%	106,200	24,560	30.1%
I-95 SB*	Alegheny Ave.	Castor Ave.	87,319	103,600	16,281	18.6%	103,400	16,081	18.4%	103,700	16,381	18.8%
I-95 NB*	Castor Ave.	Bridge St.	74,716	75,900	1,184	1.6%	75,800	1,084	1.5%	75,700	984	1.3%
I-95 SB*	Betsy Ross Bridge	Allegheny Ave.	73,319	73,800	481	0.7%	73,600	281	0.4%	73,500	181	0.2%
I-95 Ramps												
I-95 NB Off-ramp	I-95	Westmoreland St.or Allegheny Ave.	9,060	11,200	2,140	23.6%	10,700	1,640	18.1%	10,400	1,340	14.8%
I-95 SB On-ramp	I-95	Allegheny Ave.	10,748	12,300	1,552	14.4%	12,100	1,352	12.6%	12,300	1,552	14.4%
I-95 NB On-ramp	I-95	Allegheny Ave.	n/a	9,600	3,022	45.9%	9,500	2,922	44.4%	9,200	2,622	39.9%
I-95 NB On-ramp	I-95	Castor Ave.	6,578	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
I-95/Betsy Ross Brdg.	Betsy Ross Brdg. NB On-ramp	Castor Ave.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
I-95 SB Off-ramp	I-95	Allegheny Ave.	7,367	9,700	2,333	31.7%	9,500	2,133	29.0%	9,900	2,533	34.4%
I-95 NB Off-ramp	I-95	Aramingo Ave./Betsy Ross Bridge	13,502	30,600	17,098	126.6%	30,500	16,998	125.9%	30,500	16,998	125.9%
I-95 NB Off-ramp	Castor Ave.	Betsy Ross Bridge	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
I-95 SB On-ramp	I-95	Aramingo Ave./Betsy Ross Bridge	14,000	29,800	15,800	112.9%	29,800	15,800	112.9%	30,200	16,200	115.7%
Sub-total			**559,649**	**677,300**	**117,651**	**21.0%**	**674,700**	**115,051**	**20.6%**	**675,100**	**115,451**	**20.6%**
Crossing Streets												
Somerset St.	Belgrade St.	Thompson St.	3,265	3,600	335	10.3%	3,600	335	10.3%	3,500	235	7.2%
Ann St.	Belgrade St.	Thompson St.	1,343	1,600	257	19.1%	1,600	257	19.1%	1,600	257	19.1%
Clearfield St.	Belgrade St.	Thompson St.	2,400	2,700	300	12.5%	2,700	300	12.5%	2,500	100	4.2%
Allegheny Ave.	Aramingo Ave.	Belgrade St.	16,685	23,100	6,415	38.4%	23,000	6,315	37.8%	23,900	7,215	43.2%
Allegheny Ave.	Belgrade St.	Thompson St.	16,685	23,800	7,115	42.6%	23,600	6,915	41.4%	24,700	8,015	48.0%
Allegheny Ave.	Richmond St.	I-95 SB ramps	20,198	32,300	12,102	59.9%	33,500	13,302	65.9%	36,500	16,302	80.7%
Allegheny Ave.	Bath St.	Delaware Ave.	5,614	7,800	2,186	38.9%	7,600	1,986	35.4%	7,500	1,886	33.6%
Westmoreland St.	Belgrade St.	Thompson St.	6,427	4,900	-1,527	-23.8%	4,800	-1,627	-25.3%	3,500	-2,927	-45.5%
Westmoreland St.	Richmond St.	I-95	6,841	5,400	-1,441	-21.1%	3,700	-3,141	-45.9%	n/a	n/a	n/a
Westmoreland St.**	I-95	Bath St.	4,300	5,400	1,100	25.6%	3,700	-600	-14.0%	n/a	n/a	n/a
Tioga St.	Belgrade St.	Thompson St.	2,946	3,300	354	12.0%	3,300	354	12.0%	3,300	354	12.0%
Castor Ave.	Aramingo Ave.	Thompson St.	13,224	10,900	-2,324	-17.6%	10,800	-2,424	-18.3%	11,100	-2,124	-16.1%
Castor Ave.	Thompson St.	Richmond St.	11,355	8,900	-2,455	-21.6%	8,900	-2,455	-21.6%	9,000	-2,355	-20.7%
Castor Ave.	Richmond St.	I-95 ramp	7,678	3,300	-4,378	-57.0%	3,300	-4,378	-57.0%	3,400	-4,278	-55.7%
Castor Ave.	I-95 ramp	Delaware Ave.	3,720	3,100	-620	-16.7%	3,100	-620	-16.7%	3,200	-520	-14.0%
Sub-total			**122,681**	**140,100**	**17,419**	**14.2%**	**137,200**	**14,519**	**11.8%**	**133,700**	**22,160**	**18.1%**
Parallel Streets												
Aramingo Ave.	Somerset St.	Ann St.	14,646	15,900	1,254	8.6%	16,000	1,354	9.2%	16,200	1,554	10.6%
Aramingo Ave.	Ann St.	Allegheny Ave.	14,646	16,100	1,454	9.9%	16,200	1,554	10.6%	16,400	1,754	12.0%
Aramingo Ave.	Allegheny Ave.	Tioga St.	16,276	18,400	2,124	13.0%	18,300	2,024	12.4%	18,300	2,024	12.4%
Aramingo Ave.	Tioga St.	Castor Ave.	16,276	18,400	2,124	13.0%	18,300	2,024	12.4%	18,300	2,024	12.4%
Aramingo Ave.	Castor Ave.	Aramingo Ave. Connector	29,265	33,900	4,635	15.8%	33,900	4,635	15.8%	33,600	4,335	14.8%
Belgrade St.	Clearfield St.	Ann St.	4,098	4,600	502	12.2%	4,600	502	12.2%	4,700	602	14.7%
Belgrade St.	Tioga St.	Westmoreland St.	4,145	7,600	3,455	83.4%	7,600	3,455	83.4%	7,600	3,455	83.4%
Thompson St.	Ann St.	Clearfield St.	4,023	5,000	977	24.3%	5,100	1,077	26.8%	5,200	1,177	29.3%
Thompson St.	Westmoreland St.	Tioga St.	4,485	3,800	-685	-15.3%	3,700	-785	-17.5%	3,800	-685	-15.3%
Richmond St.	Ann St.	Clearfield St.	8,308	10,100	1,792	21.6%	10,300	1,992	24.0%	10,400	2,092	25.2%
Richmond St.**	Westmoreland St.	Tioga St.	14,454	13,200	-1,254	-8.7%	13,000	-1,454	-10.1%	13,000	-1,454	-10.1%
Richmond St.	Castor Ave.	Wheatsheaf Lane	15,673	15,200	-473	-3.0%	15,200	-473	-3.0%	15,100	-573	-3.7%
Delaware Ave.	Allegheny Ave.	Richmond St.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Delaware Ave.	Allegheny Ave.	Venango St.	5,614	7,800	2,186	38.9%	7,600	1,986	35.4%	7,500	1,886	33.6%
Sub-total			**151,909**	**170,000**	**18,091**	**11.9%**	**169,800**	**17,891**	**11.8%**	**170,100**	**18,191**	**12.0%**
TOTAL			**834,239**	**987,400**	**153,161**	**18.4%**	**981,700**	**147,461**	**17.7%**	**978,900**	**155,802**	**18.7%**

* Counts dirived by flowing nearby counts ** estimated by consultant TMC

Figure 5. Current, 2025 No-Build (Alt. 1) and 2025 Diamond without Delaware Avenue Extension (Alt. 2) Average Daily Traffic Volumes



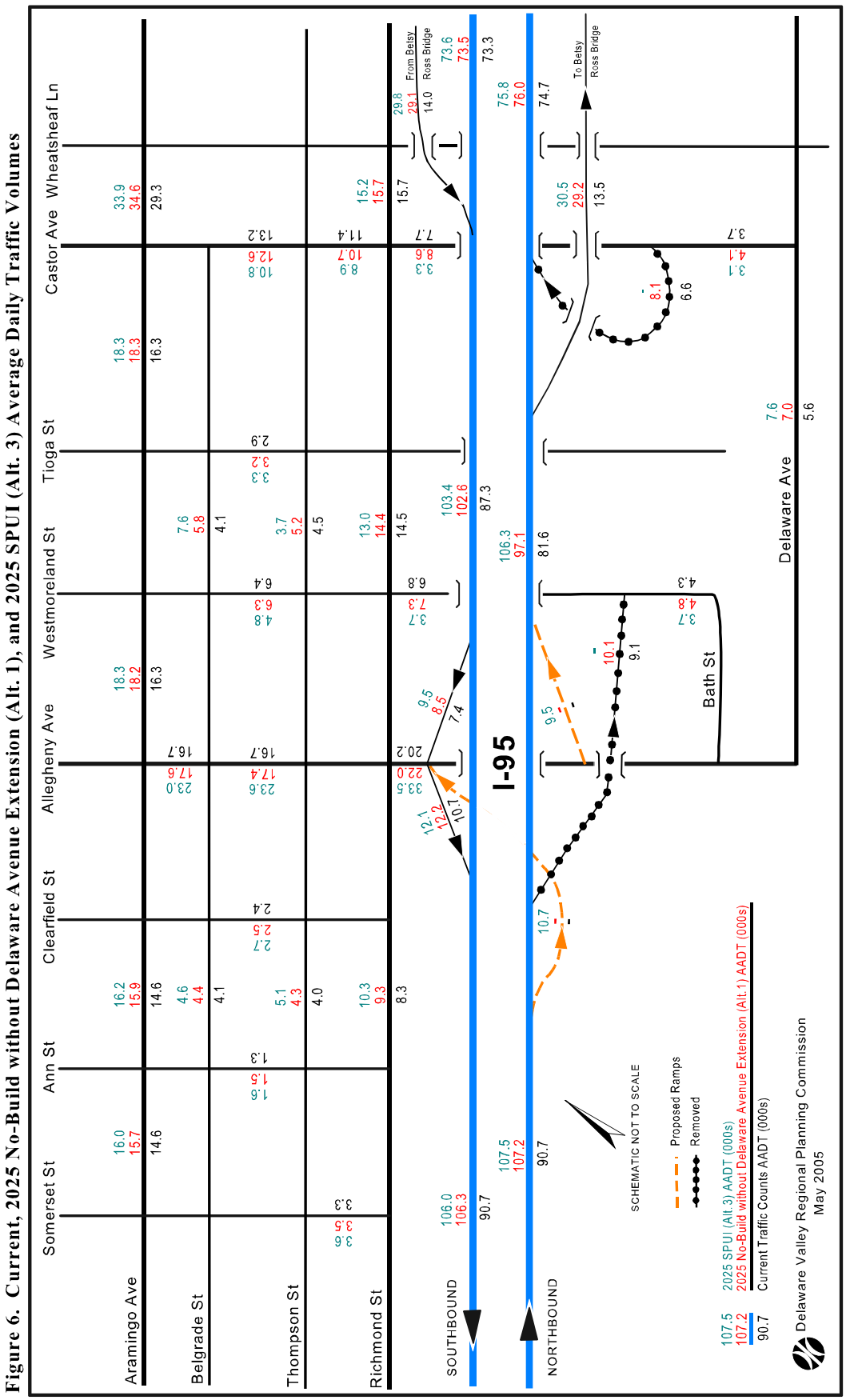


Figure 6. Current, 2025 No-Build without Delaware Avenue Extension (Alt. 1), and 2025 SPUI (Alt. 3) Average Daily Traffic Volumes

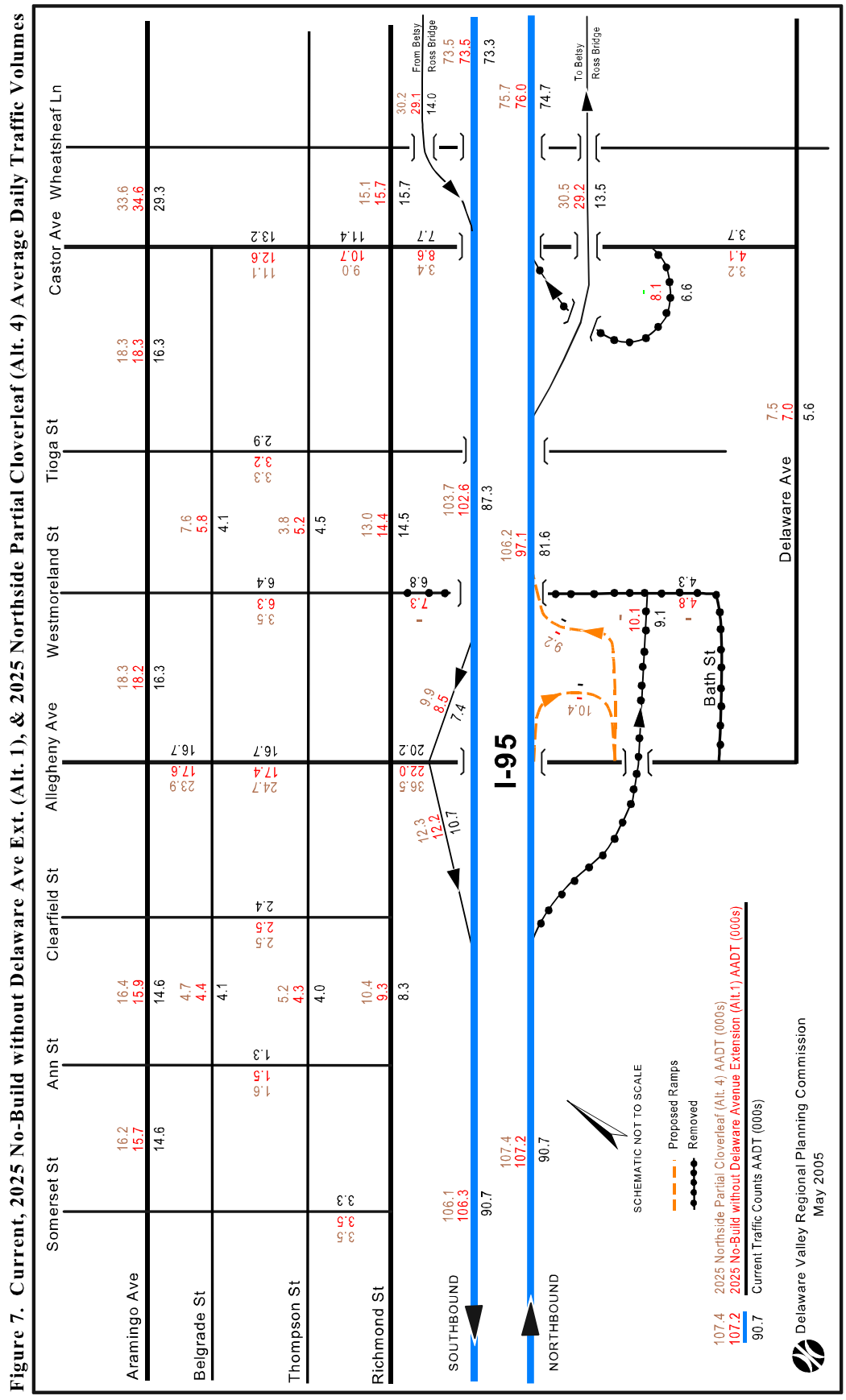


Figure 7. Current, 2025 No-Build without Delaware Ave Ext. (Alt. 1), & 2025 Northside Partial Cloverleaf (Alt. 4) Average Daily Traffic Volumes

The largest change on east-west study area roads relative to No-Build Alternative 1 are on Allegheny Avenue between I-95 and Richmond Street. For the Diamond and SPUI Alternatives, 2025 traffic on this link increases by 10,300 vpd and 11,500 vpd versus the No-Build to 32,300 and 33,500 vpd, respectively. With the Northside Partial Cloverleaf Alternative, Bath Street is closed, and AADT on this Allegheny Avenue link rises to 36,500 vpd, an increase of 14,500 over No-Build Alternative 1. These gains continue on Allegheny Avenue west of I-95, ranging from 5,400 vpd to 7,300 vpd, depending upon alternative and location, with the Northside Partial Cloverleaf Alternative having an additional 1,000 vpd more than the other alternatives.

Westmoreland Street, no longer a direct route from I-95, experiences significant reductions in traffic. West of Richmond Street, forecast 2025 demand on Westmoreland Street drops to 3,500 vpd under the Northside Partial Cloverleaf Alternative, a decease of 2,800 vpd versus No-Build Alternative 1. The Diamond and SPUI alternatives cause smaller Westmoreland Street reductions in forecast 2025 AADT, of 4,800 and 4,900 vpd, respectively. East of Richmond Street, Westmoreland Street is closed under the Northside Partial Cloverleaf Alternative and therefore has no traffic in that alternative. For the Diamond Alternative, 2025 AADT is forecast at 5,400 vpd on Westmoreland Street east of Richmond Street, and the same location is forecast at 3,700 vpd under the SPUI because of a reorientation of traffic towards Richmond Street.

As one might expect, Castor Avenue is forecast to have significant reductions in traffic as a result of moving the I-95 northbound on-ramp from Castor Avenue to Allegheny Avenue. This change relative to No-Build Alternative 1 is fairly stable between build alternatives 2, 3, and 4, ranging from a 900 vpd to 1,000 vpd reduction (to 3,100 vpd and 3,200 vpd) along Castor Avenue approaching Delaware Avenue in 2025. The corresponding Castor Avenue reduction west of Richmond Street is 1,500 vpd to 1,800 vpd (to between 8,900 vpd and 11,100 vpd), and 5,200 vpd to 5,300 vpd in 2025 between Richmond Street and I-95 (3,300 vpd to 3,400 vpd forecast).

Mainline I-95 forecast peak hour vehicular flows **(*Table 5*)** vary little south of Allegheny Avenue between the Build at Allegheny Avenue without Delaware Avenue Extension alternatives, (Diamond, Northside Partial Cloverleaf, and SPUI). The largest difference between these alternatives in either direction is about 50 vehicles in the peak hour. North of Allegheny Avenue, these build alternatives produce marginally higher forecast peak hour volumes southbound, and substantially higher flows northbound due to diverting I-95 northbound on-ramp traffic from Castor Avenue to Allegheny Avenue. Southbound, between the Betsy Ross Bridge and Allegheny Avenue, the variance between alternatives is also about 50 peak hour vehicles in between these alternatives. Northbound at the this location, forecast volumes for the PM peak hour with the same build alternatives range from 8,574 vehicles to 8,627 vehicles, versus 7,778 vehicles for the No-Build Alternative 1.

Table 5. 2025 Forecast Peak Hour Flows on I-95 Mainline and Ramps for No-Build, and Build Alts at Allegheny Ave, without Delaware Ave Ext

Location	Alt. 1 No-Build without Delaware Ave Ext		Alt. 2 Diamond without Delaware Ave Ext		Alt. 3 Single Point Urban Interchange		Alt. 4 Northside Cloverleaf	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
I-95 Mainline								
I-95 NB- Girard Ave to Allegheny Ave	6,092	8,209	6,170	8,238	6,134	8,195	6,128	8,189
I-95 SB- Girard Ave to Allegheny Ave	8,121	6,620	8,137	6,603	8,123	6,591	8,130	6,597
I-95 NB- Allegheny Ave to Castor Ave	5,375	7,778	6,039	8,627	6,031	8,596	6,026	8,574
I-95 SB- Allegheny Ave to Castor Ave	7,689	6,404	7,763	6,466	7,754	6,453	7,768	6,475
I-95 NB- Castor Ave to Bridge Street	4,173	6,178	4,201	6,137	4,196	6,116	4,194	6,101
I-95 SB- Betsy Ross Bridge to Allegheny Ave	5,162	4,180	5,175	4,189	5,167	4,181	5,150	4,172
I-95 Ramps								
I-95 NB off-ramp to Westmoreland St	717	431	n/a	n/a	n/a	n/a	n/a	n/a
I-95 NB off-ramp to Allegheny Ave	n/a	n/a	795	480	760	459	738	456
I-95 SB on-ramp from Allegheny Ave	924	843	934	852	920	838	934	852
I-95 NB on-ramp from Allegheny Ave	n/a	n/a	664	869	657	860	636	831
I-95 NB on-ramp from Castor Ave	552	776	n/a	n/a	n/a	n/a	n/a	n/a
I-95 SB off-ramp to Allegheny Ave	492	627	560	715	551	700	572	730
I-95 NB off-ramp to Aramingo & Betsy Ross Bridge	1,754	2,376	1,838	2,490	1,835	2,480	1,832	2,473
I-95 SB on-ramp from Aramingo & Betsy Ross Bridge	2,527	2,224	2,587	2,277	2,585	2,274	2,618	2,303

On the I-95 ramps, build alternatives 2 thru 4 at Allegheny Avenue produce slightly higher forecast volumes for the I-95 northbound off-ramp to Allegheny Avenue (738 vehicles to 795 vehicles in the AM peak hour and 456 vehicles to 480 vehicles in the PM peak hour) versus No-Build Alternative 1 which is forecast to carry 717 vehicles in the AM peak hour and 431 vehicles in the PM peak hour. The corresponding I-95 southbound on-ramp varies by less than 15 vpd in the peak hours between the four alternatives. Relocation of the I-95 northbound on-ramp from Castor Avenue to Allegheny Avenue increases peak hour volumes on this ramp by 55 to 112

vehicles, relative to the No-Build totals of 552 and 776 vehicles from Castor Avenue in the AM and PM peaks, respectively. The northbound I-95 on-ramp is forecast to carry between 636 vehicles and 664 vehicles in the AM peak hour and 831 vehicles to 869 vehicles in the PM peak hour from the Allegheny Avenue location under alternatives 2, 3, and 4.

The southbound off-ramp, providing the opposite movement, experiences changes similar to the northbound on-ramp. Peak hour 2025 turning movements are highly affected by the concentration of I-95 ramps onto Allegheny Avenue in build alternatives 2, 3, and 4 ***(figures 8A, 8B, 9A, 9B, 10A, and 10B)***. Intersections along Allegheny Avenue are forecast to experience significantly higher volumes. This is most extreme at I-95 southbound ramps and at Richmond Street. In the PM Peak hour, traffic volume on eastbound Allegheny Avenue between Richmond Street and I-95 southbound increases well above No-Build Alternative 1 value of 814 vehicles. The Diamond (Alternative 2) increases to 1,272 vehicles, the SPUI (Alternative 3) to 1,252 vehicles, and the Northside Partial Cloverleaf (Alternative 4) to 1,512 vehicles.

The traffic increases from the I-95 southbound ramps to Richmond Street are diffused as vehicles proceed into the neighborhood streets. These gains in traffic continue on Allegheny Avenue; 80 to 180 more vehicles in each direction, depending on time of day, are forecast between Belgrade Street and Aramingo Avenue for the Diamond (Alternative 2) or the SPUI (Alternative 3) relative to No-Build. Forecast traffic on Allegheny Avenue for the Northside Partial Cloverleaf (Alternative 4) remains the highest of any build alternative, with peaks at Gaul Street (between Belgrade Street and Aramingo Avenue) of 230 more vehicles in the PM eastbound peak hour than No-Build Alternative 1, (746 vehicles total), and 165 more vehicles westbound in the AM peak hour for a total roadway volume of 580 vehicles.

Build alternatives 2, 3, and 4 remove the existing Castor Avenue I-95 northbound on-ramp in favor of northbound access from Allegheny Avenue. This greatly reduces forecast 2025 volumes on eastbound Castor Avenue at intersections with Aramingo Avenue and Richmond Street. Westbound volumes also tend to decline, but to a lesser degree. Forecast 2025 eastbound peak hour volumes on Castor Avenue between Aramingo Avenue and Richmond Street (at Thompson Street) are highest with No-Build Alternative 1 -- 434 AM peak hour vehicles and 379 PM peak hour vehicles versus the build alternatives which produce about 310 AM peak hour vehicles and 215 PM peak hour vehicles. This reduction is even more pronounced east of Richmond Street on Castor Avenue.

