February 20, 2023
TPD# SUPE.00001

Est. 1989

TRAFFIC PLANNING AND DESIGN, INC.

SUPERIOR HOLDINGS RESIDENTIAL DEVELOPMENT

Transportation Impact Assessment

Hulmeville Borough, Bucks County, PA

For Submission To:

Hulmeville Borough, Bucks County

& PennDOT District 6-0

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SUPERIOR HOLDINGS RESIDENTIAL DEVELOPMENT
TRANSPORTATION IMPACT ASSESSMENT

FOR SUBMISSION TO:

PennDOT District 6-0 &
Hulmeville Borough, Bucks County, PA

Prepared For:
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EXECUTIVE SUMMARY

The purpose of this Transportation Impact Assessment (TIA) is to examine the potential traffic impact associated with the proposed Superior Holdings residential development on the roadway network in Hulmeville Borough, Bucks County, Pennsylvania. Based on this evaluation, the following conclusions were reached:

- The subject site is located on the eastern side of Trenton Road (SR 2018).
- The proposed site will be constructed in two (2) Phases. Phase 1 will include 112 residential units, consisting of the following:
  - 39 Single-family (detached) homes;
  - 39 Single-family (attached) homes;
  - 33 apartment units;
  - 1 existing single-family home (farmhouse).

  Phase 2 will replace the existing farmhouse with an additional 10 single-family (attached) homes for a total unit count of 121 units, broken down as follows:
  - 39 Single-family (detached) homes;
  - 49 Single-family (attached) homes;
  - 33 apartment units.

  The analyses contained in this TIA assume full-build-out (Phase 2) in order to provide a conservative approach.
- TPD assumed a future year of 2027.
- The majority of the proposed development will be served by one (1) full-access driveway to Trenton Road (SR 2018). Two (2) of the proposed single-family homes will have individual accesses to Pennsylvania Avenue, on the eastern portion of the site.
- The measured sight distances satisfy all PennDOT Sight Distance criteria.
- The full build-out of the Proposed Site will generate **89 new trips** during the weekday A.M. peak hour and **104 new trips** during the weekday P.M. peak hour.
- Under all projected (build) conditions with the development of the proposed site, and with the site-related recommendations, all study area intersections will satisfy PennDOT ILOS Standards.
- All of the study area intersections comply with the ILOS C or better requirement outlined in Appendix B of the Hulmeville Borough Zoning Ordinance for all intersections with the exception of Trenton Road (SR 2018) and Durham Road (SR 2049). During both the weekday A.M. and P.M. peak hours, the intersection currently operates at ILOS E under Existing Conditions and continues to do so in all future condition analyses. With the additional development traffic and associated improvements, the ILOS actually improves during the weekday A.M. and P.M. peak hours due to signal optimization. In order to improve this intersection to ILOS C or better (which it does not in Existing Conditions), it is TPD's opinion that additional EB and NB lanes would be required. It is TPD's opinion that these improvements are beyond the scope of this development since this is an off-site intersection that currently operates deficiently based on Borough Standards (without the Proposed Site), and the impact of the Proposed Site, as illustrated in Table 9, is minimal.

- All of the study area intersections comply with the LOS C or better requirement outlined in Appendix B of the Hulmeville Borough Zoning Ordinance for all movements within the Study Area, with the exception of the following:
  - Trenton Road (SR 2018) and Durham Road (SR 2049) - During both the weekday A.M. and P.M. peak hours. Several movements currently operate beyond the LOS C under Existing Conditions and continue to do so in all future condition analyses. In order to improve these movements to LOS C or better (which it does not in Existing Conditions), it is TPD's opinion that additional EB and NB lanes would be required. It is TPD's opinion that these improvements are beyond the scope of this development since this is an off-site intersection that currently operates deficiently based on Borough Standards (without the Proposed Site), and the impact of the Proposed Site is minimal.
  - Trenton Road (SR 2018) and Willow Avenue/HH Entrance Driveway - During the weekday A.M. peak hour. The EB approach of Willow Avenue will operate at LOS D. In order to improve this movement to LOS C or better, it is TPD's opinion that an additional EB lane would be required on Willow Avenue, or signalization of the intersection. It is TPD's opinion that both of these improvements are beyond the scope of this development since this is an off-site intersection. Additionally, the Proposed Intersection is not anticipated to add any EB traffic to the intersection, and based on PennDOT Standards in urban areas, ILOS D or better is considered acceptable.
- Levels of Service (LOS) for the study area intersections have been summarized in matrix form. **Table I** details the overall intersection LOS for each study area intersection:

TABLE I
INTERSECTION LEVEL OF SERVICE DELAY (SECONDS) SUMMARY

Intersection	Peak Hour	2022 Existing	2027 Base	2027 Projected[1]	ILOS Standards Satisfied?
Trenton Road (SR 2018) & Main Street	AM Peak Hour	A (1.7)	A (1.8)	A (1.8)	YES
	PM Peak Hour	A (1.7)	A (1.8)	A (1.9)	
Trenton Road (SR 2018) & Willow Avenue/Herbert Hoover Entrance Driveway	AM Peak Hour	A (2.4)	A (2.4)	A (2.3)	YES
	PM Peak Hour	A (0.5)	A (0.5)	A (0.5)	
Hulmeville Road (SR 0513)/Trenton Road (SR 2018) & Bellevue Avenue (SR 0513)/Hulme Avenue (SR 2027)	AM Peak Hour	B (11.3)	B (11.2)	B (11.5)	YES
	PM Peak Hour	B (14.5)	B (14.5)	B (15.0)	
Bellevue Avenue (SR 0513) & Neshaminy Street (SR 2027)	AM Peak Hour	A (2.9)	A (2.9)	A (2.9)	YES
	PM Peak Hour	A (4.0)	A (4.1)	A (4.1)	
Main Street (SR 2027) & Pennsylvania Avenue	AM Peak Hour	A (0.5)	A (0.5)	A (0.5)	YES
	PM Peak Hour	A (0.5)	A (0.5)	A (0.5)	
Trenton Road (SR 2018) & Herbert Hoover Exit Driveway	AM Peak Hour	A (2.8)	A (2.8)	A (2.7)	YES
	PM Peak Hour	A (3.7)	A (3.7)	A (3.7)	
Trenton Road (SR 2018) & Durham Road (SR 2049)	AM Peak Hour	E (73.9)	E (63.2)	E (68.8)	YES
	PM Peak Hour	E (66.3)	E (60.7)	E (63.9)	
Hulmeville Road (SR 0513) & Bensalem Boulevard (SR 2015)	AM Peak Hour	C (23.1)	C (22.7)	C (23.2)	YES
	PM Peak Hour	C (27.3)	C (27.6)	C (28.4)	
Trenton Road (SR 2018) & Full Access Driveway	AM Peak Hour	--	--	A (1.3)	YES
	PM Peak Hour	--	--	A (0.9)	

Site-related recommendations are summarized in **Table II**:

TABLE II
RECOMMENDATIONS

Intersection	Recommendation
Hulmeville Road (SR 0513)/ Trenton Road (SR 2018) & Bellevue Avenue (SR 0513)/ Hulme Avenue (SR 2027)	Provide signal optimization
Trenton Road (SR 2018) & Durham Road (SR 2049)	
Hulmeville Road (SR 0513) & Bensalem Boulevard (SR 2015)	
Trenton Road (SR 2018) & Proposed Site Driveway	Provide adequate turning radii to facilitate ingress/egress
	Provide a 75' Left Turn Lane on the Southbound Approach to the proposed driveway
	Provide a "STOP" sign on the WB approach
	Provide and Maintain sight distance
	Work with PennDOT and the Borough to provide ADA facilities to the extent feasible. This recommendation includes further investigation into further pedestrian connectivity between the Proposed Site and the Existing Herbert Hoover Elementary School.

INTRODUCTION

Traffic Planning and Design, Inc. (TPD) has completed a Transportation Impact Assessment (TIA) for the proposed Superior Holdings residential development, on the roadway network in Hulmeville Borough, Bucks County, Pennsylvania. The subject site is located on the eastern side of Trenton Road (SR 2018), as shown in **Figure 1.**

As shown in **Figure 2**, the Proposed Site will be constructed in two (2) Phases. Phase 1 will include 112 residential units, consisting of the following:

- 39 Single-family (detached) homes;
- 39 Single-family (attached) homes;
- 33 apartment units;
- 1 existing single-family home (farmhouse).

Phase 2 will replace the existing farmhouse with an additional 10 single-family (attached) homes for a total unit count of 121 units, broken down as follows:

- 39 Single-family (detached) homes;
- 49 Single-family (attached) homes;
- 33 apartment units.

The analyses contained in this TIA assume full-build-out (Phase 2) in order to provide a conservative approach.

Access to the Proposed Site will be provided by one (1) full-access driveway to Trenton Road (SR 2018). Two (2) of the proposed single-family homes will have individual accesses to Pennsylvania Avenue on the eastern portion of the site. TPD assumed a design year of 2027.

This report has been prepared in accordance with PennDOT's *Policies and Procedures for Transportation Impact Studies*, found in PennDOT's Publication 282, Appendix A, dated July 2017. The scope of this TIA is based on the EPS Scoping Application, dated November 23, 2022 which was sent to PennDOT 6-0 and Hulmeville Borough and the subsequent reviews. Project Correspondence is included in **Appendix A**.

EXISTING ROADWAY NETWORK

A field review of the existing roadway system in the study area was conducted. The existing roadway characteristics within the study area are summarized in **Table 1**. Photographs of the study area intersections are included in **Appendix B.**

TABLE 1
ROADWAY CHARACTERISTICS WITHIN STUDY AREA

Roadway	Ownership	Functional Classification/ Roadway Type	Predominant Directional Orientation	Average Daily Traffic[1]	Posted Speed Limit
Trenton Road	State (SR 2018)	Urban Minor Arterial	North - South	11,671	35/40 m.p.h.
Hulmeville Road	State (SR 0513)	Urban Minor Arterial	North - South	18,851	35/40 m.p.h.
Bellevue Avenue	State (SR 0513)	Urban Minor Arterial	Various	9,962	35 m.p.h.
Bensalem Boulevard	State (SR 2015)	Urban Minor Arterial	East - West	7,631	35 m.p.h.
Durham Road	State (SR 2049)	Urban Collector	East - West	8,728	35 m.p.h.
Neshaminy Street	State (SR 2027)	Urban Collector	East - West	4,480	35 m.p.h.
Hulme Street	State (SR 2027)	Urban Collector	Various	4,451	35 m.p.h.
Main Street	State (SR 2027)	Urban Local Road	East - West	4,784	25 m.p.h.
Pennsylvania Avenue	Local	Local Road	North - South	--	25 m.p.h.
Willow Avenue	Local	Local Road	East - West	--	25 m.p.h.[2]

1 = PennDOT TIRe Website (January 2023)
2 = Speed Limit not posted, assumed 25 m.p.h. for residential area.

Bicycle and Pedestrian Facilities

Based on observations during field visits, the existing pedestrian facilities are summarized below. None of the study area intersections have bicycle specific facilities.

- Trenton Road (SR 2018) & Main Street (SR 2027) – The un-signalized intersection has sidewalk on the western side of Trenton Road (SR 2018), on the southern side of the eastern Main Street (SR 2027) approach, and both sides of the western Main Street (SR 2027) approach. There are pedestrian curb ramps on the western approach leg of Main Street (SR 2027).

- Trenton Road (SR 2018) & Willow Avenue/HH ES Enter Driveway – The unsignalized intersection has partial sidewalk on the eastern side of Trenton Road (SR 2018) and there is a crosswalk across the southbound approach of Trenton Road (SR 2018).

- Hulmeville Road (SR 0513)/Trenton Road (SR 2018) & Bellevue Avenue (SR 0513)/Hulme Avenue (SR 2027) – The signalized intersection has sidewalk along the northwestern, northeastern, and southwestern corners of the intersection. There are crosswalks on all 4 approaches and curb ramps present on all of the corners except the northeastern and southeastern corners. There are "push button for green" buttons for pedestrians to cross the northbound and southbound approaches.

- Bellevue Avenue (SR 0513) & Neshaminy Street – The un-signalized intersection has sidewalk on both sides of the Bellevue Avenue (SR 0513) approaches and the southern side of Neshaminy Street. There is a pedestrian curb ramp on the northern Bellevue Avenue (SR 0513) approach but there are no crosswalks present.

- Main Street (SR 2027) & Pennsylvania Avenue – The unsignalized intersection has sidewalk on both sides of Main Street (SR 2027) and the western side of Pennsylvania Avenue. There are pedestrian curb ramps across Pennsylvania Avenue but there are no crosswalks present.

- Trenton Road (SR 2018) & HH ES Exit Driveway – The unsignalized intersection has sidewalk on the eastern side of Trenton Road (SR 2018). There are pedestrian curb ramps across the school driveway but there are no crosswalks present.

- Trenton Road (SR 2018) & Durham Road (S.R. 2049) – The signalized intersection has sidewalk and curb ramps along the northeastern and southwestern corners of the intersection, with curb ramps also on the southeastern corner. There are crosswalks on all 4 approaches. There are "push button for green" buttons for pedestrians on the northeastern and southeastern corners.

- Hulmeville Road (SR 0513) & Bensalem Boulevard (S.R. 2015) – The signalized intersection has sidewalk and curb ramps along the northwestern corner. There are crosswalks on all 4 approaches. There are "push button for green" buttons for pedestrians on all corners.

Mass Transit Facilities

Bucks County is provided with public transportation by SEPTA. Public transportation is available in the vicinity of the subject site via bus Route 130, with stops at along Bellevue Avenue (SR 0513) in the area of Green Street and Neshaminy Street. Additionally, the Langhorne SEPTA Regional Rail Station on the West Trenton Line is located about 1.5 miles north of the site.

Crash Data Investigation

Crash data were obtained from PennDOT for the study area intersections. PennDOT defines a reportable crash as follows, "A reportable (crash) is one in which an injury or fatality occurs or if at least one of the vehicles involved requires towing from the scene." Reportable crashes were tabulated for the five-year time period beginning 01/01/2016 and ending 12/31/2021. For a given intersection, PennDOT considers a crash occurrence of 5 reportable, correctable crashes over a continuous twelve-month period during the past six years to be a threshold value, above which the intersection design should be reviewed to examine if corrective measures can be taken to enhance safety. The number of reportable crashes at the study area intersections is shown in **Table 2.**

TABLE 2
PENNDOT TOTAL REPORTABLE CRASH DATA

Study Area Intersection	Total Number of Reportable (Correctable) Crashes					
	2016	2017	2018	2019	2020	2021
Trenton Road (SR 2018) & Main Street (SR 2027)	4	3	7	5	6	5
Trenton Road (SR 2018) & Willow Avenue/ Herbert Hoover ES School Driveway	0	0	0	1	1	0
Trenton Road (SR 2018)/ Hulmeville Road (SR 0513) & Bellevue Avenue (SR 0513)/ Hulme Avenue	2	2	4	2	3	3
Bellevue Avenue (SR 0513) & Neshaminy Street (SR 2027)	0	0	0	0	1	1
Main Street (SR 2027) & Pennsylvania Avenue	0	0	0	0	0	0
Trenton Road (SR 2018) & Herbert Hoover ES School Driveway	0	0	0	0	1	2
Trenton Road (SR 2018) & Durham Road (SR 2049)	0	1	0	3	2	4
Hulmeville Road (SR 0513) & Bensalem Boulevard (SR 2015)	1	1	4	1	4	7

Based on a review of the crash data in **Table 2**, there were no twelve-month periods during the past six years where 5 or more crashes occurred that were deemed correctable except for the following:

- Trenton Road (SR 2018) & Main Street (SR 2064): In 2018, 2019, 2020, and 2021 there were 5 or more crashes per year. The primary type of crashes was angle crashes. The primary causations of the crashes were driver error, such as proceeding w/o clearance, running stop sign, and other improper driving.

- Hulmeville Road (SR 0513) & Bensalem Boulevard (SR 2015): In 2021 there were 5 or more crashes per year. The primary type of crashes was angle crashes. The primary causations of the crashes were driver error, such as tailgating, running red light, and other improper driving.

EXISTING TRAFFIC CONDITIONS

Manual traffic counts were conducted on Wednesday, November 16, 2022 and Tuesday, January 24, 2023, on 15-minute intervals during the Weekday A.M. peak hour (6:30 to 10:00 A.M. peak period) and Weekday P.M. peak hour (3:00 to 6:00 P.M. peak period). Data pertaining to heavy vehicles, pedestrians and transit vehicles were observed during the manual counts. Peak hours and count dates for the study area intersections are identified in **Table 3**.

TABLE 3
MANUAL TRAFFIC COUNT INFORMATION[1]

Intersection	Date	Time Period	Intersection Peak Hour
Trenton Road (SR 2018) & Main Street (SR 2027)	Wednesday, November 16, 2022	Weekday A.M.	7:30 to 8:30 A.M.
		Weekday P.M.	4:15 to 5:15 P.M.
Trenton Road (SR 2018) & Willow Avenue/ Herbert Hoover ES School Driveway		Weekday A.M.	8:15 to 9:15 A.M.
		Weekday P.M.	4:15 to 5:15 P.M.
Trenton Road (SR 2018)/ Hulmeville Road (SR 0513) & Bellevue Avenue (SR 0513)/ Hulme Avenue		Weekday A.M.	7:30 to 8:30 A.M.
		Weekday P.M.	4:15 to 5:15 P.M.
Bellevue Avenue (SR 0513) & Neshaminy Street (SR 2027)		Weekday A.M.	7:30 to 8:30 A.M.
		Weekday P.M.	4:30 to 5:30 P.M.
Main Street (SR 2027) & Pennsylvania Avenue		Weekday A.M.	6:45 to 7:45 A.M.
		Weekday P.M.	4:45 to 5:45 P.M.
Trenton Road (SR 2018) & Herbert Hoover ES School Driveway	Tuesday, January 24, 2023	Weekday A.M.	8:15 to 9:15 A.M.
		Weekday P.M.	3:30 to 4:30 P.M.
Trenton Road (SR 2018) & Durham Road (SR 2049)		Weekday A.M.	7:15 to 8:15 A.M.
		Weekday P.M.	4:45 to 5:45 P.M.
Hulmeville Road (SR 0513) & Bensalem Boulevard (SR 2015)		Weekday A.M.	7:15 to 8:15 A.M.
		Weekday P.M.	4:45 to 5:45 P.M.

1 =Peak Hour consists of the four consecutive 15-minute intervals where the highest traffic volumes occur.

Existing Condition traffic volumes for the weekday A.M. and weekday P.M. peak hours are illustrated in **Figures 3-4**. Manual traffic count data sheets are provided in **Appendix C**.

BASE (NO-BUILD) CONDITIONS

A background growth factor for the roadways in the study area was developed based on growth factors for August 2022 to July 2023 obtained from the PennDOT Bureau of Planning and Research (BPR). The PennDOT BPR suggests using a background growth trend factor of 0.22% per year in Bucks County for urban non-interstate roadways. Therefore, a growth rate of 1.10% (0.22% compounded annually for 5 years) was added to the existing volumes to produce the 2027 Base Conditions. The 2027 Base Conditions traffic volumes for the weekday A.M. and weekday P.M. peak hours are illustrated in **Figures 5-6.**

SCHEDULED ROADWAY IMPROVEMENTS

Based on a review of the PennDOT 12-Year Plan, there are no specific active planned roadway improvements in the vicinity of the proposed site.

PROPOSED SITE ACCESS

Access to the Proposed Site will be provided by one (1) full-access driveway to Trenton Road (SR 2018). Additionally, two of the proposed single-family houses will have individual accesses to Pennsylvania Avenue, on the eastern portion of the site.

Sight Distance Analysis

A sight distance analysis was prepared for the proposed site driveway location. In general, recommended safe sight distances depend upon the posted speed limit and roadway grades. The existing sight distances at the proposed driveways were measured in accordance with PennDOT Publication 282 Highway Occupancy Permit Guidelines and compared to PennDOT's desirable sight distance standard, which is identified in 67 PA Code Chapter 441.8(h), "Access to and Occupancy of Highways by Driveways and Local Roads." In addition, measured sight distances at the proposed driveways were compared to PennDOT's safe stopping sight distance standard, which is calculated by the following equation:

$$\mathbf{SSSD = 1.47VT + V^2/[30(f \pm g)]}$$

SSSD = safe stopping sight distance (acceptable sight distance)
V = Vehicle Speed
T = Perception Reaction Time of Driver (2.5 seconds)
f = Coefficient of Friction for Wet Pavements
g = Percent of Roadway Grade Divided by 100

Table 4 shows the measured, intersection, desirable, and acceptable (SSSD) sight distances at the site driveway for vehicles entering and exiting the site.

TABLE 4
SIGHT DISTANCE ANALYSIS
PROPOSED SITE DRIVEWAY

	Direction	Posted Speed (mph)	Sight Distances (feet)				
			Grade[1] (%)	ISD[2]	DES[3]	SSSD[2]	EXIST[4]
Proposed Site Driveway							
Exiting Movements	*To the left*	40	+3%	500′	538′	364′	**400′**
	To the right		-1%	430′	460′	390′	**800′+**
Entering Left Turns	*Approaching same direction*		-1%	N/A	N/A	390′	**800′+**
	Approaching opposite direction		+3%	365′	373′	364′	**415′**

ISD = Intersection Sight Distance
DES = PennDOT Desirable Sight Distance
SSSD = PennDOT Acceptable Sight Distance
EXIST = Existing (measured) Sight Distance

1 = Roadway Grade Approaching Driveway
2 = Based on the posted speed + 5mph
3 = Based on the posted speed
4 = With Regrading and Vegetation Removal

As shown in **Table 4** above, with regrading and maintenance of on-site vegetation, all measured sight distances satisfy PennDOT Safe Stopping Sight Distance (SSSD) criteria, and in all but one case, satisfy PennDOT Intersection Sight Distance (ISD) criteria.

TRIP GENERATION

The trip generation rates for the proposed site were obtained from the manual *Trip Generation*, 11th Edition, 2021, an Institute of Transportation Engineers (ITE) Informational Report. The data are categorized by Land Use Codes, with total vehicular trips for a given land use estimated using an independent variable and statistically generated rates or equations.

Table 5 shows the equations/rates and directional percentages for the analyzed time periods.

TABLE 5
TRIP GENERATION DATA – PROPOSED SITE

Land Use (ITE #)	Time Period	Size (X)	Equation/Rate	Enter %
Single-Family (Detached) Housing (ITE# 210)	Average Weekday	39 DU	Ln(T) = 0.92*ln(X) + 2.68	50%
	Weekday AM Peak Hour		Ln(T) = 0.91*ln(X) + 0.12	25%
	Weekday PM Peak Hour		Ln(T) = 0.94*ln(X) + 0.27	63%
Single-Family (Attached) Housing (ITE# 215)	Average Weekday	49 DU	T = 7.20*(X)	50%
	Weekday AM Peak Hour		T = 0.48*(X)	25%
	Weekday PM Peak Hour		T = 0.57*(X)	59%
Multifamily Housing (Low-Rise) (ITE# 220)	Average Weekday	33 U	T = 6.41*(X) + 75.31	50%
	Weekday AM Peak Hour		T = 0.31*(X) + 22.85	24%
	Weekday PM Peak Hour		T = 0.43*(X) + 20.55	63%

T = Total Trips; X = Independent Variable, Units = U, Dwelling Units = DU

The results of the trip generation calculations are summarized in **Table 6**.

TABLE 6
TRIP GENERATION – PROPOSED DEVELOPMENT

Land Use	Total Trips		
	Total	Enter	Exit
Average Weekday			
Single-Family (Detached) Housing (ITE# 210)	424	212	212
Single-Family (Attached) Housing (ITE# 215)	354	177	177
Multifamily Housing (Low-Rise) (ITE# 220)	288	144	144
Total	**1,066**	**533**	**533**
Weekday A.M. Peak Hour			
Single-Family (Detached) Housing (ITE# 210)	32	8	24
Single-Family (Attached) Housing (ITE# 215)	24	6	18
Multifamily Housing (Low-Rise) (ITE# 220)	33	8	25
Total	**89**	**22**	**67**
Weekday P.M. Peak Hour			
Single-Family (Detached) Housing (ITE# 210)	41	26	15
Single-Family (Attached) Housing (ITE# 215)	28	16	12
Multifamily Housing (Low-Rise) (ITE# 220)	35	22	13
Total	**104**	**64**	**40**

Based on Table 6, the Proposed Site, at full-build-out, will generate 89 new trips during the weekday A.M. peak hour and 104 new trips during the weekday P.M. peak hour.

TRIP DISTRIBUTION

The distribution and assignment of new trips generated by the proposed development was based upon existing traffic patterns in the study area. Based on this evaluation, the new trips for the proposed development were distributed to the local roadway network based on the percentages shown in **Table 7.**

TABLE 7
TRIP DISTRIBUTION PERCENTAGES – NEW TRIPS

Direction - To/From	Assignment - To/From	Distribution Percentage
		AM/PM
North	via Trenton Road	18%
South	via Hulmeville Road	13%
North	via Bellevue Avenue	12%
East	via Durham Road	12%
West	via Durham Road	12%
West	via Bensalem Boulevard	12%
East	via Bensalem Boulevard	10%
East	via Main Street	6%
West	via Neshaminy Street	5%

The distribution of site-generated trips for the proposed development are shown in **Figures 7-8**. The trip assignment percentage information is included in **Appendix D**.

PROJECTED (BUILD) CONDITION TRAFFIC VOLUMES

The site-generated trips for the proposed development were added to the 2027 Base condition traffic volumes to develop the 2027 projected (build) condition traffic volumes as shown in **Figures 9-10.** Traffic volume development worksheets are also contained in **Appendix D.**

LEVELS OF SERVICE FOR AN INTERSECTION

For analysis of intersections, level of service is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. LOS criteria is stated in terms of control delay per vehicle for a one-hour analysis period. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The criteria are shown in **Table 8**. Delay, as it relates to level of service, is a complex measure and is dependent upon a number of variables. For signalized intersections, these variables include the quality of vehicle progression, the cycle length, the green time ratio, and the volume/capacity ratio for the lane group in question. For unsignalized intersections, delay is related to the availability of gaps in the flow of traffic on the major street and the driver's discretion in selecting an appropriate gap for a particular movement from the minor street (straight across, left or right turn).

TABLE 8
LEVEL OF SERVICE CRITERIA
UNSIGNALIZED AND SIGNALIZED INTERSECTIONS[1]

Level of Service	Control Delay Per Vehicle (Seconds)	
	Signalized	Unsignalized
A	< 10	< 10
B	> 10 and < 20	> 10 and < 15
C	> 20 and < 35	> 15 and < 25
D	> 35 and < 55	> 25 and < 35
E	> 55 and < 80	> 35 and < 50
F	> 80 or v/c > 1.0	> 50 or v/c > 1.0

[1]Obtained from Exhibits 19-8 and 20-2 of the Transportation Research Board's Highway Capacity Manual 6th Edition

CAPACITY ANALYSIS METHODOLOGY

Capacity analyses were conducted for the analyzed peak hours at the study area intersections. These analyses were conducted according to the methodologies contained in the *Highway Capacity Manual* (HCM) 6th Edition using *Synchro* version 11 software, a Trafficware product, with the following exceptions:

The following conditions were analyzed, as applicable:

- 2022 Existing conditions;
- 2027 Base conditions (Build-out year without development);
- 2027 Projected conditions (Build-out year with development).

It should be noted that based on methodologies contained in Chapter 10 of PennDOT's Publication 46, TPD adjusted the following HCM default values in the *Synchro 11* capacity analysis. These adjustments were made at the signalized intersections within the study area for all time periods based on the study area location being classified as Suburban:

- Base saturation flow rates for signalized intersections. The saturation flow rate was changed from the default value of 1900 to 1800 based on Exhibit 10-9.

- Start-up lost time and extension of effective green time for signalized intersections. The startup lost time was changed from the default value of 2.0 seconds to 2.5 seconds. Based on the total clearance time (yellow plus all-red time) being greater than 5 seconds, the extension of green time was changed from the default value of 2 seconds to 3.5 seconds. These adjusted values were based on Exhibit 10-10.