Figure 8A. 2025 Diamond without Delaware Avenue Extension (Alternative 2) AM/PM Peak Hour Turning Movements

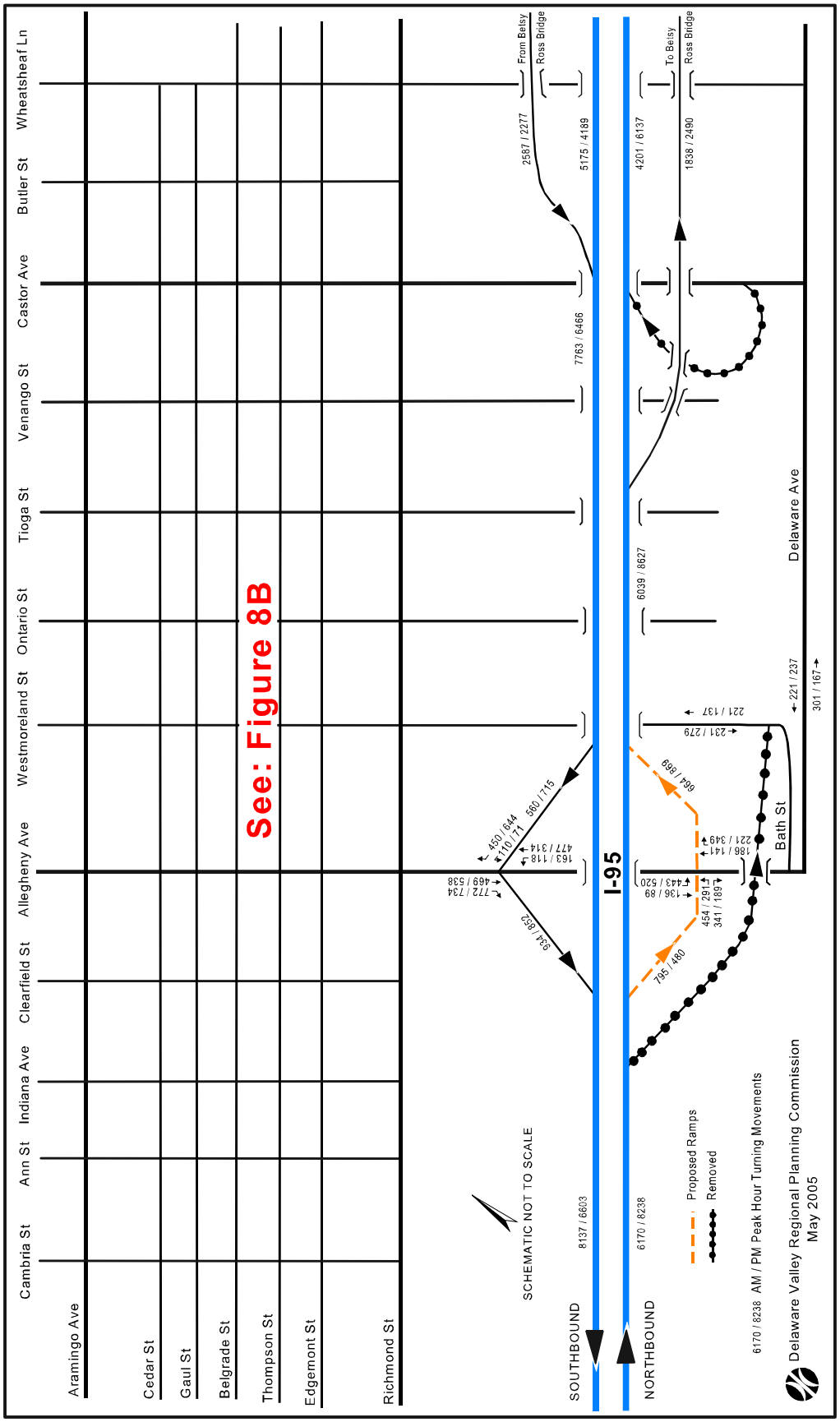
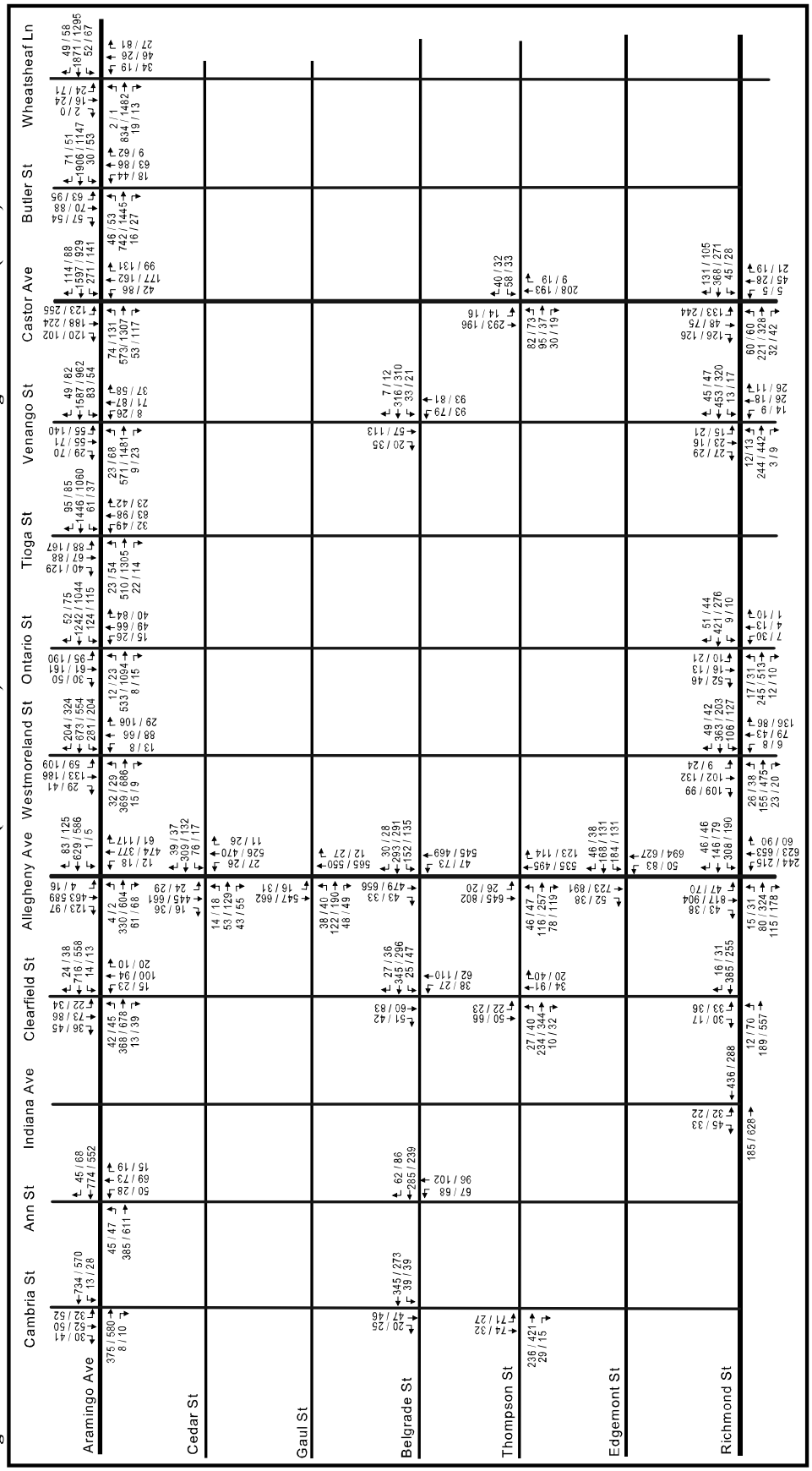


Figure 8B. 2025 Diamond without Delaware Avenue Extension (Alternative 2) AM/PM Peak Hour Turning Movements (Inset)



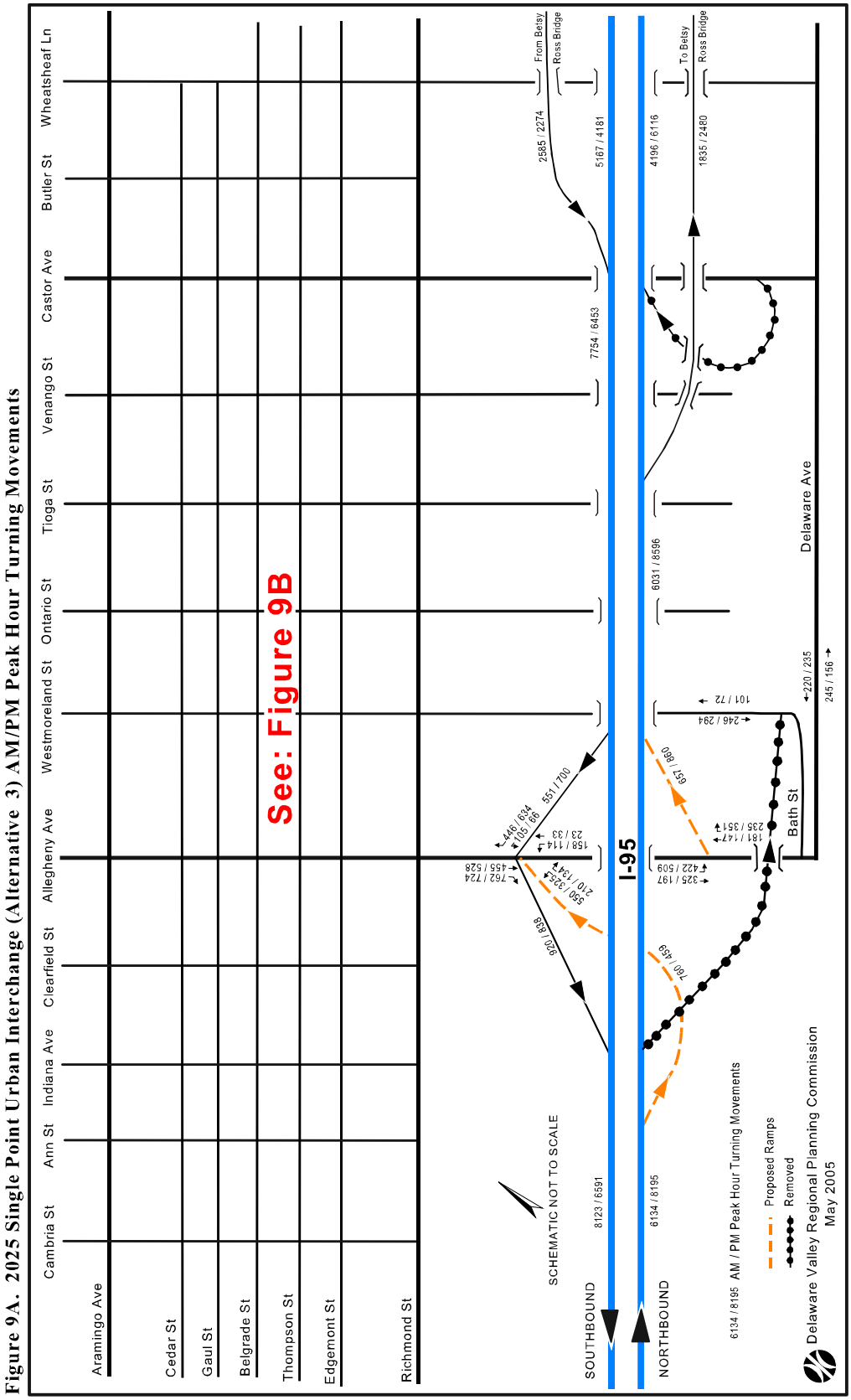


Figure 9A. 2025 Single Point Urban Interchange (Alternative 3) AM/PM Peak Hour Turning Movements

Figure 9B. 2025 Single Point Urban Interchange (Alternative 3) AM/PM Peak Hour Turning Movements (Inset)

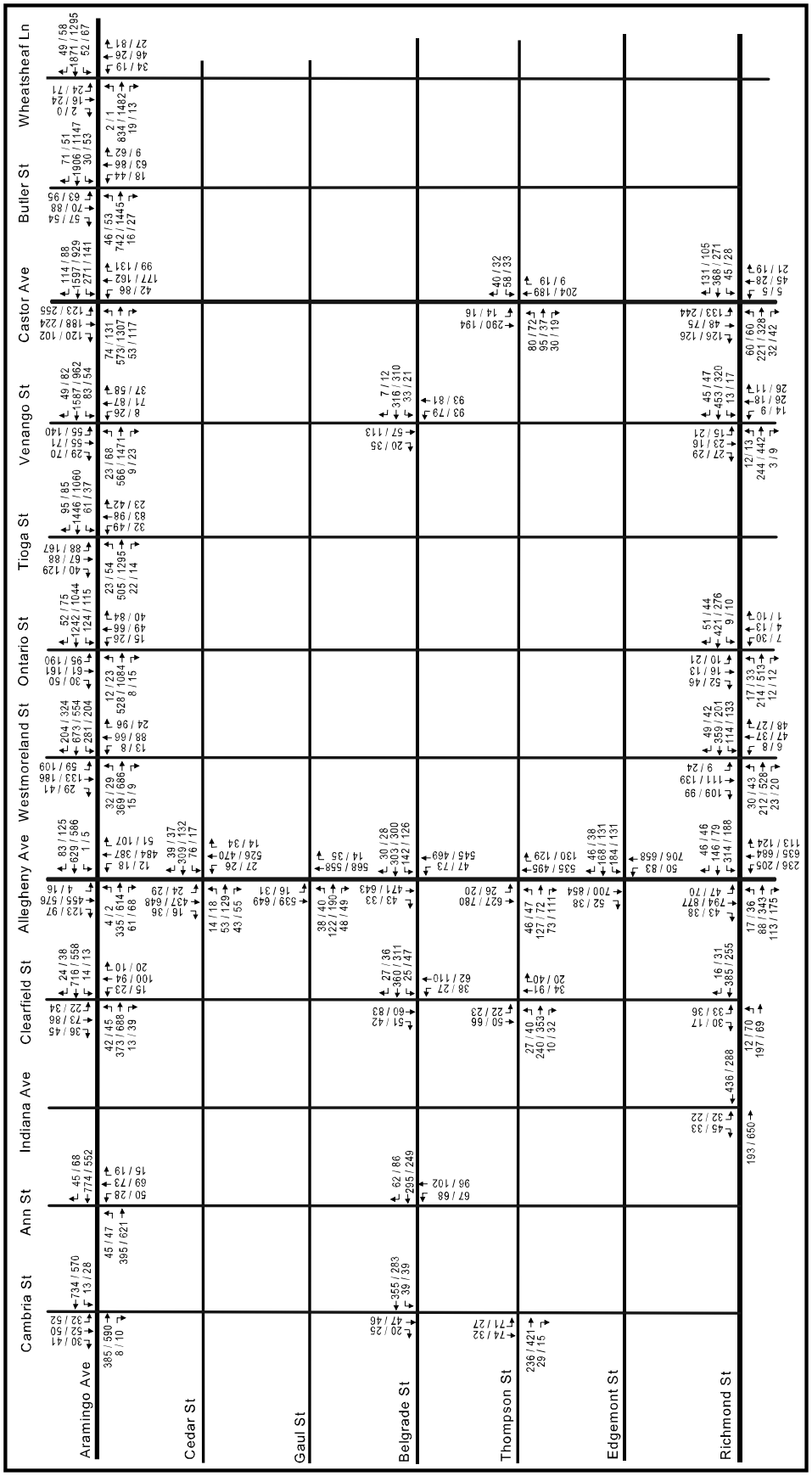


Figure 10A. 2025 Northside Partial Cloverleaf (Alternative 4) AM/PM Peak Hour Turning Movements

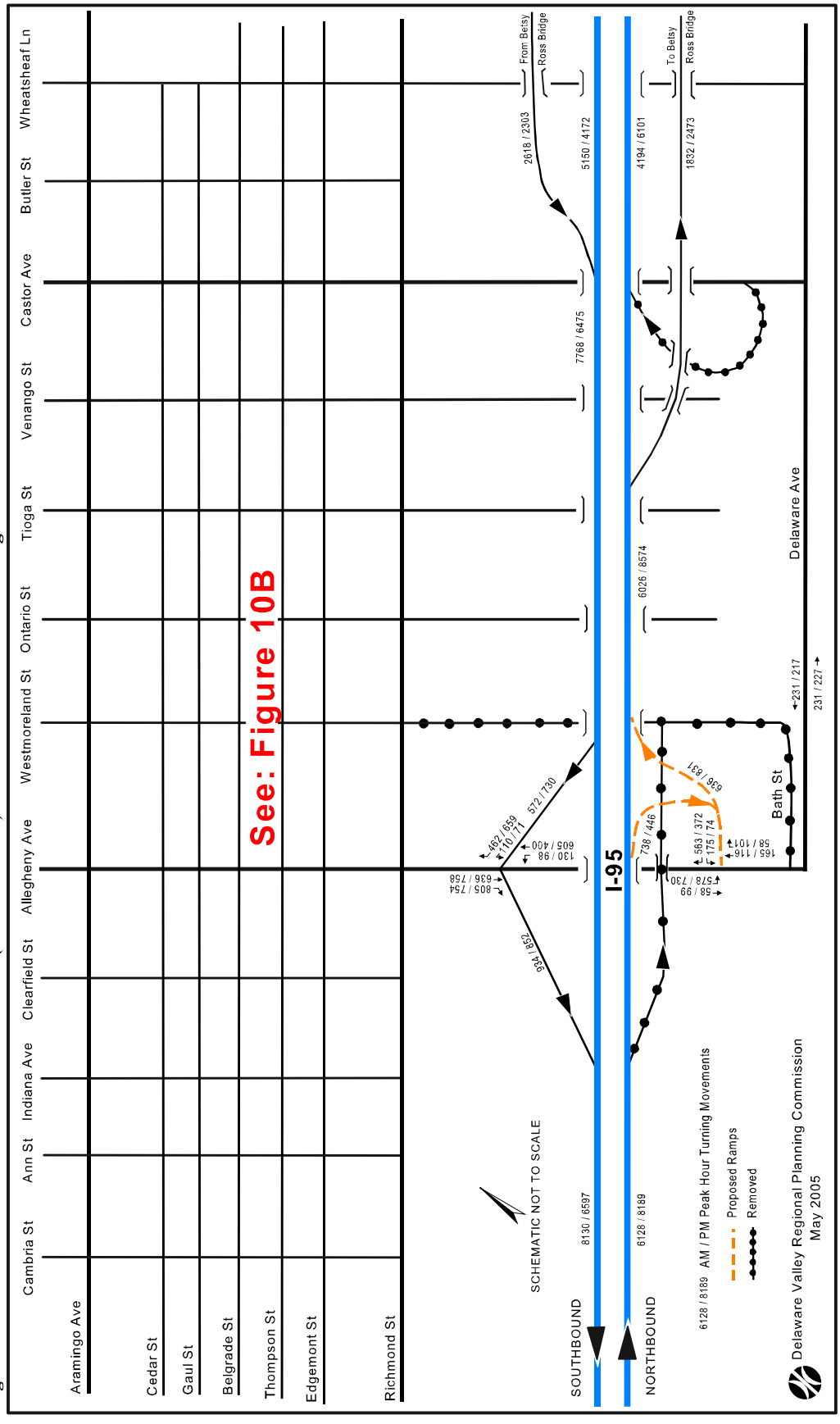
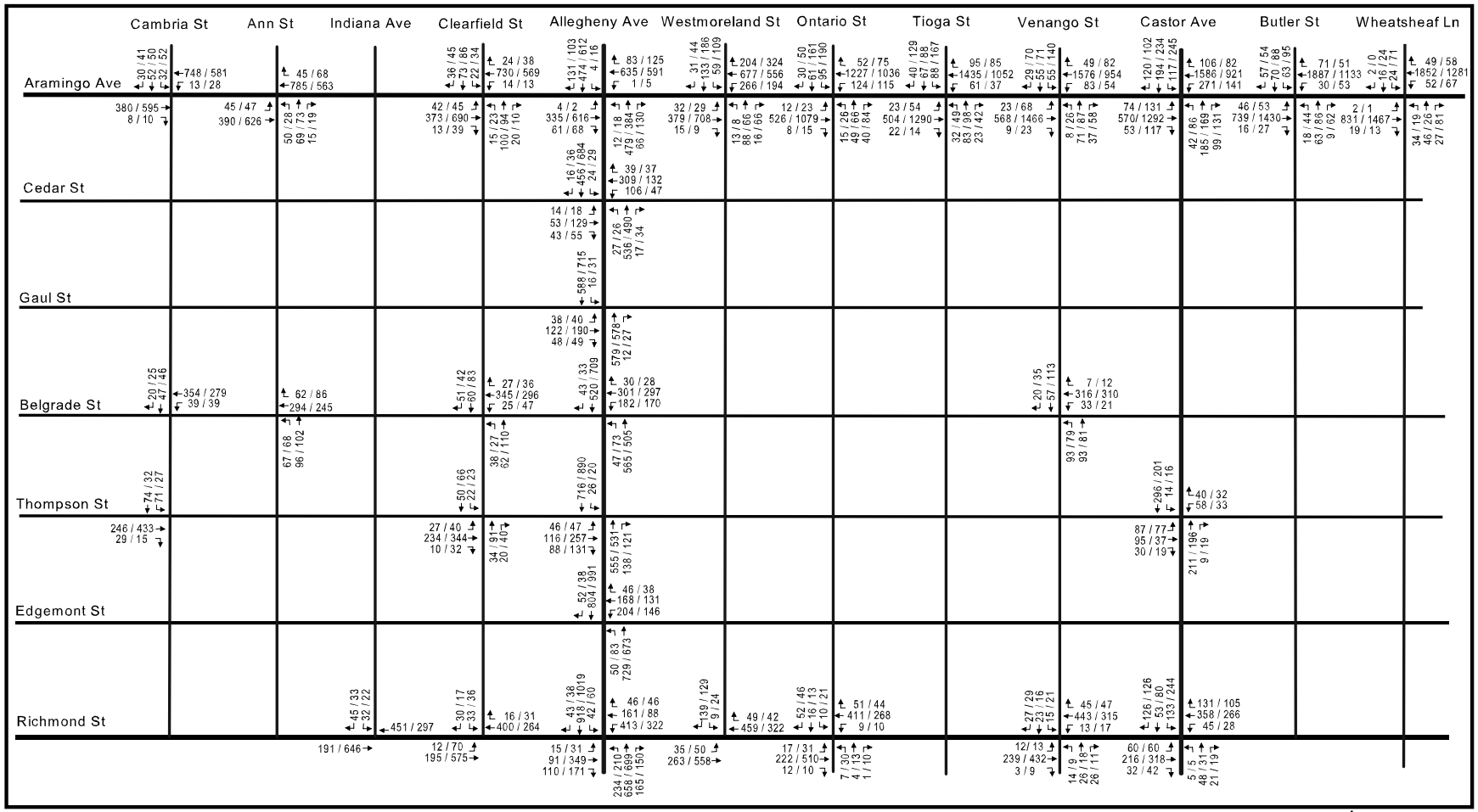


Figure 10B. 2025 Northside Partial Cloverleaf (Alternative 4) AM/PM Peak Hour Turning Movements (Inset)



Delaware Valley Regional Planning Commission
May 2005

C. Build Alternatives at Allegheny Avenue with Delaware Avenue Extension

These alternatives provide new northbound I-95 ramps to place the existing I-95 on and off-ramps using the Diamond (Alternative 2) analyzed in the Part B above and a new alternative, the Southside Partial Cloverleaf. These alternatives also include the proposed Delaware Avenue Extension from Richmond Street at Lehigh Avenue to the eastern terminus of Allegheny Avenue. Existing Richmond Street would be renamed as Delaware Avenue from Girard Avenue to Lehigh Avenue and reconstructed and realigned as required. The Northside Partial Cloverleaf and SPUI Alternative are not carried forward into this analysis. Forecasted Year 2025 daily traffic volumes are shown in ***Figure 11*** for the Diamond (Alternative 5) and in ***Figure 12*** for the Southside Partial Cloverleaf (Alternative 6) and in tabular form for both alternatives in ***Table 6***.

The inclusion of Delaware Avenue Extension **(*see Figure 11*)** from Lehigh Avenue to Allegheny Avenue generally decreases north-south volumes through residential portions of the study area, pulling traffic away from Aramingo Avenue, Richmond Street between Lehigh Avenue and Allegheny Avenue. Northbound I-95 mainline daily traffic forecasts generally decrease from Girard Avenue to Allegheny Avenue with the proposed Delaware Avenue Extension. Year 2025 forecasts for northbound I-95 decline to 106,900 vpd for the Diamond (Alternative 5) and 107,300 vpd for the Southside Partial Cloverleaf (Alternative 6). This is comparable to 108,100 vpd forecast for 2025 under the Diamond without Delaware Avenue and 107,400 under the Southside Partial Cloverleaf without the extension. The No-Build Alternative carried 107,200 Northbound in 2025 without Delaware Avenue Extension. Going southbound on I-95 from Allegheny to Girard, the results are comparable with 105,500 vpd forecast in 2025 for both the Diamond and Southside Partial Cloverleaf with Delaware Avenue Extension alternatives. This is a 700 vpd decrease from the Diamond (Alternative 2), 1900 vpd decrease from Southside Partial Cloverleaf (Alternative 6), and 800 vpd less than the No-Build (Alternative 1) all without Delaware Avenue Extension.

Forecast northbound traffic volume to the Betsy Ross Bridge and Aramingo Avenue off-ramps is 30,500 vpd and 30,300 vpd for the Diamond with Delaware Avenue Extension and Southside Partial Cloverleaf Alternatives, respectively. This compares to 29,000 with and 29,200 vpd for the No-Build with and without the Delaware Avenue Extension (alternatives 7 and 1). Much of this growth is a consequence of improved access to the Betsy Ross Bridge via the proposed northbound on-ramp to I-95 from Allegheny Avenue. Southbound on-ramp volume differences, from the Betsy Ross Bridge and Aramingo Avenue to I-95, are less pronounced, with 29,700 vpd and 29,600 vpd for the Diamond with Delaware Avenue Extension and Southside Partial Cloverleaf Alternatives, respectively. This is only slightly higher than the 29,100 vpd forecast for the No-Build Alternative 1, without Delaware Avenue Extension.

At Allegheny Avenue, changes on I-95 ramps due to introduction of Delaware Avenue Extension are minimal volume. The largest change is a reduction to 10,500 vpd for the I-95 northbound off-ramp and to 11,600 vpd southbound on-ramp for the Diamond Alternative with Delaware Avenue. This is 700 vpd less on each ramp than the same 2025 forecast locations for

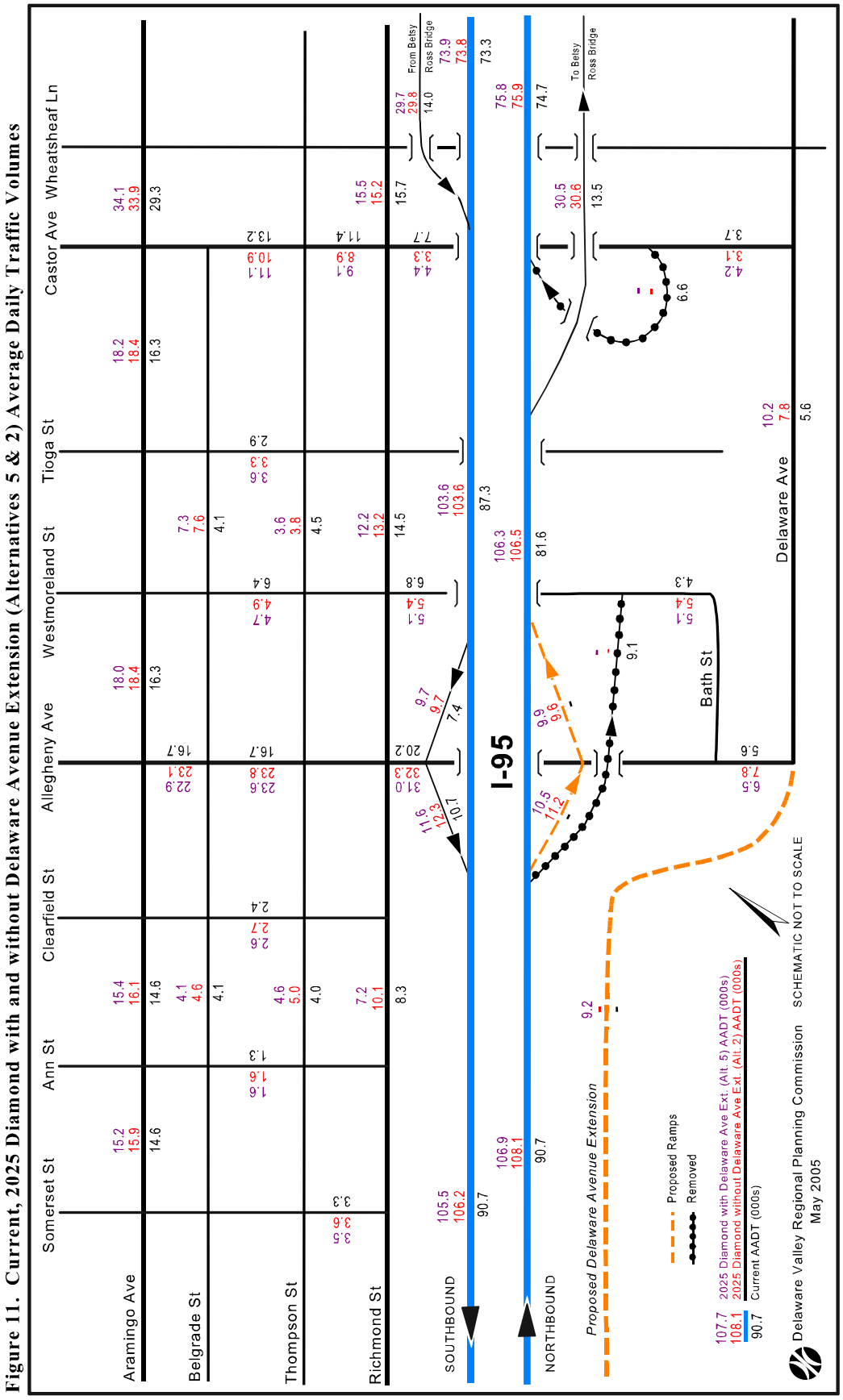


Figure 11. Current, 2025 Diamond with and without Delaware Avenue Extension (Alternatives 5 & 2) Average Daily Traffic Volumes

Figure 12. Current, 2025 Diamond with Delaware Ave Ext., and 2025 Southside Partial Cloverleaf (Alts. 5 and 6) Average Daily Traffic Volumes

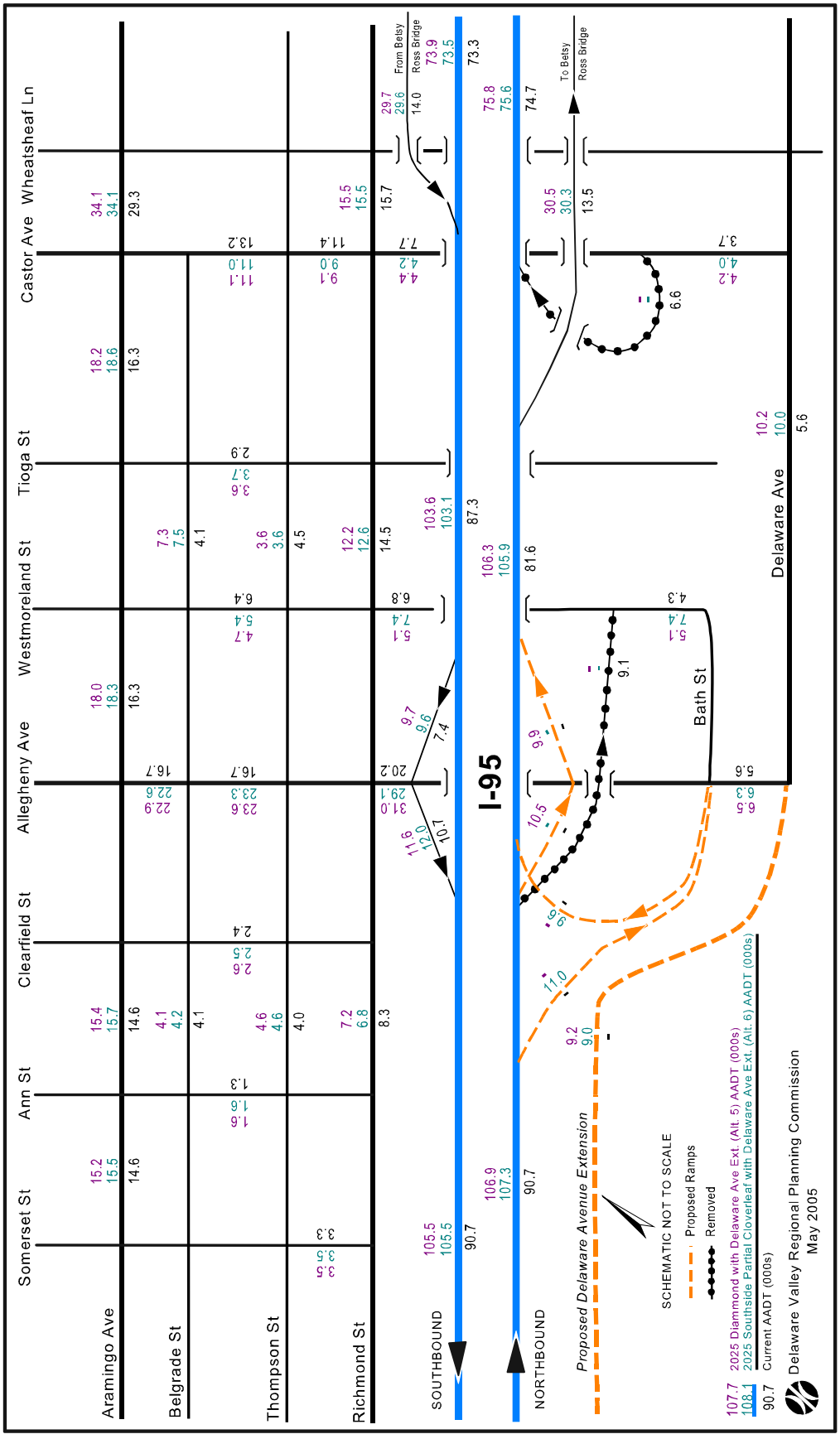


Table 6. Current, and 2025 Forecast for the No-Build with Delaware Ave. Ext. (Alt.7), Diamond with Delaware Ave. Ext. (Alt. 5) and Southside Partial Cloverleaf (Alt. 6) Average Daily Traffic Volumes

Highway Facility	Location From	To	Current Traffic Count	Alt. 7 2025 No-Build w/ Del. Ave.	Alt. 7 No-Bld w/ Del. Ave Versus Current Diff.	Alt. 7 No-Bld w/ Del. Ave Versus Current % Dff.	Alt. 5 2025 Diamond w/ Del Ave	Alt. 5 Diamond w/ Del. Ave. Versus Current Diff.	Alt. 5 Diamond w/ Del. Ave. Versus Current % Dff.	Alt. 6 2025 Southside Part Clov.	Alt. 6 Southside Part. Clo Versus Current Diff.	Alt. 6 Southside Part. Clo Versus Current % Dff.
I-95 Mainline												
I-95 NB*	Aramingo Ave.	Allegheny Ave.	90,700	105,800	15,100	16.6%	106,900	16,200	17.9%	107,300	16,600	18.3%
I-95 SB*	Aramingo Ave.	Allegheny Ave.	90,700	105,100	14,400	15.9%	105,500	14,800	16.3%	105,500	14,800	16.3%
I-95 NB*	Alegheny Ave.	Castor Ave.	81,640	96,400	14,760	18.1%	106,300	24,660	30.2%	105,900	24,260	29.7%
I-95 SB*	Alegheny Ave.	Castor Ave.	87,319	102,400	15,081	17.3%	103,600	16,281	18.6%	103,100	15,781	18.1%
I-95 NB*	Castor Ave.	Bridge St.	74,716	75,700	984	1.3%	75,800	1,084	1.5%	75,600	884	1.2%
I-95 SB*	Betsy Ross Bridge	Allegheny Ave.	73,319	73,300	-19	0.0%	73,900	581	0.8%	73,500	181	0.2%
I-95 Ramps												
I-95 NB Off-ramp	I-95	Westmoreland St. or Allegheny Ave.	9,060	9,400	340	3.8%	10,500	1,440	15.9%	11,000	1,940	21.4%
I-95 SB On-ramp	I-95	Allegheny Ave.	10,748	11,700	952	8.9%	11,600	852	7.9%	12,000	1,252	11.6%
I-95 NB On-ramp	I-95	Allegheny Ave.	n/a	n/a	n/a	n/a	9,900	3,322	50.5%	9,600	3,022	45.9%
I-95 NB On-ramp	I-95	Castor Ave.	6,578	8,300	1,722	26.2%	n/a	n/a	n/a	n/a	n/a	n/a
I-95/Betsy Ross Brdg	Betsy Ross Brdg NB On-ramp	Castor Ave.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
I-95 SB Off-ramp	I-95	Allegheny Ave.	7,367	9,000	1,633	22.2%	9,700	2,333	31.7%	9,600	2,233	30.3%
I-95 NB Off-ramp	I-95	Aramingo Ave./Betsy Ross Bridge	13,502	29,000	15,498	114.8%	30,500	16,998	125.9%	30,300	16,798	124.4%
I-95 NB Off-ramp	Castor Ave.	Betsy Ross Bridge	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
I-95 SB On-ramp	I-95	Aramingo Ave./Betsy Ross Bridge	14,000	29,100	15,100	107.9%	29,700	15,700	112.1%	29,600	15,600	111.4%
Sub-total			**559,649**	**655,200**	**95,551**	**17.1%**	**673,900**	**114,251**	**20.4%**	**673,000**	**113,351**	**20.3%**
Crossing Streets												
Somerset St.	Belgrade St.	Thompson St.	3,265	3,300	35	1.1%	3,500	235	7.2%	3,500	235	7.2%
Ann St.	Belgrade St.	Thompson St.	1,343	1,500	157	11.7%	1,600	257	19.1%	1,600	257	19.1%
Clearfield St.	Belgrade St.	Thompson St.	2,400	2,600	200	8.3%	2,600	200	8.3%	2,500	100	4.2%
Allegheny Ave.	Aramingo Ave.	Belgrade St.	16,685	17,800	1,115	6.7%	22,900	6,215	37.2%	22,600	5,915	35.5%
Allegheny Ave.	Belgrade St.	Thompson St.	16,685	17,600	915	5.5%	23,600	6,915	41.4%	23,300	6,615	39.6%
Allegheny Ave.	Richmond St.	I-95 SB ramps	20,198	20,600	402	2.0%	31,000	10,802	53.5%	29,100	8,902	44.1%
Allegheny Ave.	Bath St.	Delaware Ave.	5,614	5,800	186	3.3%	6,500	886	15.8%	6,300	686	12.2%
Westmoreland St.	Belgrade St.	Thompson St.	6,427	6,400	-27	-0.4%	4,700	-1,727	-26.9%	5,400	-1,027	-16.0%
Westmoreland St.	Richmond St.	I-95	6,841	7,600	759	11.1%	5,100	-1,741	-25.4%	7,400	559	8.2%
Westmoreland St.**	I-95	Bath St.	4,300	4,400	100	2.3%	5,100	800	18.6%	7,400	3,100	72.1%
Tioga St.	Belgrade St.	Thompson St.	2,946	3,100	154	5.2%	3,600	654	22.2%	3,600	654	22.2%
Castor Ave.	Aramingo Ave.	Thompson St.	13,224	12,400	-824	-6.2%	11,100	-2,124	-16.1%	11,000	-2,224	-16.8%
Castor Ave.	Thompson St.	Richmond St.	11,355	10,300	-1,055	-9.3%	9,100	-2,255	-19.9%	9,000	-2,355	-20.7%
Castor Ave.	Richmond St.	I-95 ramp	7,678	8,100	422	5.5%	4,400	-3,278	-42.7%	4,200	-3,478	-45.3%
Castor Ave.	I-95 ramp	Delaware Ave.	3,720	5,300	1,580	42.5%	4,200	480	12.9%	4,000	280	7.5%
Sub-total			**122,681**	**126,800**	**4,119**	**3.4%**	**139,000**	**16,319**	**13.3%**	**140,900**	**18,219**	**14.9%**
Parallel Streets												
Aramingo Ave.	Somerset St.	Ann St.	14,646	15,500	854	5.8%	15,200	554	3.8%	15,500	854	5.8%
Aramingo Ave.	Ann St.	Allegheny Ave.	14,646	15,600	954	6.5%	15,400	754	5.1%	15,700	1,054	7.2%
Aramingo Ave.	Allegheny Ave.	Tioga St.	16,276	17,900	1,624	10.0%	18,000	1,724	10.6%	18,300	2,024	12.4%
Aramingo Ave.	Tioga St.	Castor Ave.	16,276	18,100	1,824	11.2%	18,200	1,924	11.8%	18,600	2,324	14.3%
Aramingo Ave.	Castor Ave.	Aramingo Ave. Connector	29,265	34,200	4,935	16.9%	34,100	4,835	16.5%	34,100	4,835	16.5%
Belgrade St.	Clearfield St.	Ann St.	4,098	4,300	202	4.9%	4,100	2	0.0%	4,200	102	2.5%
Belgrade St.	Tioga St.	Westmoreland St.	4,145	5,600	1,455	35.1%	7,300	3,155	76.1%	7,500	3,355	80.9%
Thompson St.	Ann St.	Clearfield St.	4,023	4,000	-23	-0.6%	4,600	577	14.3%	4,600	577	14.3%
Thompson St.	Westmoreland St.	Tioga St.	4,485	5,000	515	11.5%	3,600	-885	-19.7%	3,600	-885	-19.7%
Richmond St.	Ann St.	Clearfield St.	8,308	7,300	-1,008	-12.1%	7,200	-1,108	-13.3%	6,800	-1,508	-18.2%
Richmond St.**	Westmoreland St.	Tioga St.	14,454	13,700	-754	-5.2%	12,200	-2,254	-15.6%	12,800	-1,654	-11.4%
Richmond St.	Castor Ave.	Wheatsheaf Lane	15,673	15,300	-373	-2.4%	15,500	-173	-1.1%	15,500	-173	-1.1%
Delaware Ave.	Allegheny Ave.	Richmond St.	n/a	7,800	n/a	n/a	9,200	n/a	n/a	10,000	n/a	n/a
Delaware Ave.	Allegheny Ave.	Venango St.	5,614	10,800	5,186	92.4%	10,200	4,586	81.7%	9,000	3,386	60.3%
Sub-total			**151,909**	**175,100**	**15,391**	**10.1%**	**174,800**	**13,691**	**9.0%**	**176,200**	**14,291**	**9.4%**
TOTAL			**834,239**	**957,100**	**115,061**	**13.8%**	**987,700**	**144,261**	**17.3%**	**990,100**	**145,861**	**17.5%**

* Counts dirived by flowing nearby counts ** estimated by consultant TMC

the Diamond without Delaware Avenue Extension. The Southside Partial Cloverleaf (Alternative 6) forecasts at Allegheny Avenue are slightly higher at 11,000 vpd for the I-95 northbound off-ramp and 12,000 vpd for the I-95 southbound on-ramp. Forecasted volumes to and from the north are very similar to the Diamond without Delaware Avenue (Alternative 2). With the Delaware Avenue Extension, the proposed I-95 northbound on-ramp and existing I-95 southbound off-ramp at Allegheny Avenue vary by less than 300 vpd for both the Southside Partial Cloverleaf (9,600 vpd northbound and 9,600 vpd southbound) and Diamond (9,900 vpd northbound and 9,700 vpd southbound) alternatives from these alternatives without the Delaware Avenue Extension. For the Diamond and Southside Partial Cloverleaf alternatives with Delaware Avenue Extension, ramps to and from the Betsy Ross Bridge change less than 300 vpd relative to without the proposed extension. With the introduction of Delaware Avenue, these ramps are forecast to carry 29,600 vpd to 29,700 vpd southbound onto I-95, with 30,300 vpd to 30,500 vpd northbound from I-95.

The Southside Partial Cloverleaf (Alternative 6) and Diamond (Alternative 5), both with Delaware Avenue Extension, test the impact of completing Delaware Avenue on the neighborhood street network in Port Richmond while proposing that all I-95 ramps be at Allegheny Avenue. In addition, the Southside Partial Cloverleaf Alternative aligns both northbound ramps to connect directly to Westmoreland Street via Bath Street in an attempt to reduce traffic along Allegheny Avenue. Each of these changes has specific impacts on neighborhood circulation. First, the completion of Delaware Avenue significantly decreases the 2025 forecast AADT on Richmond Street, particularly south of Allegheny Avenue. The forecast No-Build without Delaware Avenue Extension (Alternative 1) 2025 AADT at this location is 9,300 vpd, and the Diamond without Delaware Avenue Extension (Alternative 2) 2025 forecast AADT is 10,100 vpd. In contrast the forecast 2025 AADT on Richmond Street south of Allegheny Avenue is 6,800 vpd for the Southside Partial Cloverleaf Alternative and 7,200 vpd for the Diamond with Delaware Avenue Extension Alternative. This substantial reduction in travel is offset by usage of the proposed Delaware Avenue Extension between Richmond Street at Lehigh Avenue and Allegheny Avenue; a total of 6,800 vpd for the Southside Partial Cloverleaf and 7,200 vpd for the Diamond with Delaware Avenue Extension (Alternative 5). This usage is also reflected in forecasts for Delaware Avenue from Allegheny Avenue to Castor Avenue, and Castor Avenue from Richmond Street to Delaware Avenue. With the Delaware Avenue Extension, the 2025 forecast AADT for the existing AFC segment of Delaware Avenue rises to 10,000 vpd and 10,200 vpd, versus 7,000 vpd for the No-Build Alternative 1 and 7,800 vpd for the Diamond without Delaware Avenue Extension (Alternative 2). Forecast AADT on Castor Avenue between Richmond Street and Delaware Avenue with Delaware Avenue increases just over 1,000 vpd more than the No-Build and Diamond without Delaware Avenue Extension (alternatives 1 and 2); for a total of 4,000 to 4,400 vpd, depending on the location and ramp configuration.

The second major change in forecast 2025 traffic volume applies to Allegheny Avenue, Westmoreland Street, and Bath Street, particularly under the Southside Partial Cloverleaf (Alternative 6). Under the Diamond with Delaware Avenue Extension (Alternative 5),

completion of Delaware Avenue reduces forecast AADT on Allegheny Avenue between I-95 and Richmond Street to 31,000 vpd from 32,300. This reduction of 1,300 vpd also applies to Allegheny Avenue between Bath Street and Delaware Avenue, with a forecast of 6,500 vpd. However, traffic volume on Allegheny Avenue west of Richmond Street changes minimally between the Diamond alternatives (2 and 5) with and without Delaware Avenue Extension. With the Southside Partial Cloverleaf Alternative and realignment of northbound ramps onto Westmoreland Street via Bath Street, forecast 2025 usage of these two roads from Allegheny Avenue to Richmond Street rises to 7,400 vpd, an increase of 2,000 over the Diamond without Delaware Avenue Extension (Alternative 2) and 2,600 vpd over the No-Build without Delaware Avenue Extension (Alternative 1). This is balanced by a decrease in forecast traffic along Allegheny Avenue between I-95 and Richmond Street – to 29,100 vpd under the Southside Partial Cloverleaf (Alternative 6) some 3,200 less than the Diamond without Delaware Avenue Extension (Alternative 2), but still 7,100 vpd more than the No-Build without Delaware Avenue Extension (Alternative 1). This is the lowest forecast volume amongst alternatives consolidating I-95 access at Allegheny Avenue.

For the Southside Partial Cloverleaf (Alternative 6), Allegheny Avenue west of Richmond street is forecast to have about 22,600 to 23,300 vpd; about 500 less than the Diamond without Delaware Avenue Extension (Alternative 2). East of Bath Street, 2025 forecast AADT on Allegheny Avenue is 6,300 vpd for the Southside Partial Cloverleaf (Alternative 6), 700 vpd and 1,500 vpd fewer than for No-Build Alternative 1and the Diamond without Delaware Avenue Extension (Alternative 2). The remainder of neighborhood links vary by less than 500 vpd between the Southside Partial Cloverleaf (Alternative 6), and the Diamond Alternative with and without Delaware Avenue Extension.

Table 7 shows peak hour mainline and ramp flows for the build alternatives (5 and 6) at Allegheny Avenue with Delaware Avenue Extension and for comparison purposes, the No-Build and Diamond Alternatives (1 and 2) without Delaware Avenue Extension. The Diamond with Delaware Avenue Extension (Alternative 5) and Southside Partial Cloverleaf (Alternative 6), both including the Delaware Avenue Extension, reduce peak direction I-95 mainline flows relative to No-Build and Diamond alternatives (1 and 2) without Delaware Avenue Extension. In general the reductions in volume on I-95 due to build alternatives (5 and 6) at Allegheny Avenue with Delaware Avenue Extension are around 100 vehicles in the peak hour for the peak direction. One exception is northbound I-95 from Allegheny Avenue to the Betsy Ross Bridge where relocating the I-95 northbound on-ramp contributes to an increase in the forecast 2025 peak hour volume of about 820 vehicles relative to the No-Build without Delaware Avenue Extension (Alternative 1). However, the PM peak hour 2025 forecast for build alternatives at Allegheny Avenue (5 and 6) with Delaware Avenue Extension fall short of the Diamond without Delaware Avenue Extension (Alternative 2) on I-95 northbound between Allegheny Avenue and the Betsy Ross Bridge by 45 vehicles at 8,582 vehicles for the Diamond with Delaware Avenue Extension (Alternative 5) and 72 vehicles at 8,555 for the Southside Partial Cloverleaf (Alternative 6). For northbound I-95 exiting the study area at Frankford Creek, forecast peak hour volumes decline slightly with either build alternative (5 or 6) at Allegheny Avenue with

Delaware Avenue Extension , less than 100 vehicles, relative to the No-Build without Delaware Avenue Extension (Alternative 1). Entering the study area from the north, on I-95 southbound, variance in 2025 peak hour forecasts between No-Build and Diamond alternatives without Delaware Avenue Extension (1 and 2) and build alternatives at Allegheny Avenue with Delaware Avenue Extension (Alternatives 5 and 6) is no more than 40 vehicles in the peak hours. Forecast 2025 peak hour flows for ramps to and from the Betsy Ross Bridge vary little between the alternatives (2, 3, 5 and 6) which concentrate access at Allegheny Avenue, with a

Table 7. 2025 Forecast Peak Hour Flows on I-95 Mainline and Ramps for Build Alternatives at Allegheny Avenue with Delaware Avenue Extension Versus the No-Build and Diamond Alternatives without Delaware Ave Extension

	Alt. 1 No-Build w/o Delaware Ave.		Alt. 2 Diamond w/o Delaware Ave.		Alt. 5 Diamond with Delaware Ave.		Alt. 6 Southside Partial Cloverleaf	
Location	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
I-95 Mainline								
I-95 NB- Girard Ave to Allegheny Ave	6,092	8,209	6,170	8,238	6,111	8,136	6,134	8,166
I-95 SB- Girard Ave to Allegheny Ave	8,121	6,620	8,137	6,603	8,073	6,569	8,073	6,569
I-95 NB- Allegheny Ave to Castor Ave	5,375	7,778	6,039	8,627	6,050	8,582	6,005	8,555
I-95 SB- Allegheny Ave to Castor Ave	7,689	6,404	7,763	6,466	7,753	6,481	7,715	6,441
I-95 NB- Castor Ave to Bridge Street	4,173	6,178	4,201	6,137	4,212	6,092	4,182	6,079
I-95 SB- Betsy Ross Bridge to Allegheny Ave	5,162	4,180	5,175	4,189	5,166	4,204	5,135	4,171
I-95 Ramps								
I-95 NB off-ramp to Westmoreland St	717	431	n/a	n/a	n/a	n/a	n/a	n/a
I-95 NB off-ramp to Allegheny Ave	n/a	n/a	795	480	745	450	790	480
I-95 SB on-ramp from Allegheny Ave	924	843	934	852	880	803	912	834
I-95 NB on-ramp from Allegheny Ave	n/a	n/a	664	869	684	896	661	869
I-95 NB on-ramp from Castor Ave	552	776	n/a	n/a	n/a	n/a	n/a	n/a
I-95 SB off-ramp to Allegheny Ave	492	627	560	715	560	715	554	706
I-95 NB off-ramp to Aramingo & Betsy Ross Bridge	1,754	2,376	1,838	2,490	1,838	2,490	1,823	2,476
I-95 SB on-ramp from Aramingo & Betsy Ross Bridge	2,527	2,224	2,587	2,277	2,587	2,277	2,580	2,270

spread of only 14 vehicles (2,476 vehicles to 2,490 vehicles) northbound and 7 vehicles (2,270 vehicles to 2,277 vehicles) southbound. Each of these traffic volumes is about 50 peak hour vehicles higher than the No-Build without Delaware Avenue Extension (Alternative 1) for the southbound on-ramp and 100 higher for the I-95 northbound off-ramp. Ramps to and from I-95 primarily decline with the introduction of Delaware Avenue. This is most pronounced for the I-95 southbound on-ramp from Allegheny Avenue which declines by 40 to 50 vehicles in each of the AM and PM peak hours from either build alternative (5 or 6) at Allegheny Avenue with Delaware Avenue Extension to either the No-Build or Diamond Alternative without Delaware Avenue Extension (Alternatives 1 and 2).

Forecast AM and PM peak hour usage of the I-95 northbound off-ramp to Allegheny Avenue declines relative to Alternative 2 the Diamond without Delaware Avenue (795 AM peak hour vehicles and 480 PM peak hour vehicles) for Alternative 5 the Diamond with Delaware Avenue (745 AM peak hour vehicles and 450 PM peak hour vehicles). Forecast AM peak hour volumes increase for Alternative 6 the Southside Partial Cloverleaf , (790 AM peak hour vehicles and 480 PM peak hour vehicles). However, all of these forecasts for the I-95 northbound off-ramp at Allegheny Avenue to are higher than those for the I-95 northbound off-ramp to Westmoreland Street given the Alternative 1 No-Build without Delaware Avenue Extension (717 AM peak hour vehicles and 431 PM peak hour vehicles). For I-95 ramps to and from the north at Allegheny Avenue, changes in forecast peak hour between the Diamond without Delaware Avenue Extension (Alternative 2) and either build alternative at Allegheny Avenue with Delaware Avenue Extension (Alternatives 5 or 6) are minimal; 50 vehicles or less in all cases. However, forecast peak hour volumes for each of these ramps are between 62 vehicles and 120 vehicles higher than for the No-Build without Delaware Avenue (Alternative 1).

For build alternatives at Allegheny Avenue with Delaware Avenue, many local intersections are relieved as usage of Delaware Avenue pulls some traffic from the Port Richmond neighborhood. Peak hour volumes are shown in ***figures 13A and 13B*** for the Diamond with Delaware Avenue Extension (Alternative 5), and ***figures 14A and 14B*** for the Southside Partial Cloverleaf (Alternative 6). Future volumes on existing Delaware Avenue are forecast at two-way AM peak hour volume of 522 vehicles and a two-way PM peak hour volume of 404 vehicles for the Diamond without Delaware Avenue Extension (Alternative 2). However, these values rise to 751 AM peak vehicles and 661 PM peak vehicles for the Diamond with Delaware Avenue Extension (Alternative 5). For the Diamond with Delaware Avenue Extension (Alternative 5), the proposed Delaware Avenue Extension is used by 731 AM peak vehicles and 689 PM peak vehicles. Results for the Southside Partial Cloverleaf (Alternative 6) on Delaware Avenue are very similar with 2025 forecast two-way AM peak hour volumes of 733 vehicles north of Allegheny Avenue, and 720 vehicles on the proposed extension and with 2025 forecast two-way PM peak hour volumes of 648 vehicles north of Allegheny Avenue, and 677 vehicles on the proposed extension.