- Critical and Follow-Up Gap times were adjusted relative to the difference between default and PA Default values contained in Exhibits 10-11 and 10-12. As requested by PennDOT, worksheets/tables showing how these values were calculated are included in **Appendix E**.
- Per PennDOT standards, the signal timings at the study area intersections were optimized under the projected (build) conditions.
- The intersection of Bellevue Avenue (SR 0513) and Neshaminy Street (SR 2027) cannot be analyzed (as is) utilizing HCM 6th edition methodology, as the existing geometry has free-flowing WB and SB approaches, and a STOP-controlled EB approach. In order to utilize HCM 6th edition methodology, TPD revised the orientation of the WB approach of the intersection to be the NB approach, to form a conventional T-

intersection. The westbound approach currently has a "stop, except right turn" sign which has been removed in the analyses.

In addition, capacity analyses were conducted at the proposed site driveway intersection under the projected conditions. The capacity analysis worksheets are included in **Appendix F**. Signal diagrams are included in **Appendix G**.

PennDOT's Transportation Impact Study Guidelines outlined in Strike-Off Letter 470-09-4, dated February 12, 2009 contain the following criteria regarding levels of service:

- Page 29 of the Guidelines state that if evaluation of the With Development Horizon Year Scenario to the Without Development Horizon Year Scenario indicates that the overall intersection level of service has dropped, the applicant will be required to mitigate the level of service if the increase in overall intersection delay is greater than 10-seconds. If the overall intersection delay increase is less than or equal to 10-seconds, mitigation of the intersection will not be required.
- Page 29 of the Guidelines state that for mitigation scenarios, applicants are expected to mitigate the overall intersection LOS to the original Without Development LOS; the 10-second delay variance is not applied to mitigation scenarios. Applicants may be required to address available storage and queue lengths at critical movements or approaches even if the overall LOS requirements are met.
- Page 31 of the Guidelines state that if signalization is the preferred alternative for mitigation, overall intersection LOS C in rural areas and LOS D in urban areas is acceptable.
- Page 31 of the Guidelines states new signalized or unsignalized intersection established to serve as access to the development shall be designed to operate at minimum LOS C for rural areas, and minimum LOS D for urban areas.

LEVELS OF SERVICE IN THE STUDY AREA

Level of service (LOS) matrices for the study area intersections are shown in **Table 9**.

TABLE 9
LEVEL OF SERVICE DELAY (SECONDS) SUMMARY

Intersection	Movement	Weekday A.M. Peak Hour			Weekday P.M. Peak Hour		
		2022 Exist.	2027 Base	2027 Proj.[1]	2022 Exist.	2027 Base	2027 Proj.[1]
Trenton Road (SR 2018) & Main Street (SR 2064)	EBLTR	C	C	C	B	B	B
	WBLTR	B	B	B	B	C	C
	NBLTR	A	A	A	A	A	A
	SBLTR	A	A	A	A	A	B
	ILOS	**A (1.7)**	**A (1.8)**	**A (1.8)**	**A (1.7)**	**A (1.8)**	**A (1.9)**
Trenton Road (SR 2018) & Willow Avenue/ Herbert Hoover Entrance Driveway	EBLTR	C	C	D	C	C	C
	NBLTR	A	A	A	A	A	A
	SBLTR	B	B	B	A	A	A
	ILOS	**A (2.4)**	**A (2.4)**	**A (2.3)**	**A (0.5)**	**A (0.5)**	**A (0.5)**
Hulmeville Road (SR 0513)/ Trenton Road (SR 2018) & Bellevue Avenue (SR 0513)/ Hulme Avenue (SR 2027)	EBLT	C	C	C	C	C	C
	EBR	A	A	A	A	A	A
	WBLTR	C	C	C	C	C	C
	NBL	A	A	A	A	A	A
	NBTR	A	A	A	A	A	A
	SBLTR	B	B	B	B	B	B
	ILOS	**B (11.3)**	**B (11.2)**	**B (11.5)**	**B (14.5)**	**B (14.5)**	**B (15.0)**
Bellevue Avenue (SR 0513) & Neshaminy Street (SR 2027)	EBLR	B	B	B	B	B	C
	NBLT	A	A	A	B	B	B
	ILOS	**A (2.9)**	**A (2.9)**	**A (2.9)**	**A (4.0)**	**A (4.1)**	**A (4.1)**
Main Street (SR 2027) & Pennsylvania Avenue	EBLT	A	A	A	A	A	A
	SBLR	A	A	A	A	A	A
	ILOS	**A (0.5)**	**A (0.5)**	**A (0.5)**	**A (0.5)**	**A (0.5)**	**A (0.5)**
Trenton Road (SR 2018) & Herbert Hoover Exit Driveway	WBL	B	B	C	C	C	C
	WBR	B	B	B	B	B	B
	ILOS	**A (2.8)**	**A (2.8)**	**A (2.7)**	**A (3.7)**	**A (3.7)**	**A (3.7)**
Trenton Road (SR 2018) & Durham Road (SR 2049)	EBLTR	E	E	E	E	E	E
	WBL	C	C	C	D	D	D
	WBTR	D	D	D	D	D	D
	NBL	D	D	D	D	D	D
	NBTR	F (143.3)	F (108.6)	F (124.9)	F (105.0)	F (88.8)	F (95.8)
	SBL	D	D	D	D	D	D
	SBTR	D	D	D	D	D	D
	ILOS	**E (73.9)**	**E (63.2)**	**E (68.8)**	**E (66.3)**	**E (60.7)**	**E (63.9)**
Hulmeville Road (SR 0513) & Bensalem Boulevard (SR 2015)	EBL	B	B	B	C	C	C
	EBTR	B	B	B	B	B	B
	WBLTR	C	C	C	C	C	C
	NBL	C	C	C	C	C	C
	NBTR	C	C	C	C	C	C
	SBL	B	B	B	C	C	C
	SBTR	B	B	B	C	C	C
	ILOS	**C (23.1)**	**C (22.7)**	**C (23.2)**	**C (27.3)**	**C (27.6)**	**C (28.4)**
Trenton Road (SR 2018) & Proposed Site Driveway	WBLR	--	--	B	--	--	C
	SBLT	--	--	A	--	--	B
	ILOS	**--**	**--**	**A (1.3)**	**--**	**--**	**A (0.9)**

Proj[1] = projected conditions with site-related improvements

As shown in **Table 9**, under all projected (build) conditions with the development of the proposed site, and with the site-related recommendations, all study area intersections will satisfy PennDOT ILOS Standards.

Hulmeville Borough Zoning Requirements (Appendix B)

The below is an excerpt from Appendix B of the Hulmeville Borough Zoning Requirements, detailing one of the requirements for Transportation Impact Studies.

- *Levels of service for all roadways and intersections shall be listed. All roadways and/or intersections or portions of intersections showing a level of service below C shall be considered deficient, and specific recommendations for the elimination of these problems shall be listed, unless design limitations preclude Level of Service C. Where such conditions exist, the Traffic Engineer shall seek guidance from the Borough Planning Commission prior to submission of the Traffic Impact Study. This listing of recommended improvements shall include, but not be limited to, the following elements: internal circulation design, site access location and design, external roadway and intersection design and improvements, traffic signal installation and operation including signal timing, and transit design improvements, All physical roadway improvements shall be shown in sketches.*

- As shown in **Table 9** all of the study area intersections comply with the ILOS C or better requirement outlined in Appendix B of the Hulmeville Borough Zoning Ordinance for all intersections with the exception of Trenton Road (SR 2018) and Durham Road (SR 2049). During both the weekday A.M. and P.M. peak hours, the intersection currently operates at ILOS E under Existing Conditions and continues to do so in all future condition analyses. With the additional development traffic and associated improvements, the ILOS actually improves during the weekday A.M. and P.M. peak hours due to signal optimization. In order to improve this intersection to ILOS C or better (which it does not in Existing Conditions), it is TPD's opinion that additional EB and NB lanes would be required. It is TPD's opinion that these improvements are beyond the scope of this development since this is an off-site intersection that currently operates deficiently based on Borough Standards (without the Proposed Site), and the impact of the Proposed Site, as illustrated in **Table 9**, is minimal.

- All of the study area intersections comply with the LOS C or better requirement outlined in Appendix B of the Hulmeville Borough Zoning Ordinance for all movements within the Study Area, with the exception of the following:
  - Trenton Road (SR 2018) and Durham Road (SR 2049) - During both the weekday A.M. and P.M. peak hours. Several movements currently operate beyond the LOS C under Existing Conditions and continue to do so in all future condition analyses. In order to improve these movements to LOS C or better (which it does not in Existing Conditions), it is TPD's opinion that additional EB and NB lanes would be required. It is TPD's opinion that these improvements are beyond the scope of this development since this is an off-site intersection that currently operates deficiently based on Borough Standards (without the Proposed Site), and the impact of the Proposed Site is minimal.
  - Trenton Road (SR 2018) and Willow Avenue/HH Entrance Driveway - During the weekday A.M. peak hour. The EB approach of Willow Avenue will operate at LOS D. In order to improve this movement to LOS C or better, it is TPD's opinion that an additional EB lane would be required on Willow Avenue, or signalization of the intersection. It is TPD's opinion that both of these improvements are beyond the scope of this development since this is an off-site intersection. Additionally, the Proposed Intersection is not anticipated to add any EB traffic to the intersection, and based on PennDOT Standards in urban areas, ILOS D or better is considered acceptable.

95TH PERCENTILE QUEUE ANALYSIS

Queue analyses were conducted at the study area intersections using *Synchro 11* software. For this analysis, the 95th percentile queue is defined as the queue length that is exceeded in 5% of the signal cycles. As an example, for a signal with a 90-second cycle, this means that the 95th percentile queue length will be exceeded during 2 of the 40 signal cycles that occur during the peak hour. The queue analysis results are summarized in **Table 10** for the analyzed peak hours.

TABLE 10
95TH PERCENTILE QUEUE ANALYSIS (FEET)

Intersection	Movement	Available Storage	Weekday A.M. Peak Hour			Weekday P.M. Peak Hour		
			2022 Exist.	2027 Base	2027 Proj.[1]	2022 Exist.	2027 Base	2027 Proj.[1]
Trenton Road (SR 2018) & Main Street (SR 2064)	EBLTR	275'[2]	0'	0'	0'	0'	0'	0'
	WBLTR	785'[2]	15'	15'	18'	18'	18'	20'
	NBLTR	40'[2]	0'	0'	0'	0'	0'	0'
	SBLTR	80'[2]	3'	3'	3'	5'	5'	5'
Trenton Road (SR 2018) & Willow Avenue/Meeks Road	EBLTR	350'[3]	18'	18'	20'	3'	3'	3'
	NBLTR	80'[2]	0'	0'	0'	0'	0'	0'
	SBLTR	250'[2]	15'	15'	15'	3'	3'	3'
Hulmeville Road (SR 0513)/Trenton Road (SR 2018) & Bellevue Avenue (SR 0513)/Hulme Avenue (SR 2027)	EBLT	350'	100'	98'	103'	165'	163'	175'
	EBR	1000'+[2]	0'	0'	0'	0'	0'	0'
	WBLTR	275'[2]	110'	105'	108'	155'	153'	153'
	NBL	75'[2]	73'	73'	73'	68'	68'	73'
	NBTR	275'[2]	63'	63'	65'	108'	110'	125'
	SBLTR	75'	138'	138'	160'	188'	190'	210'
Bellevue Avenue (SR 0513) & Neshaminy Street	EBLR	--	13'	13'	13'	35'	35'	38'
	NBLT	--	18'	18'	18'	33'	33'	35'
Main Street (SR 2027) & Pennsylvania Avenue	EBLT	360'[2]	0'	0'	0'	3'	3'	3'
	SBLR	1000'[2]	3'	3'	3'	0'	0'	3'
Trenton Road (SR 2018) & Herbert Hoover Exit Driveway	WBL	--	13'	13'	13'	33'	33'	38'
	WBR	--	23'	23'	25'	35'	35'	35'
Trenton Road (SR 2018) & Durham Road (SR 2049)	EBLTR	--	350'	353'	355'	558'	545'	570'
	WBL	150'+	68'	70'	75'	123'	130'	140'
	WBTR	---	350'	375'	378'	288'	308'	308'
	NBL	160'	58'	55'	68'	50'	48'	58'
	NBTR	1000'+[2]	935'	828'	918'	798'	748'	790'
	SBL	110'	48'	45'	45'	68'	68'	68'
	SBTR	--	440'	423'	430'	545'	530'	548'
Hulmeville Road (SR 0513) & Bensalem Boulevard (SR 2015)	EBL	180'+	138'	148'	150'	168'	180'	195'
	EBTR	--	88'	93'	93'	83'	85'	85'
	WBLTR	--	228'	230'	235'	253'	258'	265'
	NBL	100'	20'	18'	20'	30'	30'	30'
	NBTR	--	270'	265'	273'	320'	323'	335'
	SBL	125'	43'	43'	48'	100'	103'	110'
	SBTR	1000'+[2]	213'	210'	223'	380'	390'	403'
Trenton Road (SR 2018) & Proposed Site Driveway	WBLR	1000'[2]	--	--	15'	--	--	13'
	SBLT	--	--	--	0'	--	--	3'

Proj[1] = projected conditions with site-related improvements
2 = Distance to Adjacent Intersection
3 = Distance to Proposed Driveway

Queue analysis worksheets are included with the capacity analysis worksheets provided in **Appendix F**.

AUXILIARY TURN LANE ANALYSIS

Methodology

TPD evaluated auxiliary turn lane warrants at the Proposed Driveways. The warrant analysis methodology contained within Chapter 11 of PennDOT's *Publication 46*, Section 11.17 and Strike-Off Letter 470-08-07 was utilized for this evaluation.

Findings

Table 11 summarizes the results of the auxiliary turn lane analysis at the site access intersection.

TABLE 11
AUXILIARY TURN LANE ANALYSIS SUMMARY

Intersection	Auxiliary Lane	Warrant Satisfied?	Required Lane Length
Trenton Road (SR 2018) & Proposed Site Driveway	NB Right-Turn Lane	No	--
	SB Left-Turn Lane	Yes	75'

The calculations for the auxiliary turn lane warrants are included in **Appendix H**.

RECOMMENDATIONS

TPD has made the following recommendations in relation to the proposed residential development in Hulmeville Borough, as outlined in **Table 12**:

TABLE 12
RECOMMENDATIONS

Intersection	Recommendation
Hulmeville Road (SR 0513)/ Trenton Road (SR 2018) & Bellevue Avenue (SR 0513)/ Hulme Avenue (SR 2027)	Provide signal optimization
Trenton Road (SR 2018) & Durham Road (SR 2049)	
Hulmeville Road (SR 0513) & Bensalem Boulevard (SR 2015)	
Trenton Road (SR 2018) & Proposed Site Driveway	Provide adequate turning radii to facilitate ingress/egress
	Provide a 75' Left Turn Lane on the Southbound Approach to the proposed driveway
	Provide a "STOP" sign on the WB approach
	Provide and Maintain sight distance
	Work with PennDOT and the Borough to provide ADA facilities to the extent feasible. This recommendation includes further investigation into further pedestrian connectivity between the Proposed Site and the Existing Herbert Hoover Elementary School.

CONCLUSIONS

Based on the results of the Transportation Impact Assessment (TIA), TPD offers the following conclusions:

- The subject site is located on the eastern side of Trenton Road (SR 2018).
- The proposed site will be constructed in two (2) Phases. Phase 1 will include 112 residential units, consisting of the following:
  - 39 Single-family (detached) homes;
  - 39 Single-family (attached) homes;
  - 33 apartment units;
  - 1 existing single-family home (farmhouse).

  Phase 2 will replace the existing farmhouse with an additional 10 single-family (attached) homes for a total unit count of 121 units, broken down as follows:
  - 39 Single-family (detached) homes;
  - 49 Single-family (attached) homes;
  - 33 apartment units.

  The analyses contained in this TIA assume full-build-out (Phase 2) in order to provide a conservative approach.
- TPD assumed a future year of 2027.
- The majority of the proposed development will be served by one (1) full-access driveway to Trenton Road (SR 2018). Two (2) of the proposed single-family homes will have individual accesses to Pennsylvania Avenue on the eastern portion of the site.
- The measured sight distances satisfy all PennDOT Sight Distance criteria.
- The full build-out of the Proposed Site will generate **89 new trips** during the weekday A.M. peak hour and **104 new trips** during the weekday P.M. peak hour.
- Under all projected (build) conditions with the development of the proposed site, and with the site-related recommendations, all study area intersections will satisfy PennDOT ILOS Standards.
- All of the study area intersections comply with the ILOS C or better requirement outlined in Appendix B of the Hulmeville Borough Zoning Ordinance for all intersections with the exception of Trenton Road (SR 2018) and Durham Road (SR 2049). During both the weekday A.M. and P.M. peak hours, the intersection currently operates at ILOS E under Existing Conditions and continues to do so in all future condition analyses. With the additional development traffic and associated improvements, the ILOS actually improves during the weekday A.M. and P.M. peak hours due to signal optimization. In order to improve this intersection to ILOS C or better (which it does not in Existing Conditions), it is TPD's opinion that additional EB and NB lanes would be required. It is TPD's opinion that these improvements are beyond the scope of this development since this is an off-site intersection that currently operates deficiently based on Borough

Standards (without the Proposed Site), and the impact of the Proposed Site, as illustrated in Table 9, is minimal.

- All of the study area intersections comply with the LOS C or better requirement outlined in Appendix B of the Hulmeville Borough Zoning Ordinance for all movements within the Study Area, with the exception of the following:
  - Trenton Road (SR 2018) and Durham Road (SR 2049) - During both the weekday A.M. and P.M. peak hours. Several movements currently operate beyond the LOS C under Existing Conditions and continue to do so in all future condition analyses. In order to improve these movements to LOS C or better (which it does not in Existing Conditions), it is TPD's opinion that additional EB and NB lanes would be required. It is TPD's opinion that these improvements are beyond the scope of this development since this is an off-site intersection that currently operates deficiently based on Borough Standards (without the Proposed Site), and the impact of the Proposed Site is minimal.
  - Trenton Road (SR 2018) and Willow Avenue/HH Entrance Driveway - During the weekday A.M. peak hour. The EB approach of Willow Avenue will operate at LOS D. In order to improve this movement to LOS C or better, it is TPD's opinion that an additional EB lane would be required on Willow Avenue, or signalization of the intersection. It is TPD's opinion that both of these improvements are beyond the scope of this development since this is an off-site intersection. Additionally, the Proposed Intersection is not anticipated to add any EB traffic to the intersection, and based on PennDOT Standards in urban areas, ILOS D or better is considered acceptable.

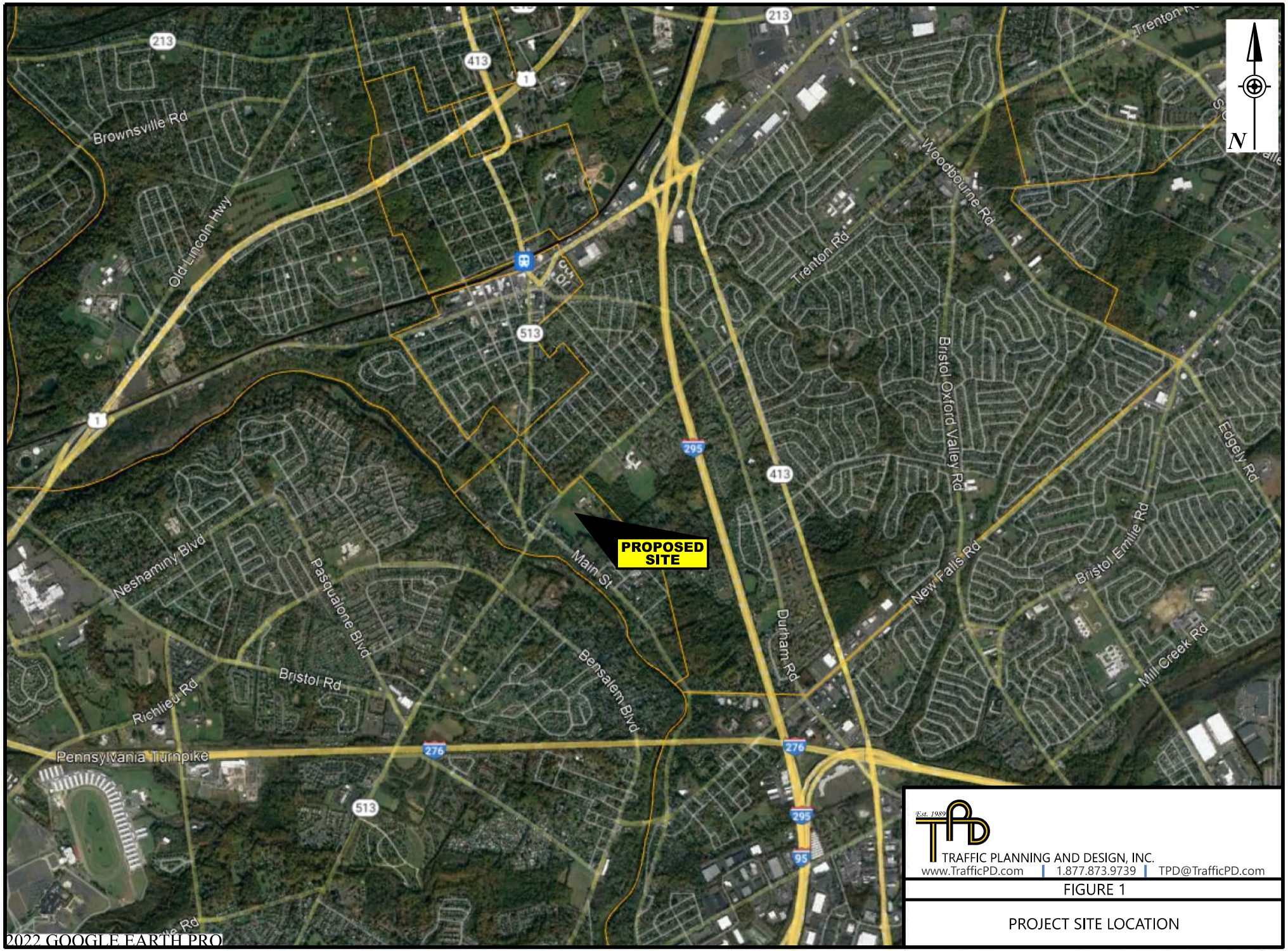

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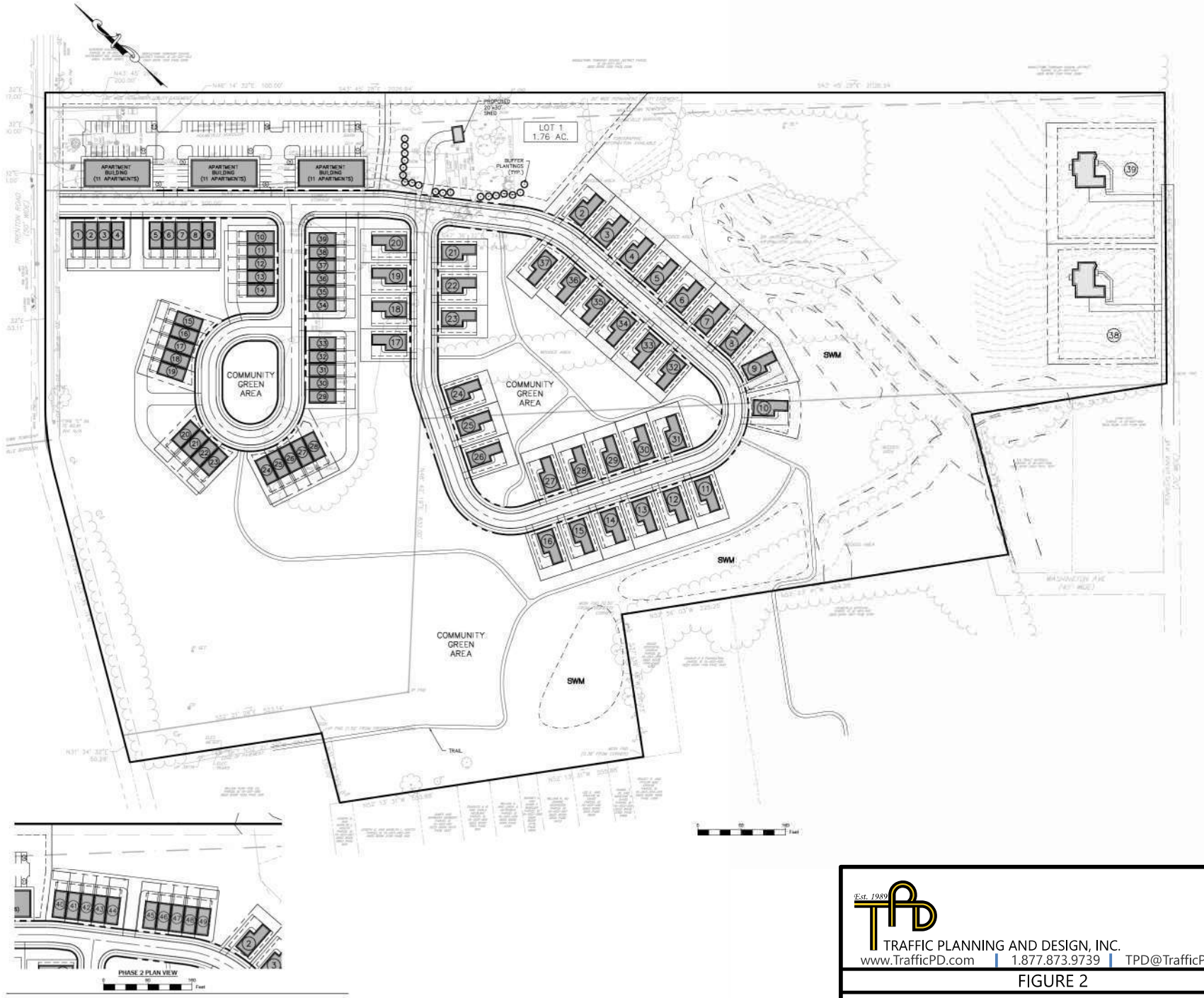
FIGURE 1

PROJECT SITE LOCATION



KEY:

SCHEMATIC DRAWING:NOT TO SCALE

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FIGURE 2

PROPOSED SITE PLAN

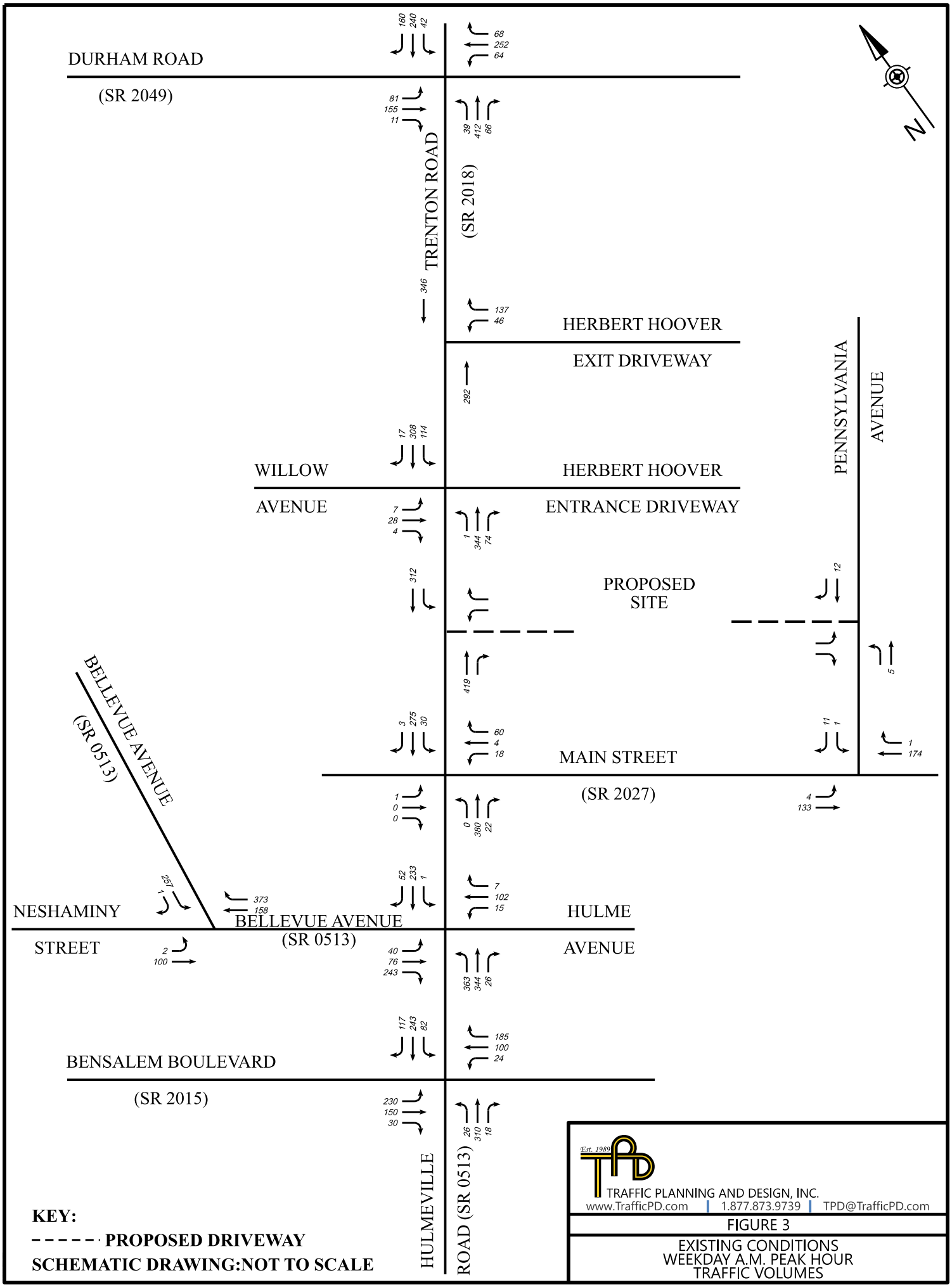
DURHAM ROAD
(SR 2049)
TRENTON ROAD
(SR 2018)
HERBERT HOOVER
EXIT DRIVEWAY
HERBERT HOOVER
ENTRANCE DRIVEWAY
WILLOW
AVENUE
PENNSYLVANIA
AVENUE
PROPOSED
SITE
MAIN STREET
(SR 2027)
BELLEVUE AVENUE
(SR 0513)
NESHAMINY
STREET
BELLEVUE AVENUE
(SR 0513)
HULME
AVENUE
BENSALEM BOULEVARD
(SR 2015)
HULMEVILLE
ROAD (SR 0513)
N
KEY:
PROPOSED DRIVEWAY
SCHEMATIC DRAWING:NOT TO SCALE
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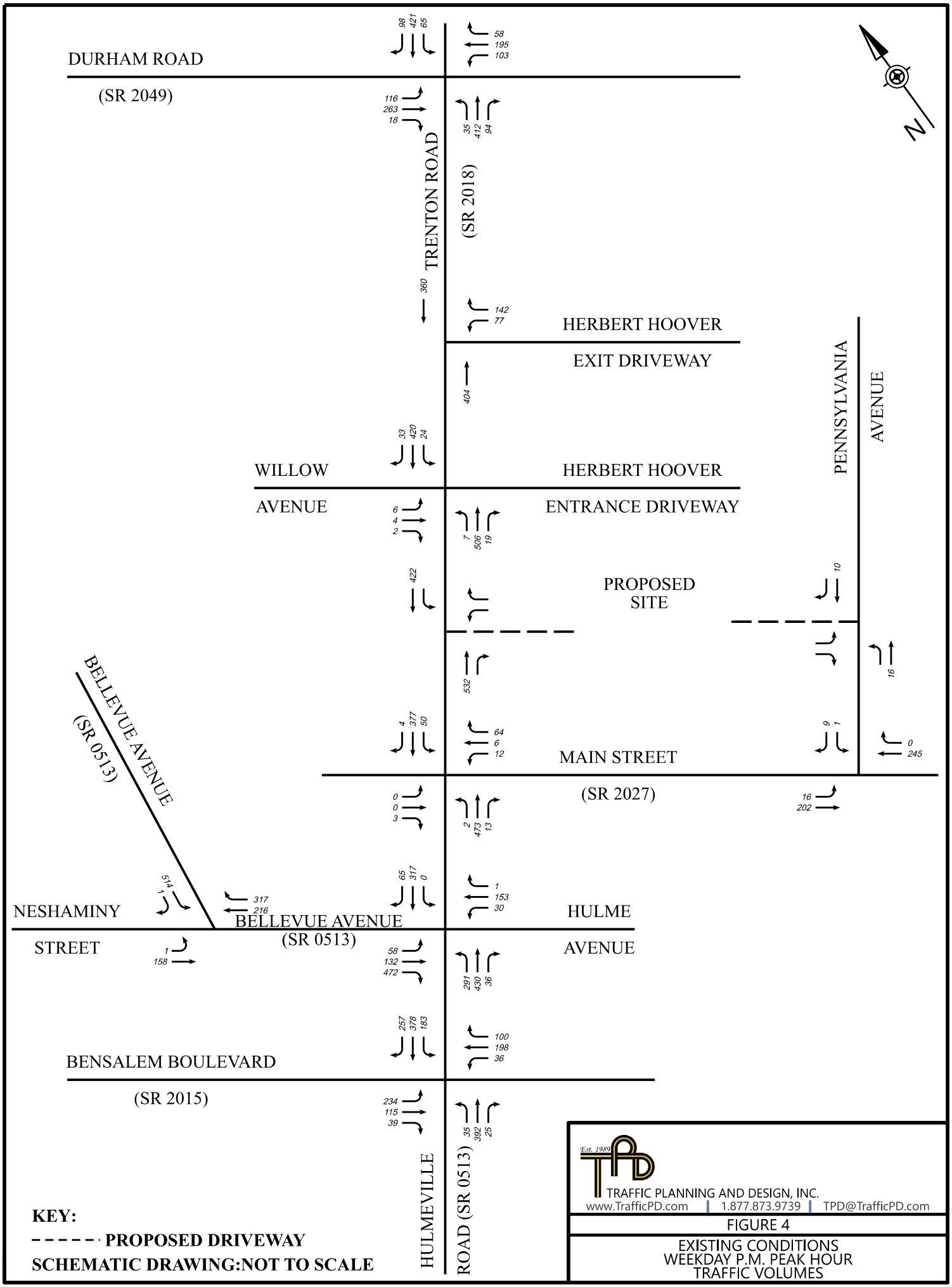
FIGURE 3
EXISTING CONDITIONS
WEEKDAY A.M. PEAK HOUR
TRAFFIC VOLUMES



KEY:

- - - - - PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

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FIGURE 4

EXISTING CONDITIONS
WEEKDAY P.M. PEAK HOUR
TRAFFIC VOLUMES

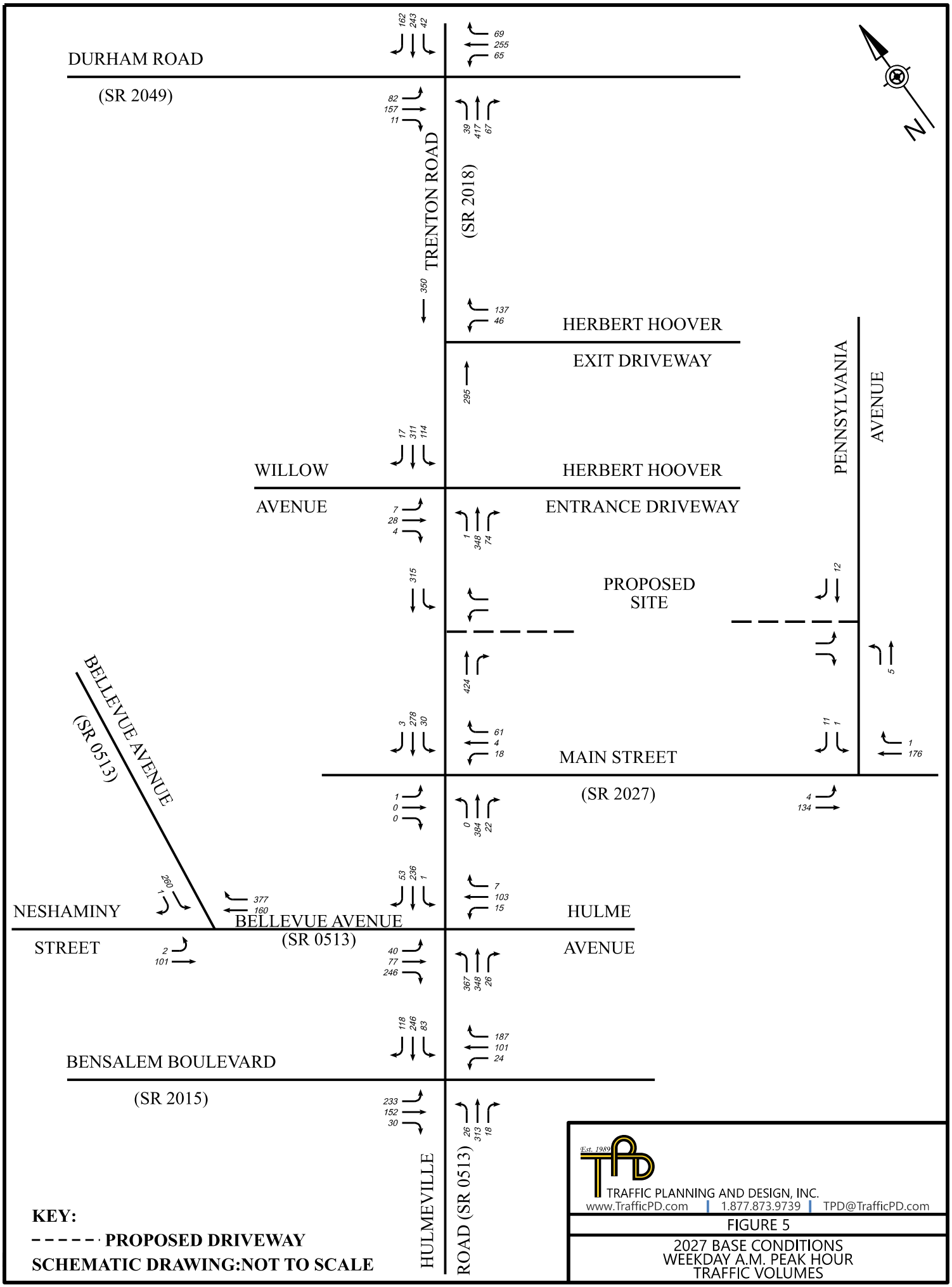
DURHAM ROAD
(SR 2049)
TRENTON ROAD
(SR 2018)
HERBERT HOOVER
EXIT DRIVEWAY
HERBERT HOOVER
ENTRANCE DRIVEWAY
WILLOW
AVENUE
PENNSYLVANIA
AVENUE
PROPOSED
SITE
MAIN STREET
(SR 2027)
BELLEVUE AVENUE
(SR 0513)
NESHAMINY
STREET
BELLEVUE AVENUE
(SR 0513)
HULME
AVENUE
BENSALEM BOULEVARD
(SR 2015)
HULMEVILLE
ROAD (SR 0513)
N
KEY:
PROPOSED DRIVEWAY
SCHEMATIC DRAWING:NOT TO SCALE
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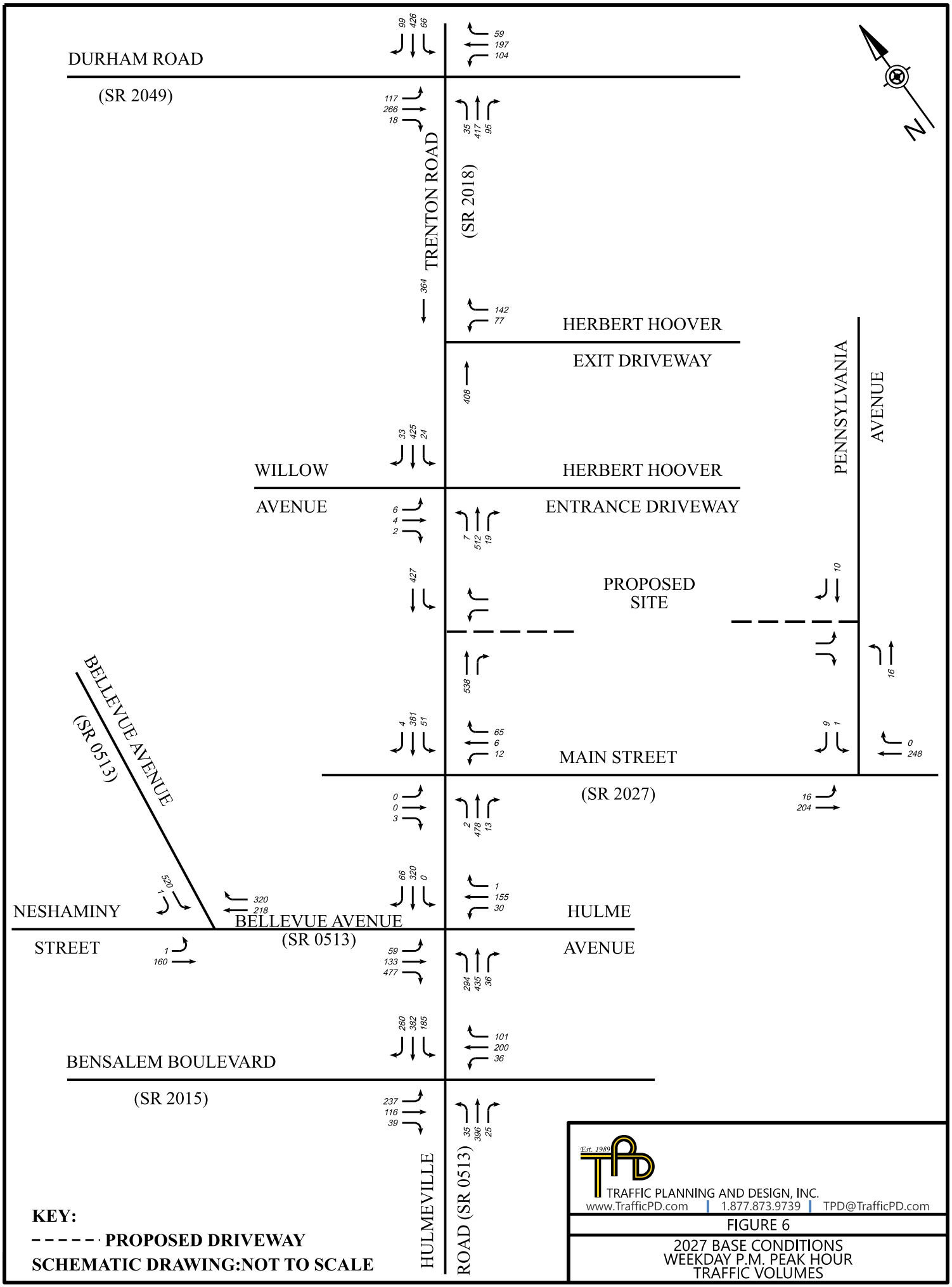
FIGURE 5
2027 BASE CONDITIONS
WEEKDAY A.M. PEAK HOUR
TRAFFIC VOLUMES



KEY:

- - - - - PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

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FIGURE 6

2027 BASE CONDITIONS
WEEKDAY P.M. PEAK HOUR
TRAFFIC VOLUMES

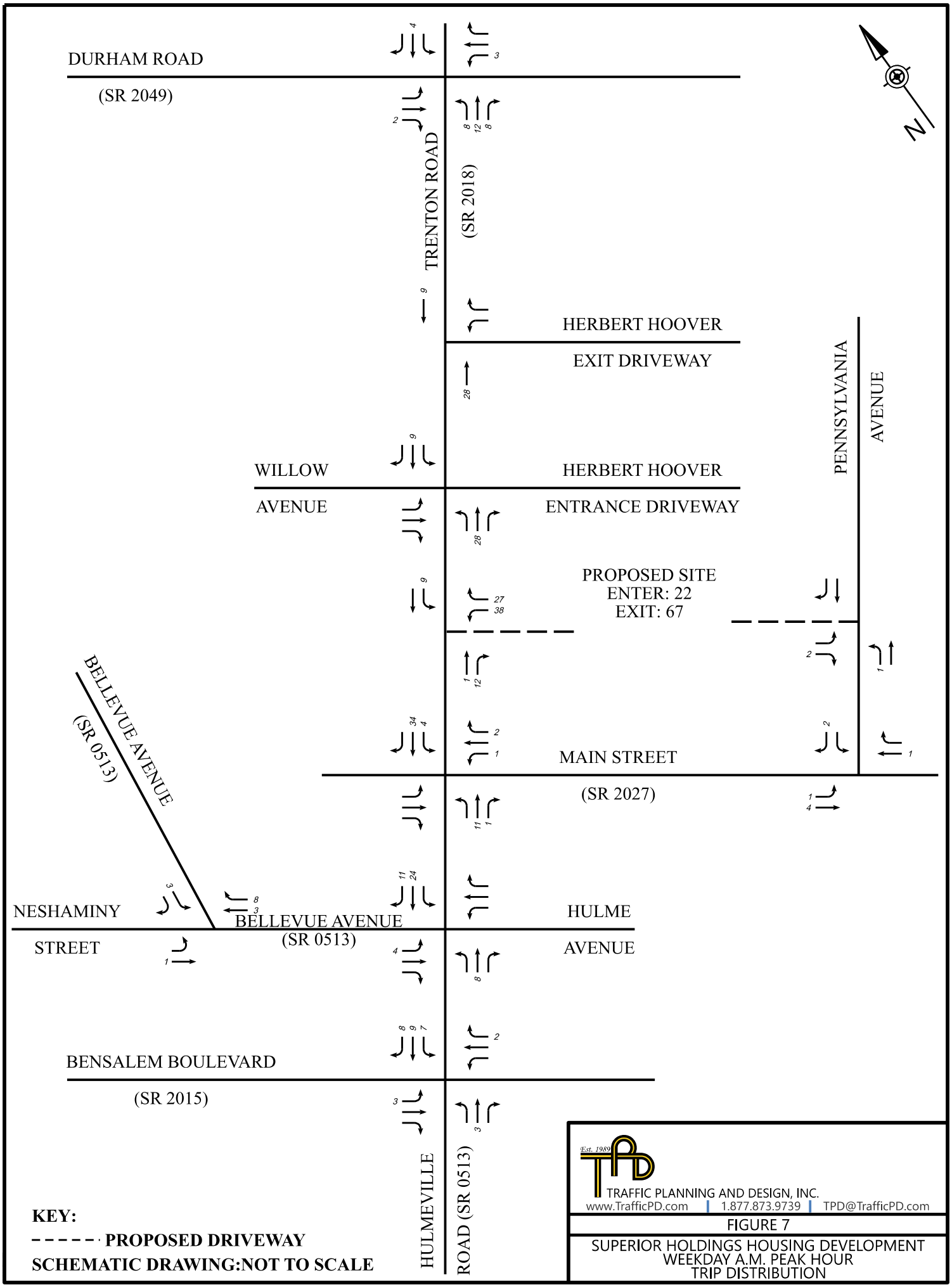

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FIGURE 7

SUPERIOR HOLDINGS HOUSING DEVELOPMENT
WEEKDAY A.M. PEAK HOUR
TRIP DISTRIBUTION

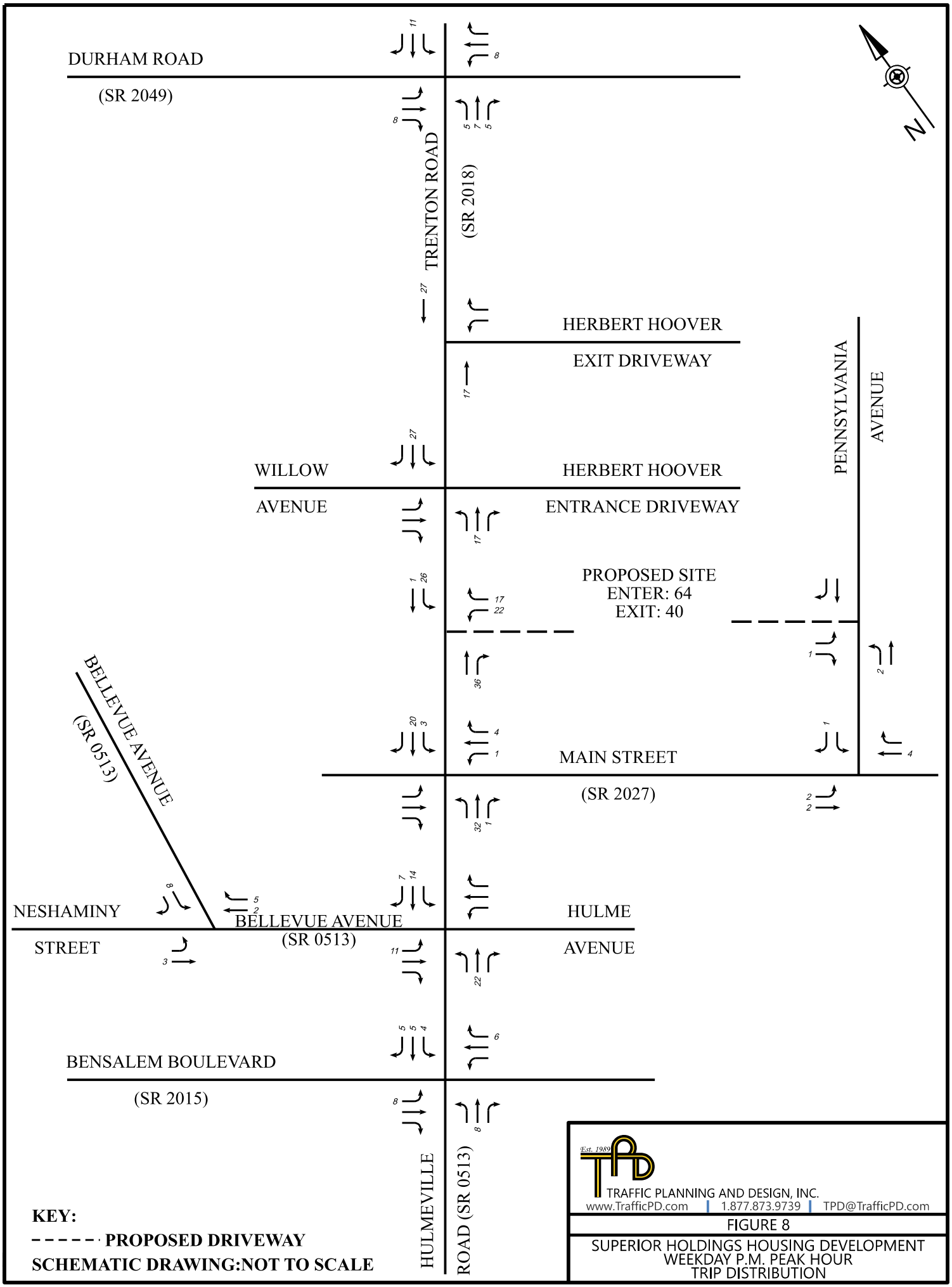

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FIGURE 8

SUPERIOR HOLDINGS HOUSING DEVELOPMENT
WEEKDAY P.M. PEAK HOUR
TRIP DISTRIBUTION

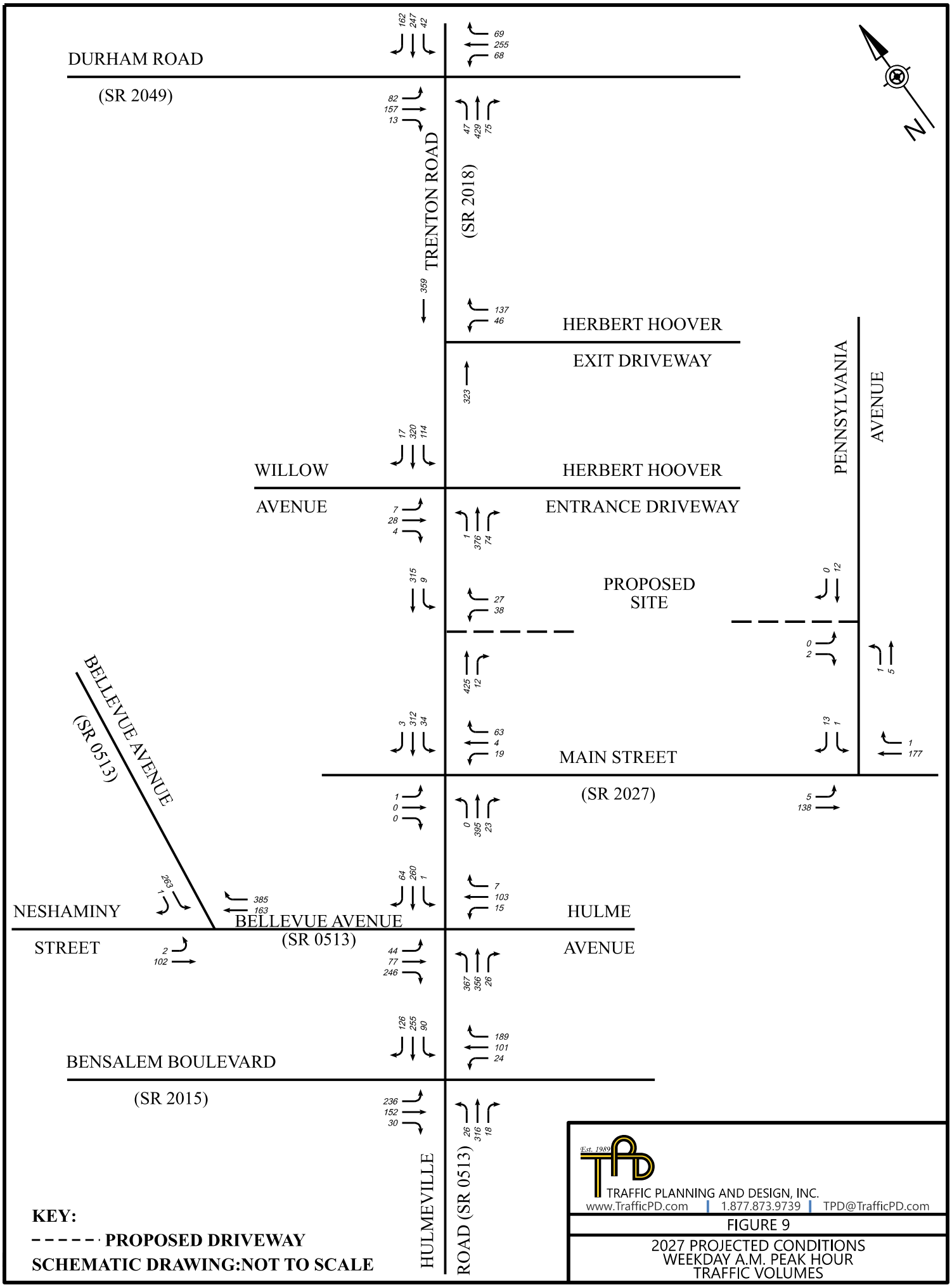
DURHAM ROAD
(SR 2049)
TRENTON ROAD
(SR 2018)
HERBERT HOOVER
EXIT DRIVEWAY
WILLOW
AVENUE
HERBERT HOOVER
ENTRANCE DRIVEWAY
PENNSYLVANIA
AVENUE
PROPOSED
SITE
BELLEVUE AVENUE
(SR 0513)
MAIN STREET
(SR 2027)
NESHAMINY
STREET
BELLEVUE AVENUE
(SR 0513)
HULME
AVENUE
BENSALEM BOULEVARD
(SR 2015)
HULMEVILLE
ROAD (SR 0513)
N
KEY:
PROPOSED DRIVEWAY
SCHEMATIC DRAWING:NOT TO SCALE
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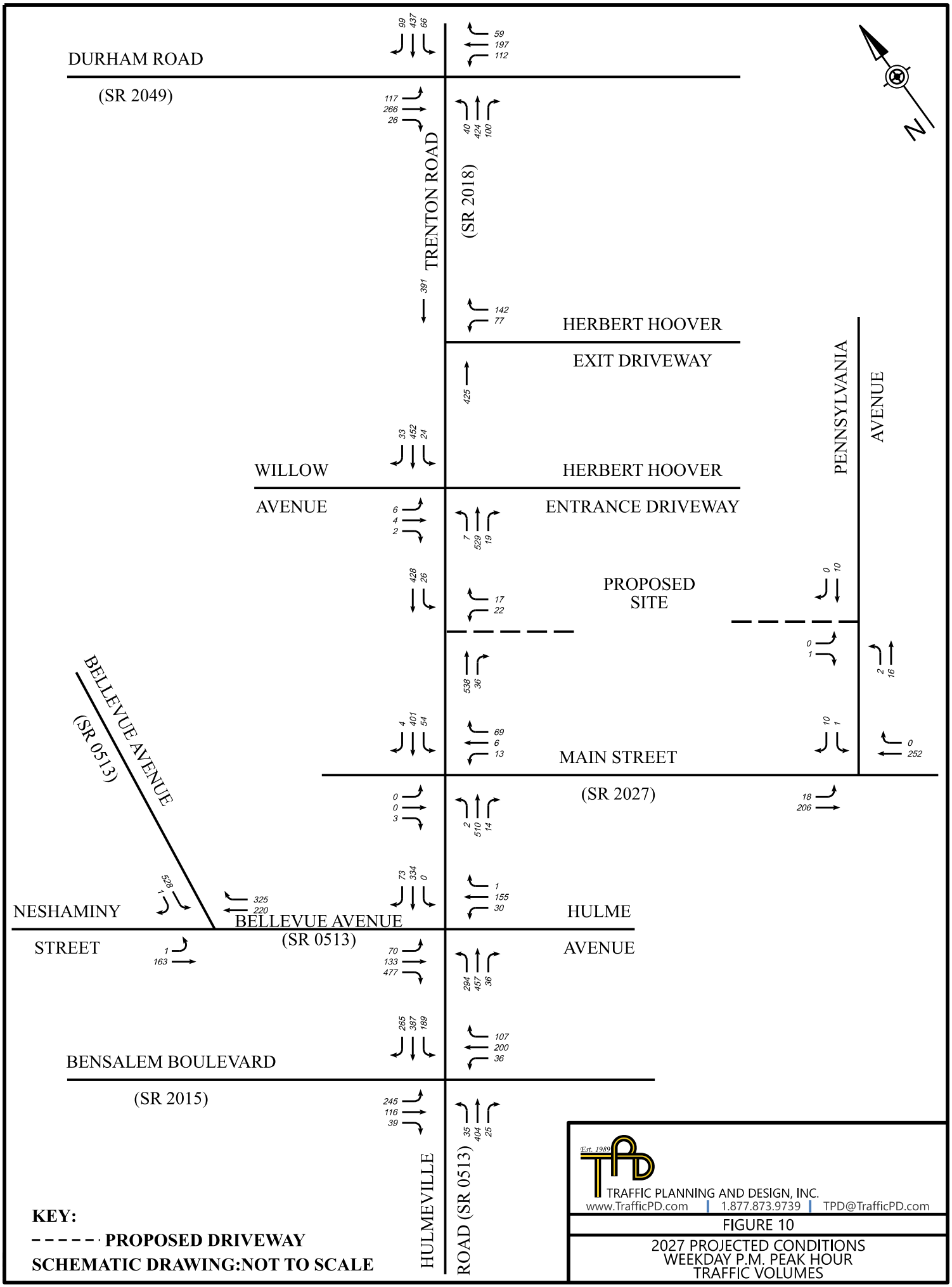
FIGURE 9
2027 PROJECTED CONDITIONS
WEEKDAY A.M. PEAK HOUR
TRAFFIC VOLUMES