Figure 13A. 2025 Diamond with Delaware Avenue Extension (Alternative 5) AM/PM Peak Hour Turning Movements

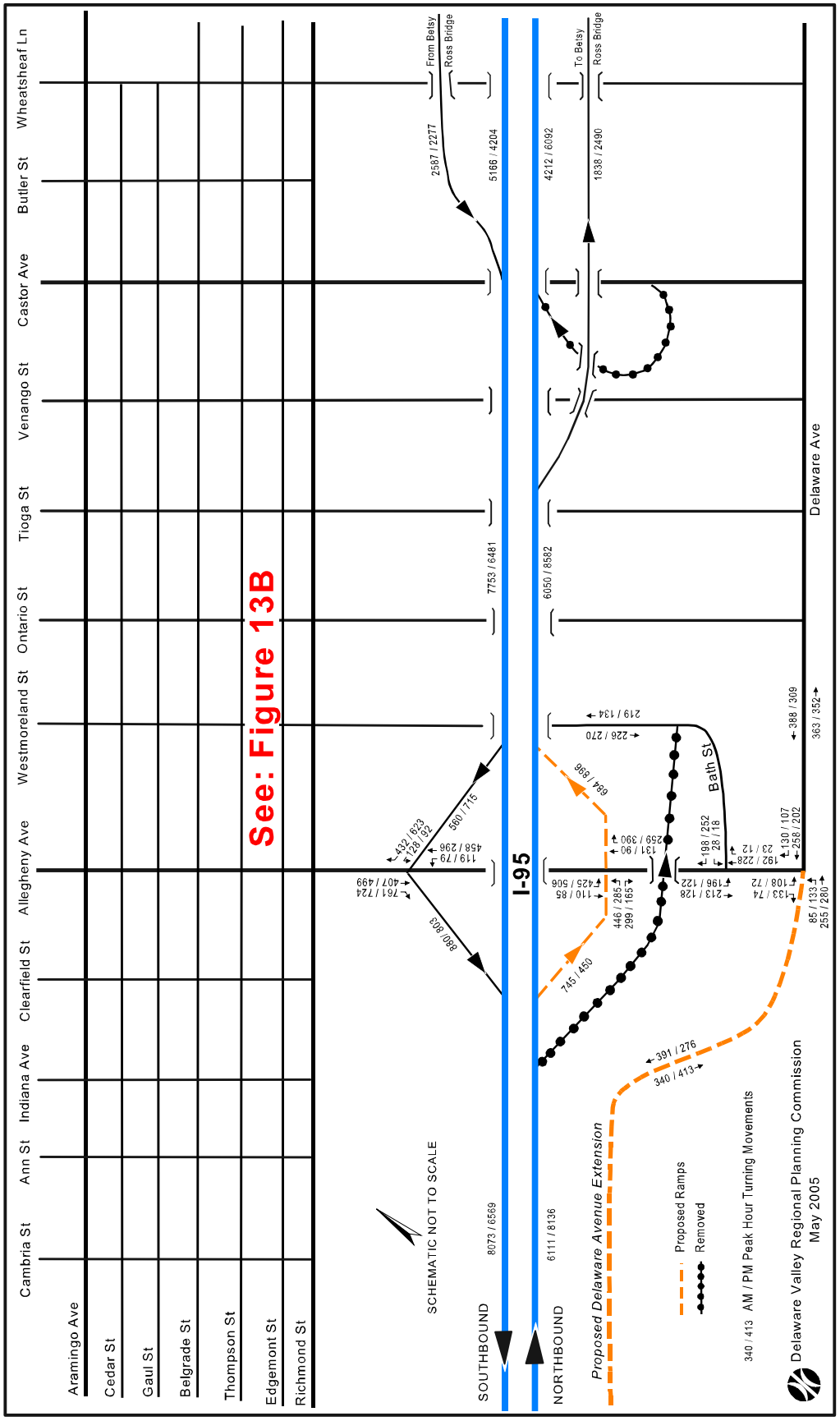


Figure 13B. 2025 Diamond with Delaware Avenue Extension (Alternative 5) AM/PM Peak Hour Turning Movements (Inset)

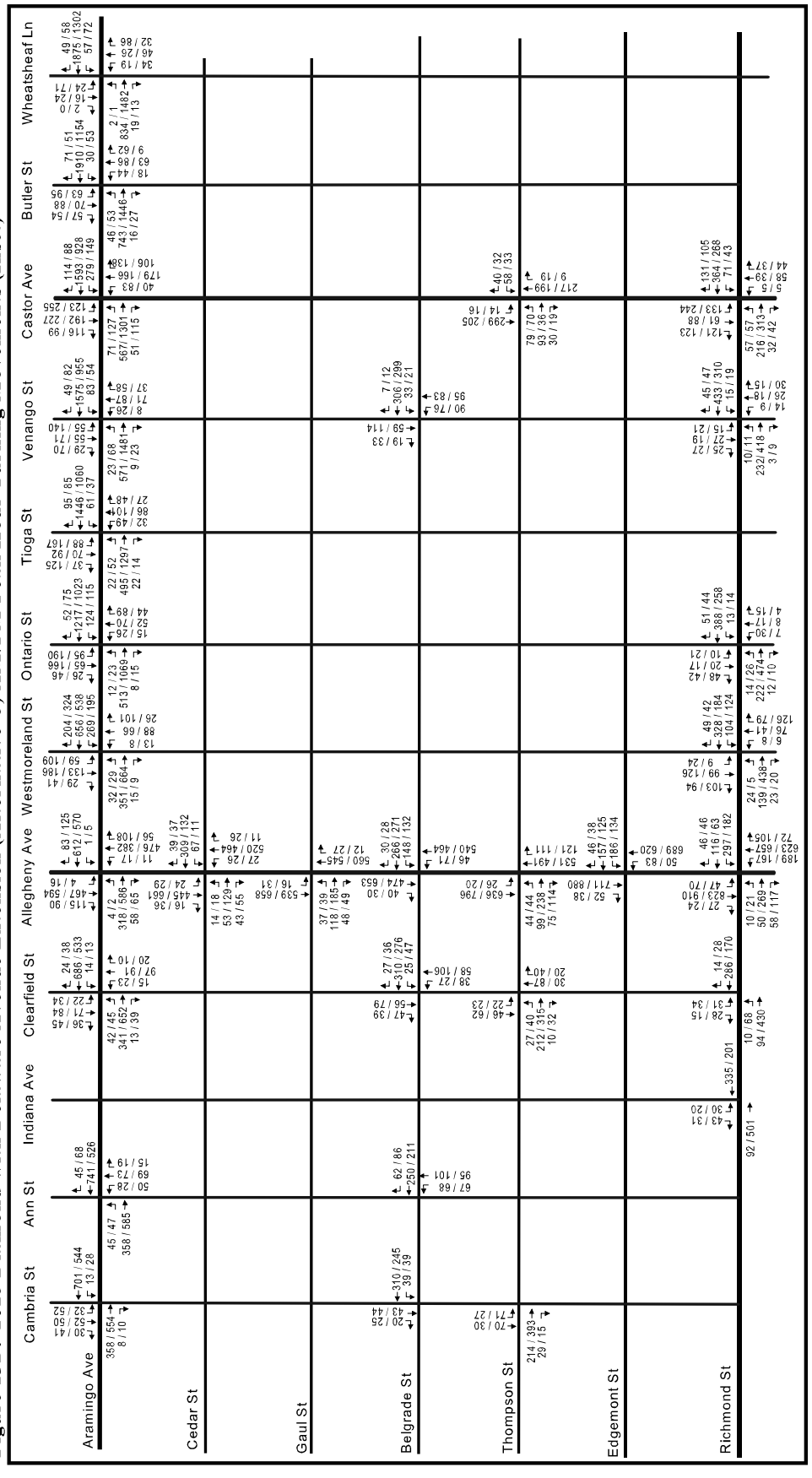


Figure 14A. 2025 Southside Partial Cloverleaf (Alternative 6) AM/PM Peak Hour Turning Movements

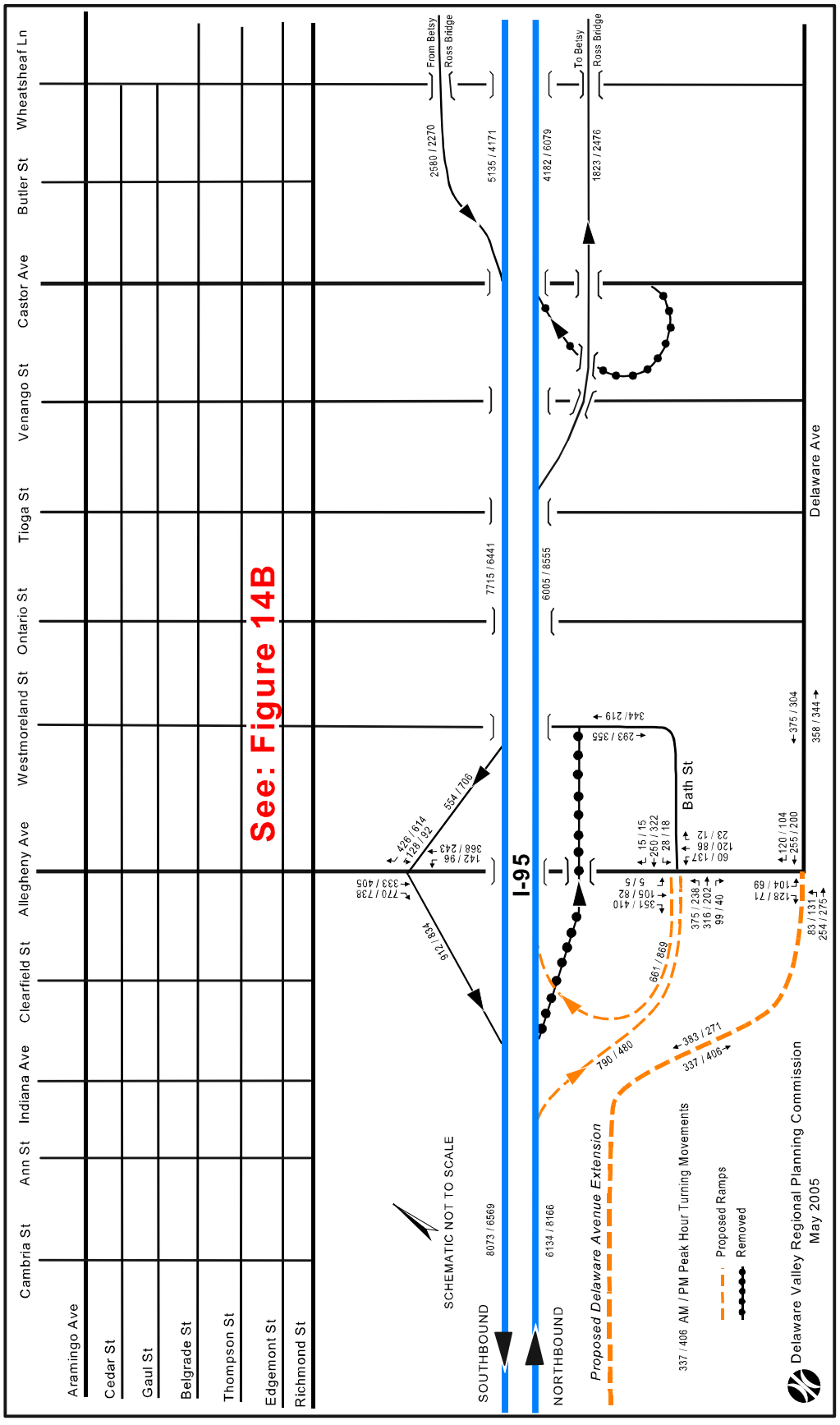
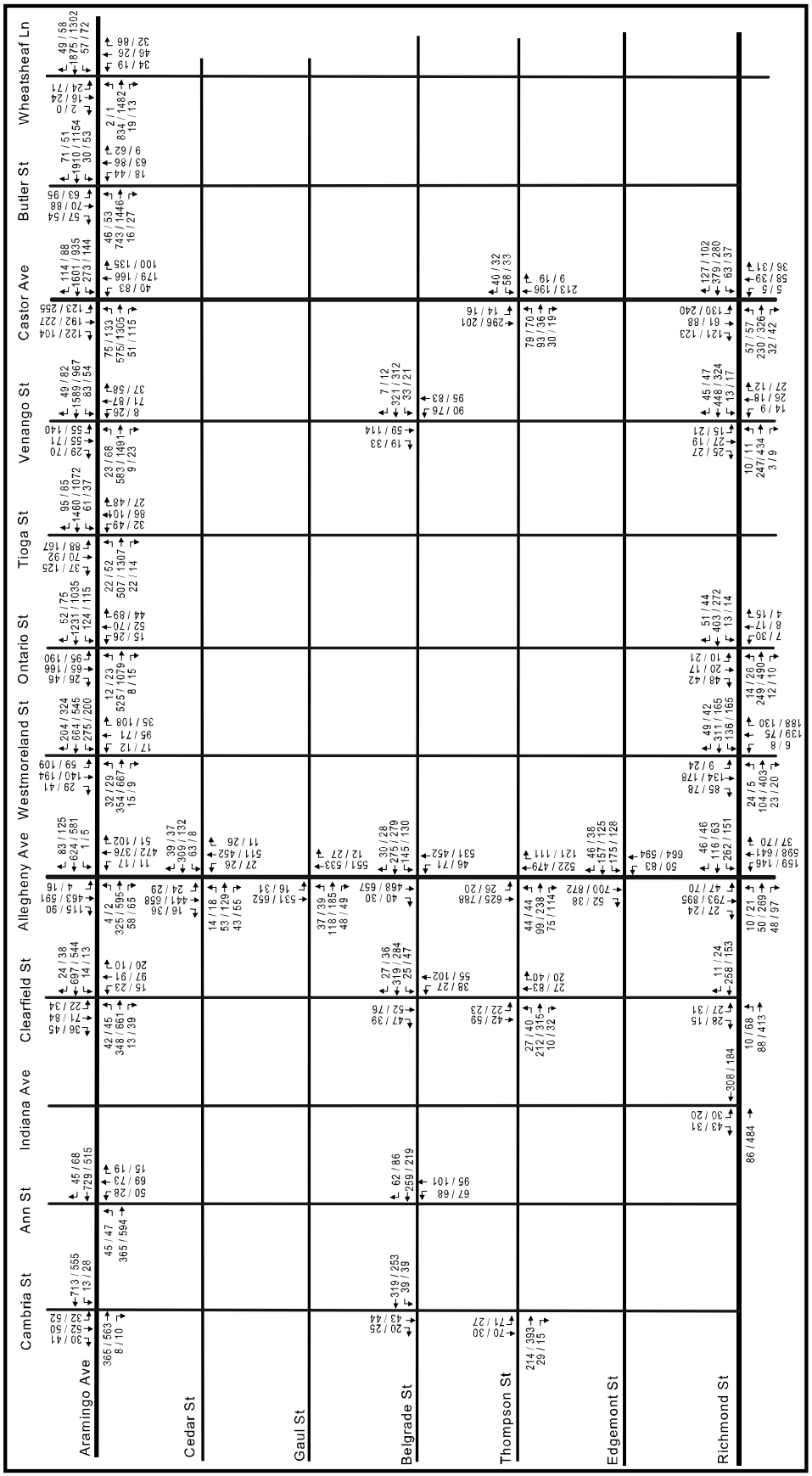


Figure 14B. 2025 Southside Partial Cloverleaf (Alternative 6) AM/PM Peak Hour Turning Movements (Inset)



At the intersections of Allegheny Avenue with I-95 and Richmond Street, introduction of Delaware Avenue Extension in either the Southside Partial Cloverleaf or Diamond (Alternatives 5 or 6) reduces peak hour volumes. For the Diamond alternatives (5 and 2) with and without Delaware Avenue Extension, the crucial eastbound movement from Richmond Street to I-95 southbound is reduced by 73 vehicles in the AM peak hour to 1,168 vehicles, and reduced by 49 vehicles to 1,223 vehicles in the PM peak hour with the proposed Delaware Avenue Extension. The Southside Partial Cloverleaf (Alternative 6), by encouraging the use of Bath Street and Westmoreland Street, further reduces these eastbound totals approaching I-95 on Allegheny Avenue to 1103 vehicles in the AM peak hour and 1,143 vehicles in the PM peak hour. Similar results hold for westbound Allegheny Avenue from I-95 to Richmond Street with 2025 peak hour forecasts higher for the Diamond without Delaware Avenue Extension (Alternative 2) than the Southside Partial Cloverleaf (Alternative 6) at 794 AM peak vehicles (133 fewer vehicles) and 862 PM peak vehicles (96 fewer vehicles). As with the eastbound direction, the Diamond with Delaware Avenue Extension (Alternative 5) forecasts for westbound Allegheny Avenue are about halfway between the Diamond without Delaware Avenue Extension (Alternative 2) and the Southside Partial Cloverleaf (Alternative 6). Reduced peak hour travel volumes on Allegheny Avenue due to the proposed Delaware Avenue Extension are forecast throughout the study area towards Aramingo Avenue for build alternatives at Allegheny Avenue (Alternatives 5 and 6). However, these forecasts are typically only 10 to 20 vehicles less, per direction in either the AM or PM peak period, than for the Diamond without Delaware Avenue Extension (Alternative 2) and the forecasts remain significantly higher than for alternatives that maintain existing ramp locations. At Aramingo Avenue and Allegheny Avenue, slight reductions in peak hour volumes (less than 20 vehicles) are forecast for Aramingo Avenue in either the Southside Partial Cloverleaf (Alternative 6) or Diamond with Delaware Avenue Extension (Alternative 5) versus the Diamond without Delaware Avenue Extension (Alternative 2).

Forecasted peak hour turning movement flows at Castor Avenue intersections with Aramingo Avenue and Richmond Street change little with the introduction of Delaware Avenue Extension in either the Southside Partial Cloverleaf (Alternative 6) or Diamond with Delaware Avenue Extension (Alternatives 5) versus the Diamond without Delaware Avenue Extension (Alternative 2). However, removal of the northbound Castor Avenue on-ramp does change peak hour volumes for either the Southside Partial Cloverleaf Alternative 6) or Diamond with Delaware Avenue Extension (Alternatives 5) relative to the No-Build without Delaware Avenue Extension (Alternative 1). This effect is typically seen as a reduction of 120 to 160 vehicles per hour eastbound on Castor Avenue.

D. Alternatives with Existing Ramps and Delaware Avenue Extension

The alternatives with existing ramps and Delaware Avenue Extension are designed to minimize volume and ease traffic congestion at the intersections of Richmond Street and I-95 with Allegheny Avenue. These alternatives include the No Build with Delaware Avenue Extension (Alternative 7), Minimum Build (Alternative 8), and Dual Castor Avenue Ramps (Alternative 9). The first of these alternatives, No-Build with Delaware Avenue Extension (Alternative 7)

maintains the existing ramp structure and adds the proposed extension of Delaware Avenue from the intersection of Richmond Street and Lehigh Avenue to the existing Delaware Avenue at Allegheny Avenue, including renaming and realigning Richmond Street from Aramingo Avenue to Lehigh Avenue.. Extending Delaware Avenue provides relief to both I-95 and Richmond Street south of Allegheny Avenue. Forecast daily volumes for the No-Build with Delaware Avenue Extension (Alternative 7) shown in ***Figure 15*** with all similar alternatives in ***Table 8***. Forecast 2025 I-95 mainline traffic volumes under the No-Build with Delaware Avenue Extension (Alternative 7) between Girard Avenue and Allegheny Avenue decline relative to the No-Build without Delaware Avenue Extension (Alternative 1) by 1,400 vpd northbound and 1,200 vpd southbound, to 105,800 vpd and 105,100 vpd respectively. These changes on I-95 are much smaller north of Allegheny Avenue, with minor decreases at ramps to the south (500 vpd less) and from the south (700 vpd less), while ramps to and from the north increase slightly (200 vpd and 500 vpd, respectively). The forecast on northbound I-95 between Allegheny Avenue and Castor avenue for the No-Build with Delaware Avenue Extension is 96,400 vpd versus 97,100 without Delaware Avenue Extension. Comparable southbound forecast are 102,400 vpd with Delaware Avenue Extension and 102,600 vpd without Delaware Avenue Extension. Under Alternative 7, ramps to and from the Betsy Ross Bridge, forecast at 29,000 vpd northbound, and 29,100 southbound in 2025. This is a change of 200 vpd fewer northbound, and no change southbound due to the addition of the Delaware Avenue Extension to No-Build Alternative 1.

Most neighborhood streets are forecast to be minimally impacted by the addition of the proposed Delaware Avenue Extension to the No-Build Alternative. There are, however, some notable exceptions. First, Allegheny Avenue between I-95 and Richmond Street is forecast to decline by 1,400 vpd relative to the No-Build, at 20,600 vpd. This is just 400 vpd over the current count. This decrease is also applicable to Allegheny Avenue between Bath Street and Delaware Avenue, forecast at 5,800 vpd under the No-Build with Delaware Avenue Extension (Alternative 7), 1200 vpd less than the No-Build without Delaware Avenue Extension (Alternative 1). This is offset by an increase of 1,200 vpd versus the No-Build without Delaware Avenue Extension (Alternative 1) on Castor Avenue from I-95 to Delaware Avenue to a total of 5,300 vpd for the No-Build with Delaware Avenue Extension (Alternative 7).

Finally, traffic on Richmond Street south of Allegheny Avenue declines due to the new Delaware Avenue Extension, with a 2025 forecast volume of 7,300 vpd.; 1,000 vpd less than the current count, and 2,000 vpd less than the forecast for the No-Build without Delaware Avenue Extension (Alternative 1) at this location. Usage of Delaware Avenue offsets this loss of traffic on Richmond Street and forecast reductions on the I-95 mainline. Year 2025 traffic volumes for the proposed Delaware Avenue Extension are forecast at 7,800 vpd**,** with 10,800 vpd forecast for Delaware Avenue between Allegheny Avenue and Castor Avenue, an increase of 3,800 vpd versus the No-Build without Delaware Avenue Extension (Alternative 1). Peak hour volumes for Alternative 7 are shown in ***figures 16A and 16B***. Forecast changes in peak hour flows from No-build Alternative 1 mirror the AADT differences brought about by the extension of Delaware Avenue described above.

Figure 15. Current and 2025 No-Build with and without Delaware Avenue Extension (Alternatives 7 and 1) Average Daily Traffic Volumes

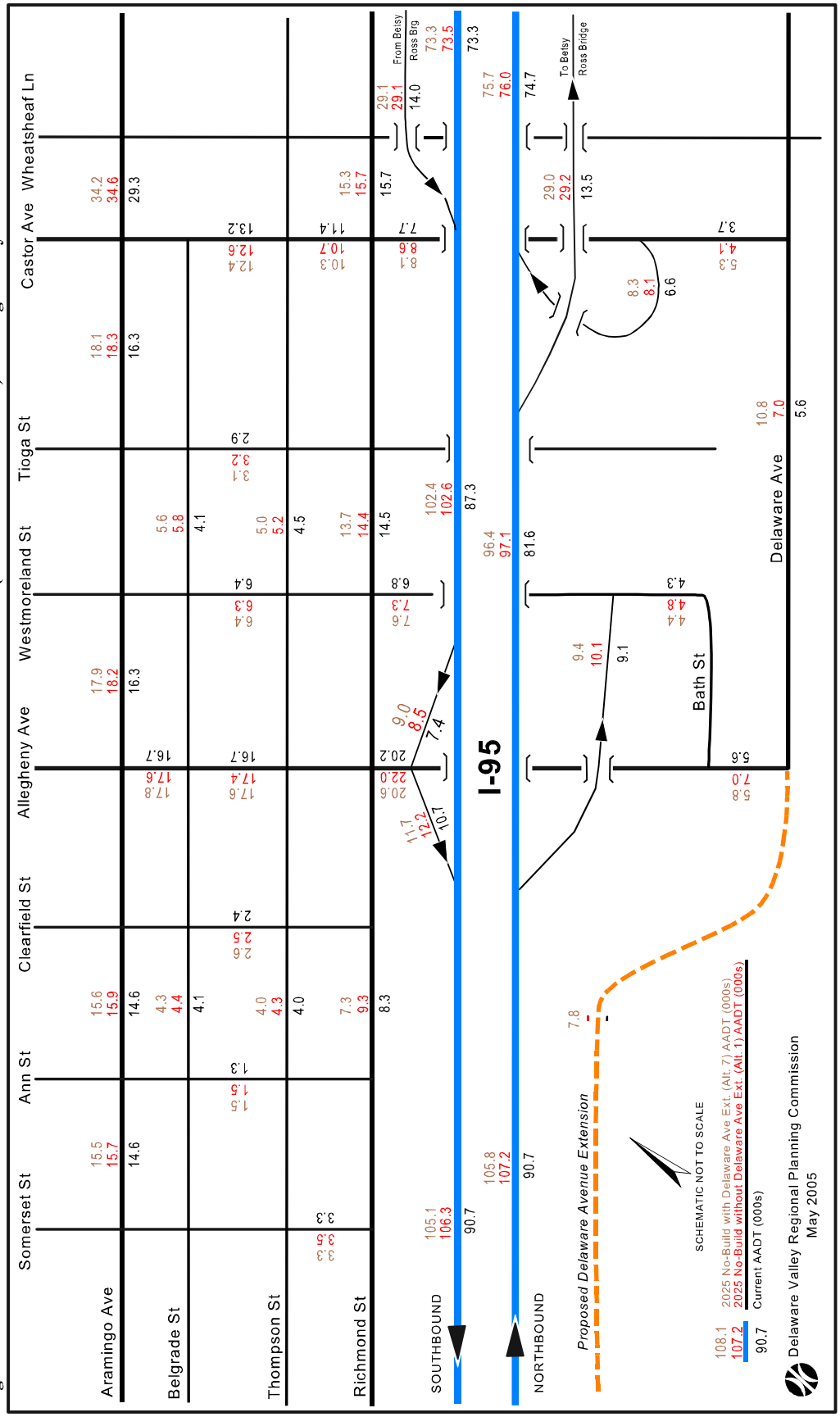


Table 8. Current, and 2025 Forecast for the No-Build with Delaware Ave. Ext. (Alt.7), Minimum Build (Alt. 8), and Dual Castor Ave Ramps (Alt. 9) Average Daily Traffic Volumes