KEY:

- - - - - PROPOSED DRIVEWAY

SCHEMATIC DRAWING:NOT TO SCALE

Est. 1989
TRAFFIC PLANNING AND DESIGN, INC.
www.TrafficPD.com | 1.877.873.9739 | TPD@TrafficPD.com

FIGURE 10

2027 PROJECTED CONDITIONS
WEEKDAY P.M. PEAK HOUR
TRAFFIC VOLUMES

APPENDIX A

Project Correspondence

Bressler, Matt

From: ePermitting Help <penndotepermittinghelp@pa.gov>
Sent: Thursday, January 12, 2023 10:53 AM
To: Evl5@aol.com; Hammond, Matt; Bressler, Matt; fhanney@pa.gov; jotten@pa.gov; slapenta@pa.gov; c-smccutch@pa.gov; scburton@pa.gov; ajparker@mccormicktaylor.com; w.wheeler@hulmeville-pa.gov
Cc: RA-PDEPSPROD@pa.gov
Subject: :: Scoping Meeting Application - Returned - Application Number is : S0620220112 (Sent on: 01/12/2023 10:53:04 AM)

Follow Up Flag: Follow up
Flag Status: Flagged

PennDOT has completed its review of the TIS Determination and Scoping Meeting Application.

Please address the following comments below, and resubmit the application to PennDOT for review.

PennDOT Review Comments :

1. The trip generation in the scoping application for the single-family homes (attached) is inconsistent with the ITE results for 39 dwelling units.
2. With respect to the formal permit application, please ensure that the following items are addressed:a. Please be advised that pursuant to and in accordance with Title 67, Chapter 441.8(h)(2)(iv) of the code, the Safe Stopping Sight Distance is the absolute minimum acceptable sight distance for a local road. It is the designer?s responsibility to ensure that this minimum requirement is satisfied. Furthermore, it should also be understood that any comments made (or guidance given) in this correspondence are preliminary in nature and the Department reserves the right to change, alter, withdraw, or amend them as it deems necessary in the future.b. It should be understood that in accordance with PennDOT Strike-Off Letter 470-10-03 and pursuant to section 421 of the State Highway Law (36 P.S. ? 670-421) the installation of any drainage facilities within the Legal Right-of-Way may necessitate additional permitting requirements, including, but not limited to, a separate Highway Occupancy Permit from the Municipality for the future maintenance of the new drainage facilities.c. Consistent with current Department Policy, applicants for Highway Occupancy Permits must apply for an EPS Business Partner ID (BPID). The BPID is to be used in the establishment of a billing account for the invoicing of inspection costs. For information on obtaining a BPID, you may visit: https://www.dot14.state.pa.us/EPS/home/manageBPRegistration.jsp
3. Provide a left turn lane and evaluate the need for a right turn lane to access the site from SR 2018 (Trenton Road).
4. The PennDOT project number for this scoping application review, S0620220112, must be referenced when the formal Highway Occupancy Permit (HOP) application is submitted.
5. Provide truck turning templates for the proposed access in the formal HOP submission.
6. Provide documentation of scope concurrence from Hulmeville Borough.
7. The Department has reviewed the Scoping Application submission for compliance with applicable Department Regulations. A Transportation Impact Assessment can be submitted in the PennDOT Electronic Permitting System (EPS) in the next submission.

Click here to access the Scoping Application

From: Amanda Fuller <afuller@gilmore-assoc.com>
Sent: Monday, January 2, 2023 2:04 PM
To: Hammond, Matt <mhammond@trafficpd.com>
Cc: Damon Drummond <ddrummond@gilmore-assoc.com>
Subject: Hulmeville Borough - Scoping Application Comments

Hi Matt - Happy New Year. Below are our comments regarding the scoping application for the proposed land development at 150 Trenton Ave. Feel free to let me know if you have any questions, thanks.

1. Both accesses to the Hebert Hover Elementary School & Trenton Road should be included in the study area.
2. The intersections of Trenton Road/Durham Road and Hulmeville Road/Bensalem Blvd. should be included in the study area.
3. The Traffic Study should include a current proposed site plan of the development.
4. The applicant should evaluate and discuss a connection (i.e. sidewalk) to the pedestrian facilities at the school.
5. The Traffic Study should be in accordance with Appendix B from the Zoning Ordinance.

Amanda C. Fuller, P.E., LEED AP BD+C, Senior Project Manager
Gilmore & Associates, Inc.
508 Corporate Drive West, Langhorne, PA 19047
Main: 215-369-3955 | Direct: 267-274-2036 | Cell: 609-238-3558

www.gilmore-assoc.com | BUILDING ON A FOUNDATION OF EXCELLENCE

pennsylvania
DEPARTMENT OF TRANSPORTATION

TRANSPORTATION IMPACT STUDY (TIS) DETERMINATION & SCOPING MEETING APPLICATION

Scoping Meeting Application: Submitted

Scoping Meeting Date: _____ Scoping Number: S0620220112

Tax Parcel Number: 003-204,004-001,002-014

Project/Development Name: Superior Holdings - Hulmeville

Applicant Information:

Business Partner ID: _____

Applicant Name: Superior Holdings

Phone: 609-731-4568 Email 1: Evl5@aol.com

Primary Contact: Eugene V Lorenzetti Email 2: _____

Additional Engineering Firm Information:

Business Partner ID: 000094

Engineering Firm: Traffic Planning and Design Inc

Phone: 6103263100 Email 1: mhammond@trafficpd.com

Primary Contact: Matthew Hammond Email 2: _____

Creator Information:

Business Partner ID: 000094 Firm Name: Traffic Planning and Design, Inc.

Phone: 610-326-3100 Email 1: mbressler@trafficpd.com

(1) LOCATION OF PROPOSED DEVELOPMENT:

PennDOT Engineering District: 06 Email: _____

County: Bucks Email: _____

Municipality: HULMEVILLE Email: w.wheeler@hulmeville-pa.gov;

NO.	SR	Segment	Offset	Average Daily Trips	Driveway Classification	Local Road
1	2018	0010	1837	994	Low Volume	Yes

Are there any vehicle weight or size restrictions along the SR in accordance with 75 PA C.S. ss 4902? : No

(2) DESCRIPTION OF PROPOSED DEVELOPMENT (Attach site plan if available):

Proposed site access:
One (1) full-access driveway to Trenton Road (S.R. 2018). Two (2) proposed single-family homes will have individual access to Pennsylvania Avenue on the southern portion of the site.

Proposed land uses:
39 single-family (detached) homes; 39 single-family (attached) homes; 33 apartment units (low-rise)

Community linkages *(access to neighboring properties, cross easements, pedestrian and transit accommodations):*
N/A

(3) DEVELOPMENT SCHEDULE AND STAGING:

Anticipated Opening Date: 05-08-2023
Full Buildout Date: 11-08-2027

Describe Proposed Development Schedule/Staging:
None

(4) TRIP GENERATION:

Land Use & Size	Land Use Code	Were ITE results used?	Daily Trips	AM Peak Hour		PM Peak Hour		Saturday Peak Hour	
				Enter	Exit	Enter	Exit	Enter	Exit
39 single-family homes (detached)	210	Yes	424	8	24	26	15		
39 single-family homes (attached)	215	Yes	282	6	13	12	10		
33 apartment units (low-rise)	220	Yes	288	8	25	22	13		
		TOTAL:	994	22	62	60	38	0	0

(5) TRANSPORTATION IMPACT STUDY REQUIRED?

Transportation Impact Study Required? No

If Yes, based on:

Other considerations as described below:
N/A

(6) TRANSPORTATION IMPACT ASSESSMENT REQUIRED?

Transportation Impact Assessment Required? Yes

(7) STUDY AREA:

Roadway and Study Intersections:
Trenton Road (S.R. 2018) & Main Street (S.R. 2027); Trenton Road (S.R. 2018) & Willow Avenue/Herbert Hoover ES Driveway; Hulmeville Road (S.R. 0513) & Trenton Road (S.R. 2018); Hulmeville Road (S.R. 0513) & Neshaminy Street (S.R. 2027); Main Street (S.R. 2027) & Pennsylvania Avenue;

Land use context (Refer to PennDOT Design Manual, Part 1X, Appendix B):
Suburban Neighborhood

Known Congestion Areas:
TBD in TIA

Known Safety Concerns:
TBD in TIA

Known Environmental Constraints:
TBD in TIA

Pedestrian/Bike Review (Community Centers, Parks, Schools, etc.):
To be included in TIA

Transit Review (Current routes/stops):
To be included in TIA

(8) STUDY AREA TYPE:

Study Area Type: Urban

(9) TIS ANALYSIS PERIODS AND TIMES:

Analysis period and times notes:
2022 Existing Conditions; 2027 Base Conditions; 2027 Projected Conditions; AM Peak (6:30-10:00AM); PM Peak (3:00-6:00PM);

(10) TRAFFIC ADJUSTMENT FACTORS:

(a) Seasonal Adjustment (Identify counts requiring adjustment and methodology):
None

(b) Annual Base Traffic Growth: 0.22 %/yr. **Source:** PennDOT BPR

(c) Pass-By Trips (Attach justification where required):

NO.	Land Use	%	Source

(d) Captured Trips for Multi-Use Sites:
N/A

(e) Modal Split Reductions:
N/A

(f) Other Reductions:
N/A

(11) OTHER PROJECTS WITHIN STUDY AREA TO BE ADDED TO BASE TRAFFIC:

Notes:
TBD during Scoping

(12) TRIP DISTRIBUTION AND ASSIGNMENT:

Trip Distribution Notes:
To be based on existing counts/patterns

(13) APPROVAL OF DATA COLLECTION ELEMENTS AND METHODOLOGIES:

NO.	Location	Period	Type
1	See Section 7 for Intersections	See Section 9 for Time Periods	Turning Movement Counts

(14) CAPACITY/LOS ANALYSIS:

NO.	Location	Period	Type
1	See section 7 for Ints + Proposed Driveways	See Section 9 for Time Periods	HCM 6th Edition/SYNCHRO 11

(15) ROADWAY IMPROVEMENTS/MODIFICATIONS BY OTHERS TO BE INCLUDED:

Roadway Improvements:
TBD during Scoping

(16) OTHER NEEDED ANALYSES:

(a) Sight Distance Analysis:
To be included in TIA

(b) Signal Warrant Analysis (Identify locations):
As needed

(c) Required Signal Phasing/Timing Modifications (Determine for all signalized intersections; specify methodology):
As needed

(d) Traffic Signal Corridor/Network Analysis (Identify locations/methodology):
N/A

(e) Analysis of the Need for Turning Lanes (Identify locations/methodology):
To be included in TIA

(f) Turning Lane Lengths (Identify methodology to be used):
Pub 46

(g) Left Turn Signal Phasing Analysis (Identify locations/methodology):
As needed

(h) Queuing Analysis (Identify locations/methodology):
HCM 6th Edition/Synchro 11

(i) Gap Studies (Identify locations/methodology):
As needed

(j) Crash Analysis (Identify locations):
To be included in TIA

(k) Weaving Analysis (Identify locations):
N/A

(l) Other Required Studies (Specify locations/methodology):
As needed

(17) ADDITIONAL COMMENTS OR RECOMMENDATIONS RELATIVE TO THE SCOPE OF THE TIS:

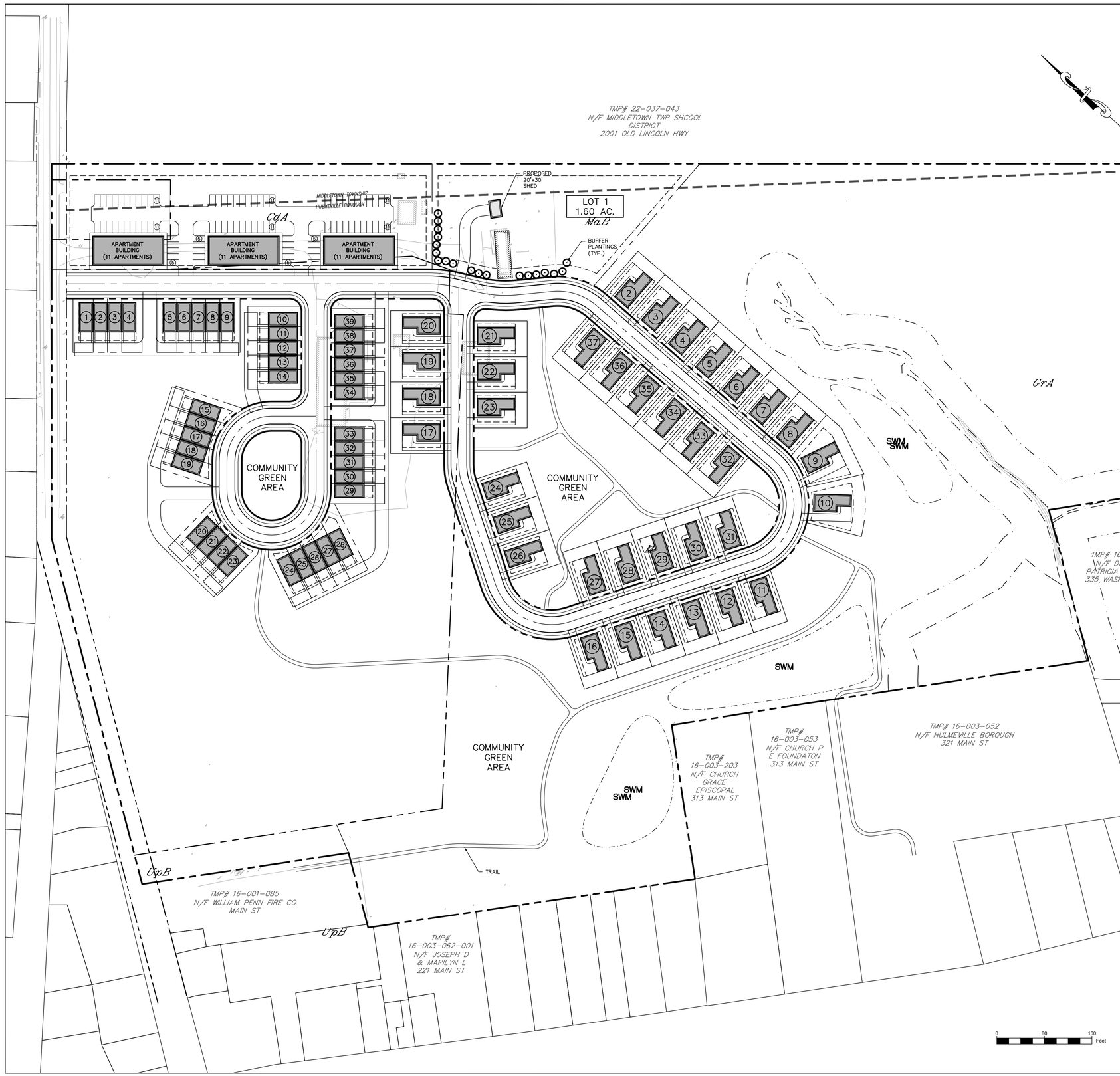
Additional Comments:
N/A

PennDOT Review Comments: (Current Cycle Comments)

After review of the scoping meeting application, the Department will contact the applicant regarding the need for a scoping meeting prior to applying for a highway occupancy permit.

This Electronic Copy Created on: 2022-11-23 10:40:50

SUPERIOR HOLDINGS - Site Location Aerial



RESOURCE PROTECTION STANDARDS

Resource	Min. Required Protection Ratio	Total Area of Land in Resource	Required Resource Protection Land	Actual Resource Protection Land	Actual Protection Ratio
	%	(Ac.)	(Ac.)	(Ac.)	%
Floodplain	100%	0.00	0.00	0.00	N/A
Floodplain Soils	100%	0.00	0.00	0.00	N/A
Wetlands	100%	1.02	1.02	1.02	100%
Wetlands Buffer	100%	2.25	2.25	2.25	100%
Steep Slopes 26%+	85%	0.31	0.26	0.30	99%
Steep Slopes 15%-25%	70%	5.85	4.10	4.40	75%
Steep Slopes 8%-15%	60%	16.44	9.87	9.99	61%
Forest	60%	12.76	7.66	11.33	89%

ZONING TABLE

Zone: R-3 Residential

ITEM	REQUIRED	PROPOSED	ORDINANCE SECTION
Conditional Use	B4 Traditional Neighborhood Development	B4 Traditional Neighborhood Development	27-502.2B
R-3 Residential Ditrict Requirements			
Min. Site Area	5 Ac.	45.33 Ac.	27-502.3B
Max. Density	7.5 DU/AC	4.13 DU/AC	27-502.3B
Min. Lot Area Single Family Detached	3,000 SF	5,400 SF	27-502.3B
Min. Lot Area Two-Family Dwelling	2,000 SF	N/A	27-502.3B
Min. Lot Area Townhouse	2,000 SF	2,160 SF	27-502.3B
Min. Lot Area Mutifamily	2,000 SF/DU	>3,298 SF (33 DU)	27-502.3B
Min. Open Space	30%	>30%	27-502.3B
Max. Impervious Ratio Per Site	60%	33%	27-502.3B
Max. Impervious Ratio Per Lot	70%	<70%	27-502.3B
Min. Lot Width Per Dwelling at Building Line	25 FT	> 25 FT	27-502.3B
Max. Building Height: Principal Dwelling Unit	35 FT	< 35 FT	27-502.3B
Max. Building Height: Accessory Structure	20 FT	< 20 FT	27-502.3B
Min. Front Yard *	4 FT	6 FT	27-502.3B
Min. Side Yard - Single Family Detached **	10 FT	5 FT **	27-502.3B
Min. Side Yard - Townhouse/Multifamily	10 FT	10 FT	27-502.3B
Min. Rear Yard	20 FT	20 FT	27-502.3B
B4 Use Requirements			
Max. Dwellings Per Townhouse Building	8 DU	6 DU	27-406.2D(3d)
Max. Dwellings Per Mutifmily Building	12 DU	11 DU	27-406.2D(3d)
Min. Community Green Area	50% Of Open Space	50%	27-406.2D(5)
Min. Buffer Yard; Perimeter Buffer	20 FT	20 FT	27-406.2D(13)
Min. Off-Street Parking Spaces	See Parking Table		27-406.2D(14)
* Front facades of residential Structures in a traditional meighborhood development shall be close to the sidewalks. The front façade of any principle residence shall be no futher than 10 FT from designated sidewalk.			
** One side yard setback for a single family detached dwelling may be reduced to 5 FT provided that the side yard setback for the adjacent dwelling is 10 FT.			
(V) Variance Required			

SITE PLAN NOTES:

1. THE BOUNDARY AND TOPOGRAPHIC INFORMATION IS TAKEN FROM BOUNDARY & TOPOGRAPHIC PLAN PREPARED CARROLL ENGINEERING IN JULY 2022.
2. TOPOGRAPHICAL INFORMATION IS BASED UPON VERTICAL DATUM NAVD 88 AND HORIZONTAL DATUM PASS-S.
3. FLOOD ZONE INFORMATION: SUBJECT PARCEL AREA IS LOCATED OUTSIDE ZONE X (AREAS DETERMINED TO BE OUTSIDE THE 500-YEAR FLOODPLAIN FO THE FLOOD INSURANCE MAP, PANEL NO. 266 OF 340, COMMUNITY MAP NO. 42077C0266F WHICH BEARS AN EFFECTIVE DATE OF JULY 6, 2004.
4. A CONDITIONAL USE APPROVAL FOR THE B4 TRADITIONAL NEIGHBORHOOD DEVELOPMENT. THE PLAN CONSISTS OF 111 DWELLING UNITS (33 APARTMENTS, 39 TOWNHOUSES AND 39 SINGLE-FAMILY DETACHED DWELLINGS.

Holmes Cunningham LLC
409 E. Butler Ave., Unit 5
Doylestown, PA 18901
(215) 586-3330
www.hcengineering.net

holmes cunningham ENGINEERING

REVISIONS

Date	Description

CALL BEFORE YOU DIG!!
PENNSYLVANIA LAW REQUIRES 3 WORKING DAYS NOTICE FOR EXCAVATION AND 10 WORKING DAYS IN DESIGN STAGE
-- STOP & CALL --
Pennsylvania One Call System, Inc.
1-800-242-1776

UTILITY LOCATIONS AS SHOWN ON THIS PLAN ARE APPROXIMATE AND IT IS THE RESPONSIBILITY OF THE CONTRACTOR, PER PA. ACT 187 TO CONTACT UTILITY COMPANIES PRIOR TO ANY EXCAVATION.

SUPERIOR HOLDINGS LLC

TP# 16-003-204 & 16-004-001
HULMEVILLE BOROUGH, BUCKS COUNTY, PA

CONCEPTUAL PLAN

ROBERT T. CUNNINGHAM, P.E.
PA PE076424

File No.
1559_CP7.DWG

HCE Job	1559	Scale	1"=80'	Designed	RC	Sheet	1 of 1
Date	7/7/2022						

Drawing No.
CP7

TMS Site 18186: Traffic Monitoring Report

Location Description: Between Hulme St. and Main St.

Details

Type of Count	MACHINE CLASS
Type of Site	Portable
Schedule	1 TIME/YR
Duration	24 HRS
Frequency Cycle	05
Cycle Year	04

Location

County	BUCKS (09)
Route	2018
Segment	0010
Offset	0170
Latitude	40.14291
Longitude	-74.9114

Map

Traffic Data

Hour	Volume	Trucks	Truck %	Volume Graph
12:00 AM	59	2	3.4	
01:00 AM	29	2	6.9	
02:00 AM	23	3	13	
03:00 AM	37	7	18.9	
04:00 AM	70	12	17.1	
05:00 AM	159	21	13.2	
06:00 AM	399	31	7.8	
07:00 AM	589	48	8.1	
08:00 AM	605	44	7.3	
09:00 AM	556	34	6.1	
10:00 AM	581	31	5.3	
11:00 AM	623	36	5.8	
12:00 PM	681	30	4.4	
01:00 PM	644	39	6.1	
02:00 PM	687	41	6	
03:00 PM	672	46	6.8	
04:00 PM	753	42	5.6	
05:00 PM	756	30	4	
06:00 PM	680	36	5.3	
07:00 PM	564	23	4.1	
08:00 PM	423	12	2.8	
09:00 PM	351	15	4.3	
10:00 PM	211	11	5.2	
11:00 PM	114	4	3.5	

TMS Site 18658: Traffic Monitoring Report

Location Description: 0.5 miles north of SR 2042.

Details

Type of Count	MACHINE CLASS
Type of Site	Portable
Schedule	1 TIME/YR
Duration	24 HRS
Frequency Cycle	05
Cycle Year	04

Location

County	BUCKS (09)
Route	2027
Segment	0060
Offset	2640
Latitude	40.1382
Longitude	-74.90345

Map

Traffic Data

Hour	Volume	Trucks	Truck %	Volume Graph
12:00 AM	20	1	5	
01:00 AM	11	1	9.1	
02:00 AM	9	0	0	
03:00 AM	6	0	0	
04:00 AM	23	2	8.7	
05:00 AM	90	19	21.1	
06:00 AM	218	34	15.6	
07:00 AM	309	37	12	
08:00 AM	311	35	11.3	
09:00 AM	256	15	5.9	
10:00 AM	207	37	17.9	
11:00 AM	225	22	9.8	
12:00 PM	248	25	10.1	
01:00 PM	256	20	7.8	
02:00 PM	258	38	14.7	
03:00 PM	364	41	11.3	
04:00 PM	419	33	7.9	
05:00 PM	459	25	5.4	
06:00 PM	365	17	4.7	
07:00 PM	280	17	6.1	
08:00 PM	180	11	6.1	
09:00 PM	140	7	5	
10:00 PM	92	5	5.4	
11:00 PM	38	1	2.6	

TMS Site 26211: Traffic Monitoring Report

Location Description: 200 feet north of Fairview Ave.