Highway Facility	Location From	To	Current Traffic Count	Alt. 7 2025 No-Build w/ Del. Ave	Alt. 7 No-Bld w/ Del. Ave Versus Current Diff.	Alt. 7 No-Bld w/ Del. Ave Versus Current % Dff.	Alt. 8 2025 Minimum Build	Alt. 8 Minimum Build Versus Current Diff.	Alt. 8 Minimum Build Versus Current % Dff.	Alt. 9 2025 Dual Castor Ave. Ramps	Alt. 9 Dual Castor Ave. Rmps. Versus Current Diff.	Alt. 9 Dual Castor Ave. Rmps. Versus Current % Dff.
I-95 Mainline												
I-95 NB*	Aramingo Ave.	Allegheny Ave.	90,700	105,800	15,100	16.6%	106,200	15,500	17.1%	105,900	15,200	16.8%
I-95 SB*	Aramingo Ave.	Allegheny Ave.	90,700	105,100	14,400	15.9%	106,100	15,400	17.0%	106,100	15,400	17.0%
I-95 NB*	Alegheny Ave.	Castor Ave.	81,640	96,400	14,760	18.1%	96,800	15,160	18.6%	n/a	n/a	n/a
I-95 SB*	Alegheny Ave.	Castor Ave.	87,319	102,400	15,081	17.3%	104,100	16,781	19.2%	104,200	16,881	19.3%
I-95 NB*	Castor Ave.	Bridge St.	74,716	75,700	984	1.3%	75,900	1,184	1.6%	76,000	1,284	1.7%
I-95 SB*	Betsy Ross Bridge	Allegheny Ave.	73,319	73,300	-19	0.0%	74,400	1,081	1.5%	74,300	981	1.3%
I-95 Ramps												
I-95 NB Off-ramp	I-95	Westmoreland St. or Allegheny Ave.	9,060	9,400	340	3.8%	9,400	340	3.8%	n/a	n/a	n/a
I-95 SB On-ramp	I-95	Allegheny Ave.	10,748	11,700	952	8.9%	11,400	652	6.1%	11,400	652	6.1%
I-95 NB On-ramp	I-95	Allegheny Ave.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
I-95 NB On-ramp	I-95	Castor Ave.	6,578	8,300	1,722	26.2%	8,300	1,722	26.2%	8,300	1,722	26.2%
I-95/Betsy Ross Brdg	Betsy Ross Bridge NB On-ramp	Castor Ave.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1,800	n/a	n/a
I-95 SB Off-ramp	I-95	Allegheny Ave.	7,367	9,000	1,633	22.2%	9,400	2,033	27.6%	9,500	2,133	29.0%
I-95 NB Off-ramp	I-95	Aramingo Ave./Betsy Ross Bridge	13,502	29,000	15,498	114.8%	29,200	15,698	116.3%	28,800	15,298	113.3%
I-95 NB Off-ramp	Castor Ave.	Betsy Ross Bridge	n/a	n/a	n/a	n/a	n/a	n/a	n/a	30,600	n/a	n/a
I-95 SB On-ramp	I-95	Aramingo Ave./Betsy Ross Bridge	14,000	29,100	15,100	107.9%	29,700	15,700	112.1%	29,900	15,900	113.6%
Sub-total			**559,649**	**655,200**	**95,551**	**17.1%**	**660,900**	**101,251**	**18.1%**	**586,800**	**85,451**	**15.3%**
Crossing Streets												
Somerset St.	Belgrade St.	Thompson St.	3,265	3,300	35	1.1%	3,400	135	4.1%	3,400	135	4.1%
Ann St.	Belgrade St.	Thompson St.	1,343	1,500	157	11.7%	1,400	57	4.2%	1,400	57	4.2%
Clearfield St.	Belgrade St.	Thompson St.	2,400	2,600	200	8.3%	2,500	100	4.2%	2,600	200	8.3%
Allegheny Ave.	Aramingo Ave.	Belgrade St.	16,685	17,800	1,115	6.7%	18,000	1,315	7.9%	18,200	1,515	9.1%
Allegheny Ave.	Belgrade St.	Thompson St.	16,685	17,600	915	5.5%	17,800	1,115	6.7%	17,900	1,215	7.3%
Allegheny Ave.	Richmond St.	I-95 SB ramps	20,198	20,600	402	2.0%	20,400	202	1.0%	20,800	602	3.0%
Allegheny Ave.	Bath St.	Delaware Ave.	5,614	5,800	186	3.3%	5,700	86	1.5%	5,700	86	1.5%
Westmoreland St.	Belgrade St.	Thompson St.	6,427	6,400	-27	-0.4%	6,500	73	1.1%	6,300	-127	-2.0%
Westmoreland St.	Richmond St.	I-95	6,841	7,600	759	11.1%	7,600	759	11.1%	7,600	759	11.1%
Westmoreland St.**	I-95	Bath St.	4,300	4,400	100	2.3%	4,500	200	4.7%	4,500	200	4.7%
Tioga St.	Belgrade St.	Thompson St.	2,946	3,100	154	5.2%	3,400	454	15.4%	3,400	454	15.4%
Castor Ave.	Aramingo Ave.	Thompson St.	13,224	12,400	-824	-6.2%	12,500	-724	-5.5%	12,700	-524	-4.0%
Castor Ave.	Thompson St.	Richmond St.	11,355	10,300	-1,055	-9.3%	10,400	-955	-8.4%	10,800	-555	-4.9%
Castor Ave.	Richmond St.	I-95 ramp	7,678	8,100	422	5.5%	7,900	222	2.9%	8,900	1,222	15.9%
Castor Ave.	I-95 ramp	Delaware Ave.	3,720	5,300	1,580	42.5%	5,600	1,880	50.5%	6,300	2,580	69.4%
Sub-total			**122,681**	**126,800**	**4,119**	**3.4%**	**127,600**	**4,919**	**4.0%**	**130,500**	**7,819**	**6.4%**
Parallel Streets												
Aramingo Ave.	Somerset St.	Ann St.	14,646	15,500	854	5.8%	14,900	254	1.7%	15,200	554	3.8%
Aramingo Ave.	Ann St.	Allegheny Ave.	14,646	15,600	954	6.5%	14,900	254	1.7%	15,300	654	4.5%
Aramingo Ave.	Allegheny Ave.	Tioga St.	16,276	17,900	1,624	10.0%	17,300	1,024	6.3%	17,700	1,424	8.7%
Aramingo Ave.	Tioga St.	Castor Ave.	16,276	18,100	1,824	11.2%	17,600	1,324	8.1%	18,000	1,724	10.6%
Aramingo Ave.	Castor Ave.	Aramingo Ave. Connector	29,265	34,200	4,935	16.9%	33,300	4,035	13.8%	33,700	4,435	15.2%
Belgrade St.	Clearfield St.	Ann St.	4,098	4,300	202	4.9%	4,200	102	2.5%	4,200	102	2.5%
Belgrade St.	Tioga St.	Westmoreland St.	4,145	5,600	1,455	35.1%	5,500	1,355	32.7%	5,500	1,355	32.7%
Thompson St.	Ann St.	Clearfield St.	4,023	4,000	-23	-0.6%	4,200	177	4.4%	4,200	177	4.4%
Thompson St.	Westmoreland St.	Tioga St.	4,485	5,000	515	11.5%	5,000	515	11.5%	5,100	615	13.7%
Richmond St.	Ann St.	Clearfield St.	8,308	7,300	-1,008	-12.1%	7,500	-808	-9.7%	7,400	-908	-10.9%
Richmond St.**	Westmoreland St.	Tioga St.	14,454	13,700	-754	-5.2%	13,500	-954	-6.6%	13,600	-854	-5.9%
Richmond St.	Castor Ave.	Wheatsheaf Lane	15,673	15,300	-373	-2.4%	15,300	-373	-2.4%	15,100	-573	-3.7%
Delaware Ave.	Allegheny Ave..	Richmond St.	n/a	7,800	n/a	n/a	8,200	n/a	n/a	8,700	n/a	n/a
Delaware Ave.	Allegheny Ave.	Venango St.	5,614	10,800	5,186	92.4%	10,900	5,286	94.2%	11,800	6,186	110.2%
Sub-total			**151,909**	**175,100**	**15,391**	**10.1%**	**172,300**	**12,191**	**8.0%**	**175,500**	**14,891**	**9.8%**
TOTAL			**834,239**	**957,100**	**115,061**	**13.8%**	**960,800**	**118,361**	**14.2%**	**892,800**	**108,161**	**13.0%**

* Counts dirived by flowing nearby counts ** estimated by consultant TMC

Figure 16A. 2025 No-Build with Delaware Avenue Extension (Alternative 7) AM/PM Peak Hour Turning Movements

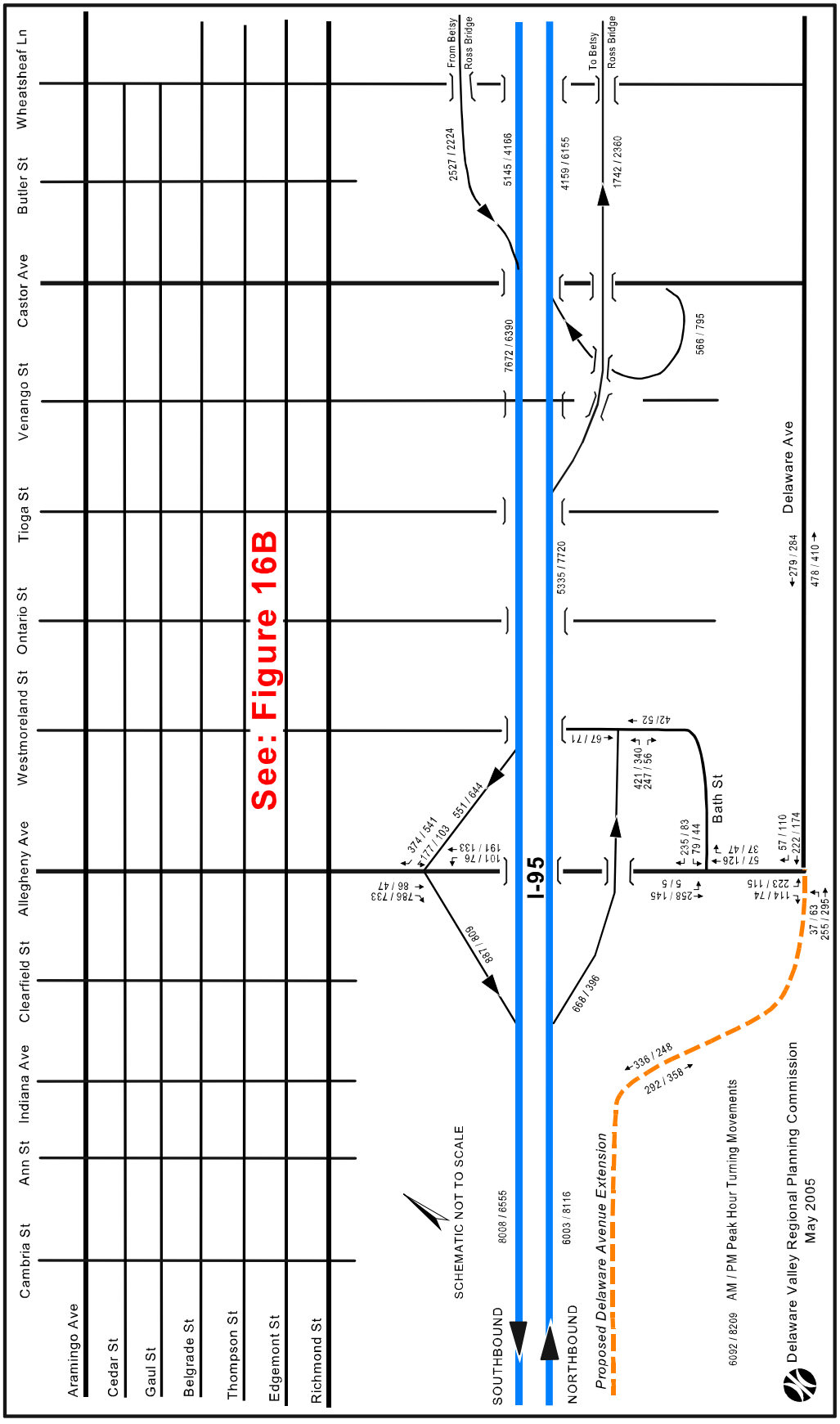
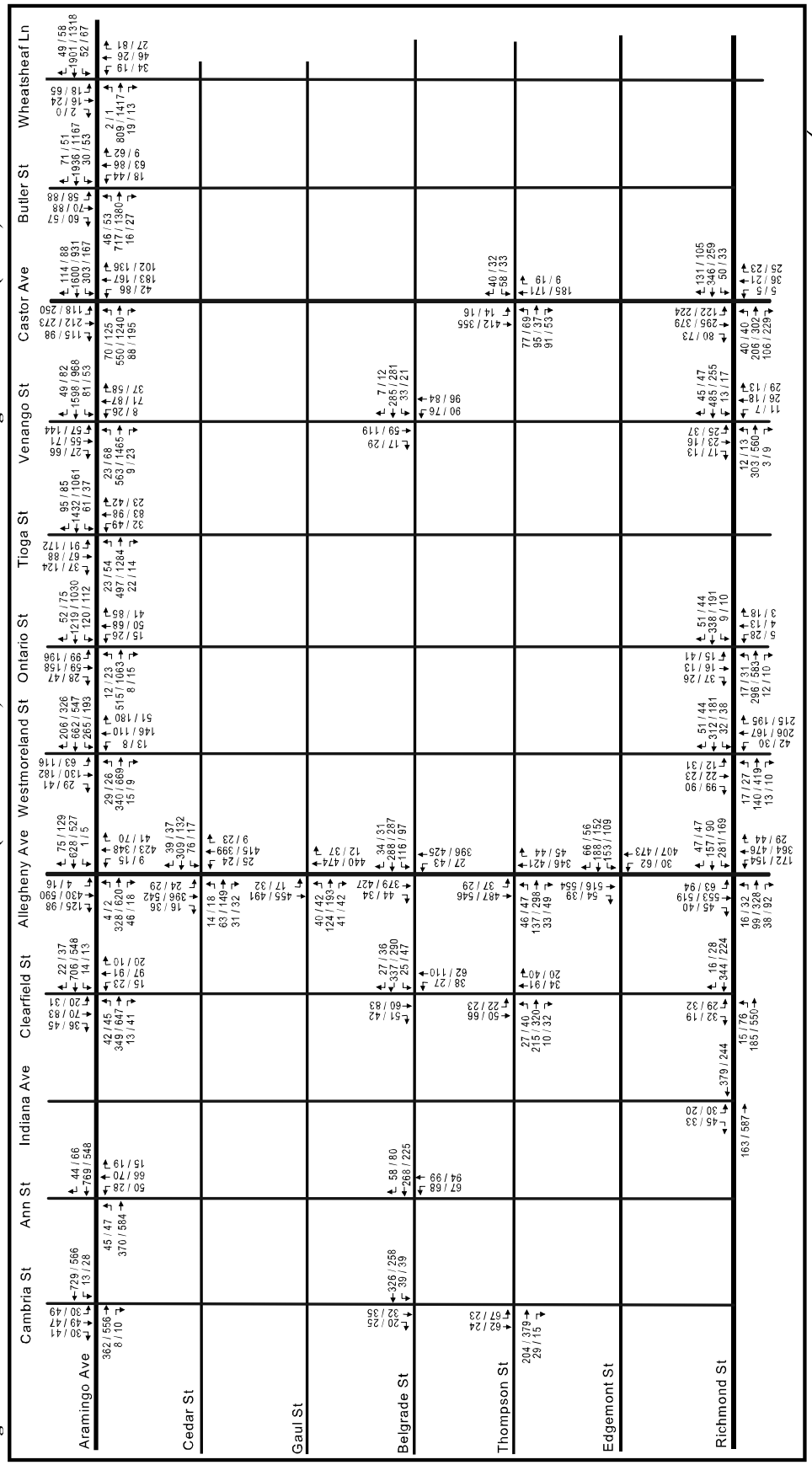


Figure 16B. 2025 No-Build with Delaware Avenue Extension (Alternative 7) AM/PM Peak Hour Turning Movements (Inset)



The Minimum Build (Alternative 8), shown in ***Figure 17***, and in ***Table 8*** (see page 65), adds a fifth southbound lane from the Betsy Ross Bridge to Allegheny Avenue. Also included, is the proposed Delaware Avenue Extension from Richmond Street at Lehigh Avenue to the eastern terminus of Allegheny Avenue. Impacts due to this alternative relative to the No-Build with Delaware Avenue (Alternative 7) are primarily on the mainline of I-95. The largest change is in the segment widened, southbound I-95 from the Betsy Ross Bridge to Allegheny Avenue, forecast at 104,100 vpd in 2025 with the Minimum Build Alternative. This is a 1,700 vpd increase relative to the No-Build with Delaware Avenue Extension (Alternative 7). Tracing this 1,700 vpd increase from the north under the Minimum Build (Alternative 8), the southbound mainline enters the study area with 1,100 vpd more than for the No-Build with Delaware Avenue Extension (Alternative 7), with the remaining 600 vpd originating via the southbound on-ramp from Betsy Ross Bridge/Aramingo Avenue. This increase extends to the next section of southbound I-95, Allegheny Avenue to Girard Avenue, which grows by 1,000 vpd to 106,100 vpd. The opposing direction, northbound I-95 experiences a 400 vpd increase from the No-Build with Delaware Avenue Extension (Alternative 7) to the Minimum Build (Alternative 8) for both the above segments, at 2025 forecast volumes of 106,200 vpd south of Allegheny Avenue and 96,800 vpd north of Westmoreland Street. Further north, this increase of 400 is evenly split between the I-95 off-ramp to Aramingo Avenue/Betsy Ross Bridge and the northbound I-95 mainline. With the introduction of the Minimum Build (Alternative 8), neighborhood north-south routes decline slightly, averaging a reduction of 1.6 percent against the No-Build with Delaware Avenue Extension (Alternative 7). The largest change is a 900 vpd reduction entering local access roads in the study area from the north via Aramingo Avenue. This reduction ranges from 500 vpd to 700 vpd on other links along Aramingo Avenue. Other north-south local roads experience little change. Finally, east-west roads are also minimally impacted, with the average change being a 0.6 percent increase. Peak hour volumes for this alternative are shown in ***figures 18A and 18B.***

The Dual Castor Avenue Ramps (Alternative 9) shown in ***Figure 19*** and ***Table 9*** (see page 73) includes the fifth southbound lane on I-95 from the Betsy Ross Bridge to Allegheny Avenue per the Minimum Build (Alternative 8), and adds an additional ramp from Castor Avenue to the northbound ramp to the Betsy Ross Bridge and Aramingo Avenue. Thus, the proposal is for dual ramps at this location, providing direct access from Castor Avenue to the Betsy Ross Bridge, thereby reducing the burden of heavy vehicles using Richmond Street to access the bridge.

Forecast mainline volumes on I-95 from Girard Avenue to Castor Avenue under the Dual Castor Avenue Ramps Alternative are almost identical to those for the Minimum Build (Alternative 8). 2025 forecast northbound I-95 volumes are 105,900 vpd south of Allegheny Avenue and 96,500 north of Westmoreland Street. Southbound forecast volumes are 106,100 vpd south of Allegheny Avenue and 104,200 north of Allegheny Avenue. North of Castor Avenue on I-95, northbound volume is forecast at 76,000 vpd in 2025, with southbound volume forecast to be 74,300 vpd. Southbound, this is 800 vpd more than the No-Build without Delaware Avenue Extension (Alternative 1). However, the forecast AADT for northbound I-95 north of Castor Avenue changes by less than 100 vpd between the above alternatives.

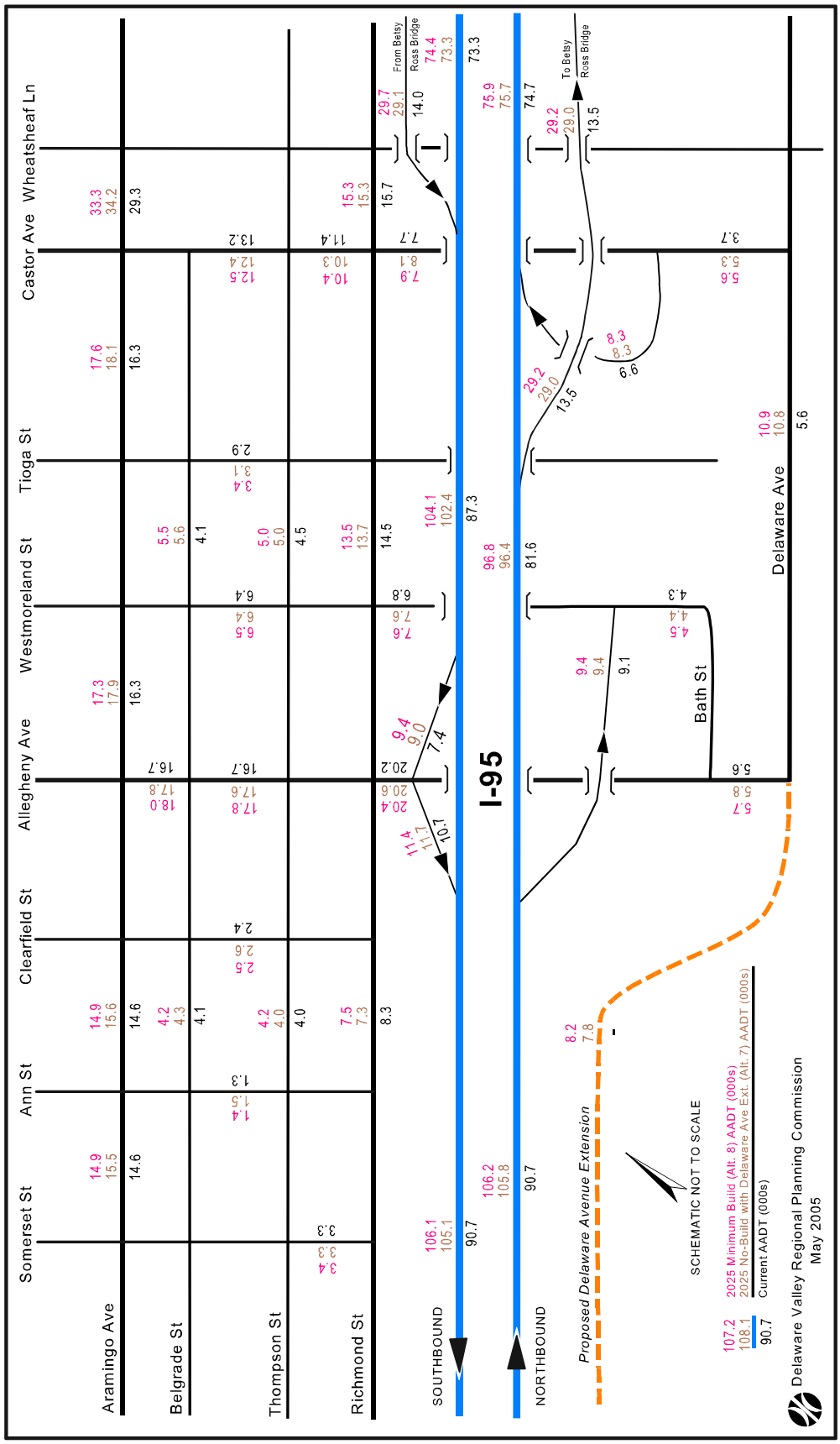


Figure 17. Current, 2025 No-Build with Delaware Avenue Extension (Alt. 7) and 2025 Minimum Build (Alt. 8) Average Daily Traffic Volumes

Figure 18A. 2025 Minimum Build (Alternative 8) AM/PM Peak Hour Turning Movements

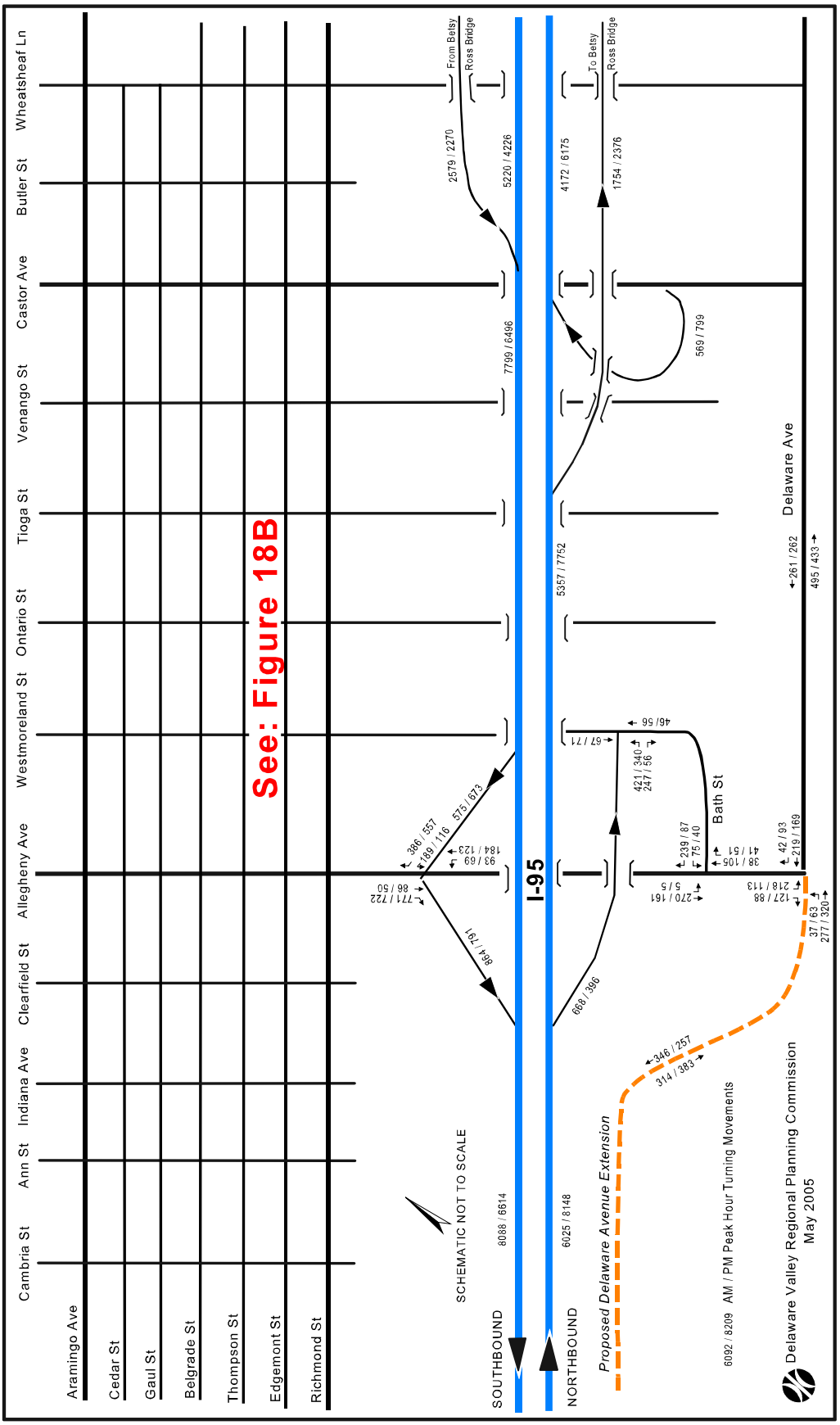
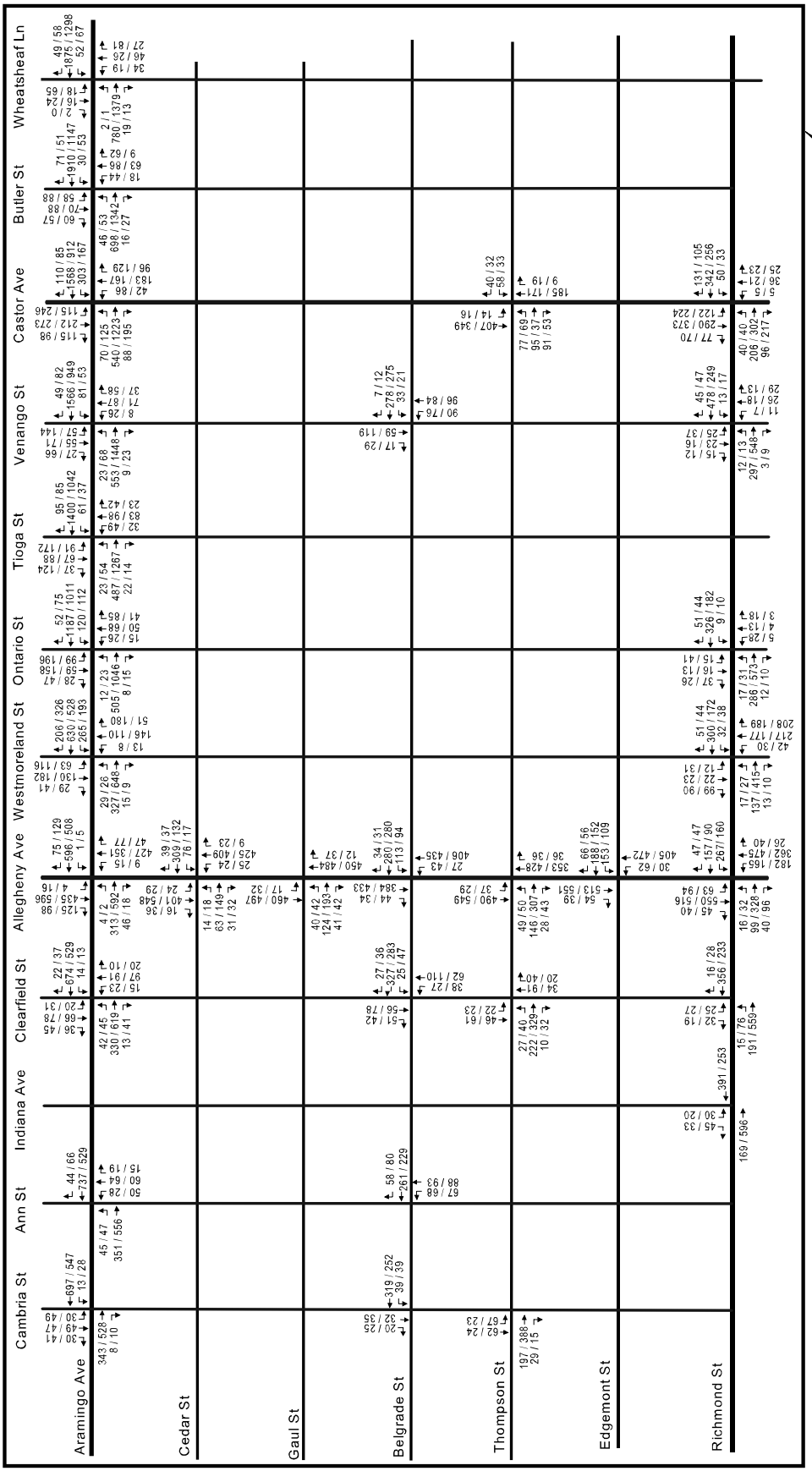


Figure 18B. 2025 Minimum Build (Alternative 8) AM/PM Peak Hour Turning Movements (Inset)