Details

Type of Count	MACHINE CLASS
Type of Site	Portable
Schedule	1 TIME/YR
Duration	24 HRS
Frequency Cycle	03
Cycle Year	03

Location

County	BUCKS (09)
Route	0513
Segment	0120
Offset	1500
Latitude	40.1481
Longitude	-74.91238

Map

Traffic Data

Hour	Volume	Volume Graph
12:00 AM	40	
01:00 AM	20	
02:00 AM	12	
03:00 AM	18	
04:00 AM	63	
05:00 AM	149	
06:00 AM	439	
07:00 AM	691	
08:00 AM	615	
09:00 AM	528	
10:00 AM	452	
11:00 AM	520	
12:00 PM	505	
01:00 PM	537	
02:00 PM	566	
03:00 PM	730	
04:00 PM	859	
05:00 PM	937	
06:00 PM	625	
07:00 PM	605	
08:00 PM	471	
09:00 PM	310	
10:00 PM	184	
11:00 PM	86	

APPENDIX B

Study Area Photographs

Job #: SUPE.00001 *Date Taken:* 11/14/2022 *Intersection Of:* Main Street & Trenton Road

Direction / Road: **Eb. Trenton Road**
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: **Eb. Trenton Road**
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 11/14/2022 *Intersection Of:* Main Street & Trenton Road

Direction / Road: **Wb. Trenton Road**
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: **Wb. Trenton Road**
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 11/14/2022 *Intersection Of:* Main Street & Trenton Road

Direction / Road: **Nb. Main Street**
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: **Nb. Main Street**
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 11/14/2022 *Intersection Of:* Main Street & Trenton Road

Direction / Road: **Sb. Main Street**
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: **Sb. Main Street**
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 11/14/2022 *Intersection Of:* Main Street & Trenton Road

Direction / Road: **Eb. Trenton Road**
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: **Eb. Trenton Road**
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 11/14/2022 *Intersection Of:* Main Street & Trenton Road

Direction / Road: **Wb. Trenton Road**
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: **Wb. Trenton Road**
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 11/14/2022 *Intersection Of:* Main Street & Trenton Road

Direction / Road: **Sb. Willow Ave**
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: **Sb. Willow Ave**
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 11/14/2022 *Intersection Of:* Hulme Ave-Route 513 & Trenton Rd

Direction / Road: **Eb. Trenton Road**
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: **Eb. Trenton Road**
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 11/14/2022 *Intersection Of:* Hulme Ave-Route 513 & Trenton Rd

Direction / Road: **Wb. Trenton Road**
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: **Wb. Trenton Road**
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 11/14/2022 *Intersection Of:* Hulme Ave-Route 513 & Trenton Rd

Direction / Road: **Nb. Hulme Avenue**
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: **Nb. Hulme Avenue**
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 11/14/2022 *Intersection Of:* Hulme Ave-Route 513 & Trenton Rd

Direction / Road: **Sb. Route 513**
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: **Sb. Route 513**
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 11/14/2022 *Intersection Of:* Neshaminy St-Route 513-Route 513

Direction / Road: **Wb. Route 513**
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: **Wb. Route 513**
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 11/14/2022 *Intersection Of:* Neshaminy St-Route 513-Route 513

Direction / Road: **Nb. Route 513**
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: **Nb. Route 513**
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 11/14/2022 *Intersection Of:* Neshaminy St-Route 513-Route 513

Direction / Road: **Sb. Neshaminy Street**
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: **Sb. Neshaminy Street**
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 11/14/2022 *Intersection Of:* Main Street & Pennsylvania Ave

Direction / Road: **Wb. Pennsylvania Ave**
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: **Wb. Pennsylvania Ave**
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 11/14/2022 *Intersection Of:* Main Street & Pennsylvania Ave

Direction / Road: **Nb. Main Street**
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: **Nb. Main Street**
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 11/14/2022 *Intersection Of:* Main Street & Pennsylvania Ave

Direction / Road: **Sb. Main Street**
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: **Sb. Main Street**
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 01-23-2023 *Intersection Of:* Trenton Road & HH ES Northern Driveway

Direction / Road: WB HH ES Northern Driveway
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: WB HH ES Northern Driveway
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 01-23-2023 *Intersection Of:* Trenton Road & HH ES Northern Driveway

Direction / Road: NB Trenton Road
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: NB Trenton Road
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 01-23-2023 *Intersection Of:* Trenton Road & HH ES Northern Driveway

Direction / Road: SB Trenton Road
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: SB Trenton Road
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 01-23-2023 *Intersection Of:* Trenton Road & Durham Road

Direction / Road: EB Durham Road
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: EB Durham Road
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 01-23-2023 *Intersection Of:* Trenton Road & Durham Road

Direction / Road: WB Durham Road
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: WB Durham Road
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 01-23-2023 *Intersection Of:* Trenton Road & Durham Road

Direction / Road: NB Trenton Road
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: NB Trenton Road
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 01-23-2023 *Intersection Of:* Trenton Road & Durham Road

Direction / Road: SB Trenton Road
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: SB Trenton Road
Approach / Departure: Approach
Distance: 150 Feet

Job #: SUPE.00001 *Date Taken:* 01-23-2023 *Intersection Of:* Hulmeville Road & Bensalem Boulevard

Direction / Road: EB Bensalem Boulevard
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: EB Bensalem Boulevard
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 01-23-2023 *Intersection Of:* Hulmeville Road & Bensalem Boulevard

Direction / Road: WB Bensalem Boulevard
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: WB Bensalem Boulevard
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 01-23-2023 *Intersection Of:* Hulmeville Road & Bensalem Boulevard

Direction / Road: NB Hulmeville Road
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: NB Hulmeville Road
Approach / Departure: Approach
Distance: 200 Feet

Job #: SUPE.00001 *Date Taken:* 01-23-2023 *Intersection Of:* Hulmeville Road & Bensalem Boulevard

Direction / Road: SB Hulmeville Road
Approach / Departure: Approach
Distance: 50 feet

Direction / Road: SB Hulmeville Road
Approach / Departure: Approach
Distance: 200 Feet

APPENDIX C

Manual Traffic Count Printouts

Counter: MIO:
Set up By JH::

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Count Name: 1 Main St & Trenton Rd
Site Code:
Start Date: 11/16/2022

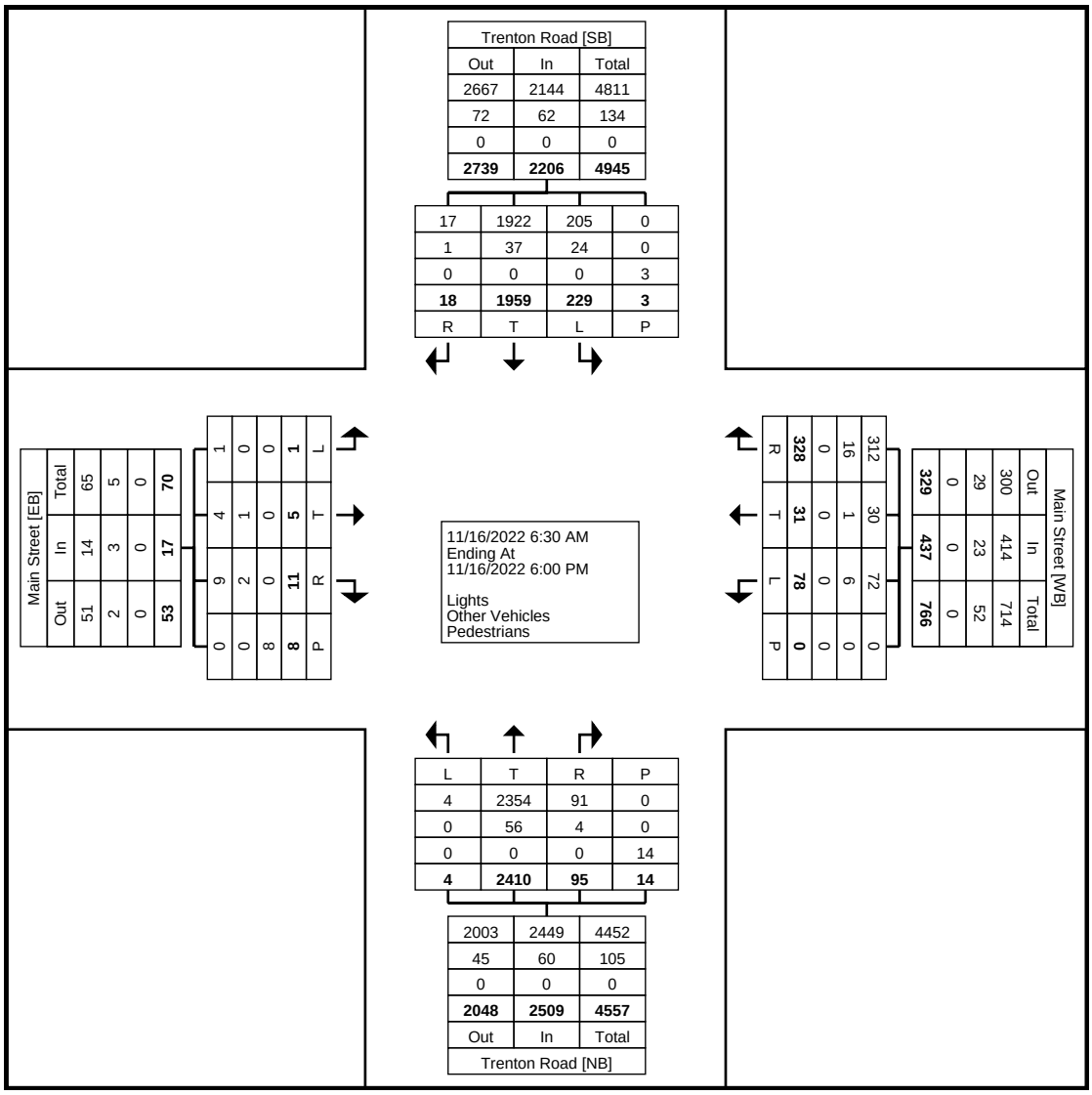
Turning Movement Data

Start Time	Main Street Eastbound					Main Street Westbound					Trenton Road Northbound					Trenton Road Southbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
6:30 AM	0	0	0	5	0	2	2	8	0	12	0	72	1	4	73	5	38	1	0	44	129
6:45 AM	0	0	3	1	3	3	1	10	0	14	0	83	5	0	88	4	57	0	0	61	166
Hourly Total	0	0	3	6	3	5	3	18	0	26	0	155	6	4	161	9	95	1	0	105	295
7:00 AM	0	0	0	0	0	1	0	15	0	16	0	82	4	1	86	5	60	0	0	65	167
7:15 AM	0	0	0	0	0	1	3	17	0	21	0	65	2	0	67	4	72	2	0	78	166
7:30 AM	0	0	0	0	0	4	1	13	0	18	0	107	6	0	113	6	81	0	0	87	218
7:45 AM	0	0	0	0	0	7	1	18	0	26	0	100	7	0	107	11	66	1	0	78	211
Hourly Total	0	0	0	0	0	13	5	63	0	81	0	354	19	1	373	26	279	3	0	308	762
8:00 AM	1	0	0	0	1	1	1	13	0	15	0	97	5	0	102	5	62	0	0	67	185
8:15 AM	0	0	0	0	0	6	1	16	0	23	0	76	4	0	80	8	66	2	0	76	179
8:30 AM	0	1	0	0	1	2	1	14	0	17	0	92	3	0	95	10	67	0	0	77	190
8:45 AM	0	2	1	0	3	3	1	14	0	18	0	107	3	1	110	9	54	1	1	64	195
Hourly Total	1	3	1	0	5	12	4	57	0	73	0	372	15	1	387	32	249	3	1	284	749
9:00 AM	0	1	0	0	1	2	1	9	0	12	0	74	6	0	80	14	89	2	0	105	198
9:15 AM	0	0	0	0	0	5	2	14	0	21	0	67	2	1	69	5	57	0	0	62	152
9:30 AM	0	0	1	0	1	4	1	8	0	13	0	85	2	0	87	4	57	0	0	61	162
9:45 AM	0	0	0	0	0	0	0	13	0	13	0	58	3	0	61	10	51	0	0	61	135
Hourly Total	0	1	1	0	2	11	4	44	0	59	0	284	13	1	297	33	254	2	0	289	647
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	0	0	1	0	1	4	1	11	0	16	0	106	4	0	110	6	78	0	0	84	211
3:15 PM	0	0	1	0	1	4	0	10	0	14	0	99	3	0	102	5	89	1	0	95	212
3:30 PM	0	0	0	0	0	0	0	8	0	8	0	91	2	0	93	18	103	0	0	121	222
3:45 PM	0	0	0	0	0	6	3	13	0	22	0	103	2	1	105	8	83	2	0	93	220
Hourly Total	0	0	2	0	2	14	4	42	0	60	0	399	11	1	410	37	353	3	0	393	865
4:00 PM	0	0	1	0	1	3	1	12	0	16	0	101	4	0	105	8	76	0	0	84	206
4:15 PM	0	0	2	0	2	7	0	14	0	21	0	118	4	1	122	11	108	0	0	119	264
4:30 PM	0	0	0	0	0	3	1	19	0	23	0	124	2	1	126	14	92	2	0	108	257
4:45 PM	0	0	1	0	1	1	3	24	0	28	2	119	2	0	123	11	79	1	0	91	243
Hourly Total	0	0	4	0	4	14	5	69	0	88	2	462	12	2	476	44	355	3	0	402	970
5:00 PM	0	0	0	0	0	1	2	7	0	10	0	112	5	1	117	14	98	1	0	113	240
5:15 PM	0	0	0	0	0	2	1	12	0	15	0	100	5	0	105	10	101	0	0	111	231
5:30 PM	0	0	0	2	0	4	1	10	0	15	1	97	5	2	103	13	76	1	2	90	208
5:45 PM	0	1	0	0	1	2	2	6	0	10	1	75	4	1	80	11	99	1	0	111	202
Hourly Total	0	1	0	2	1	9	6	35	0	50	2	384	19	4	405	48	374	3	2	425	881
Grand Total	1	5	11	8	17	78	31	328	0	437	4	2410	95	14	2509	229	1959	18	3	2206	5169
Approach %	5.9	29.4	64.7	-	-	17.8	7.1	75.1	-	-	0.2	96.1	3.8	-	-	10.4	88.8	0.8	-	-	-
Total %	0.0	0.1	0.2	-	0.3	1.5	0.6	6.3	-	8.5	0.1	46.6	1.8	-	48.5	4.4	37.9	0.3	-	42.7	-
Lights	1	4	9	-	14	72	30	312	-	414	4	2354	91	-	2449	205	1922	17	-	2144	5021
% Lights	100.0	80.0	81.8	-	82.4	92.3	96.8	95.1	-	94.7	100.0	97.7	95.8	-	97.6	89.5	98.1	94.4	-	97.2	97.1
Other Vehicles	0	1	2	-	3	6	1	16	-	23	0	56	4	-	60	24	37	1	-	62	148
% Other Vehicles	0.0	20.0	18.2	-	17.6	7.7	3.2	4.9	-	5.3	0.0	2.3	4.2	-	2.4	10.5	1.9	5.6	-	2.8	2.9
Pedestrians	-	-	-	8	-	-	-	-	0	-	-	-	-	14	-	-	-	-	3	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 1 Main St & Trenton Rd
Site Code:
Start Date: 11/16/2022



Turning Movement Data Plot

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 1 Main St & Trenton Rd
Site Code:
Start Date: 11/16/2022

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Main Street Eastbound					Main Street Westbound					Trenton Road Northbound					Trenton Road Southbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
7:30 AM	0	0	0	0	0	4	1	13	0	18	0	107	6	0	113	6	81	0	0	87	218
7:45 AM	0	0	0	0	0	7	1	18	0	26	0	100	7	0	107	11	66	1	0	78	211
8:00 AM	1	0	0	0	1	1	1	13	0	15	0	97	5	0	102	5	62	0	0	67	185
8:15 AM	0	0	0	0	0	6	1	16	0	23	0	76	4	0	80	8	66	2	0	76	179
Total	1	0	0	0	1	18	4	60	0	82	0	380	22	0	402	30	275	3	0	308	793
Approach %	100.0	0.0	0.0	-	-	22.0	4.9	73.2	-	-	0.0	94.5	5.5	-	-	9.7	89.3	1.0	-	-	-
Total %	0.1	0.0	0.0	-	0.1	2.3	0.5	7.6	-	10.3	0.0	47.9	2.8	-	50.7	3.8	34.7	0.4	-	38.8	-
PHF	0.250	0.000	0.000	-	0.250	0.643	1.000	0.833	-	0.788	0.000	0.888	0.786	-	0.889	0.682	0.849	0.375	-	0.885	0.909
Lights	1	0	0	-	1	16	4	56	-	76	0	370	20	-	390	27	268	2	-	297	764
% Lights	100.0	-	-	-	100.0	88.9	100.0	93.3	-	92.7	-	97.4	90.9	-	97.0	90.0	97.5	66.7	-	96.4	96.3
Other Vehicles	0	0	0	-	0	2	0	4	-	6	0	10	2	-	12	3	7	1	-	11	29
% Other Vehicles	0.0	-	-	-	0.0	11.1	0.0	6.7	-	7.3	-	2.6	9.1	-	3.0	10.0	2.5	33.3	-	3.6	3.7
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Traffic Planning and Design, Inc
2500 East High Street
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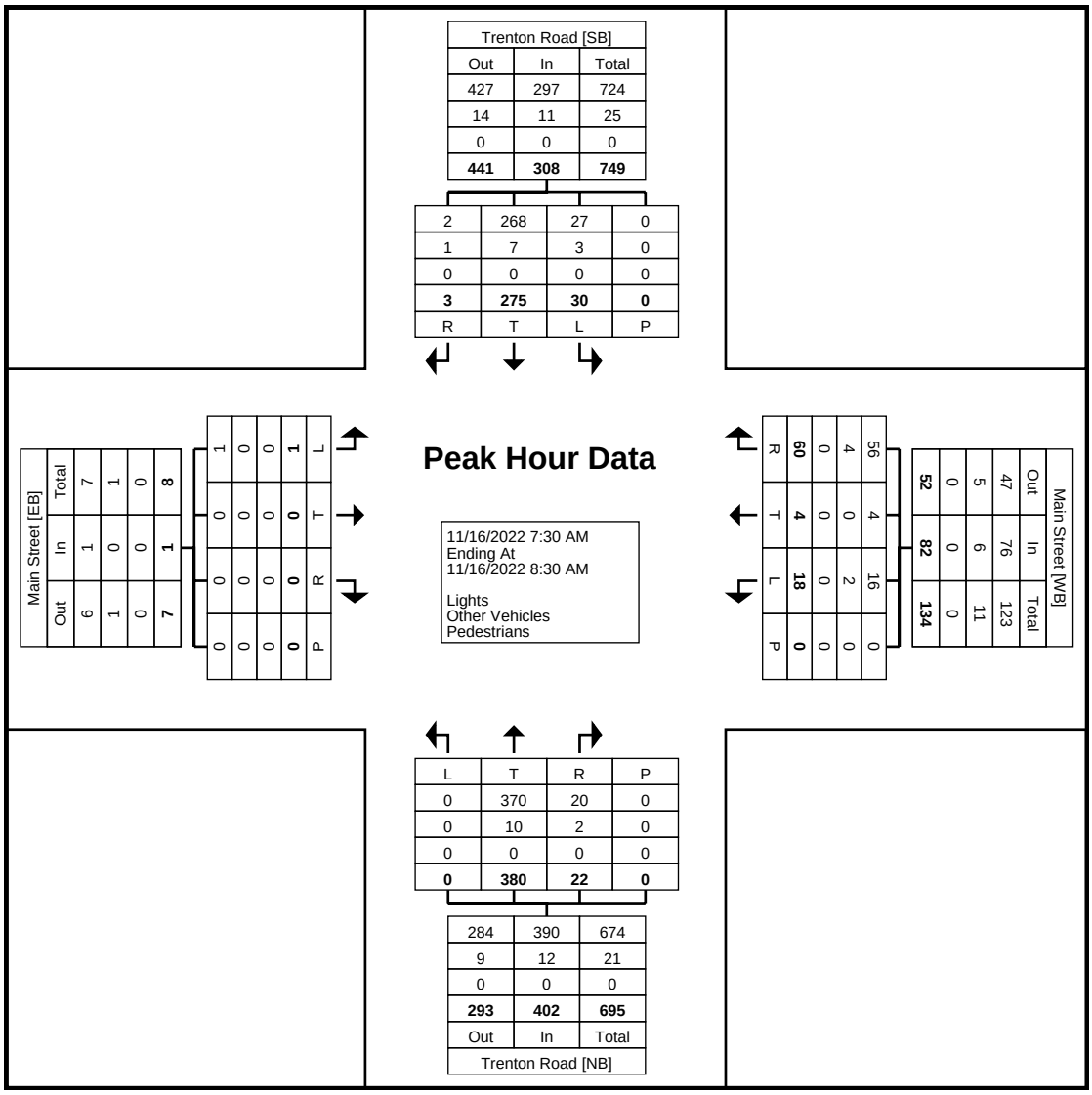
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 1 Main St & Trenton Rd
Site Code:
Start Date: 11/16/2022



Turning Movement Peak Hour Data Plot (7:30 AM)

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 1 Main St & Trenton Rd
Site Code:
Start Date: 11/16/2022

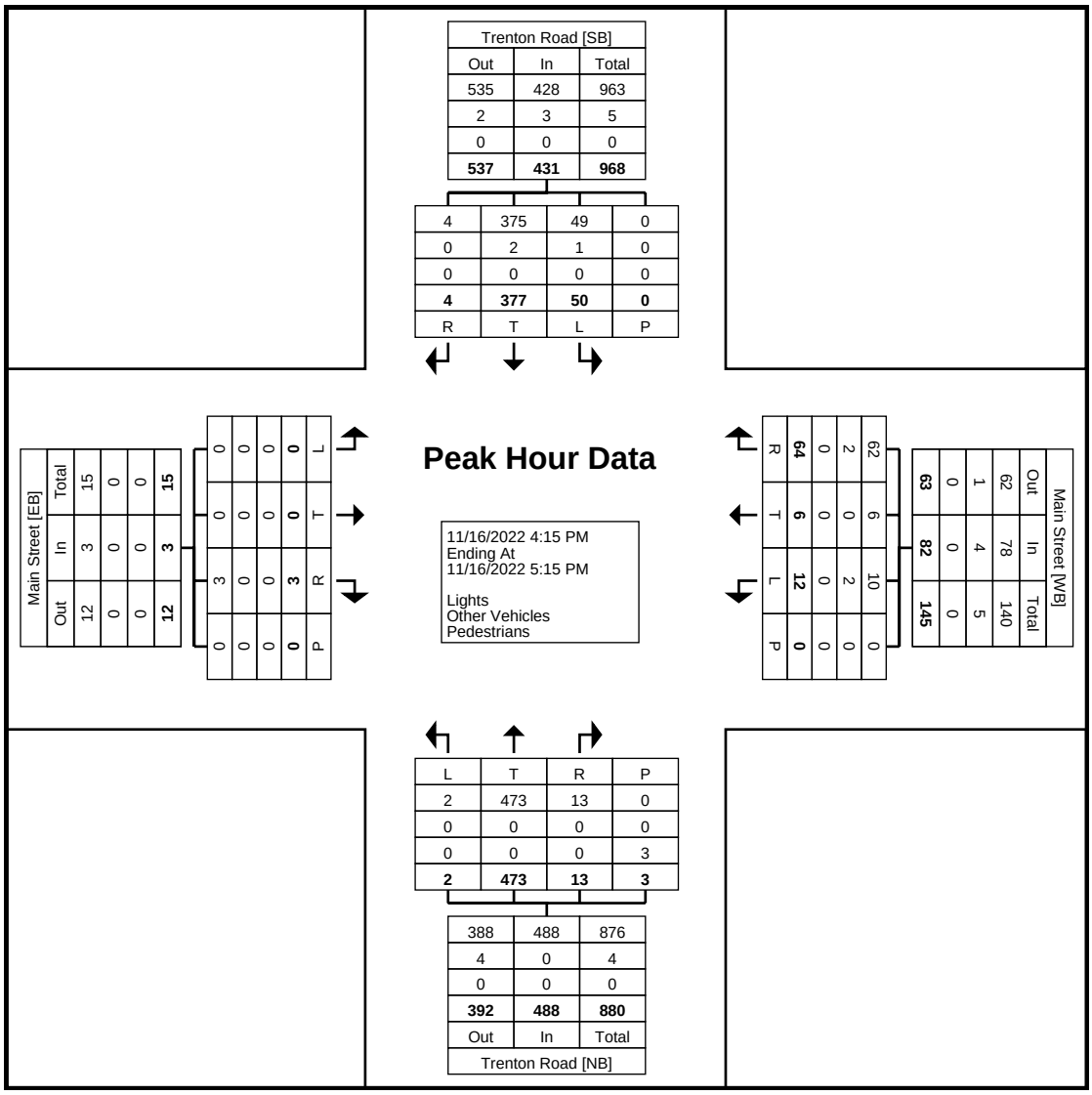
Turning Movement Peak Hour Data (4:15 PM)

Start Time	Main Street Eastbound					Main Street Westbound					Trenton Road Northbound					Trenton Road Southbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
4:15 PM	0	0	2	0	2	7	0	14	0	21	0	118	4	1	122	11	108	0	0	119	264
4:30 PM	0	0	0	0	0	3	1	19	0	23	0	124	2	1	126	14	92	2	0	108	257
4:45 PM	0	0	1	0	1	1	3	24	0	28	2	119	2	0	123	11	79	1	0	91	243
5:00 PM	0	0	0	0	0	1	2	7	0	10	0	112	5	1	117	14	98	1	0	113	240
Total	0	0	3	0	3	12	6	64	0	82	2	473	13	3	488	50	377	4	0	431	1004
Approach %	0.0	0.0	100.0	-	-	14.6	7.3	78.0	-	-	0.4	96.9	2.7	-	-	11.6	87.5	0.9	-	-	-
Total %	0.0	0.0	0.3	-	0.3	1.2	0.6	6.4	-	8.2	0.2	47.1	1.3	-	48.6	5.0	37.5	0.4	-	42.9	-
PHF	0.000	0.000	0.375	-	0.375	0.429	0.500	0.667	-	0.732	0.250	0.954	0.650	-	0.968	0.893	0.873	0.500	-	0.905	0.951
Lights	0	0	3	-	3	10	6	62	-	78	2	473	13	-	488	49	375	4	-	428	997
% Lights	-	-	100.0	-	100.0	83.3	100.0	96.9	-	95.1	100.0	100.0	100.0	-	100.0	98.0	99.5	100.0	-	99.3	99.3
Other Vehicles	0	0	0	-	0	2	0	2	-	4	0	0	0	-	0	1	2	0	-	3	7
% Other Vehicles	-	-	0.0	-	0.0	16.7	0.0	3.1	-	4.9	0.0	0.0	0.0	-	0.0	2.0	0.5	0.0	-	0.7	0.7
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	3	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 1 Main St & Trenton Rd
Site Code:
Start Date: 11/16/2022



Turning Movement Peak Hour Data Plot (4:15 PM)

Counter: MIO:
Set up By JH::

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Count Name: 2 Willow Ave-HH ES DW & Trenton Rd
Site Code:
Start Date: 11/16/2022
Page No: 1