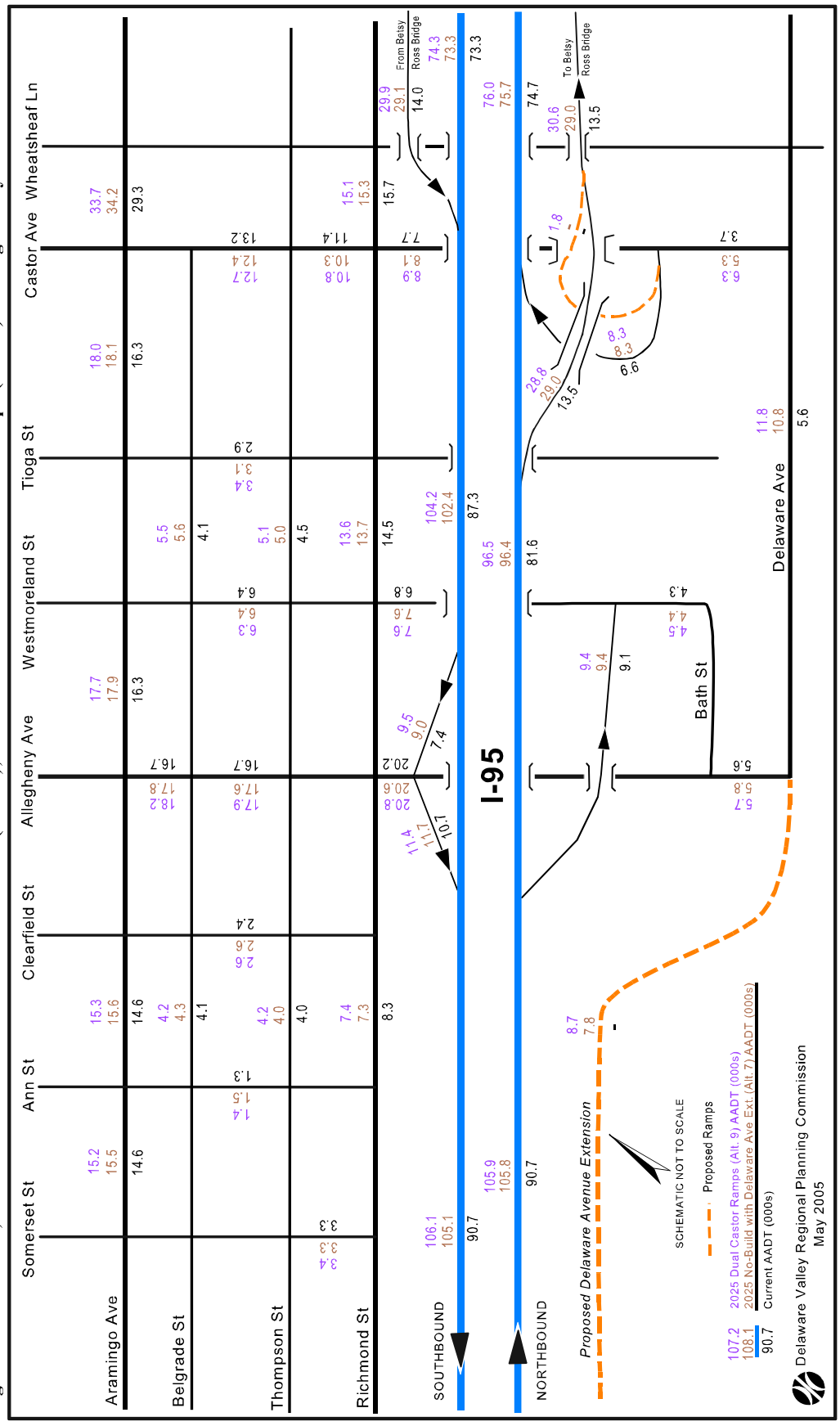


Figure 19. Current, 2025 No-Build with Delaware Ave Ext. (Alt. 7), and 2025 Dual Castor Avenue Ramps (Alt. 9) Average Daily Traffic Volumes

Table 9. 2025 Forecast Peak Hour Flows on I-95 Mainline and Ramps for the No-Build with and without Delaware Ave. Ext. and Build Alts. with Delaware Ave Ext. and Existing Ramps

	Alt. 1		Alt. 7		Alt. 8		Alt. 9	
	No-Build w/o Del		No-Build with Del		Minimum Build		Dual Castor Ramps	
Location	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
I-95 Mainline								
I-95 NB- Girard Ave to Allegheny Ave	6,092	8,209	6,003	8,116	6,025	8,148	6,010	8,122
I-95 SB- Girard Ave to Allegheny Ave	8,121	6,620	8,008	6,555	8,088	6,614	8,088	6,616
I-95 NB- Allegheny Ave to Castor Ave	5,375	7,778	5,335	7,720	5,357	7,752	5,342	7,726
I-95 SB- Allegheny Ave to Castor Ave	7,689	6,404	7,672	6,390	7,799	6,496	7,805	6,504
I-95 NB- Castor Ave to Bridge Street	4,173	6,178	4,159	6,155	4,172	6,175	4,178	6,183
I-95 SB- Betsy Ross Bridge to Allegheny Ave	5,162	4,180	5,145	4,166	5,220	4,226	5,210	4,220
I-95 Ramps								
I-95 NB off-ramp to Westmoreland St	717	431	668	396	668	396	668	396
I-95 SB on-ramp from Allegheny Ave	924	843	887	809	864	791	864	791
I-95 NB on-ramp from Castor Ave	552	776	566	795	569	799	566	795
I-95 SB off-ramp to Allegheny Ave	492	627	551	644	575	673	581	679
NB on-ramp from Castor Ave to Betsy Ross Bridge	n/a	n/a	n/a	n/a	n/a	n/a	123	172
I-95 NB off-ramp to Aramingo Ave & Betsy Ross Bridge	1,754	2,376	1,742	2,360	1,754	2,376	1,730	2,338
I-95 SB on-ramp from Aramingo Ave & Betsy Ross Bridge	2,527	2,224	2,527	2,224	2,579	2,270	2,595	2,284

I-95 ramps, with the exception of the proposed ramp to I-95 northbound from Castor Avenue, vary little between Minimum Build (Alternative 8), Dual Castor Avenue Ramps (Alternative 9), and No-Build with Delaware Avenue Extension (Alternative 7). The proposed ramp from Castor Avenue to the Betsy Ross Bridge and Aramingo Avenue is forecast at 1,800 vpd in 2025 under the Dual Castor Avenue Ramps (Alternative 9). The only change for the Dual Castor Avenue Ramps (Alternative 9) relative to the Minimum Build (Alternative 8) on existing I-95 ramps is a 100 vpd increase on the southbound off-ramp to Allegheny Avenue to 9,500 vpd. For the existing Castor Avenue ramp to northbound I-95, all alternatives are forecast at 8,300 vpd. Similarly, for the northbound off-ramp to Westmoreland Street, all three alternatives are forecast

to carry 9,400 vpd in 2025. However, with the Minimum Build and Dual Castor Avenue Ramps alternatives (8, and 9) , a slight drop in I-95 southbound on-ramp volume at Allegheny occurs – a 2025 forecast volume of 11,400 vpd for both alternatives 8 and 9, versus 11,700 forecast for the No-Build without Delaware Avenue Extension (Alternative 1). Forecast traffic on the combined ramps to the Betsy Ross Bridge and Aramingo Avenue increase slightly from the No-Build without Delaware Avenue (Alternative 1) to the Minimum Build (Alternative 8), rising by 200 vpd northbound to 29,200, and gaining 600 vpd southbound to 29,700 vpd. For the Dual Castor Avenue Ramps Alternative, southbound volume is 29,900 vpd. Northbound 2025 volume from I-95 to the Betsy Ross Bridge and Aramingo Avenue interchange drops by 200 vpd versus the No-Build without Delaware Avenue Extension (Alternative 1) to 28,800. However, with the addition of the proposed ramp from Castor Avenue, forecast at 1,800 vpd , the total is 30,600 vpd; 1,600 vpd more than the No-Build without Delaware Avenue Extension (Alternative 1).

With the Dual Castor Avenue Ramps (Alternative 9), traffic on locals streets parallel to I-95 tended to be reduced in residential areas, and increased along the Delaware riverfront. Projected volumes along Aramingo Avenue are 500 vpd to 900 vpd lower than for the No-Build without Delaware Avenue Extension Alternative, ranging from 15,200 vpd to 33,700 vpd. Delaware Avenue, under the Dual Castor Avenue Ramps Alternative, increases to 8,700 vpd south of Allegheny Avenue and 11,800 vpd north of Allegheny Avenue. This is 900 vpd to 1,000 vpd more than the No-Build with Delaware Avenue Extension (Alternative 1) and on existing Delaware Avenue, and 4,800 vpd higher than the No-build without Delaware Avenue Extension Alternative. Other parallel roads change by less than 200 vpd relative to the No-Build with Delaware Avenue Extension (Alternative 1).

Forecast 2025 traffic volumes for roads crossing I-95 change minimally due to the introduction of a new ramp at Castor Avenue under the Dual Castor Avenue Ramps (Alternative 9). All such roads except Castor Avenue experience less than 500 vpd increase or decrease relative to the No-Build with Delaware Avenue Extension (Alternative 1). However, Castor Avenue experiences increases of 300 to 500 vpd west of Richmond Street for forecasted volumes of 12,700 vpd and 10,800 vpd. Immediately west of the existing and proposed ramps from Castor Avenue, 2025 AADT is forecast at 8,900 vpd and east of these ramps 2025 forecast traffic volume is 6,300 vpd. These are increases of 800 vpd and 1,000 vpd, respectively, from the No-Build with Delaware Avenue Extension (Alternative 7) to the Dual Castor Avenue Ramps (Alternative 9). Peak hour volumes for this alternative are shown in ***figures 20A and 20B.***

I-95 mainline peak hour volumes ***Table 9*** (see page 73) **,** are very similar between the No-Build with Delaware Avenue Extension (Alternative 7), Minimum Build (Alternative 8), and Dual Castor Avenue Ramps (Alternative 9). In the northbound direction, peak hour volumes vary by less than 33 vehicles. However, all of these volumes are roughly 50 vehicles to 70 vehicles lower than for the No-Build without Delaware Avenue Extension (Alternative 1). Going southbound, forecast 2025 peak hour- peak direction flows are highest for the No-Build Alternative without Delaware Avenue Extension (Alternative 1), at 8,121 vehicles in the AM peak south of Allegheny Avenue, and 7,689 vehicles in the AM peak hour north of Allegheny

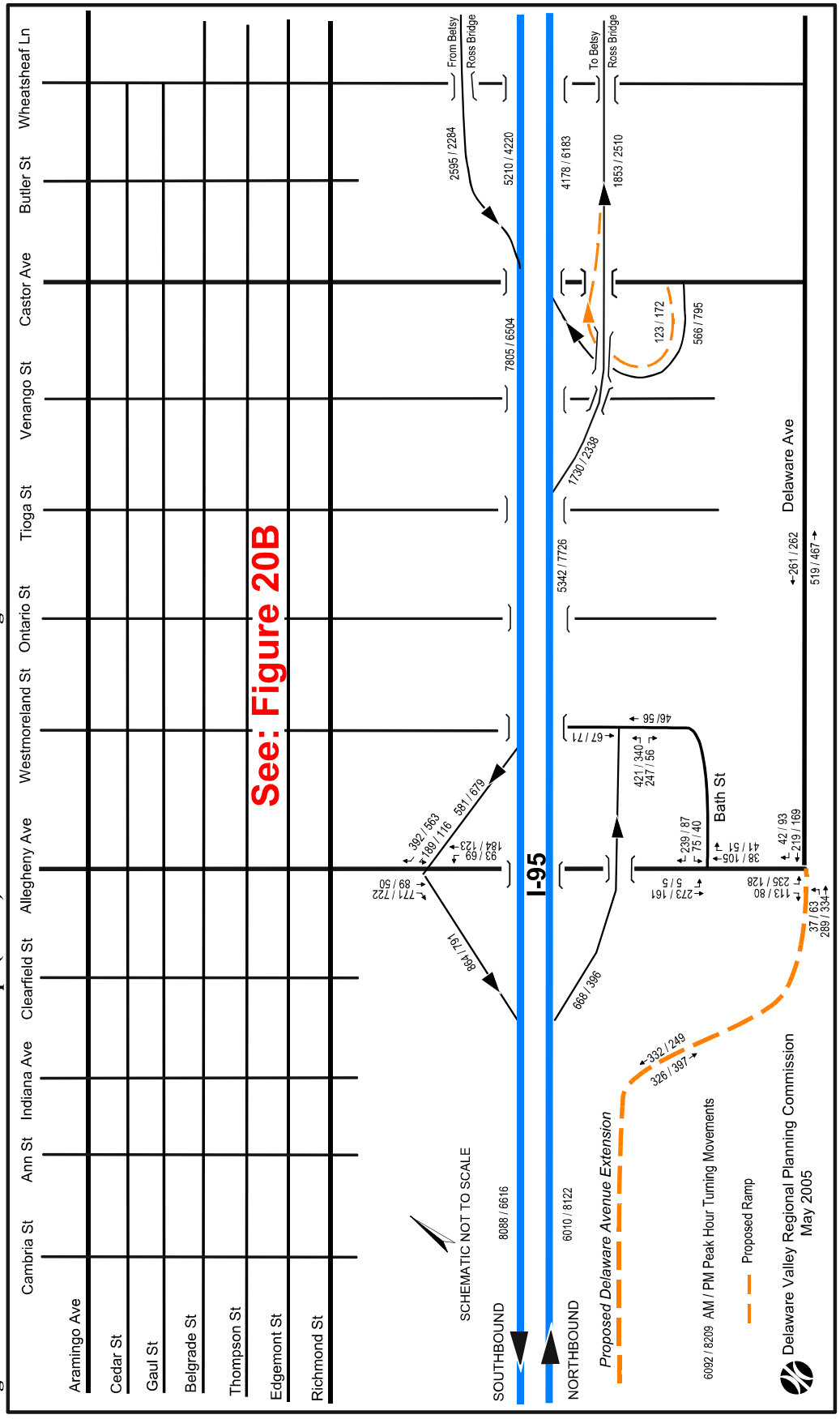
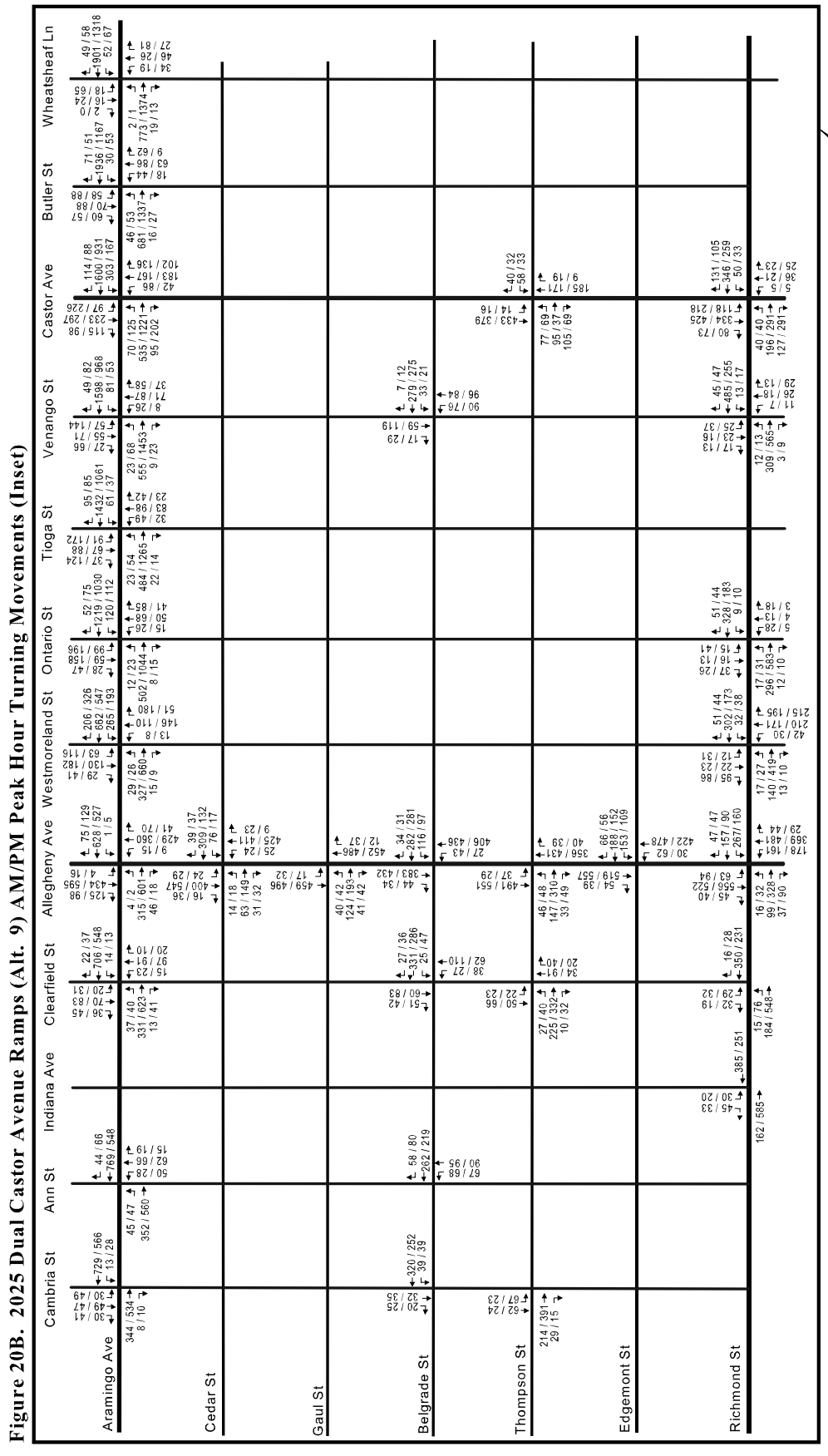


Figure 20A. 2025 Dual Castor Avenue Ramps (Alt. 9) AM/PM Peak Hour Turning Movements

Figure 20B. 2025 Dual Castor Avenue Ramps (Alt. 9) AM/PM Peak Hour Turning Movements (Inset)



Avenue. The lowest southbound I-95 mainline peak hour-peak direction volumes among the four alternatives maintaining existing ramps occurs with the No-Build Alternative with Delaware Avenue Extension (Alternative 7), at 8,008 vehicles in the AM peak south of Allegheny Avenue, and 7,672 vehicles in the AM peak hour north of Allegheny Avenue. With the Minimum Build (Alternative 8) or the Dual Castor Avenue Ramps (Alternative 9), a fifth southbound lane from the Betsy Ross Bridge to Allegheny Avenue raises traffic volumes. For both of these alternatives, southbound I-95 mainline AM peak hour volume from Allegheny Avenue to Girard Avenue is 8,088 vehicles. Between the Betsy Ross bridge and Allegheny Avenue, the southbound I-95 mainline is forecast to carry 7,799 vehicles to 7,805 vehicles in the AM peak hour with the Minimum Build (Alternative 8) or the Dual Castor Avenue Ramps (Alternative 9), respectively. This increased volume for either alternative with an additional southbound lane continues at the northern study boundary, with roughly 60 and 45 more vehicles forecast for southbound I-95 in the AM peak hour relative to the No-Build with and without Delaware Avenue Extension (Alternatives 7 and 1), respectively.

Introduction of Delaware Avenue extension, while holding the existing ramp configuration constant, tends to decrease peak hour I-95 ramp volumes to and from the south, while increasing volumes to and from the north. For any of the alternatives with the existing ramp configuration (1,7, and 8), volume on the northbound off-ramp to Westmoreland Street is 668 vehicles in the AM peak hour and 396 vehicles in the PM peak hour. This is less than the No-Build without Delaware Avenue Extension (Alternative 1) by 49 vehicles in the AM peak hour and 35 vehicles in the PM peak hour. This pattern also holds for the on-ramp from Allegheny Avenue to I-95 southbound. Peak hour volumes for the No-Build without Delaware Avenue Extension (Alternative 1) are 924 vehicles in the AM peak. and 843 vehicles in the PM peak. Adding Delaware Avenue Extension to No-Build Alternative 1 reduces forecast volume on the I-95 southbound on-ramp to 887 vehicles in the AM and 809 vehicles in the PM peak. Adding a fifth lane drops I-95 southbound on-ramp peak hour volumes to 864 vehicles in the AM peak. and 791 vehicles in the PM peak. Heading northbound, the I-95 on-ramp at Castor Avenue is fairly stable regardless of alternative, with the highest peak hour volumes forecast for the Minimum Build Alternative at 569 vehicles in the AM peak and 799 vehicles in the PM peak, 17 and 23 vehicles more than the No-Build without Delaware Avenue Extension (Alternative 1). Forecast usage of the proposed ramp from Castor Avenue to ramps for Aramingo Avenue and the Betsy Ross Bridge is 123 vehicles in the AM peak hour and 172 in the PM peak hour. Finally, for the southbound off-ramp to Allegheny Avenue from I-95, peak hour volumes from lowest to highest are; No-Build without Delaware Avenue Extension (Alternative 1) – 492 AM peak hour vehicles and 627 PM peak hour vehicles, No-Build with Delaware Avenue Extension (Alternative 7) – 551 AM peak hour vehicles and 644 PM peak hour vehicles, Minimum Build (Alternative 8) – 875 AM peak hour vehicles and 673 PM peak hour vehicles, Dual Castor Avenue Ramps (Alternative 9) – 581 AM peak hour vehicles and 679 PM peak hour vehicles.

Local intersections, with the exceptions of Richmond Street and Delaware Avenue, are minimally impacted by the No-Build with Delaware Avenue Extension (Alternative 7), Minimum Build (Alternative 8) , and Dual Castor Avenue Ramps (Alternative 9) relative to the

No-Build without Delaware Avenue Extension (Alternative 1). The largest changes occur along Delaware Avenue. Total two-way peak flows on Delaware Avenue between Venango Street and Allegheny Avenue rises from 362 vehicles in the AM peak hour and 322 vehicles in the PM peak hour for the No-Build without Delaware Avenue Extension (Alternative 1) to 780 vehicles in the AM peak hour and 729 vehicles in the PM peak hour for the Dual Castor Avenue Ramps (Alternative 9). For this section of Delaware Avenue, the No-Build with Delaware Avenue Extension (Alternative 7) 2025 forecast is 757 vehicles in the AM peak hour and 694 vehicles in the PM peak hour, with the Minimum Build (Alternative 8) at 756 vehicles in the AM peak hour and 695 vehicles in the PM peak hour. Both of these values are higher than the No-Build without Delaware Avenue Extension (Alternative 1) as they add Delaware Avenue Extension, but lower than the Dual Castor Avenue Ramps (Alternative 9) as they do not provide additional access to the Betsy Ross Bridge. Similar results are experienced on the Delaware Avenue Extension itself, with 628 vehicles in the AM peak hour and 606 vehicles in the PM peak hour for the No-Build with Delaware Avenue Extension (Alternative 7), 660 vehicles in the AM peak hour and 640 vehicles in the PM peak hour for the Minimum Build (Alternative 8), and 658 vehicles in the AM peak hour and 646 vehicles in the PM peak hour for the Dual Castor Avenue Ramps (Alternative 9). While volumes on Delaware Avenue tend to increase with introduction of the Delaware Avenue Extension, intersections with Richmond Street tend to decline in volume for any alternative adding Delaware Avenue Extension. Through traffic on Richmond Street in the study area south of Castor Avenue declines by 15 to 50 vehicles in the peak hour in each direction for alternatives with Delaware Avenue Extension, versus the No-Build without Delaware Avenue Extension (Alternative 1).

E. 2010 Opening Year Traffic Volumes

PENNDOT's traffic design consultants requested that DVRPC prepare opening year 2010 AADT traffic and AM and PM Peak Hour turning movement forecasts for I-95 sections Vine Street (I-676/VINE), Girard Avenue (GIR), and Ann Street to Frankford Creek (AFC) assuming the preferred alternative for each section and that the proposed Delaware Avenue Extension is opened to traffic. These 2010 projections are needed for construction staging analysis and planning for traffic diversion during construction. The 2010 forecasts for sections I-676/VINE and GIR and given in figures 23A through 23D of the companion report entitled, "I-95 Girard Avenue and I-676 Vine Expressway Interchanges, Section GIR Traffic Study," also prepared by DVRPC.

Figures 21 and 22 display 2010 opening year AADT and AM and peak hour ramp and turning movement volumes traffic volumes, respectively, for I-95 Section AFC. These volumes assume the preferred alternative in all three I-95 sections -- that is, Option 7 for Section GIR/I-676 Vine Expressway and the Dual Castor Avenue Ramp (Alternative 9) in Section AFC. These traffic forecasts were prepared by DVRPC using interpolation between the current traffic counts and 2025 forecasts for the preferred alternatives provided above.