Turning Movement Data

Start Time	Willow Ave Eastbound					HH ES DW Westbound					Trenton Rd Northbound					Trenton Rd Southbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
6:30 AM	2	0	0	0	2	0	0	0	0	0	0	74	0	0	74	2	39	3	0	44	120
6:45 AM	4	0	1	0	5	0	0	0	0	0	1	95	3	0	99	6	57	2	0	65	169
Hourly Total	6	0	1	0	7	0	0	0	0	0	1	169	3	0	173	8	96	5	0	109	289
7:00 AM	2	5	1	0	8	0	0	0	0	0	2	93	3	0	98	6	61	2	0	69	175
7:15 AM	1	0	2	0	3	0	0	0	0	0	0	83	2	0	85	10	76	0	0	86	174
7:30 AM	3	3	2	0	8	0	0	0	0	0	0	113	8	0	121	6	84	0	0	90	219
7:45 AM	5	3	1	0	9	0	0	0	0	0	0	115	8	0	123	11	76	6	0	93	225
Hourly Total	11	11	6	0	28	0	0	0	0	0	2	404	21	0	427	33	297	8	0	338	793
8:00 AM	3	6	0	0	9	0	0	0	0	0	1	91	12	0	104	11	69	4	0	84	197
8:15 AM	0	0	1	0	1	0	0	0	0	0	0	86	5	0	91	14	73	3	0	90	182
8:30 AM	5	5	2	0	12	0	0	0	0	0	1	101	10	0	112	31	66	3	3	100	224
8:45 AM	1	14	0	0	15	0	0	0	0	0	0	86	36	0	122	52	64	6	5	122	259
Hourly Total	9	25	3	0	37	0	0	0	0	0	2	364	63	0	429	108	272	16	8	396	862
9:00 AM	1	9	1	0	11	0	0	0	0	0	0	71	23	0	94	17	105	5	3	127	232
9:15 AM	4	2	0	0	6	0	0	0	0	0	0	79	2	0	81	10	62	1	0	73	160
9:30 AM	0	0	1	0	1	0	0	0	0	0	0	88	1	0	89	3	56	1	0	60	150
9:45 AM	1	0	0	0	1	0	0	0	0	0	2	70	0	0	72	0	61	3	0	64	137
Hourly Total	6	11	2	0	19	0	0	0	0	0	2	308	26	0	336	30	284	10	3	324	679
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	1	3	2	0	6	0	0	0	0	0	2	104	17	0	123	25	82	4	0	111	240
3:15 PM	2	10	1	0	13	0	0	0	0	0	5	87	19	0	111	30	95	6	6	131	255
3:30 PM	1	3	2	0	6	0	0	0	0	0	1	94	5	0	100	10	121	7	12	138	244
3:45 PM	2	2	1	0	5	0	0	0	0	0	3	104	2	0	109	1	84	6	1	91	205
Hourly Total	6	18	6	0	30	0	0	0	0	0	11	389	43	0	443	66	382	23	19	471	944
4:00 PM	2	0	0	0	2	0	0	0	0	0	1	112	2	0	115	5	92	6	0	103	220
4:15 PM	1	0	0	0	1	0	0	0	0	0	1	130	4	0	135	4	114	9	0	127	263
4:30 PM	1	1	1	0	3	0	0	0	0	0	1	127	6	0	134	11	103	11	0	125	262
4:45 PM	2	2	0	0	4	0	0	0	0	0	3	131	6	0	140	4	94	7	0	105	249
Hourly Total	6	3	1	0	10	0	0	0	0	0	6	500	18	0	524	24	403	33	0	460	994
5:00 PM	2	1	1	0	4	0	0	0	0	0	2	118	3	0	123	5	109	6	0	120	247
5:15 PM	3	0	1	0	4	0	0	0	0	0	5	107	1	0	113	5	115	6	0	126	243
5:30 PM	3	2	1	0	6	0	0	0	0	0	0	113	1	0	114	3	81	5	0	89	209
5:45 PM	0	1	2	0	3	0	0	0	0	0	2	75	5	0	82	4	110	5	0	119	204
Hourly Total	8	4	5	0	17	0	0	0	0	0	9	413	10	0	432	17	415	22	0	454	903
Grand Total	52	72	24	0	148	0	0	0	0	0	33	2547	184	0	2764	286	2149	117	30	2552	5464
Approach %	35.1	48.6	16.2	-	-	0.0	0.0	0.0	-	-	1.2	92.1	6.7	-	-	11.2	84.2	4.6	-	-	-
Total %	1.0	1.3	0.4	-	2.7	0.0	0.0	0.0	-	0.0	0.6	46.6	3.4	-	50.6	5.2	39.3	2.1	-	46.7	-
Lights	48	68	20	-	136	0	0	0	-	0	32	2491	176	-	2699	269	2099	110	-	2478	5313
% Lights	92.3	94.4	83.3	-	91.9	-	-	-	-	-	97.0	97.8	95.7	-	97.6	94.1	97.7	94.0	-	97.1	97.2
Other Vehicles	4	4	4	-	12	0	0	0	-	0	1	56	8	-	65	17	50	7	-	74	151
% Other Vehicles	7.7	5.6	16.7	-	8.1	-	-	-	-	-	3.0	2.2	4.3	-	2.4	5.9	2.3	6.0	-	2.9	2.8
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	30	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

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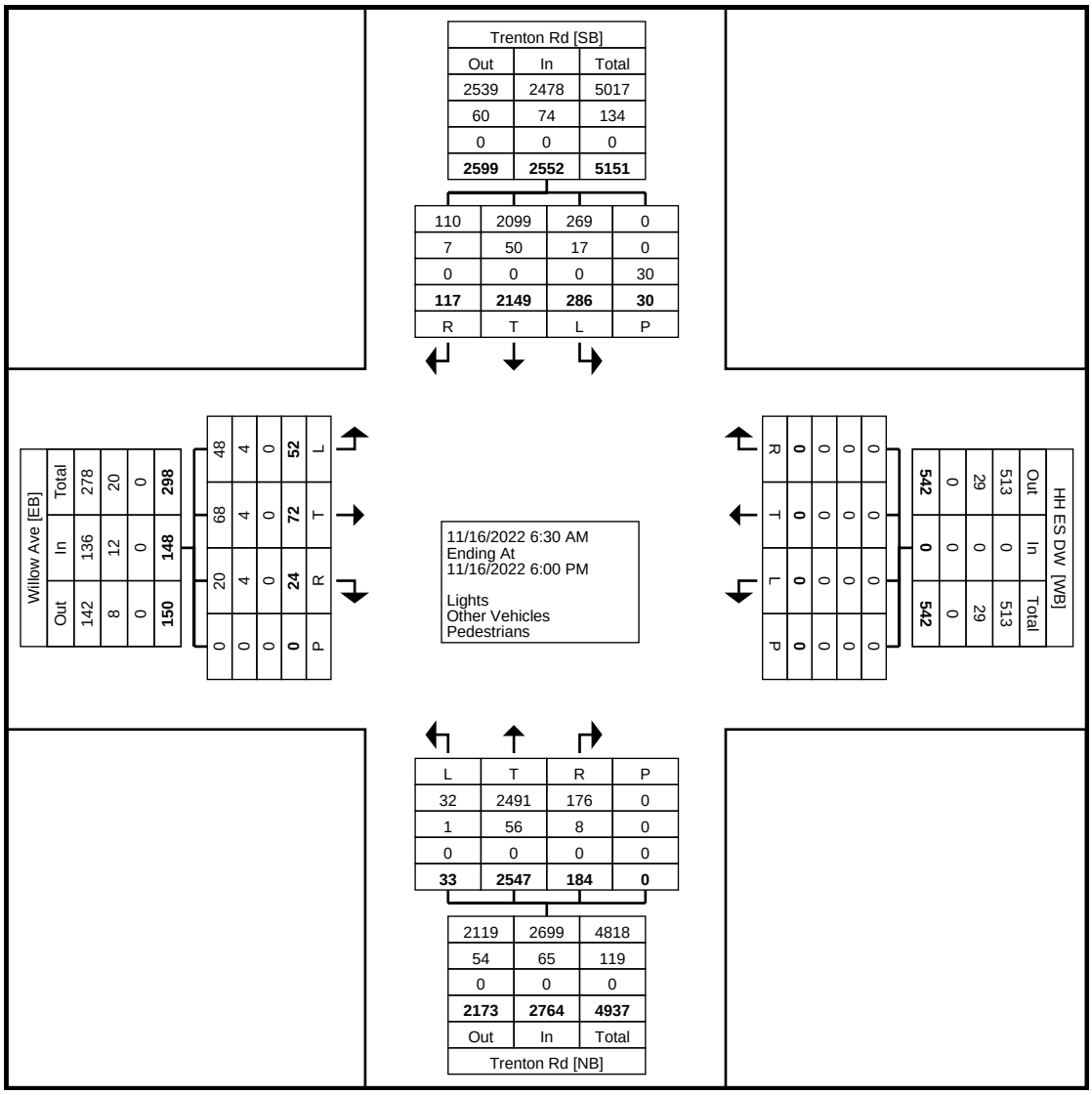
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 2 Willow Ave-HH ES DW & Trenton Rd
Site Code:
Start Date: 11/16/2022



Turning Movement Data Plot

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 2 Willow Ave-HH ES DW & Trenton Rd
Site Code:
Start Date: 11/16/2022

Turning Movement Peak Hour Data (8:15 AM)

Start Time	Willow Ave Eastbound					HH ES DW Westbound					Trenton Rd Northbound					Trenton Rd Southbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
8:15 AM	0	0	1	0	1	0	0	0	0	0	0	86	5	0	91	14	73	3	0	90	182
8:30 AM	5	5	2	0	12	0	0	0	0	0	1	101	10	0	112	31	66	3	3	100	224
8:45 AM	1	14	0	0	15	0	0	0	0	0	0	86	36	0	122	52	64	6	5	122	259
9:00 AM	1	9	1	0	11	0	0	0	0	0	0	71	23	0	94	17	105	5	3	127	232
Total	7	28	4	0	39	0	0	0	0	0	1	344	74	0	419	114	308	17	11	439	897
Approach %	17.9	71.8	10.3	-	-	0.0	0.0	0.0	-	-	0.2	82.1	17.7	-	-	26.0	70.2	3.9	-	-	-
Total %	0.8	3.1	0.4	-	4.3	0.0	0.0	0.0	-	0.0	0.1	38.4	8.2	-	46.7	12.7	34.3	1.9	-	48.9	-
PHF	0.350	0.500	0.500	-	0.650	0.000	0.000	0.000	-	0.000	0.250	0.851	0.514	-	0.859	0.548	0.733	0.708	-	0.864	0.866
Lights	5	26	4	-	35	0	0	0	-	0	1	333	67	-	401	110	299	17	-	426	862
% Lights	71.4	92.9	100.0	-	89.7	-	-	-	-	-	100.0	96.8	90.5	-	95.7	96.5	97.1	100.0	-	97.0	96.1
Other Vehicles	2	2	0	-	4	0	0	0	-	0	0	11	7	-	18	4	9	0	-	13	35
% Other Vehicles	28.6	7.1	0.0	-	10.3	-	-	-	-	-	0.0	3.2	9.5	-	4.3	3.5	2.9	0.0	-	3.0	3.9
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	11	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Traffic Planning and Design, Inc
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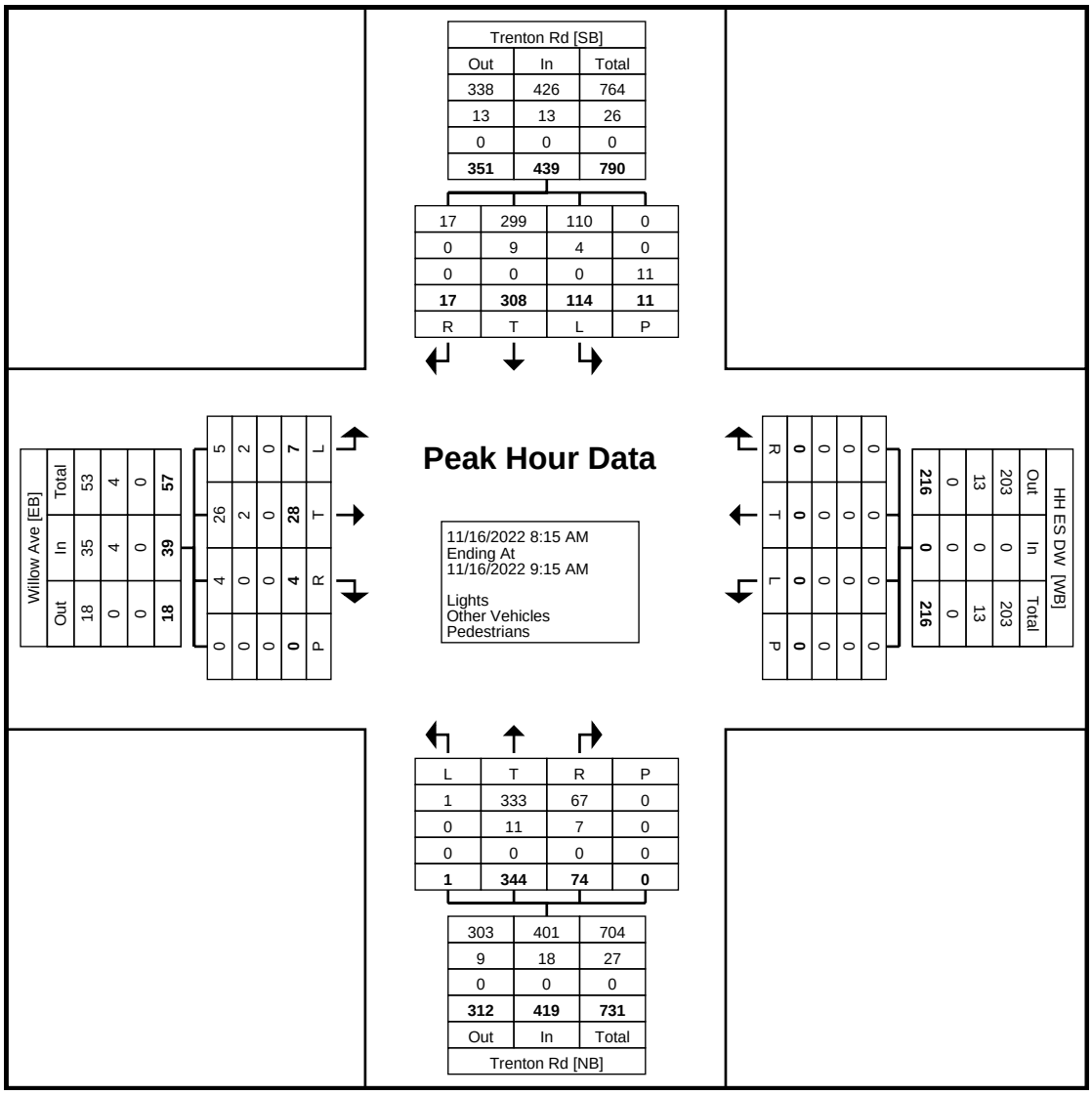
Site Code:
Start Date: 11/16/2022



Turning Movement Peak Hour Data Plot (8:15 AM)

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 2 Willow Ave-HH ES DW & Trenton Rd
Site Code:
Start Date: 11/16/2022

Turning Movement Peak Hour Data (4:15 PM)

Start Time	Willow Ave Eastbound					HH ES DW Westbound					Trenton Rd Northbound					Trenton Rd Southbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
4:15 PM	1	0	0	0	1	0	0	0	0	0	1	130	4	0	135	4	114	9	0	127	263
4:30 PM	1	1	1	0	3	0	0	0	0	0	1	127	6	0	134	11	103	11	0	125	262
4:45 PM	2	2	0	0	4	0	0	0	0	0	3	131	6	0	140	4	94	7	0	105	249
5:00 PM	2	1	1	0	4	0	0	0	0	0	2	118	3	0	123	5	109	6	0	120	247
Total	6	4	2	0	12	0	0	0	0	0	7	506	19	0	532	24	420	33	0	477	1021
Approach %	50.0	33.3	16.7	-	-	0.0	0.0	0.0	-	-	1.3	95.1	3.6	-	-	5.0	88.1	6.9	-	-	-
Total %	0.6	0.4	0.2	-	1.2	0.0	0.0	0.0	-	0.0	0.7	49.6	1.9	-	52.1	2.4	41.1	3.2	-	46.7	-
PHF	0.750	0.500	0.500	-	0.750	0.000	0.000	0.000	-	0.000	0.583	0.966	0.792	-	0.950	0.545	0.921	0.750	-	0.939	0.971
Lights	6	4	2	-	12	0	0	0	-	0	7	505	19	-	531	24	418	30	-	472	1015
% Lights	100.0	100.0	100.0	-	100.0	-	-	-	-	-	100.0	99.8	100.0	-	99.8	100.0	99.5	90.9	-	99.0	99.4
Other Vehicles	0	0	0	-	0	0	0	0	-	0	0	1	0	-	1	0	2	3	-	5	6
% Other Vehicles	0.0	0.0	0.0	-	0.0	-	-	-	-	-	0.0	0.2	0.0	-	0.2	0.0	0.5	9.1	-	1.0	0.6
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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610.326.3100

Counter: MIO:
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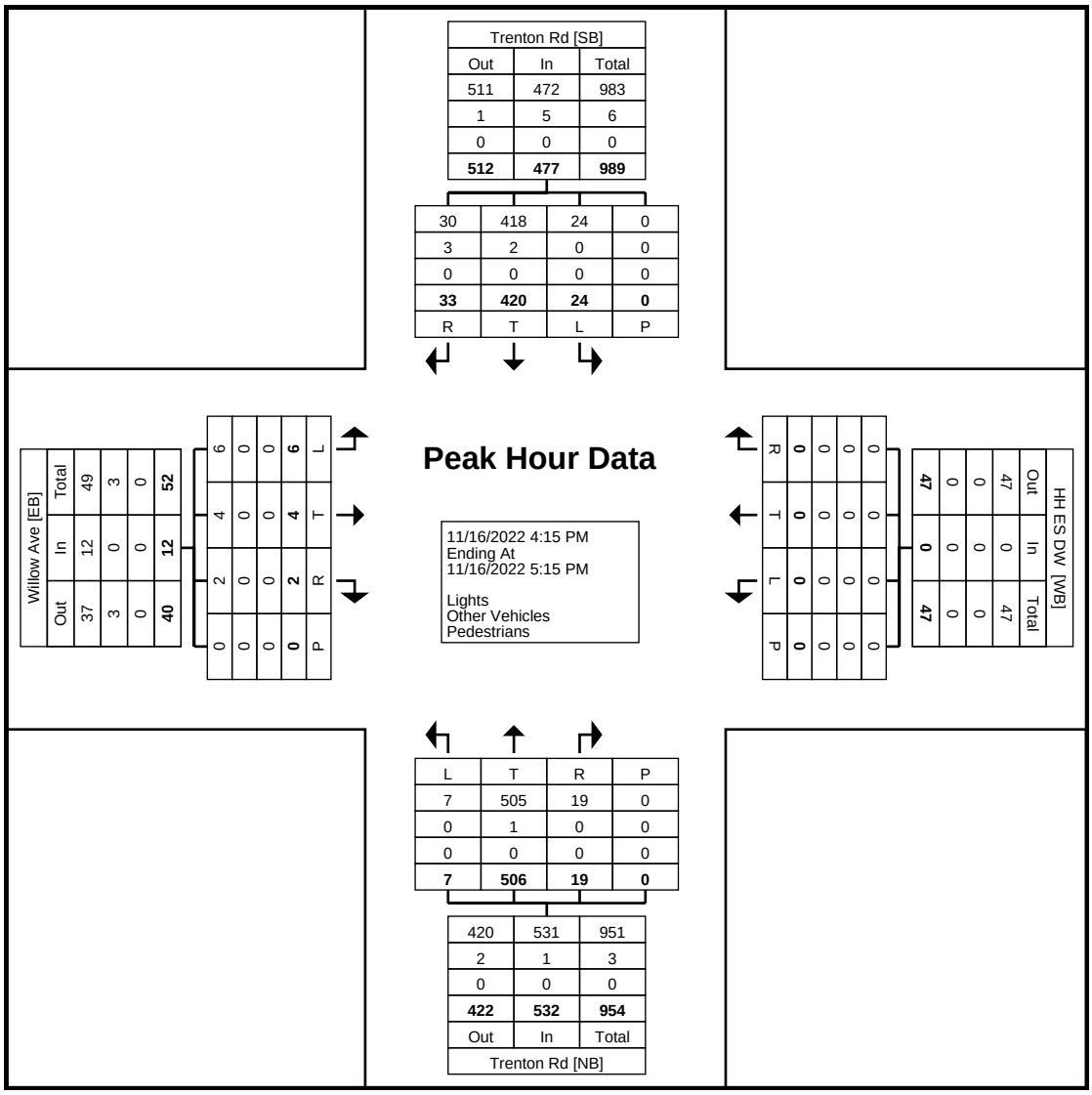
Count Name: 2 Willow Ave-HH ES DW & Trenton Rd
Site Code:
Start Date: 11/16/2022



Turning Movement Peak Hour Data Plot (4:15 PM)

Counter: MIO:
Set up By JH::

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Count Name: 3 Hulme Ave & Trenton Rd
Site Code:
Start Date: 11/16/2022

Turning Movement Data

Start Time	Route 513 Eastbound						Hulme Ave Westbound						Trenton Rd Northbound						Trenton Rd Southbound						Int. Total
	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
6:30 AM	1	13	14	22	0	50	3	27	1	0	0	31	80	69	0	1	0	150	0	27	14	1	0	42	273
6:45 AM	6	15	15	21	0	57	4	40	0	0	0	44	66	80	4	1	0	151	1	47	13	1	0	62	314
Hourly Total	7	28	29	43	0	107	7	67	1	0	0	75	146	149	4	2	0	301	1	74	27	2	0	104	587
7:00 AM	9	16	17	25	0	67	6	20	1	0	0	27	85	78	4	2	0	169	0	41	18	0	0	59	322
7:15 AM	8	23	18	25	0	74	7	25	0	0	0	32	77	55	2	1	0	135	0	65	12	0	0	77	318
7:30 AM	9	24	34	28	0	95	4	22	2	0	0	28	113	101	3	0	0	217	0	65	13	1	0	79	419
7:45 AM	13	13	38	20	0	84	5	32	1	0	0	38	85	89	5	0	0	179	0	57	14	2	0	73	374
Hourly Total	39	76	107	98	0	320	22	99	4	0	0	125	360	323	14	3	0	700	0	228	57	3	0	288	1433
8:00 AM	11	22	35	31	0	99	4	31	1	0	0	36	86	87	8	0	0	181	0	52	9	0	0	61	377
8:15 AM	7	17	15	42	0	81	2	17	3	0	0	22	79	67	10	0	0	156	1	59	12	1	0	73	332
8:30 AM	11	16	38	16	0	81	7	20	0	0	0	27	72	84	7	0	0	163	0	52	13	4	0	69	340
8:45 AM	30	12	31	40	0	113	3	22	0	1	0	26	83	76	6	0	0	165	0	43	15	1	0	59	363
Hourly Total	59	67	119	129	0	374	16	90	4	1	0	111	320	314	31	0	0	665	1	206	49	6	0	262	1412
9:00 AM	21	14	31	29	0	95	1	23	0	0	0	24	63	60	8	1	0	132	0	64	22	1	0	87	338
9:15 AM	5	10	20	39	0	74	8	23	0	0	0	31	67	62	9	0	0	138	0	50	14	0	0	64	307
9:30 AM	6	15	28	31	0	80	5	19	0	0	0	24	60	80	3	0	0	143	0	46	11	1	0	58	305
9:45 AM	5	14	28	28	0	75	7	11	0	0	0	18	54	56	4	4	0	118	0	46	6	0	0	52	263
Hourly Total	37	53	107	127	0	324	21	76	0	0	0	97	244	258	24	5	0	531	0	206	53	2	0	261	1213
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	18	27	36	51	0	132	6	20	0	0	0	26	70	87	10	0	0	167	0	74	9	0	0	83	408
3:15 PM	20	20	57	36	0	133	9	26	1	0	0	36	50	79	9	0	0	138	0	86	10	0	0	96	403
3:30 PM	10	32	55	65	0	162	4	33	0	0	0	37	77	81	5	0	0	163	0	71	32	0	0	103	465
3:45 PM	9	29	56	66	0	160	5	25	0	0	0	30	67	88	6	0	0	161	0	78	12	0	0	90	441
Hourly Total	57	108	204	218	0	587	24	104	1	0	0	129	264	335	30	0	0	629	0	309	63	0	0	372	1717
4:00 PM	10	39	69	56	0	174	2	32	0	0	0	34	82	94	4	2	0	182	0	69	11	0	0	80	470
4:15 PM	16	36	56	58	0	166	11	29	0	0	0	40	58	109	5	3	0	175	0	93	23	0	0	116	497
4:30 PM	13	27	59	70	0	169	5	37	0	0	0	42	70	112	5	0	0	187	0	71	18	0	0	89	487
4:45 PM	15	38	69	47	0	169	8	53	0	0	0	61	82	106	12	0	0	200	0	77	11	0	0	88	518
Hourly Total	54	140	253	231	0	678	26	151	0	0	0	177	292	421	26	5	0	744	0	310	63	0	0	373	1972
5:00 PM	14	31	44	69	0	158	6	34	1	0	0	41	81	103	11	0	0	195	0	76	12	1	3	89	483
5:15 PM	13	29	68	52	0	162	10	38	0	0	0	48	72	89	7	1	0	169	0	89	16	0	0	105	484
5:30 PM	7	35	80	45	0	167	5	35	3	0	0	43	62	97	6	1	0	166	1	72	8	0	0	81	457
5:45 PM	10	17	48	63	0	138	3	25	1	0	0	29	71	69	4	1	0	145	0	84	14	0	0	98	410
Hourly Total	44	112	240	229	0	625	24	132	5	0	0	161	286	358	28	3	0	675	1	321	50	1	3	373	1834
Grand Total	297	584	1059	1075	0	3015	140	719	15	1	0	875	1912	2158	157	18	0	4245	3	1654	362	14	3	2033	10168
Approach %	9.9	19.4	35.1	35.7	-	-	16.0	82.2	1.7	0.1	-	-	45.0	50.8	3.7	0.4	-	-	0.1	81.4	17.8	0.7	-	-	-
Total %	2.9	5.7	10.4	10.6	-	29.7	1.4	7.1	0.1	0.0	-	8.6	18.8	21.2	1.5	0.2	-	41.7	0.0	16.3	3.6	0.1	-	20.0	-
Lights	282	559	1023	1048	-	2912	140	674	15	1	-	830	1861	2127	157	18	-	4163	1	1622	354	10	-	1987	9892
% Lights	94.9	95.7	96.6	97.5	-	96.6	100.0	93.7	100.0	100.0	-	94.9	97.3	98.6	100.0	100.0	-	98.1	33.3	98.1	97.8	71.4	-	97.7	97.3
Other Vehicles	15	25	36	27	-	103	0	45	0	0	-	45	51	31	0	0	-	82	2	32	8	4	-	46	276
% Other Vehicles	5.1	4.3	3.4	2.5	-	3.4	0.0	6.3	0.0	0.0	-	5.1	2.7	1.4	0.0	0.0	-	1.9	66.7	1.9	2.2	28.6	-	2.3	2.7
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Traffic Planning and Design, Inc
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Suite 650
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610.326.3100

Counter: MIO:
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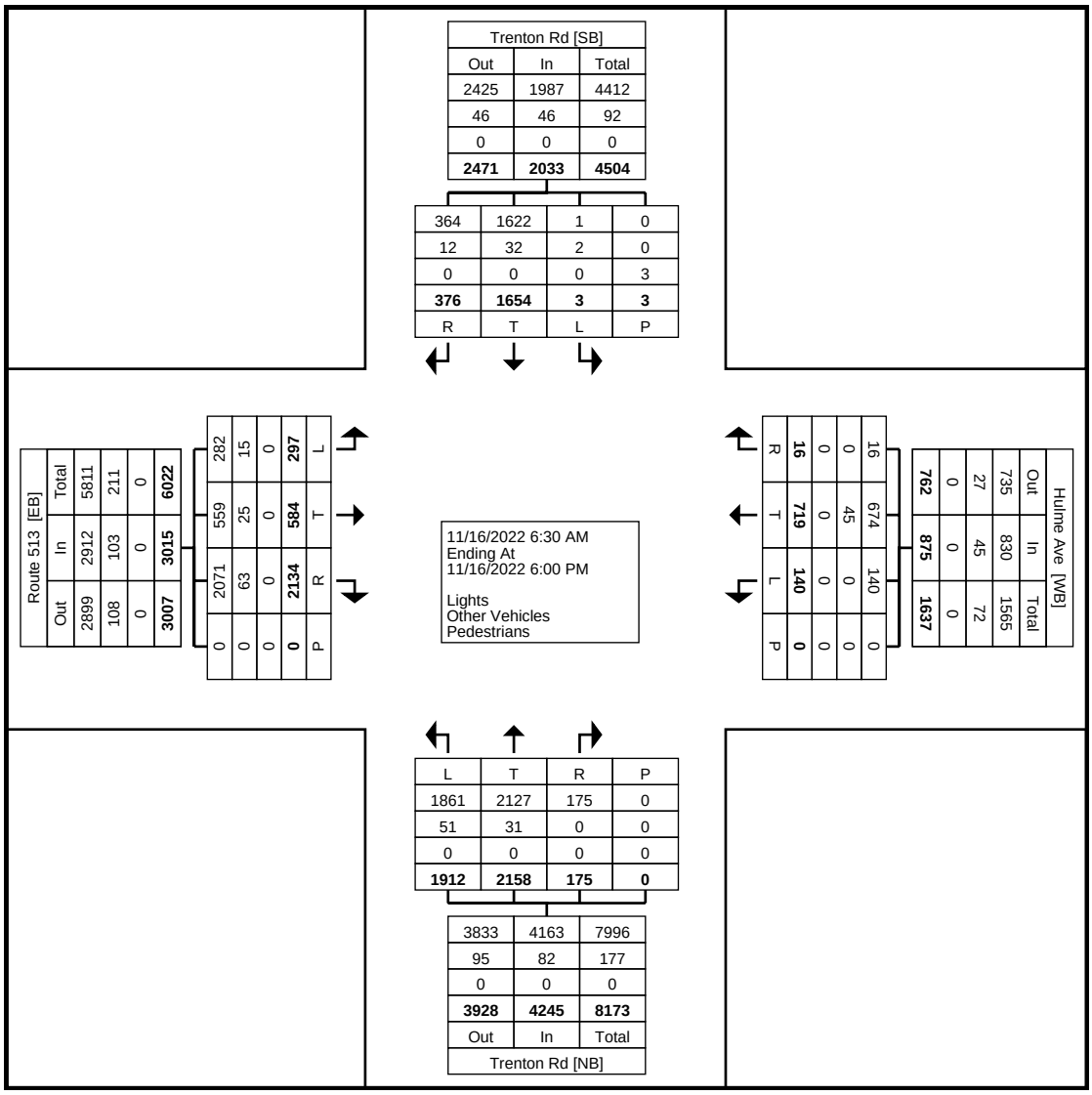
Count Name: 3 Hulme Ave & Trenton Rd
Site Code:
Start Date: 11/16/2022



Turning Movement Data Plot

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2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 3 Hulme Ave & Trenton Rd
Site Code:
Start Date: 11/16/2022

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Route 513 Eastbound						Hulme Ave Westbound						Trenton Rd Northbound						Trenton Rd Southbound						Int. Total
	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
7:30 AM	9	24	34	28	0	95	4	22	2	0	0	28	113	101	3	0	0	217	0	65	13	1	0	79	419
7:45 AM	13	13	38	20	0	84	5	32	1	0	0	38	85	89	5	0	0	179	0	57	14	2	0	73	374
8:00 AM	11	22	35	31	0	99	4	31	1	0	0	36	86	87	8	0	0	181	0	52	9	0	0	61	377
8:15 AM	7	17	15	42	0	81	2	17	3	0	0	22	79	67	10	0	0	156	1	59	12	1	0	73	332
Total	40	76	122	121	0	359	15	102	7	0	0	124	363	344	26	0	0	733	1	233	48	4	0	286	1502
Approach %	11.1	21.2	34.0	33.7	-	-	12.1	82.3	5.6	0.0	-	-	49.5	46.9	3.5	0.0	-	-	0.3	81.5	16.8	1.4	-	-	-
Total %	2.7	5.1	8.1	8.1	-	23.9	1.0	6.8	0.5	0.0	-	8.3	24.2	22.9	1.7	0.0	-	48.8	0.1	15.5	3.2	0.3	-	19.0	-
PHF	0.769	0.792	0.803	0.720	-	0.907	0.750	0.797	0.583	0.000	-	0.816	0.803	0.851	0.650	0.000	-	0.844	0.250	0.896	0.857	0.500	-	0.905	0.896
Lights	39	75	115	119	-	348	15	94	7	0	-	116	347	335	26	0	-	708	0	227	46	2	-	275	1447
% Lights	97.5	98.7	94.3	98.3	-	96.9	100.0	92.2	100.0	-	-	93.5	95.6	97.4	100.0	-	-	96.6	0.0	97.4	95.8	50.0	-	96.2	96.3
Other Vehicles	1	1	7	2	-	11	0	8	0	0	-	8	16	9	0	0	-	25	1	6	2	2	-	11	55
% Other Vehicles	2.5	1.3	5.7	1.7	-	3.1	0.0	7.8	0.0	-	-	6.5	4.4	2.6	0.0	-	-	3.4	100.0	2.6	4.2	50.0	-	3.8	3.7
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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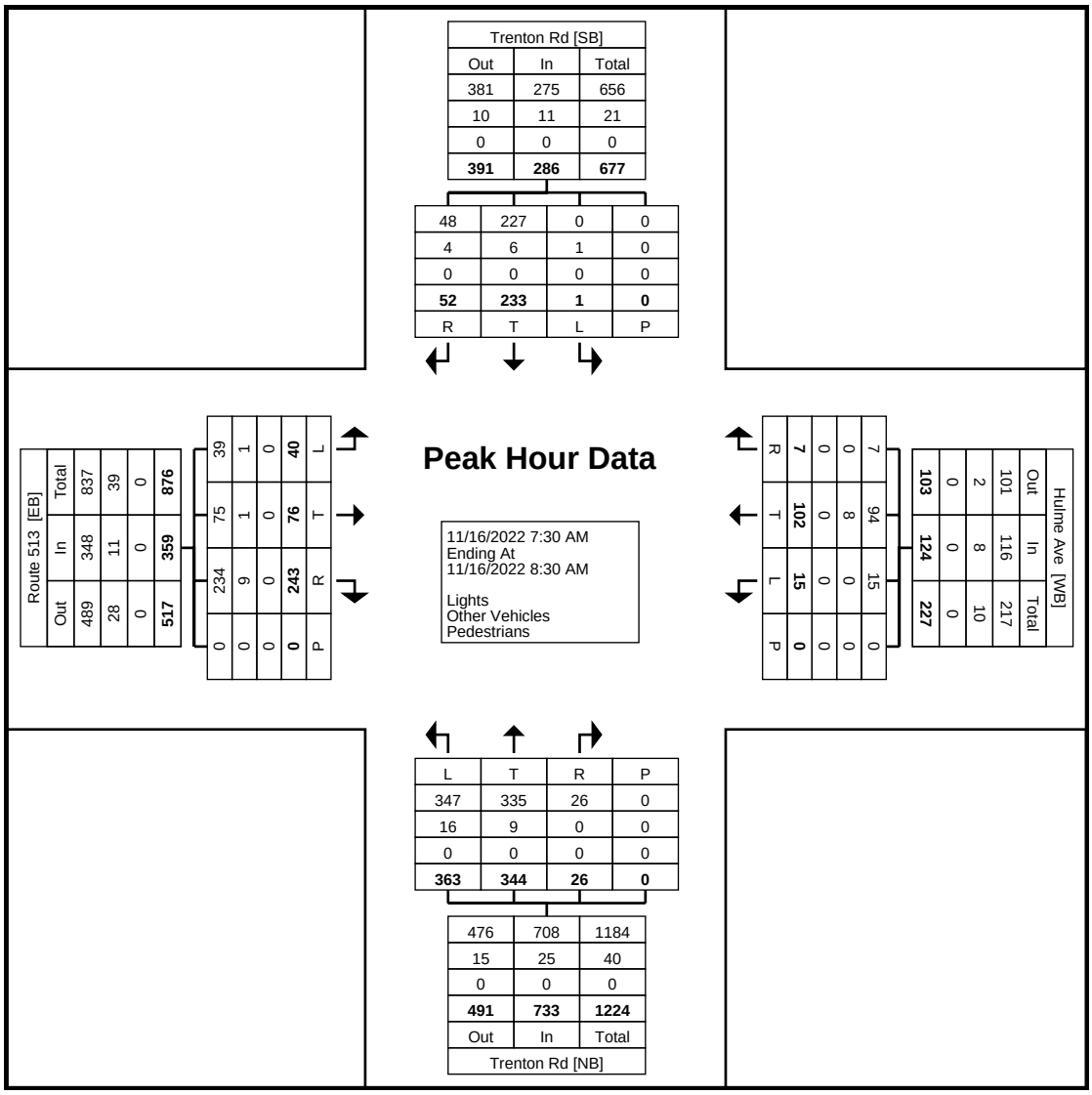


Turning Movement Peak Hour Data Plot (7:30 AM)

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 3 Hulme Ave & Trenton Rd
Site Code:
Start Date: 11/16/2022

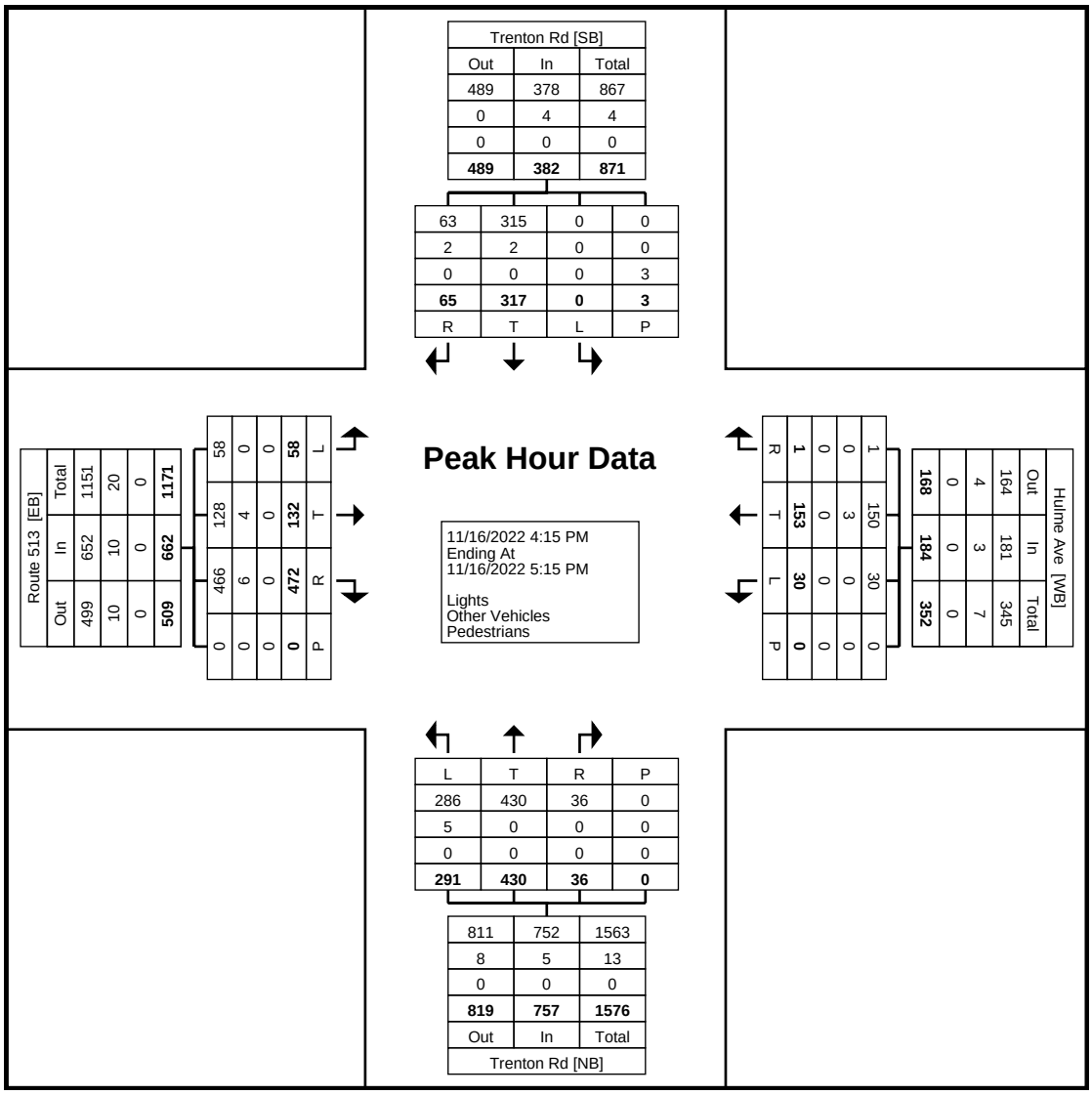
Turning Movement Peak Hour Data (4:15 PM)

Start Time	Route 513 Eastbound						Hulme Ave Westbound						Trenton Rd Northbound						Trenton Rd Southbound						Int. Total
	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
4:15 PM	16	36	56	58	0	166	11	29	0	0	0	40	58	109	5	3	0	175	0	93	23	0	0	116	497
4:30 PM	13	27	59	70	0	169	5	37	0	0	0	42	70	112	5	0	0	187	0	71	18	0	0	89	487
4:45 PM	15	38	69	47	0	169	8	53	0	0	0	61	82	106	12	0	0	200	0	77	11	0	0	88	518
5:00 PM	14	31	44	69	0	158	6	34	1	0	0	41	81	103	11	0	0	195	0	76	12	1	3	89	483
Total	58	132	228	244	0	662	30	153	1	0	0	184	291	430	33	3	0	757	0	317	64	1	3	382	1985
Approach %	8.8	19.9	34.4	36.9	-	-	16.3	83.2	0.5	0.0	-	-	38.4	56.8	4.4	0.4	-	-	0.0	83.0	16.8	0.3	-	-	-
Total %	2.9	6.6	11.5	12.3	-	33.4	1.5	7.7	0.1	0.0	-	9.3	14.7	21.7	1.7	0.2	-	38.1	0.0	16.0	3.2	0.1	-	19.2	-
PHF	0.906	0.868	0.826	0.871	-	0.979	0.682	0.722	0.250	0.000	-	0.754	0.887	0.960	0.688	0.250	-	0.946	0.000	0.852	0.696	0.250	-	0.823	0.958
Lights	58	128	224	242	-	652	30	150	1	0	-	181	286	430	33	3	-	752	0	315	63	0	-	378	1963
% Lights	100.0	97.0	98.2	99.2	-	98.5	100.0	98.0	100.0	-	-	98.4	98.3	100.0	100.0	100.0	-	99.3	-	99.4	98.4	0.0	-	99.0	98.9
Other Vehicles	0	4	4	2	-	10	0	3	0	0	-	3	5	0	0	0	-	5	0	2	1	1	-	4	22
% Other Vehicles	0.0	3.0	1.8	0.8	-	1.5	0.0	2.0	0.0	-	-	1.6	1.7	0.0	0.0	0.0	-	0.7	-	0.6	1.6	100.0	-	1.0	1.1
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 3 Hulme Ave & Trenton Rd
Site Code:
Start Date: 11/16/2022



Turning Movement Peak Hour Data Plot (4:15 PM)

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 4 Neshaminy St- Route 513 & Route 513
Site Code:
Start Date: 11/16/2022

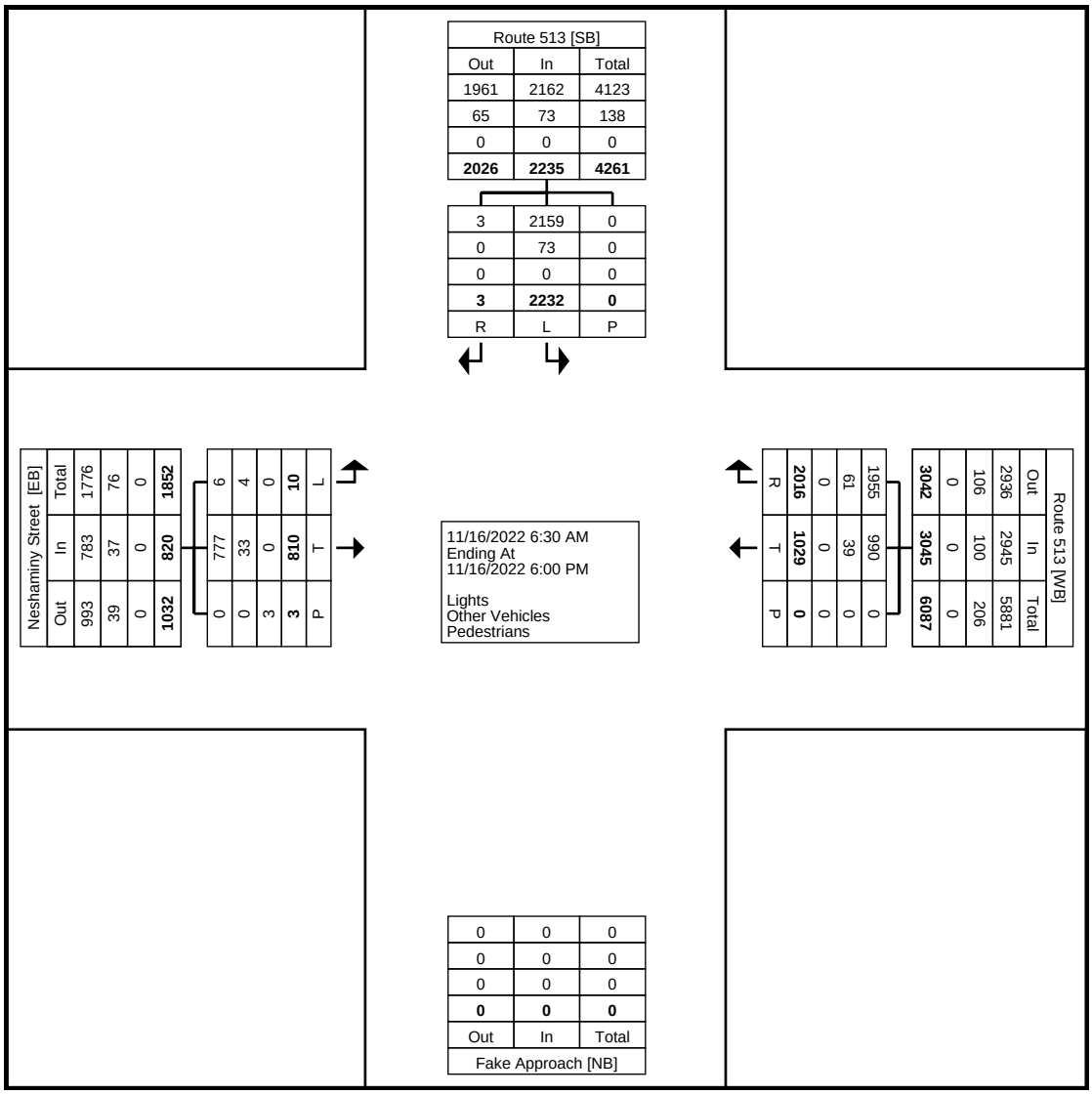
Turning Movement Data

Start Time	Neshaminy Street Eastbound				Route 513 Westbound				Route 513 Southbound				
	Left	Thru	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
6:30 AM	1	13	0	14	37	86	0	123	34	0	0	34	171
6:45 AM	1	22	0	23	47	79	0	126	38	0	0	38	187
Hourly Total	2	35	0	37	84	165	0	249	72	0	0	72	358
7:00 AM	1	25	0	26	39	89	0	128	36	0	0	36	190
7:15 AM	0	28	0	28	35	76	0	111	49	0	0	49	188
7:30 AM	0	29	0	29	32	110	0	142	67	0	0	67	238
7:45 AM	1	30	0	31	54	89	0	143	58	1	0	59	233
Hourly Total	2	112	0	114	160	364	0	524	210	1	0	211	849
8:00 AM	0	22	0	22	39	90	0	129	72	0	0	72	223
8:15 AM	1	19	0	20	33	84	0	117	60	0	0	60	197
8:30 AM	0	27	1	27	30	85	0	115	55	0	0	55	197
8:45 AM	1	59	0	60	32	91	0	123	60	0	0	60	243
Hourly Total	2	127	1	129	134	350	0	484	247	0	0	247	860
9:00 AM	0	26	0	26	46	58	0	104	68	0	0	68	198
9:15 AM	0	27	0	27	24	84	0	108	51	0	0	51	186
9:30 AM	0	25	0	25	27	79	0	106	58	0	0	58	189
9:45 AM	2	22	0	24	20	52	0	72	54	0	0	54	150
Hourly Total	2	100	0	102	117	273	0	390	231	0	0	231	723
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	0	34	0	34	34	63	0	97	97	0	0	97	228
3:15 PM	0	38	0	38	35	57	0	92	103	0	0	103	233
3:30 PM	0	35	0	35	57	77	0	134	127	0	0	127	296
3:45 PM	0	30	0	30	38	73	0	111	124	0	0	124	265
Hourly Total	0	137	0	137	164	270	0	434	451	0	0	451	1022
4:00 PM	0	48	0	48	42	70	0	112	130	0	0	130	290
4:15 PM	0	44	2	44	37	65	0	102	126	0	0	126	272
4:30 PM	0	36	0	36	51	77	0	128	132	0	0	132	296
4:45 PM	0	47	0	47	68	86	0	154	129	0	0	129	330
Hourly Total	0	175	2	175	198	298	0	496	517	0	0	517	1188
5:00 PM	0	38	0	38	42	84	0	126	119	1	0	120	284
5:15 PM	1	37	0	38	55	70	0	125	134	0	0	134	297
5:30 PM	1	26	0	27	41	69	0	110	137	1	0	138	275
5:45 PM	0	23	0	23	34	73	0	107	114	0	0	114	244
Hourly Total	2	124	0	126	172	296	0	468	504	2	0	506	1100
Grand Total	10	810	3	820	1029	2016	0	3045	2232	3	0	2235	6100
Approach %	1.2	98.8	-	-	33.8	66.2	-	-	99.9	0.1	-	-	-
Total %	0.2	13.3	-	13.4	16.9	33.0	-	49.9	36.6	0.0	-	36.6	-
Lights	6	777	-	783	990	1955	-	2945	2159	3	-	2162	5890
% Lights	60.0	95.9	-	95.5	96.2	97.0	-	96.7	96.7	100.0	-	96.7	96.6
Other Vehicles	4	33	-	37	39	61	-	100	73	0	-	73	210
% Other Vehicles	40.0	4.1	-	4.5	3.8	3.0	-	3.3	3.3	0.0	-	3.3	3.4
Pedestrians	-	-	3	-	-	-	0	-	-	-	0	-	-
% Pedestrians	-	-	100.0	-	-	-	-	-	-	-	-	-	-

Counter: MIO:
Set up By JH::

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Count Name: 4 Neshaminy St-Route 513 & Route 513
Site Code:
Start Date: 11/16/2022



Turning Movement Data Plot

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 4 Neshaminy St- Route 513 & Route 513
Site Code:
Start Date: 11/16/2022

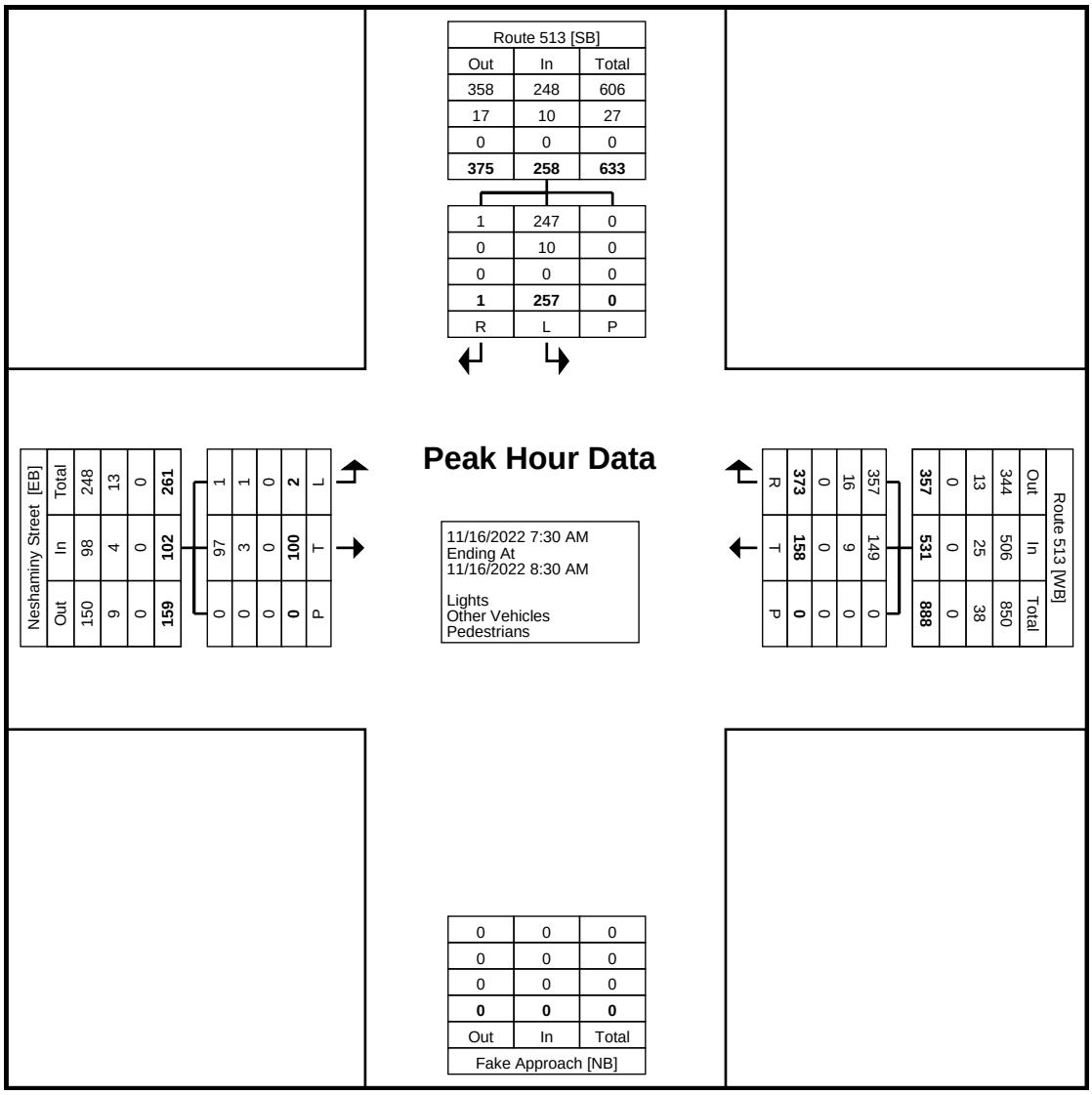
Turning Movement Peak Hour Data (7:30 AM)

Start Time	Neshaminy Street Eastbound				Route 513 Westbound				Route 513 Southbound				
	Left	Thru	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
7:30 AM	0	29	0	29	32	110	0	142	67	0	0	67	238
7:45 AM	1	30	0	31	54	89	0	143	58	1	0	59	233
8:00 AM	0	22	0	22	39	90	0	129	72	0	0	72	223
8:15 AM	1	19	0	20	33	84	0	117	60	0	0	60	197
Total	2	100	0	102	158	373	0	531	257	1	0	258	891
Approach %	2.0	98.0	-	-	29.8	70.2	-	-	99.6	0.4	-	-	-
Total %	0.2	11.2	-	11.4	17.7	41.9	-	59.6	28.8	0.1	-	29.0	-
PHF	0.500	0.833	-	0.823	0.731	0.848	-	0.928	0.892	0.250	-	0.896	0.936
Lights	1	97	-	98	149	357	-	506	247	1	-	248	852
% Lights	50.0	97.0	-	96.1	94.3	95.7	-	95.3	96.1	100.0	-	96.1	95.6
Other Vehicles	1	3	-	4	9	16	-	25	10	0	-	10	39
% Other Vehicles	50.0	3.0	-	3.9	5.7	4.3	-	4.7	3.9	0.0	-	3.9	4.4
Pedestrians	-	-	0	-	-	-	0	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 4 Neshaminy St-Route 513 & Route 513
Site Code:
Start Date: 11/16/2022



Turning Movement Peak Hour Data Plot (7:30 AM)