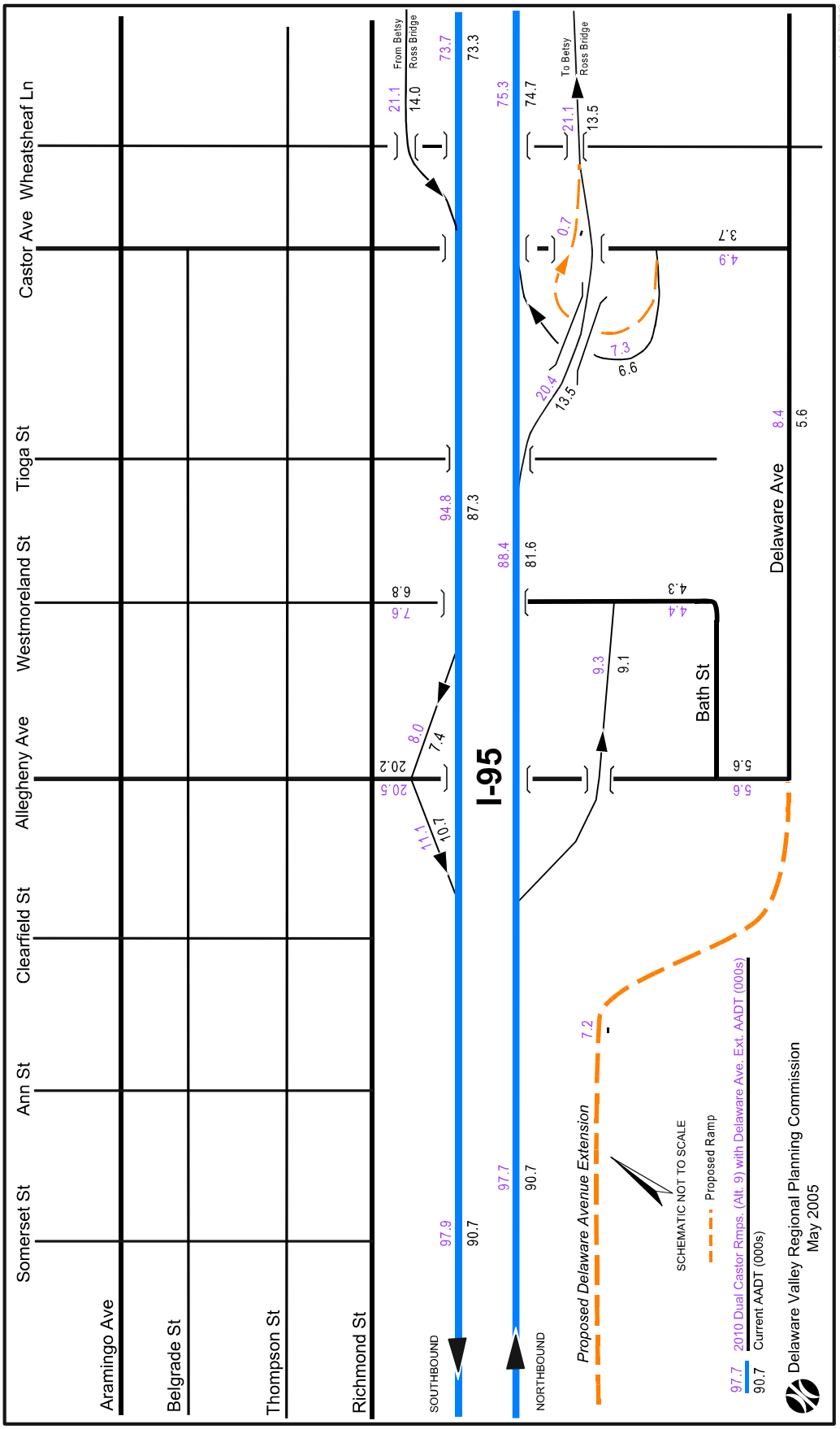
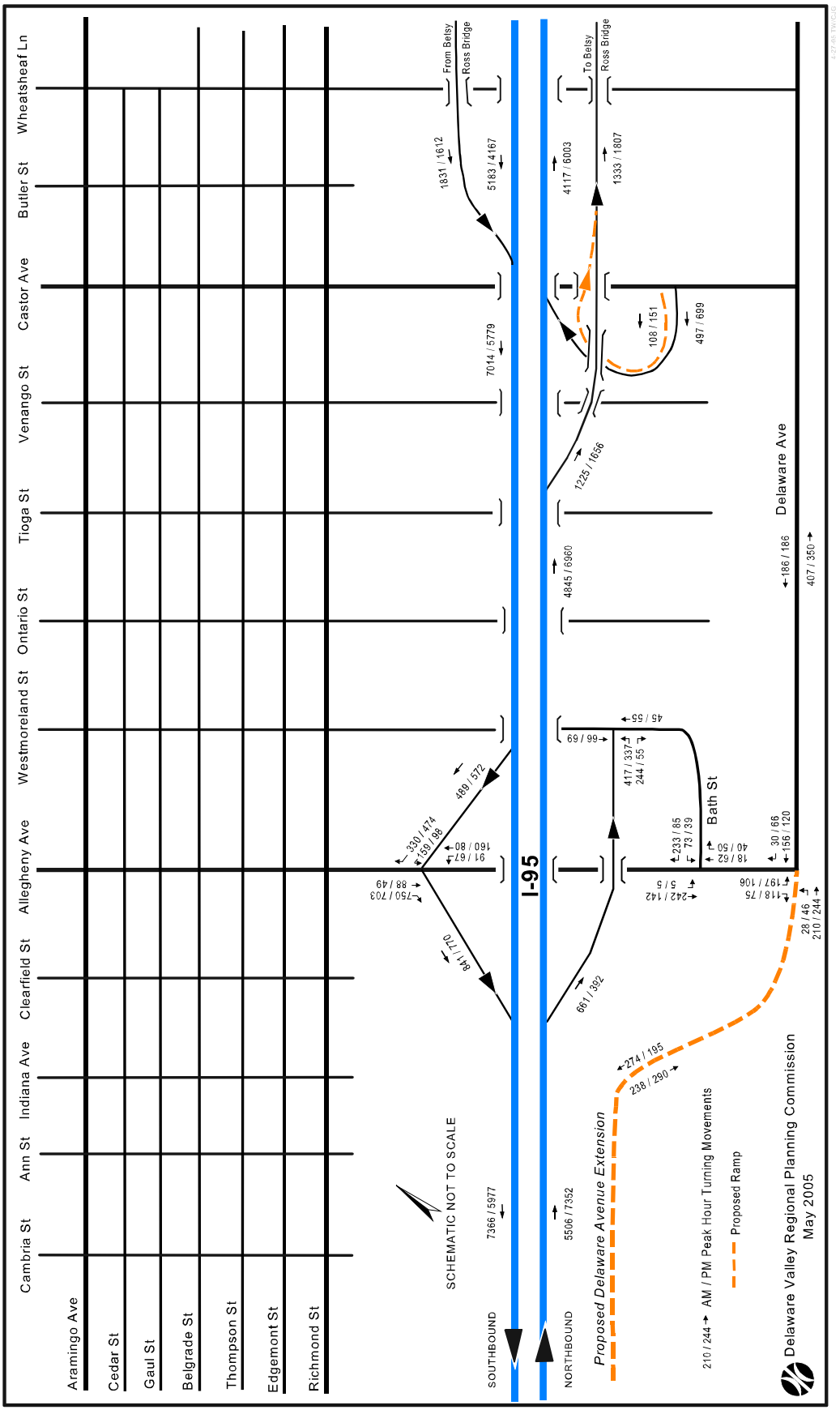


Figure 21. Current and 2010 Dual Castor Avenue Ramps (Alt. 9) with Delaware Avenue Extension Average Daily Traffic Volumes

Figure 22. 2010 Dual Castor Avenue Ramps (Alt. 9) with Delaware Avenue Extension AM/PM Peak Hour Turning Movements



Specifically, the 2030 I-95 southbound forecast between the Allegheny and Girard interchanges has been reduced from 106,100 to 97,500 vpd to reflect 2010 traffic conditions. As a result of the interpolation, the southbound I-95 Allegheny Avenue on-ramp has been reduced from 11,400 to 11,100 vpd in 2010 and the northbound I-95 Allegheny Avenue off-ramp has been reduced from 9,400 to 9,300 vpd. I-95 mainline northbound volumes between the Girard and Allegheny interchanges have been reduced from 105,900 in 2030 to 97,500 vpd in 2010 and 2010 traffic volumes on the proposed Delaware Avenue Extension are estimated at 7,200 vpd south of Allegheny Avenue as opposed to 8,700 in 2030.

APPENDIX A
24-HOUR MACHINE TRAFFIC COUNTS

(Page left intentionally blank)

TABLE OF CONTENTS

(Page left intentionally blank)

DVRPC – Travel Monitoring

DATE: 3/27/2000

ROAD: TR 95 NB OFF RAMP **FROM:** TR 95 NB **TO:** WEST MORELAND ST

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 8013/0750/0500 **FC:** 14

PROJECT: 042-221 **COUNT DIR:** NORTH **TRAFFIC DIR:** NORTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: **DVRPC FILE #:** 27786 **COUNTER:** 9765 **WEATHER:** F

Hour Ending	Monday 03/27/00	Tuesday 03/28/00	Wednesday 03/29/00	Thursday 03/30/00	Friday 03/31/00
1 AM		106	140		
2 AM		77	80		
3 AM		74	89		
4 AM		64	94		
5 AM		141	140		
6 AM		319	352		
7 AM		662	679		
8 AM		635	684		
9 AM		596	648		
10 AM		694	638		
11 AM		590	694		
12 PM	668	585	642		
1 PM	620	610	704		
2 PM	664	632			
3 PM	712	735			
4 PM	619	589			
5 PM	528	458			
6 PM	492	490			
7 PM	373	427			
8 PM	319	375			
9 PM	242	258			
10 PM	200	226			
11 PM	194	215			
12 AM	181	182			
		9,740			

SEASONAL FACTOR:	.972	AADT: **9,060**	AM PEAK %:	7.1	HOUR ENDING:	10:00 AM
AXLE CORR. FACTOR:	.957		PM PEAK %:	7.5	HOUR ENDING:	3:00 PM

DVRPC – Travel Monitoring

DATE: 3/29/2000

ROAD: TR 95 SB ON RAMP **FROM:** ALLEGHENY AVE **TO:** TR 95 SB

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 8013/0250/0350 **FC:** 14

PROJECT: 042-221 **COUNT DIR:** SOUTH **TRAFFIC DIR:** SOUTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: **DVRPC FILE #:** 27788 **COUNTER:** 9868 **WEATHER:** F

Hour Ending	Wednesday 03/29/00	Thursday 03/30/00	Friday 03/31/00	Saturday 04/01/00	Sunday 04/02/00
1 AM		88	151		
2 AM		96	123		
3 AM		72	134		
4 AM		123	134		
5 AM		153	135		
6 AM		333	322		
7 AM		624	642		
8 AM		878	855		
9 AM		771			
10 AM		682			
11 AM		708			
12 PM		682			
1 PM		652			
2 PM		709			
3 PM	758	753			
4 PM	820	810			
5 PM	770	790			
6 PM	668	664			
7 PM	502	532			
8 PM	409	407			
9 PM	326	339			
10 PM	278	248			
11 PM	222	254			
12 AM	166	186			
		11,554			

SEASONAL FACTOR:	.972	AADT: **10,748**	AM PEAK %:	7.6	HOUR ENDING:	8:00 AM
AXLE CORR. FACTOR:	.957		PM PEAK %:	7.	HOUR ENDING:	4:00 PM

DVRPC – Travel Monitoring

DATE: 3/27/2000

ROAD: TR 95 SB OFF RAMP **FROM:** TR 95 SB **TO:** ALLEGHENY AVE

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 8013/0500/0500 **FC:** 14

PROJECT: 042-221 **COUNT DIR:** SOUTH **TRAFFIC DIR:** SOUTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: **DVRPC FILE #:** 27787 **COUNTER:** 9834 **WEATHER:** F

Hour Ending	Monday 03/27/00	Tuesday 03/28/00	Wednesday 03/29/00	Thursday 03/30/00	Friday 03/31/00
1 AM		76	110		
2 AM		81	86		
3 AM		56	53		
4 AM		40	36		
5 AM		47	62		
6 AM		174	186		
7 AM		353	342		
8 AM		293	288		
9 AM		349	286		
10 AM		441	444		
11 AM		448	386		
12 PM	456	454	496		
1 PM	476	422	432		
2 PM	454	447			
3 PM	564	550			
4 PM	602	588			
5 PM	614	640			
6 PM	593	574			
7 PM	443	487			
8 PM	389	396			
9 PM	307	298			
10 PM	263	302			
11 PM	209	236			
12 AM	153	168			
		7,920			

SEASONAL FACTOR:	.972	AADT: **7,367**	AM PEAK %:	5.7	HOUR ENDING:	12:00 PM
AXLE CORR. FACTOR:	.957		PM PEAK %:	8.1	HOUR ENDING:	5:00 PM

DVRPC – Travel Monitoring

DATE: 3/27/2000

ROAD: TR 95 NB ON RAMP **FROM:** CASTOR AVE **TO:** TR 95 NB

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 8015/0010/0500 **FC:** 14

PROJECT: 042-221 **COUNT DIR:** NORTH **TRAFFIC DIR:** NORTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: **DVRPC FILE #:** 27785 **COUNTER:** 9867 **WEATHER:** F

Hour Ending	Monday 03/27/00	Tuesday 03/28/00	Wednesday 03/29/00	Thursday 03/30/00	Friday 03/31/00
1 AM		42	53		
2 AM		28	46		
3 AM		26	28		
4 AM		26	44		
5 AM		72	73		
6 AM		218	236		
7 AM		407	453		
8 AM		461	467		
9 AM		318	330		
10 AM		356	346		
11 AM		330	308		
12 PM	390	380	368		
1 PM	394	374			
2 PM	406	463			
3 PM	498	538			
4 PM	598	648			
5 PM	561	578			
6 PM	483	475			
7 PM	362	402			
8 PM	310	270			
9 PM	204	226			
10 PM	174	176			
11 PM	119	158			
12 AM	91	100			
		7,072			

SEASONAL FACTOR:	.972	AADT: **6,578**	AM PEAK %:	6.5	HOUR ENDING:	8:00 AM
AXLE CORR. FACTOR:	.957		PM PEAK %:	9.2	HOUR ENDING:	4:00 PM

DVRPC – Travel Monitoring

DATE: 3/28/2000

ROAD: TR 95 NB OFF RAMP **FROM:** TR 95 NB **TO:** B ROSS AND ARAMINGO AVE RAMPS

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 8017/0010/3000 **FC:** 14

PROJECT: 042-221 **COUNT DIR:** NORTH **TRAFFIC DIR:** NORTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: **DVRPC FILE #:** 27810 **COUNTER:** 9993 **WEATHER:** F

Hour Ending	Tuesday 03/28/00	Wednesday 03/29/00	Thursday 03/30/00	Friday 03/31/00	Saturday 04/01/00
1 AM		201	181		
2 AM		149	154		
3 AM		135	131		
4 AM		187	176		
5 AM		199	189		
6 AM		498	434		
7 AM		695	659		
8 AM		838	859		
9 AM		811	794		
10 AM		574	600		
11 AM	596	673	579		
12 PM	588	687	725		
1 PM	664	752	750		
2 PM	729	757	793		
3 PM	904	870	906		
4 PM	944	911	1,022		
5 PM	960	980	1,084		
6 PM	1,177	1,191	1,189		
7 PM	954	941	967		
8 PM	649	714	750		
9 PM	510	510			
10 PM	425	523			
11 PM	402	389			
12 AM	290	330			
		14,515			

SEASONAL FACTOR:	.972	AADT: **13,502**	AM PEAK %:	5.8	HOUR ENDING:	8:00 AM
AXLE CORR. FACTOR:	.957		PM PEAK %:	8.2	HOUR ENDING:	6:00 PM

DVRPC – Travel Monitoring

DATE: 4/5/2000

ROAD: TR 95 SB ON RAMP **FROM:** B ROSS AND ARAMINGO AVE RAMPS **TO:** TR 95 SB

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 8017/0250/2000 **FC:** 14

PROJECT: 042-221 **COUNT DIR:** SOUTH **TRAFFIC DIR:** SOUTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: **DVRPC FILE #:** 27809 **COUNTER:** 9787 **WEATHER:** F

Hour Ending	Wednesday 04/05/00	Thursday 04/06/00	Friday 04/07/00	Saturday 04/08/00	Sunday 04/09/00
1 AM		140	147		
2 AM		81	140		
3 AM		100	97		
4 AM		118	112		
5 AM		192	188		
6 AM		476	518		
7 AM		990	985		
8 AM		1,426			
9 AM		1,600			
10 AM		1,032			
11 AM	774	782			
12 PM	702	738			
1 PM	662	679			
2 PM	666	696			
3 PM	696	685			
4 PM	834	837			
5 PM	904	911			
6 PM	1,044	1,031			
7 PM	844	880			
8 PM	526	584			
9 PM	434	432			
10 PM	374	400			
11 PM	298	316			
12 AM	232	286			
		15,412			

SEASONAL FACTOR:	.95	AADT: **14,012**	AM PEAK %:	10.4	HOUR ENDING:	9:00 AM
AXLE CORR. FACTOR:	.957		PM PEAK %:	6.7	HOUR ENDING:	6:00 PM

DVRPC – Travel Monitoring

DATE: 5/29/2002

ROAD: SOMERSET ST **FROM:** BELGRADE ST **TO:** THOMPSON ST

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** LOC **FC:** 16

PROJECT: 242-030-14 **COUNT DIR:** BOTH **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 35 **LOOP OR CLASS:** Y

STATION ID: **DVRPC FILE #:** 32871 **COUNTER:** 999 **WEATHER:** F

Hour Ending	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02	Sunday 06/02/02
1 AM		30			
2 AM		18			
3 AM		7			
4 AM		11			
5 AM		21			
6 AM		52			
7 AM		104			
8 AM		176			
9 AM		159			
10 AM		152			
11 AM		127			
12 PM		156			
1 PM		156			
2 PM		175			
3 PM		196			
4 PM		298			
5 PM		287			
6 PM		314			
7 PM		231			
8 PM		194			
9 PM		166			
10 PM		103			
11 PM		81			
12 AM		51			
		3,265			

SEASONAL FACTOR:	.924	AADT: **3,017**	AM PEAK %:	5.4	HOUR ENDING:	8:00 AM
AXLE CORR. FACTOR:	.977		PM PEAK %:	9.6	HOUR ENDING:	6:00 PM

DVRPC – Travel Monitoring

DATE: 5/28/2002

ROAD: ANN ST WB **FROM:** BELGRADE ST **TO:** THOMPSON ST

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** LOC **FC:** 16

PROJECT: 242-030-15 **COUNT DIR:** WEST **TRAFFIC DIR:** WEST **SPEED LIMIT:** 35 **LOOP OR CLASS:**

STATION ID: **DVRPC FILE #:** 32872 **COUNTER:** 9766 **WEATHER:** F

Hour Ending	Tuesday 05/28/02	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02
1 AM		25	28		
2 AM		9	20		
3 AM		3	9		
4 AM		2	5		
5 AM		3	6		
6 AM		17	14		
7 AM		30	24		
8 AM		46	44		
9 AM		87	84		
10 AM		50	61		
11 AM	50	54			
12 PM	62	67			
1 PM	66	64			
2 PM	82	59			
3 PM	82	66			
4 PM	120	108			
5 PM	135	136			
6 PM	146	154			
7 PM	116	135			
8 PM	68	78			
9 PM	65	86			
10 PM	46	64			
11 PM	51	91			
12 AM	18	54			
		1,488			

SEASONAL FACTOR:	.924	AADT: **1,343**	AM PEAK %:	5.8	HOUR ENDING:	9:00 AM
AXLE CORR. FACTOR:	.977		PM PEAK %:	10.3	HOUR ENDING:	6:00 PM

DVRPC – Travel Monitoring

DATE: 5/28/2002

ROAD: CLEARFIELD ST **FROM:** BELGRADE ST **TO:** THOMPSON ST

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** LOC **FC:** 16

PROJECT: 242-030-16 **COUNT DIR:** BOTH **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 35 **LOOP OR CLASS:**

STATION ID: **DVRPC FILE #:** 32873 **COUNTER:** 9866 **WEATHER:** F

Hour Ending	Tuesday 05/28/02	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02
1 AM		21	23		
2 AM		19	17		
3 AM		9	14		
4 AM		8	8		
5 AM		7	13		
6 AM		29	32		
7 AM		66	58		
8 AM		138	138		
9 AM		114	142		
10 AM	91	108			
11 AM	110	112			
12 PM	122	138			
1 PM	150	134			
2 PM	144	114			
3 PM	172	174			
4 PM	199	209			
5 PM	214	189			
6 PM	232	265			
7 PM	178	205			
8 PM	168	160			
9 PM	123	138			
10 PM	89	119			
11 PM	76	114			
12 AM	38	67			
		2,657			

SEASONAL FACTOR:	.924	AADT: **2,399**	AM PEAK %:	5.2	HOUR ENDING:	8:00 AM
AXLE CORR. FACTOR:	.977		PM PEAK %:	10.	HOUR ENDING:	6:00 PM

DVRPC – Travel Monitoring

DATE: 11/18/1998

ROAD: ALLEGHENY AVE WB **FROM:** ARAMINGO AVE **TO:** BELGRADE ST

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 2016/0101/2000 **FC:** 16

PROJECT: PAP98 **COUNT DIR:** WEST **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: 25290 **DVRPC FILE #:** 4680 **COUNTER:** 9485 **WEATHER:** F

Hour Ending	Wednesday 11/18/98	Thursday 11/19/98	Friday 11/20/98	Saturday 11/21/98	Sunday 11/22/98
1 AM		103	116		
2 AM		90	90		
3 AM		101	81		
4 AM		57	53		
5 AM		41	58		
6 AM		141	168		
7 AM		306			
8 AM		475			
9 AM		469			
10 AM		594			
11 AM	575	538			
12 PM	530	525			
1 PM	583	560			
2 PM	562	574			
3 PM	614	595			
4 PM	579	645			
5 PM	541	647			
6 PM	499	551			
7 PM	439	423			
8 PM	388	392			
9 PM	305	268			
10 PM	230	267			
11 PM	226	219			
12 AM	197	170			
		8,751			

SEASONAL FACTOR:	.946	AADT: **8,063**	AM PEAK %:	6.8	HOUR ENDING:	10:00 AM
AXLE CORR. FACTOR:	.974		PM PEAK %:	7.4	HOUR ENDING:	5:00 PM

DVRPC – Travel Monitoring

DATE: 11/18/1998

ROAD: ALLEGHENY AVE EB **FROM:** ARAMINGO AVE **TO:** BELGRADE ST

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 2016/0100/2000 **FC:** 16

PROJECT: PAP98 **COUNT DIR:** EAST **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: 25290 **DVRPC FILE #:** 4702 **COUNTER:** 9488 **WEATHER:** F

Hour Ending	Wednesday 11/18/98	Thursday 11/19/98	Friday 11/20/98	Saturday 11/21/98	Sunday 11/22/98
1 AM		112	108		
2 AM		65	78		
3 AM		48	79		
4 AM		57	79		
5 AM		70	81		
6 AM		161	171		
7 AM		306			
8 AM		479			
9 AM		565			
10 AM		482			
11 AM	531	559			
12 PM	538	664			
1 PM	561	546			
2 PM	580	555			
3 PM	692	693			
4 PM	707	655			
5 PM	627	697			
6 PM	516	582			
7 PM	497	530			
8 PM	364	479			
9 PM	327	358			
10 PM	226	300			
11 PM	195	218			
12 AM	177	176			
		9,357			

SEASONAL FACTOR:	.946	AADT: **8,622**	AM PEAK %:	7.1	HOUR ENDING:	12:00 PM
AXLE CORR. FACTOR:	.974		PM PEAK %:	7.4	HOUR ENDING:	5:00 PM

DVRPC – Travel Monitoring

DATE: 5/28/2002

ROAD: ALLEGHENY AVE EB **FROM:** RICHMOND ST **TO:** TR 95 SB RAMPS

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 2016/0110/1668 **FC:** 16

PROJECT: 242-030-19 **COUNT DIR:** EAST **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: 25292 **DVRPC FILE #:** 32876 **COUNTER:** 9835 **WEATHER:** F

Hour Ending	Tuesday 05/28/02	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02
1 AM		112	119		
2 AM		108	96		
3 AM		72	98		
4 AM		74	86		
5 AM		92	110		
6 AM		282	303		
7 AM		745	679		
8 AM	930	967			
9 AM	962	1,049			
10 AM	642	728			
11 AM	618	609			
12 PM	568	584			
1 PM	651	699			
2 PM	701	619			
3 PM	728	735			
4 PM	836	834			
5 PM	895	862			
6 PM	776	770			
7 PM	598	652			
8 PM	406	454			
9 PM	316	404			
10 PM	266	286			
11 PM	231	264			
12 AM	212	221			
		12,222			

SEASONAL FACTOR:	.924	AADT: **11,033**	AM PEAK %:	8.6	HOUR ENDING:	9:00 AM
AXLE CORR. FACTOR:	.977		PM PEAK %:	7.1	HOUR ENDING:	5:00 PM

DVRPC – Travel Monitoring

DATE: 5/28/2002

ROAD: ALLEGHENY AVE WB **FROM:** RICHMOND ST **TO:** TR 95 SB RAMPS

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 2016/0111/1668 **FC:** 16

PROJECT: 242-030-20 **COUNT DIR:** WEST **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: 25292 **DVRPC FILE #:** 32877 **COUNTER:** 9867 **WEATHER:** F

Hour Ending	Tuesday 05/28/02	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02
1 AM		120	119		
2 AM		68	92		
3 AM		61	76		
4 AM		66	58		
5 AM		66	69		
6 AM		158	154		
7 AM		535	556		
8 AM		804	772		
9 AM	514	522			
10 AM	484	492			
11 AM	533	540			
12 PM	546	564			
1 PM	540	586			
2 PM	554	618			
3 PM	624	636			
4 PM	666	690			
5 PM	686	714			
6 PM	484	474			
7 PM	489	447			
8 PM	461	530			
9 PM	388	440			
10 PM	385	437			
11 PM	252	344			
12 AM	164	240			
		10,152			

SEASONAL FACTOR:	.924	AADT: **9,165**	AM PEAK %:	7.9	HOUR ENDING:	8:00 AM
AXLE CORR. FACTOR:	.977		PM PEAK %:	7.	HOUR ENDING:	5:00 PM

DVRPC – Travel Monitoring

DATE: 5/28/2002

ROAD: WESTMORELAND ST **FROM:** BELGRADE ST **TO:** THOMPSON ST

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** LOC **FC:** 16

PROJECT: 242-030-21 **COUNT DIR:** BOTH **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 35 **LOOP OR CLASS:**

STATION ID: **DVRPC FILE #:** 32878 **COUNTER:** 9946 **WEATHER:** F

Hour Ending	Tuesday 05/28/02	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02
1 AM		68	85		
2 AM		55	59		
3 AM		39	42		
4 AM		40	36		
5 AM		48	57		
6 AM		126	128		
7 AM		264	256		
8 AM		490	466		
9 AM		478	500		
10 AM	375	370			
11 AM	400	375			
12 PM	390	398			
1 PM	426	410			
2 PM	448	440			
3 PM	438	471			
4 PM	396	431			
5 PM	476	440			
6 PM	446	424			
7 PM	426	419			
8 PM	354	379			
9 PM	283	331			
10 PM	268	270			
11 PM	164	214			
12 AM	135	139			
		7,119			

SEASONAL FACTOR:	.924	AADT: **6,427**	AM PEAK %:	6.9	HOUR ENDING:	8:00 AM
AXLE CORR. FACTOR:	.977		PM PEAK %:	6.6	HOUR ENDING:	3:00 PM

DVRPC – Travel Monitoring

DATE: 5/28/2002

ROAD: WESTMORELAND ST WB **FROM:** RICHMOND ST **TO:** TR 95 SB OFF RAMP

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** LOC **FC:** 16

PROJECT: 242-030-23 **COUNT DIR:** WEST **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: **DVRPC FILE #:** 32880 **COUNTER:** 9765 **WEATHER:** F

Hour Ending	Tuesday 05/28/02	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02
1 AM		128	122		
2 AM		86	86		
3 AM		42	64		
4 AM		46	58		
5 AM		97	99		
6 AM		185	182		
7 AM		362	358		
8 AM		500	440		
9 AM		506	443		
10 AM	449	436			
11 AM	456	422			
12 PM	486	454			
1 PM	481	446			
2 PM	504	479			
3 PM	464	466			
4 PM	245	218			
5 PM	231	211			
6 PM	192	134			
7 PM	245	231			
8 PM	292	378			
9 PM	267	323			
10 PM	245	280			
11 PM	221	262			
12 AM	176	188			
		6,880			

SEASONAL FACTOR:	.924	AADT: **6,211**	AM PEAK %:	7.4	HOUR ENDING:	9:00 AM
AXLE CORR. FACTOR:	.977		PM PEAK %:	7.	HOUR ENDING:	2:00 PM

DVRPC – Travel Monitoring

DATE: 5/28/2002

ROAD: WESTMORELAND ST EB **FROM:** RICHMOND ST **TO:** TR 95 SB OFF RAMP

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** LOC **FC:** 16

PROJECT: 242-030-22 **COUNT DIR:** EAST **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: **DVRPC FILE #:** 32879 **COUNTER:** 9950 **WEATHER:** F

Hour Ending	Tuesday 05/28/02	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02
1 AM		6	3		
2 AM		6	2		
3 AM		4	2		
4 AM		6	4		
5 AM		7	2		
6 AM		14	8		
7 AM		26	24		
8 AM		44	32		
9 AM		36	35		
10 AM	28	22			
11 AM	22	26			
12 PM	19	18			
1 PM	36	34			
2 PM	36	58			
3 PM	42	43			
4 PM	50	100			
5 PM	36	52			
6 PM	38	46			
7 PM	41	48			
8 PM	26	36			
9 PM	20	28			
10 PM	8	22			
11 PM	2	11			
12 AM	2	5			
		698			

SEASONAL FACTOR:	.924	AADT: **630**	AM PEAK %:	6.3	HOUR ENDING:	8:00 AM
AXLE CORR. FACTOR:	.977		PM PEAK %:	14.3	HOUR ENDING:	4:00 PM

DVRPC – Travel Monitoring

DATE: 5/28/2002

ROAD: TIOGA ST **FROM:** BELGRADE ST **TO:** THOMPSON ST

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** LOC **FC:** 16

PROJECT: 242-030-25 **COUNT DIR:** BOTH **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: **DVRPC FILE #:** 32882 **COUNTER:** 9489 **WEATHER:** F

Hour Ending	Tuesday 05/28/02	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02
1 AM		33	49		
2 AM		28	26		
3 AM		19	21		
4 AM		11	14		
5 AM		19	15		
6 AM		32	36		
7 AM		43	49		
8 AM		164	132		
9 AM		208	198		
10 AM		216			
11 AM		199			
12 PM		155			
1 PM	168	193			
2 PM	246	246			
3 PM	197	210			
4 PM	217	243			
5 PM	225	217			
6 PM	224	227			
7 PM	193	213			
8 PM	208	201			
9 PM	141	126			
10 PM	112	113			
11 PM	76	93			
12 AM	50	54			
		3,263			

SEASONAL FACTOR:	.924	AADT: **2,946**	AM PEAK %:	6.6	HOUR ENDING:	10:00 AM
AXLE CORR. FACTOR:	.977		PM PEAK %:	7.5	HOUR ENDING:	2:00 PM

DVRPC – Travel Monitoring

DATE: 5/28/2002

ROAD: CASTOR AVE **FROM:** ARAMINGO AVE **TO:** THOMPSON ST

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 1005/0050/1112 **FC:** 16

PROJECT: 242-030-26 **COUNT DIR:** BOTH **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: **DVRPC FILE #:** 32883 **COUNTER:** 9520 **WEATHER:** F

Hour Ending	Tuesday 05/28/02	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02
1 AM		202	178		
2 AM		103	135		
3 AM		67	67		
4 AM		48	59		
5 AM		58	58		
6 AM		85	96		
7 AM		345	324		
8 AM		851	784		
9 AM		1,045	968		
10 AM		875			
11 AM		813			
12 PM		841			
1 PM	923	830			
2 PM	855	841			
3 PM	976	930			
4 PM	1,003	941			
5 PM	984	1,014			
6 PM	1,059	1,042			
7 PM	978	976			
8 PM	758	784			
9 PM	689	705			
10 PM	457	520			
11 PM	376	422			
12 AM	274	311			
		14,649			

SEASONAL FACTOR:	.924	AADT: **13,224**	AM PEAK %:	7.1	HOUR ENDING:	9:00 AM
AXLE CORR. FACTOR:	.977		PM PEAK %:	7.1	HOUR ENDING:	6:00 PM

DVRPC – Travel Monitoring

DATE: 5/29/2002

ROAD: CASTOR AVE EB **FROM:** THOMPSON ST **TO:** RICHMOND ST

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 1005/0040/1229 **FC:** 16

PROJECT: 242-030-28 **COUNT DIR:** EAST **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 35 **LOOP OR CLASS:** Y

STATION ID: 25208 **DVRPC FILE #:** 32885 **COUNTER:** 999 **WEATHER:** F

Hour Ending	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02	Sunday 06/02/02
1 AM		108			
2 AM		62			
3 AM		45			
4 AM		52			
5 AM		91			
6 AM		273			
7 AM		661			
8 AM		682			
9 AM		648			
10 AM		558			
11 AM		547			
12 PM		610			
1 PM		640			
2 PM		684			
3 PM		704			
4 PM		819			
5 PM		857			
6 PM		822			
7 PM		629			
8 PM		535			
9 PM		452			
10 PM		374			
11 PM		310			
12 AM		192			
		11,355			

SEASONAL FACTOR:	.924	AADT: **10,492**	AM PEAK %:	6.	HOUR ENDING:	8:00 AM
AXLE CORR. FACTOR:	.977		PM PEAK %:	7.5	HOUR ENDING:	5:00 PM

DVRPC – Travel Monitoring

DATE: 5/28/2002

ROAD: CASTOR AVE **FROM:** RICHMOND ST **TO:** TR 95 NB ON RAMP

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 1005/0030/1459 **FC:** 16

PROJECT: 242-030-27 **COUNT DIR:** BOTH **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: **DVRPC FILE #:** 32884 **COUNTER:** 8801 **WEATHER:** F

Hour Ending	Tuesday 05/28/02	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02
1 AM		103	110		
2 AM		66	79		
3 AM		43	56		
4 AM		30	47		
5 AM		22	30		
6 AM		61	55		
7 AM		256	241		
8 AM		571	565		
9 AM		552	537		
10 AM		475			
11 AM		459			
12 PM	412	474			
1 PM	435	491			
2 PM	520	513			
3 PM	496	546			
4 PM	516	568			
5 PM	678	735			
6 PM	553	614			
7 PM	489	564			
8 PM	391	436			
9 PM	285	308			
10 PM	211	269			
11 PM	192	210			
12 AM	111	139			
		8,505			

SEASONAL FACTOR:	.924	AADT: **7,678**	AM PEAK %:	6.7	HOUR ENDING:	8:00 AM
AXLE CORR. FACTOR:	.977		PM PEAK %:	8.6	HOUR ENDING:	5:00 PM

DVRPC – Travel Monitoring

DATE: 5/28/2002

ROAD: CASTOR AVE **FROM:** TR 95 NB ON RAMP **TO:** DELAWARE AVE

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 1005/0030/1457 **FC:** 16

PROJECT: 242-030-30 **COUNT DIR:** BOTH **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: **DVRPC FILE #:** 32887 **COUNTER:** 9491 **WEATHER:** F

Hour Ending	Tuesday 05/28/02	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02
1 AM		31	31		
2 AM		15	21		
3 AM		7	7		
4 AM		4	27		
5 AM		4	10		
6 AM		14	22		
7 AM		81	69		
8 AM		275	251		
9 AM		246	315		
10 AM		277			
11 AM		270			
12 PM	257	278			
1 PM	320	316			
2 PM	306	257			
3 PM	255	272			
4 PM	282	320			
5 PM	404	447			
6 PM	296	309			
7 PM	224	255			
8 PM	109	163			
9 PM	90	106			
10 PM	51	53			
11 PM	67	70			
12 AM	35	51			
		4,121			

SEASONAL FACTOR:	.924	AADT: **3,720**	AM PEAK %:	6.7	HOUR ENDING:	12:00 PM
AXLE CORR. FACTOR:	.977		PM PEAK %:	10.8	HOUR ENDING:	5:00 PM

DVRPC – Travel Monitoring

DATE: 2/20/2001

ROAD: ARAMINGO AVE NB **FROM:** AUBURN ST **TO:** CLEARVIEW ST

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 2009/0030/1124 **FC:** 14

PROJECT: PAP01 **COUNT DIR:** NORTH **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: 25266 **DVRPC FILE #:** 29422 **COUNTER:** 9946 **WEATHER:** F

Hour Ending	Tuesday 02/20/01	Wednesday 02/21/01	Thursday 02/22/01	Friday 02/23/01	Saturday 02/24/01
1 AM		63	54		
2 AM		54	40		
3 AM		57	37		
4 AM		27	34		
5 AM		64	66		
6 AM		164	174		
7 AM		282	250		
8 AM		368	338		
9 AM		378	384		
10 AM	458	438			
11 AM	442	436			
12 PM	465	472			
1 PM	494	468			
2 PM	468	462			
3 PM	528	558			
4 PM	568	582			
5 PM	616	636			
6 PM	546	591			
7 PM	360	350			
8 PM	272	256			
9 PM	246	251			
10 PM	173	171			
11 PM	114	134			
12 AM	76	68			
		7,330			

SEASONAL FACTOR:	.976	AADT: **6,761**	AM PEAK %:	6.4	HOUR ENDING:	12:00 PM
AXLE CORR. FACTOR:	.945		PM PEAK %:	8.7	HOUR ENDING:	5:00 PM

DVRPC – Travel Monitoring

DATE: 2/20/2001

ROAD: ARAMINGO AVE SB **FROM:** AUBURN ST **TO:** CLEARVIEW ST

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 2009/0031/1133 **FC:** 14

PROJECT: PAP01 **COUNT DIR:** SOUTH **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: 25266 **DVRPC FILE #:** 29423 **COUNTER:** 9866 **WEATHER:** F

Hour Ending	Tuesday 02/20/01	Wednesday 02/21/01	Thursday 02/22/01	Friday 02/23/01	Saturday 02/24/01
1 AM		54	50		
2 AM		34	37		
3 AM		28	24		
4 AM		26	28		
5 AM		60	61		
6 AM		224	214		
7 AM		590	562		
8 AM		745	783		
9 AM		613	604		
10 AM	470	500			
11 AM	514	521			
12 PM	460	488			
1 PM	438	472			
2 PM	486	456			
3 PM	471	508			
4 PM	554	609			
5 PM	545	546			
6 PM	491	500			
7 PM	454	438			
8 PM	327	366			
9 PM	297	300			
10 PM	208	217			
11 PM	158	158			
12 AM	96	96			
		8,549			

SEASONAL FACTOR:	.976	AADT: **7,885**	AM PEAK %:	8.7	HOUR ENDING:	8:00 AM
AXLE CORR. FACTOR:	.945		PM PEAK %:	7.1	HOUR ENDING:	4:00 PM

DVRPC – Travel Monitoring

DATE: 5/28/2002

ROAD: ARAMINGO AVE NB **FROM:** VENANGO ST **TO:** CASTOR AVE

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 2009/0050/1552 **FC:** 14

PROJECT: 242-030-07 **COUNT DIR:** NORTH **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 35 **LOOP OR CLASS:** Y

STATION ID: 25267 **DVRPC FILE #:** 32864 **COUNTER:** 999 **WEATHER:** F

Hour Ending	Tuesday 05/28/02	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02
1 AM		152			
2 AM		71			
3 AM		57			
4 AM		37			
5 AM		73			
6 AM		236			
7 AM		598			
8 AM		908			
9 AM		980			
10 AM		864			
11 AM		859			
12 PM		963			
1 PM		1,029			
2 PM		973			
3 PM		984			
4 PM		1,181			
5 PM		1,175			
6 PM		1,210			
7 PM		1,149			
8 PM		838			
9 PM		767			
10 PM		544			
11 PM		377			
12 AM		251			
		16,276			

SEASONAL FACTOR:	.922	AADT: **15,007**	AM PEAK %:	6.	HOUR ENDING:	9:00 AM
AXLE CORR. FACTOR:	.94		PM PEAK %:	7.4	HOUR ENDING:	6:00 PM

DVRPC – Travel Monitoring

DATE: 6/4/2001

ROAD: ARAMINGO AVE NB **FROM:** WHEATSHEAF LA **TO:** ARAMINGO CONNECTOR

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 2009/0060/1500 **FC:** 14

PROJECT: 142-130-5 **COUNT DIR:** NORTH **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 30 **LOOP OR CLASS:**

STATION ID: **DVRPC FILE #:** 30735 **COUNTER:** 9624 **WEATHER:** F

Hour Ending	Monday 06/04/01	Tuesday 06/05/01	Wednesday 06/06/01	Thursday 06/07/01	Friday 06/08/01
1 AM		72	82		
2 AM		71	58		
3 AM		54	51		
4 AM		62	69		
5 AM		186	159		
6 AM		392	409		
7 AM		670	723		
8 AM		894	865		
9 AM		754	796		
10 AM		682	666		
11 AM		820	811		
12 PM		862	904		
1 PM		918			
2 PM		945			
3 PM	1,210	1,186			
4 PM	1,600	1,597			
5 PM	1,646	1,656			
6 PM	1,226	1,156			
7 PM	808	778			
8 PM	657	640			
9 PM	494	535			
10 PM	352	412			
11 PM	240	277			
12 AM	186	186			
		15,805			

SEASONAL FACTOR:	.918	AADT: **13,711**	AM PEAK %:	5.7	HOUR ENDING:	8:00 AM
AXLE CORR. FACTOR:	.945		PM PEAK %:	10.5	HOUR ENDING:	5:00 PM

DVRPC – Travel Monitoring

DATE: 5/28/2002

ROAD: BELGRADE ST SB **FROM:** ANN ST **TO:** CLEARFIELD ST

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** LOC **FC:** 16

PROJECT: 242-030-01 **COUNT DIR:** SOUTH **TRAFFIC DIR:** SOUTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: **DVRPC FILE #:** 32858 **COUNTER:** 9767 **WEATHER:** F

Hour Ending	Tuesday 05/28/02	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02
1 AM		48	56		
2 AM		36	30		
3 AM		18	28		
4 AM		16	16		
5 AM		21	7		
6 AM		6	7		
7 AM		34	28		
8 AM		112	128		
9 AM	216	312			
10 AM	330	344			
11 AM	199	224			
12 PM	180	197			
1 PM	215	204			
2 PM	244	252			
3 PM	228	232			
4 PM	284	276			
5 PM	306	295			
6 PM	322	321			
7 PM	375	364			
8 PM	282	341			
9 PM	240	278			
10 PM	218	271			
11 PM	159	218			
12 AM	94	119			
		4,539			

SEASONAL FACTOR:	.924	AADT: **4,098**	AM PEAK %:	7.6	HOUR ENDING:	10:00 AM
AXLE CORR. FACTOR:	.977		PM PEAK %:	8.	HOUR ENDING:	7:00 PM

DVRPC – Travel Monitoring

DATE: 5/28/2002

ROAD: BELGRADE ST SB **FROM:** WESTMORELAND ST **TO:** ONTARIO ST

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** LOC **FC:** 16

PROJECT: 242-030-02 **COUNT DIR:** SOUTH **TRAFFIC DIR:** SOUTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: **DVRPC FILE #:** 32859 **COUNTER:** 9769 **WEATHER:** F

Hour Ending	Tuesday 05/28/02	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02
1 AM		42	52		
2 AM		22	27		
3 AM		18	19		
4 AM		10	7		
5 AM		4	4		
6 AM		6	6		
7 AM		35	29		
8 AM		148	149		
9 AM	256	336			
10 AM	386	363			
11 AM	248	259			
12 PM	231	222			
1 PM	244	210			
2 PM	260	250			
3 PM	287	242			
4 PM	267	263			
5 PM	306	294			
6 PM	360	358			
7 PM	364	374			
8 PM	280	340			
9 PM	236	267			
10 PM	191	228			
11 PM	148	204			
12 AM	80	97			
		4,592			

SEASONAL FACTOR:	.924	AADT: **4,145**	AM PEAK %:	7.9	HOUR ENDING:	10:00 AM
AXLE CORR. FACTOR:	.977		PM PEAK %:	8.1	HOUR ENDING:	7:00 PM

DVRPC – Travel Monitoring

DATE: 5/28/2002

ROAD: THOMPSON ST NB **FROM:** ANN ST **TO:** CLEARFIELD ST

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** LOC **FC:** 16

PROJECT: 242-030-03 **COUNT DIR:** NORTH **TRAFFIC DIR:** NORTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: **DVRPC FILE #:** 32860 **COUNTER:** 9763 **WEATHER:** F

Hour Ending	Tuesday 05/28/02	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02
1 AM		43	52		
2 AM		28	27		
3 AM		14	28		
4 AM		6	13		
5 AM		9	6		
6 AM		6	5		
7 AM		21	28		
8 AM		88	78		
9 AM		221	226		
10 AM	123	212			
11 AM	180	182			
12 PM	230	207			
1 PM	241	212			
2 PM	243	259			
3 PM	304	264			
4 PM	350	299			
5 PM	452	476			
6 PM	409	410			
7 PM	453	531			
8 PM	252	326			
9 PM	176	193			
10 PM	132	141			
11 PM	82	112			
12 AM	60	94			
		4,354			

SEASONAL FACTOR:	.924	AADT: **4,023**	AM PEAK %:	5.1	HOUR ENDING:	9:00 AM
AXLE CORR. FACTOR:	1		PM PEAK %:	12.2	HOUR ENDING:	7:00 PM

DVRPC – Travel Monitoring

DATE: 5/28/2002

ROAD: THOMPSON ST NB **FROM:** WESTMORELAND ST **TO:** ONTARIO ST

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** LOC **FC:** 16

PROJECT: 242-030-04 **COUNT DIR:** NORTH **TRAFFIC DIR:** NORTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: **DVRPC FILE #:** 32861 **COUNTER:** 9957 **WEATHER:** F

Hour Ending	Tuesday 05/28/02	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02
1 AM		52	64		
2 AM		30	38		
3 AM		27	33		
4 AM		12	22		
5 AM		8	10		
6 AM		24	20		
7 AM		82	48		
8 AM		172	158		
9 AM		300	302		
10 AM	298	297			
11 AM	293	220			
12 PM	276	220			
1 PM	270	251			
2 PM	280	274			
3 PM	320	288			
4 PM	334	316			
5 PM	405	394			
6 PM	420	471			
7 PM	444	457			
8 PM	300	385			
9 PM	198	241			
10 PM	180	182			
11 PM	91	155			
12 AM	80	110			
		4,968			

SEASONAL FACTOR:	.924	AADT: **4,485**	AM PEAK %:	6.	HOUR ENDING:	9:00 AM
AXLE CORR. FACTOR:	.977		PM PEAK %:	9.5	HOUR ENDING:	6:00 PM

DVRPC – Travel Monitoring

DATE: 5/28/2002

ROAD: RICHMOND ST SB **FROM:** ANN ST **TO:** CLEARFIELD ST

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 2001/0160/1220 **FC:** 16

PROJECT: 242-030-06 **COUNT DIR:** SOUTH **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 30 **LOOP OR CLASS:**

STATION ID: 16946 **DVRPC FILE #:** 32863 **COUNTER:** 9770 **WEATHER:** F

Hour Ending	Tuesday 05/28/02	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02
1 AM		101	122		
2 AM		54	62		
3 AM		34	50		
4 AM		20	33		
5 AM		26	11		
6 AM		21	17		
7 AM		55	58		
8 AM		187	184		
9 AM		380	350		
10 AM		376	378		
11 AM	270	216			
12 PM	200	236			
1 PM	218	248			
2 PM	258	276			
3 PM	287	318			
4 PM	262	250			
5 PM	270	325			
6 PM	330	329			
7 PM	332	336			
8 PM	282	310			
9 PM	236	255			
10 PM	203	225			
11 PM	186	180			
12 AM	137	196			
		4,954			

SEASONAL FACTOR:	.924	AADT: **4,472**	AM PEAK %:	7.7	HOUR ENDING:	9:00 AM
AXLE CORR. FACTOR:	.977		PM PEAK %:	6.8	HOUR ENDING:	7:00 PM

DVRPC – Travel Monitoring

DATE: 5/28/2002

ROAD: RICHMOND ST NB **FROM:** ANN ST **TO:** CLEARFIELD ST

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 2001/0160/1220 **FC:** 16

PROJECT: 242-030-05 **COUNT DIR:** NORTH **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 30 **LOOP OR CLASS:**

STATION ID: 16946 **DVRPC FILE #:** 32862 **COUNTER:** 9873 **WEATHER:** F

Hour Ending	Tuesday 05/28/02	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02
1 AM		74	82		
2 AM		34	46		
3 AM		41	38		
4 AM		24	34		
5 AM		21	13		
6 AM		18	18		
7 AM		28	43		
8 AM		109	117		
9 AM		96	104		
10 AM		118	106		
11 AM	152	217			
12 PM	168	136			
1 PM	164	151			
2 PM	154	116			
3 PM	180	135			
4 PM	150	164			
5 PM	484	408			
6 PM	602	588			
7 PM	574	667			
8 PM	468	506			
9 PM	177	188			
10 PM	160	168			
11 PM	120	132			
12 AM	98	110			
		4,249			

SEASONAL FACTOR:	.924	AADT: **3,836**	AM PEAK %:	5.1	HOUR ENDING:	11:00 AM
AXLE CORR. FACTOR:	.977		PM PEAK %:	15.7	HOUR ENDING:	7:00 PM

DVRPC – Travel Monitoring

DATE: 5/29/2002

ROAD: RICHMOND ST NB **FROM:** CASTOR AVE **TO:** WHEATSHEAF LA

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 2001/0180/1601 **FC:** 14

PROJECT: 242-030-09 **COUNT DIR:** NORTH **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: 24846 **DVRPC FILE #:** 32866 **COUNTER:** 9869 **WEATHER:** F

Hour Ending	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02	Sunday 06/02/02
1 AM		144	178		
2 AM		72	68		
3 AM		58	74		
4 AM		38	61		
5 AM		40	62		
6 AM		74	93		
7 AM		178	148		
8 AM		292	264		
9 AM		439	421		
10 AM		422			
11 AM		361			
12 PM		390			
1 PM	366	448			
2 PM	420	446			
3 PM	460	442			
4 PM	531	592			
5 PM	780	786			
6 PM	1,013	1,006			
7 PM	1,030	1,081			
8 PM	734	720			
9 PM	432	490			
10 PM	321	374			
11 PM	284	288			
12 AM	214	198			
		9,379			

SEASONAL FACTOR:	.922	AADT: **8,129**	AM PEAK %:	4.7	HOUR ENDING:	9:00 AM
AXLE CORR. FACTOR:	.94		PM PEAK %:	11.5	HOUR ENDING:	7:00 PM

DVRPC – Travel Monitoring

DATE: 5/29/2002

ROAD: RICHMOND ST SB **FROM:** CASTOR AVE **TO:** WHEATSHEAF LA

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 2001/0180/1601 **FC:** 14

PROJECT: 242-030-10 **COUNT DIR:** SOUTH **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: 24846 **DVRPC FILE #:** 32867 **COUNTER:** 9871 **WEATHER:** F

Hour Ending	Wednesday 05/29/02	Thursday 05/30/02	Friday 05/31/02	Saturday 06/01/02	Sunday 06/02/02
1 AM		107	129		
2 AM		64	70		
3 AM		57	73		
4 AM		34	46		
5 AM		46	54		
6 AM		58	62		
7 AM		189	195		
8 AM		593	592		
9 AM		865	807		
10 AM		762			
11 AM		528			
12 PM	395	426			
1 PM	387	461			
2 PM	424	465			
3 PM	472	446			
4 PM	444	460			
5 PM	523	550			
6 PM	516	564			
7 PM	494	537			
8 PM	381	425			
9 PM	324	346			
10 PM	280	266			
11 PM	226	246			
12 AM	139	210			
		8,705			

SEASONAL FACTOR:	.922	AADT: **7,544**	AM PEAK %:	9.9	HOUR ENDING:	9:00 AM
AXLE CORR. FACTOR:	.94		PM PEAK %:	6.5	HOUR ENDING:	6:00 PM

DVRPC – Travel Monitoring

DATE: 6/26/2002

ROAD: DELAWARE AVE NB **FROM:** ALLEGHENY AVE **TO:** VENANGO ST

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 1005/0020/1136 **FC:** 16

PROJECT: 242-030-11 **COUNT DIR:** NORTH **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 35 **LOOP OR CLASS:**

STATION ID: 15025 **DVRPC FILE #:** 32868 **COUNTER:** 9840 **WEATHER:** F

Hour Ending	Wednesday 06/26/02	Thursday 06/27/02	Friday 06/28/02	Saturday 06/29/02	Sunday 06/30/02
1 AM		44	42		
2 AM		41	28		
3 AM		14	26		
4 AM		12	24		
5 AM		2	24		
6 AM		36	38		
7 AM		108	87		
8 AM		177	162		
9 AM		191			
10 AM	212	206			
11 AM	200	212			
12 PM	200	208			
1 PM	212	228			
2 PM	219	210			
3 PM	271	222			
4 PM	192	230			
5 PM	290	299			
6 PM	276	298			
7 PM	256	252			
8 PM	114	206			
9 PM	79	88			
10 PM	48	71			
11 PM	64	83			
12 AM	34	52			
		3,490			

SEASONAL FACTOR:	.921	AADT: **3,140**	AM PEAK %:	6.1	HOUR ENDING:	11:00 AM
AXLE CORR. FACTOR:	.977		PM PEAK %:	8.6	HOUR ENDING:	5:00 PM

DVRPC – Travel Monitoring

DATE: 6/26/2002

ROAD: DELAWARE AVE SB **FROM:** ALLEGHENY AVE **TO:** VENANGO ST

COUNTY: PHILADELPHIA **MCD:** 239 - PHILADELPHIA **SR/SEG/OFF:** 1005/0021/1128 **FC:** 16

PROJECT: 242-030-12 **COUNT DIR:** SOUTH **TRAFFIC DIR:** BOTH **SPEED LIMIT:** 25 **LOOP OR CLASS:**

STATION ID: 15025 **DVRPC FILE #:** 32869 **COUNTER:** 9872 **WEATHER:** F

Hour Ending	Wednesday 06/26/02	Thursday 06/27/02	Friday 06/28/02	Saturday 06/29/02	Sunday 06/30/02
1 AM		22	12		
2 AM		38	19		
3 AM		22	26		
4 AM		22	21		
5 AM		45	18		
6 AM		58	56		
7 AM		182	142		
8 AM		291	225		
9 AM		329			
10 AM	156	170			
11 AM	174	146			
12 PM	196	174			
1 PM	150	175			
2 PM	179	174			
3 PM	179	206			
4 PM	179	170			
5 PM	149	150			
6 PM	106	122			
7 PM	77	69			
8 PM	54	58			
9 PM	24	42			
10 PM	28	32			
11 PM	42	32			
12 AM	19	20			
		2,749			

SEASONAL FACTOR:	.921	AADT:	**2,474**	AM PEAK %:	12.	HOUR ENDING:	9:00 AM
AXLE CORR. FACTOR:	.977			PM PEAK %:	7.5	HOUR ENDING:	3:00 PM

I-95 Interchange Enhancement and Reconstruction
I-95 Section AFC (Ann Street to Frankford Creek) Interchange Traffic Study

Publication No.: 06010

Date Published: May 2006

Geographic Area Covered: *Delaware Expressway (I-95), Allegheny Avenue, Delaware Avenue, and Lower Northeast Philadelphia neighborhoods of Port Richmond, Kensington, Fishtown, and Queen Village north of Center City Philadelphia*

Key Words: Traffic Volumes, Peak Hour Traffic, Travel Forecast, I-95, Delaware Expressway, Betsy Ross Bridge, Allegheny Avenue, Richmond Street, Castor, Aramingo, Lehigh and Girard avenues, Westmoreland Street, Delaware Avenue Extension

ABSTRACT
This report presents traffic forecasts and analysis for the Delaware Expressway (I-95), Section AFC (Ann Street to Frankford Creek) and Allegheny Avenue. The report examines the impacts of 2025 traffic volumes on I-95, interchanges for Castor, Aramingo/Girard and Allegheny avenues, and also the local roadway system for a No-Build Alternative with and without Delaware Avenue Extension and seven Build Alternatives. The report also briefly describes the methodology used to develop the traffic forecasts.

Delaware Valley Regional Planning Commission
190 North Independence Mall West, 8th Floor
Philadelphia, PA 19106-1520

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

Staff contact: W. Thomas Walker, Ph.D.
Direct Phone: 215-238-2886
E-mail: twalker@dvrpc.org

Delaware Valley
Regional Planning
Commisson

DVRPC, 8th Floor
190 N. Independence Mall West
Philadelphia, PA 19106-1520

www.dvrpc.org
215.592.1800

Delaware Valley
Regional Planning
Commission

DVRPC, 8th Floor
190 N. Independence Mall West
Philadelphia, PA 19106-1520

www.dvrpc.org
215.592.1800