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 4 Neshaminy St-Route 513 & Route 513
Site Code:
Start Date: 11/16/2022

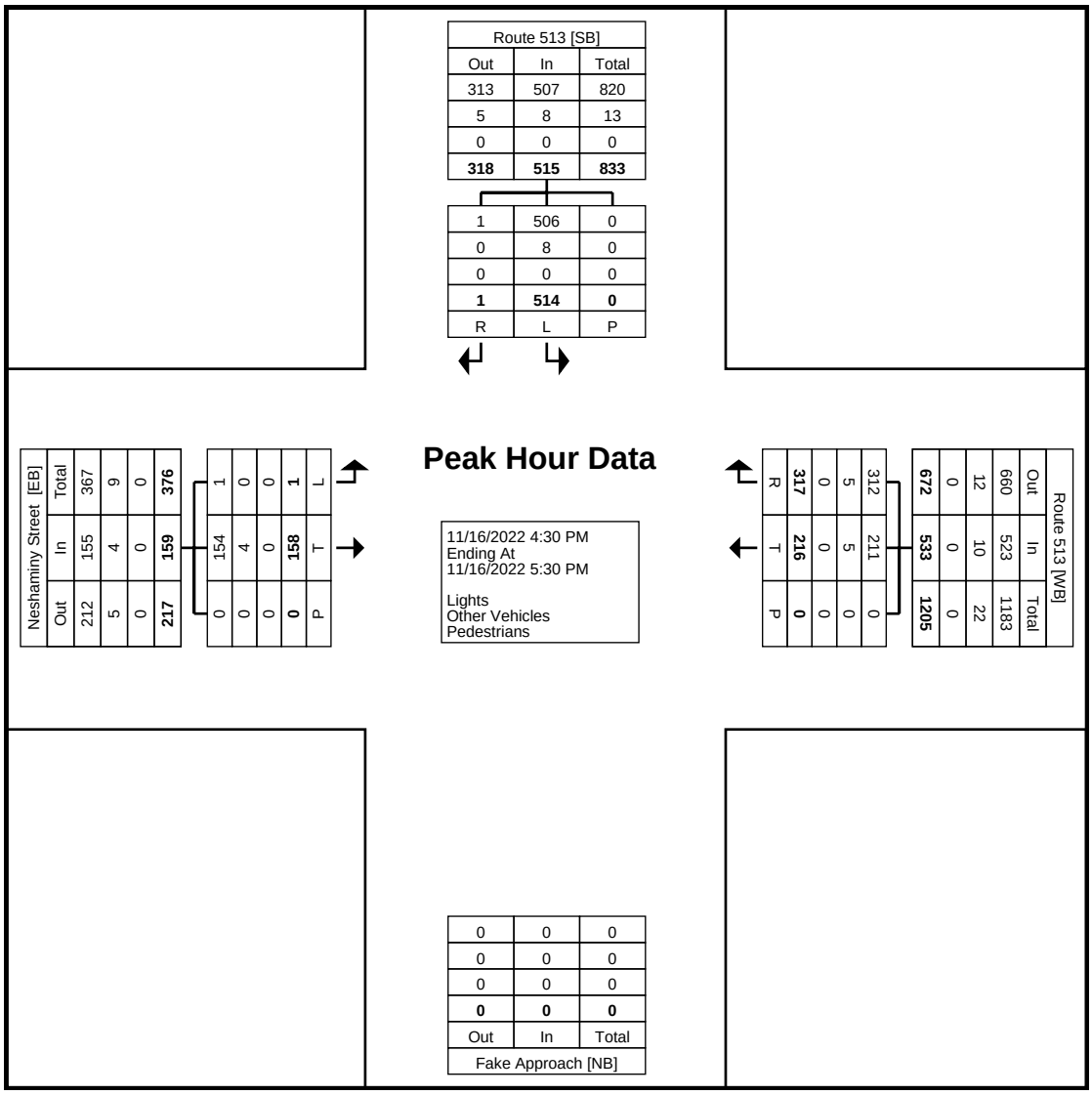
Turning Movement Peak Hour Data (4:30 PM)

Start Time	Neshaminy Street Eastbound				Route 513 Westbound				Route 513 Southbound				
	Left	Thru	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
4:30 PM	0	36	0	36	51	77	0	128	132	0	0	132	296
4:45 PM	0	47	0	47	68	86	0	154	129	0	0	129	330
5:00 PM	0	38	0	38	42	84	0	126	119	1	0	120	284
5:15 PM	1	37	0	38	55	70	0	125	134	0	0	134	297
Total	1	158	0	159	216	317	0	533	514	1	0	515	1207
Approach %	0.6	99.4	-	-	40.5	59.5	-	-	99.8	0.2	-	-	-
Total %	0.1	13.1	-	13.2	17.9	26.3	-	44.2	42.6	0.1	-	42.7	-
PHF	0.250	0.840	-	0.846	0.794	0.922	-	0.865	0.959	0.250	-	0.961	0.914
Lights	1	154	-	155	211	312	-	523	506	1	-	507	1185
% Lights	100.0	97.5	-	97.5	97.7	98.4	-	98.1	98.4	100.0	-	98.4	98.2
Other Vehicles	0	4	-	4	5	5	-	10	8	0	-	8	22
% Other Vehicles	0.0	2.5	-	2.5	2.3	1.6	-	1.9	1.6	0.0	-	1.6	1.8
Pedestrians	-	-	0	-	-	-	0	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 4 Neshaminy St-Route 513 & Route 513
Site Code:
Start Date: 11/16/2022



Turning Movement Peak Hour Data Plot (4:30 PM)

Counter: MIO:
Set up By JH::

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Count Name: 5 Main St & Pennsylvania Ave
Site Code:
Start Date: 11/16/2022

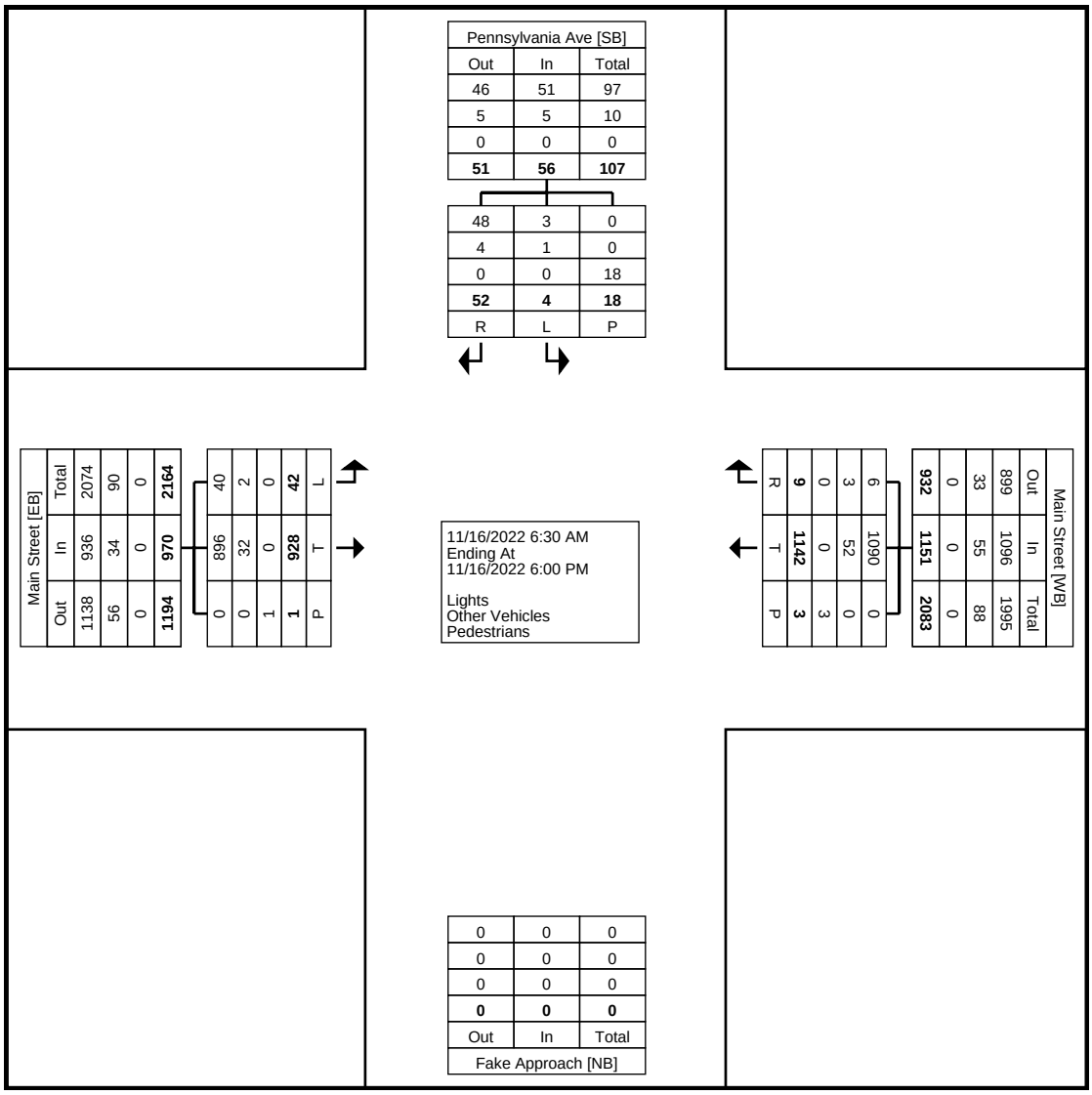
Turning Movement Data

Start Time	Main Street Eastbound				Main Street Westbound				Pennsylvania Ave Southbound				
	Left	Thru	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
6:30 AM	1	19	0	20	35	1	0	36	0	4	0	4	60
6:45 AM	0	36	0	36	54	0	0	54	1	2	2	3	93
Hourly Total	1	55	0	56	89	1	0	90	1	6	2	7	153
7:00 AM	2	32	0	34	41	0	0	41	0	3	0	3	78
7:15 AM	1	28	1	29	42	1	0	43	0	4	3	4	76
7:30 AM	1	37	0	38	37	0	0	37	0	2	0	2	77
7:45 AM	1	26	0	27	49	0	0	49	0	3	0	3	79
Hourly Total	5	123	1	128	169	1	0	170	0	12	3	12	310
8:00 AM	1	33	0	34	46	0	0	46	0	3	4	3	83
8:15 AM	0	26	0	26	33	0	1	33	0	3	0	3	62
8:30 AM	0	30	0	30	32	1	0	33	0	1	0	1	64
8:45 AM	0	33	0	33	34	0	0	34	1	3	0	4	71
Hourly Total	1	122	0	123	145	1	1	146	1	10	4	11	280
9:00 AM	0	26	0	26	38	1	0	39	0	0	0	0	65
9:15 AM	0	21	0	21	30	0	0	30	0	2	0	2	53
9:30 AM	1	25	0	26	26	0	0	26	0	1	0	1	53
9:45 AM	1	22	0	23	24	0	0	24	0	1	0	1	48
Hourly Total	2	94	0	96	118	1	0	119	0	4	0	4	219
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	0	41	0	41	40	1	1	41	0	0	0	0	82
3:15 PM	1	30	0	31	43	1	0	44	0	0	0	0	75
3:30 PM	3	47	0	50	40	1	0	41	0	1	0	1	92
3:45 PM	3	38	0	41	44	0	0	44	0	2	1	2	87
Hourly Total	7	156	0	163	167	3	1	170	0	3	1	3	336
4:00 PM	4	49	0	53	49	1	0	50	1	2	0	3	106
4:15 PM	3	50	0	53	64	1	0	65	0	3	1	3	121
4:30 PM	3	43	0	46	60	0	1	60	0	1	3	1	107
4:45 PM	2	53	0	55	79	0	0	79	1	2	2	3	137
Hourly Total	12	195	0	207	252	2	1	254	2	8	6	10	471
5:00 PM	3	47	0	50	55	0	0	55	0	0	1	0	105
5:15 PM	4	47	0	51	61	0	0	61	0	3	0	3	115
5:30 PM	7	55	0	62	50	0	0	50	0	4	0	4	116
5:45 PM	0	34	0	34	36	0	0	36	0	2	1	2	72
Hourly Total	14	183	0	197	202	0	0	202	0	9	2	9	408
Grand Total	42	928	1	970	1142	9	3	1151	4	52	18	56	2177
Approach %	4.3	95.7	-	-	99.2	0.8	-	-	7.1	92.9	-	-	-
Total %	1.9	42.6	-	44.6	52.5	0.4	-	52.9	0.2	2.4	-	2.6	-
Lights	40	896	-	936	1090	6	-	1096	3	48	-	51	2083
% Lights	95.2	96.6	-	96.5	95.4	66.7	-	95.2	75.0	92.3	-	91.1	95.7
Other Vehicles	2	32	-	34	52	3	-	55	1	4	-	5	94
% Other Vehicles	4.8	3.4	-	3.5	4.6	33.3	-	4.8	25.0	7.7	-	8.9	4.3
Pedestrians	-	-	1	-	-	-	3	-	-	-	18	-	-
% Pedestrians	-	-	100.0	-	-	-	100.0	-	-	-	100.0	-	-

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 5 Main St & Pennsylvania Ave
Site Code:
Start Date: 11/16/2022



Turning Movement Data Plot

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 5 Main St & Pennsylvania Ave
Site Code:
Start Date: 11/16/2022

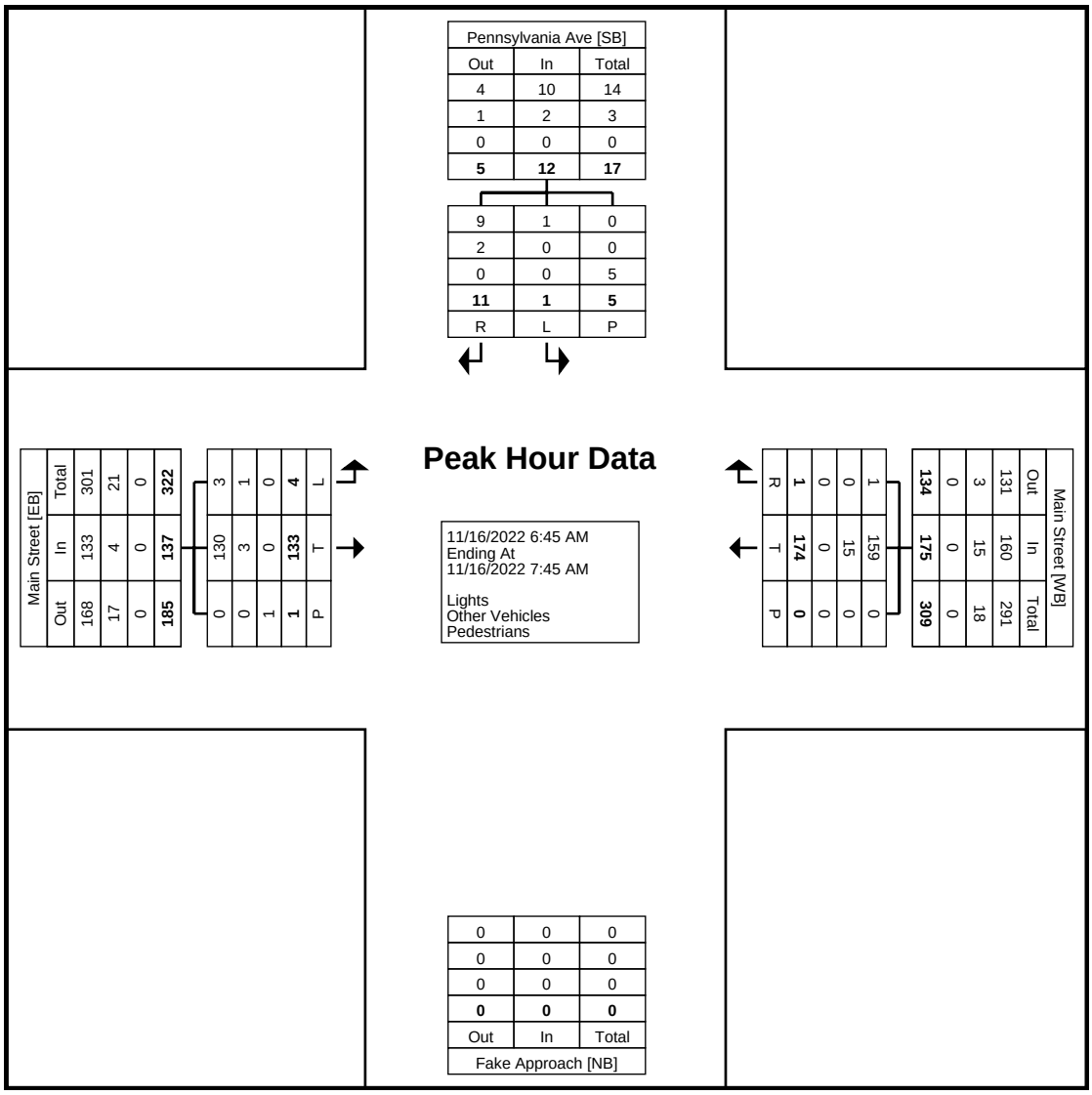
Turning Movement Peak Hour Data (6:45 AM)

Start Time	Main Street Eastbound				Main Street Westbound				Pennsylvania Ave Southbound				
	Left	Thru	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
6:45 AM	0	36	0	36	54	0	0	54	1	2	2	3	93
7:00 AM	2	32	0	34	41	0	0	41	0	3	0	3	78
7:15 AM	1	28	1	29	42	1	0	43	0	4	3	4	76
7:30 AM	1	37	0	38	37	0	0	37	0	2	0	2	77
Total	4	133	1	137	174	1	0	175	1	11	5	12	324
Approach %	2.9	97.1	-	-	99.4	0.6	-	-	8.3	91.7	-	-	-
Total %	1.2	41.0	-	42.3	53.7	0.3	-	54.0	0.3	3.4	-	3.7	-
PHF	0.500	0.899	-	0.901	0.806	0.250	-	0.810	0.250	0.688	-	0.750	0.871
Lights	3	130	-	133	159	1	-	160	1	9	-	10	303
% Lights	75.0	97.7	-	97.1	91.4	100.0	-	91.4	100.0	81.8	-	83.3	93.5
Other Vehicles	1	3	-	4	15	0	-	15	0	2	-	2	21
% Other Vehicles	25.0	2.3	-	2.9	8.6	0.0	-	8.6	0.0	18.2	-	16.7	6.5
Pedestrians	-	-	1	-	-	-	0	-	-	-	5	-	-
% Pedestrians	-	-	100.0	-	-	-	-	-	-	-	100.0	-	-

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 5 Main St & Pennsylvania Ave
Site Code:
Start Date: 11/16/2022



Turning Movement Peak Hour Data Plot (6:45 AM)

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 5 Main St & Pennsylvania Ave
Site Code:
Start Date: 11/16/2022

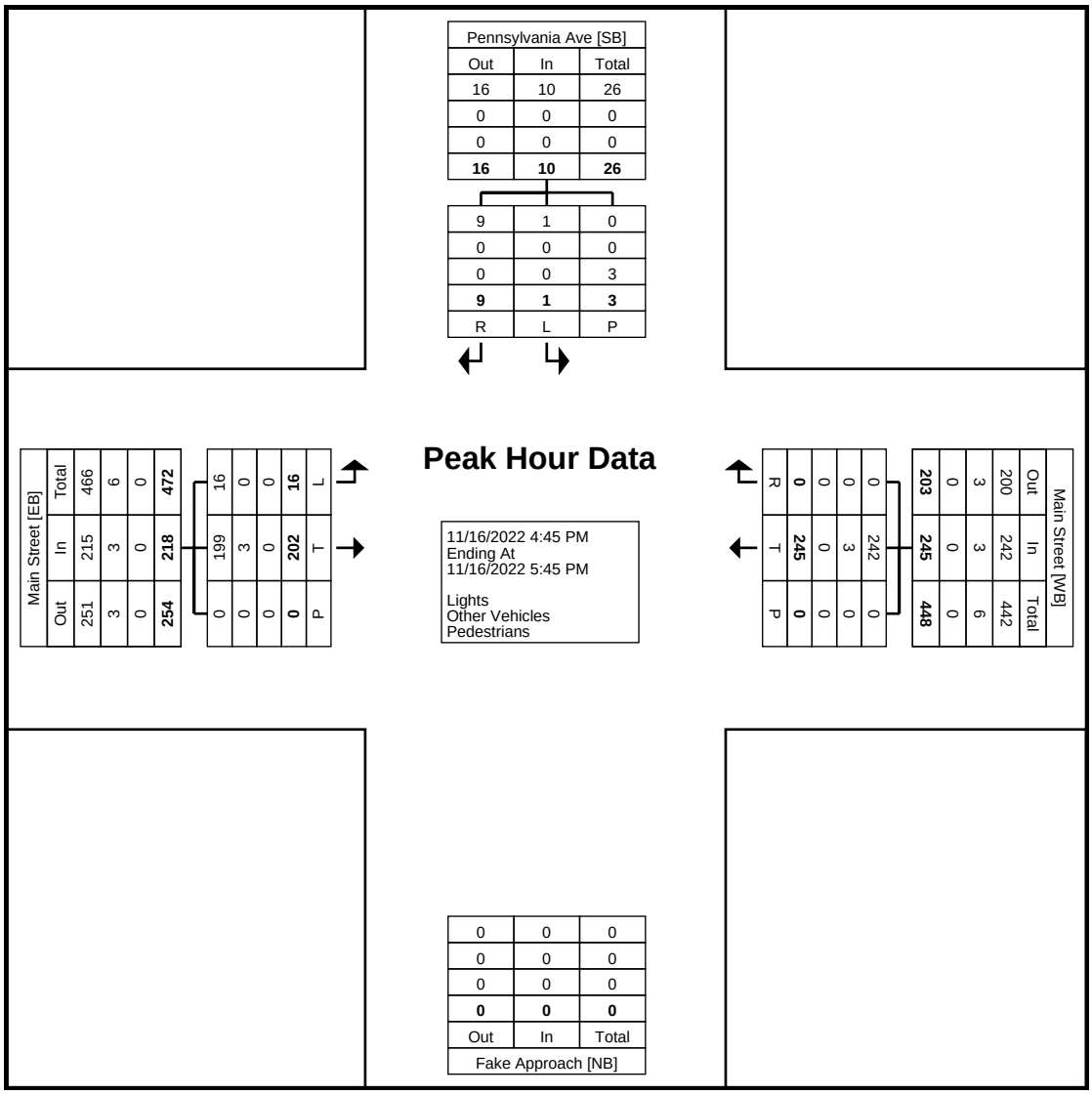
Turning Movement Peak Hour Data (4:45 PM)

Start Time	Main Street Eastbound				Main Street Westbound				Pennsylvania Ave Southbound				
	Left	Thru	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
4:45 PM	2	53	0	55	79	0	0	79	1	2	2	3	137
5:00 PM	3	47	0	50	55	0	0	55	0	0	1	0	105
5:15 PM	4	47	0	51	61	0	0	61	0	3	0	3	115
5:30 PM	7	55	0	62	50	0	0	50	0	4	0	4	116
Total	16	202	0	218	245	0	0	245	1	9	3	10	473
Approach %	7.3	92.7	-	-	100.0	0.0	-	-	10.0	90.0	-	-	-
Total %	3.4	42.7	-	46.1	51.8	0.0	-	51.8	0.2	1.9	-	2.1	-
PHF	0.571	0.918	-	0.879	0.775	0.000	-	0.775	0.250	0.563	-	0.625	0.863
Lights	16	199	-	215	242	0	-	242	1	9	-	10	467
% Lights	100.0	98.5	-	98.6	98.8	-	-	98.8	100.0	100.0	-	100.0	98.7
Other Vehicles	0	3	-	3	3	0	-	3	0	0	-	0	6
% Other Vehicles	0.0	1.5	-	1.4	1.2	-	-	1.2	0.0	0.0	-	0.0	1.3
Pedestrians	-	-	0	-	-	-	0	-	-	-	3	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100

Counter: MIO:
Set up By JH::

Count Name: 5 Main St & Pennsylvania Ave
Site Code:
Start Date: 11/16/2022



Turning Movement Peak Hour Data Plot (4:45 PM)

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Counted By: Mio:
Set Up By: JH:
Weather:Clear:

Count Name: Trenton Road & HH ES Northern Driveway
Site Code:
Start Date: 01/24/2023

Turning Movement Data

Start Time	HH ES Northern Driveway Westbound				Trenton Road Northbound				Trenton Road Southbound				
	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
6:30 AM	0	0	0	0	49	0	0	49	0	56	0	56	105
6:45 AM	0	0	0	0	81	0	0	81	0	74	0	74	155
Hourly Total	0	0	0	0	130	0	0	130	0	130	0	130	260
7:00 AM	2	0	0	2	86	0	0	86	0	60	0	60	148
7:15 AM	3	3	0	6	91	0	0	91	0	69	0	69	166
7:30 AM	3	5	0	8	97	0	0	97	0	81	0	81	186
7:45 AM	6	6	0	12	112	0	0	112	0	100	0	100	224
Hourly Total	14	14	0	28	386	0	0	386	0	310	0	310	724
8:00 AM	8	17	0	25	97	0	0	97	0	66	0	66	188
8:15 AM	2	3	0	5	86	0	0	86	0	73	0	73	164
8:30 AM	0	5	0	5	70	0	0	70	0	96	0	96	171
8:45 AM	21	59	1	80	73	0	0	73	0	105	0	105	258
Hourly Total	31	84	1	115	326	0	0	326	0	340	0	340	781
9:00 AM	23	70	0	93	63	0	0	63	0	72	0	72	228
9:15 AM	2	10	0	12	73	0	0	73	0	64	0	64	149
9:30 AM	1	3	0	4	68	0	0	68	0	57	0	57	129
9:45 AM	0	2	0	2	85	0	0	85	0	49	0	49	136
Hourly Total	26	85	0	111	289	0	0	289	0	242	0	242	642
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	1	7	0	8	87	0	0	87	0	114	0	114	209
3:15 PM	3	6	1	9	74	0	0	74	0	125	0	125	208
3:30 PM	41	84	2	125	102	0	0	102	0	93	0	93	320
3:45 PM	23	31	0	54	97	0	0	97	0	78	0	78	229
Hourly Total	68	128	3	196	360	0	0	360	0	410	0	410	966
4:00 PM	9	18	0	27	86	0	0	86	0	99	0	99	212
4:15 PM	4	9	0	13	119	0	0	119	0	90	0	90	222
4:30 PM	6	9	0	15	104	0	0	104	0	113	0	113	232
4:45 PM	5	7	0	12	123	0	0	123	0	113	0	113	248
Hourly Total	24	43	0	67	432	0	0	432	0	415	0	415	914
5:00 PM	5	5	0	10	123	0	0	123	0	106	0	106	239
5:15 PM	1	6	0	7	122	0	0	122	0	110	0	110	239
5:30 PM	1	6	0	7	117	0	0	117	0	121	0	121	245
5:45 PM	1	9	0	10	83	0	0	83	0	103	0	103	196
Hourly Total	8	26	0	34	445	0	0	445	0	440	0	440	919
Grand Total	171	380	4	551	2368	0	0	2368	0	2287	0	2287	5206
Approach %	31.0	69.0	-	-	100.0	0.0	-	-	0.0	100.0	-	-	-
Total %	3.3	7.3	-	10.6	45.5	0.0	-	45.5	0.0	43.9	-	43.9	-
Lights	165	361	-	526	2309	0	-	2309	0	2213	-	2213	5048
% Lights	96.5	95.0	-	95.5	97.5	-	-	97.5	-	96.8	-	96.8	97.0
Other Vehicles	6	19	-	25	59	0	-	59	0	74	-	74	158
% Other Vehicles	3.5	5.0	-	4.5	2.5	-	-	2.5	-	3.2	-	3.2	3.0
Pedestrians	-	-	4	-	-	-	0	-	-	-	0	-	-
% Pedestrians	-	-	100.0	-	-	-	-	-	-	-	-	-	-

Traffic Planning and Design, Inc
2500 East High Street
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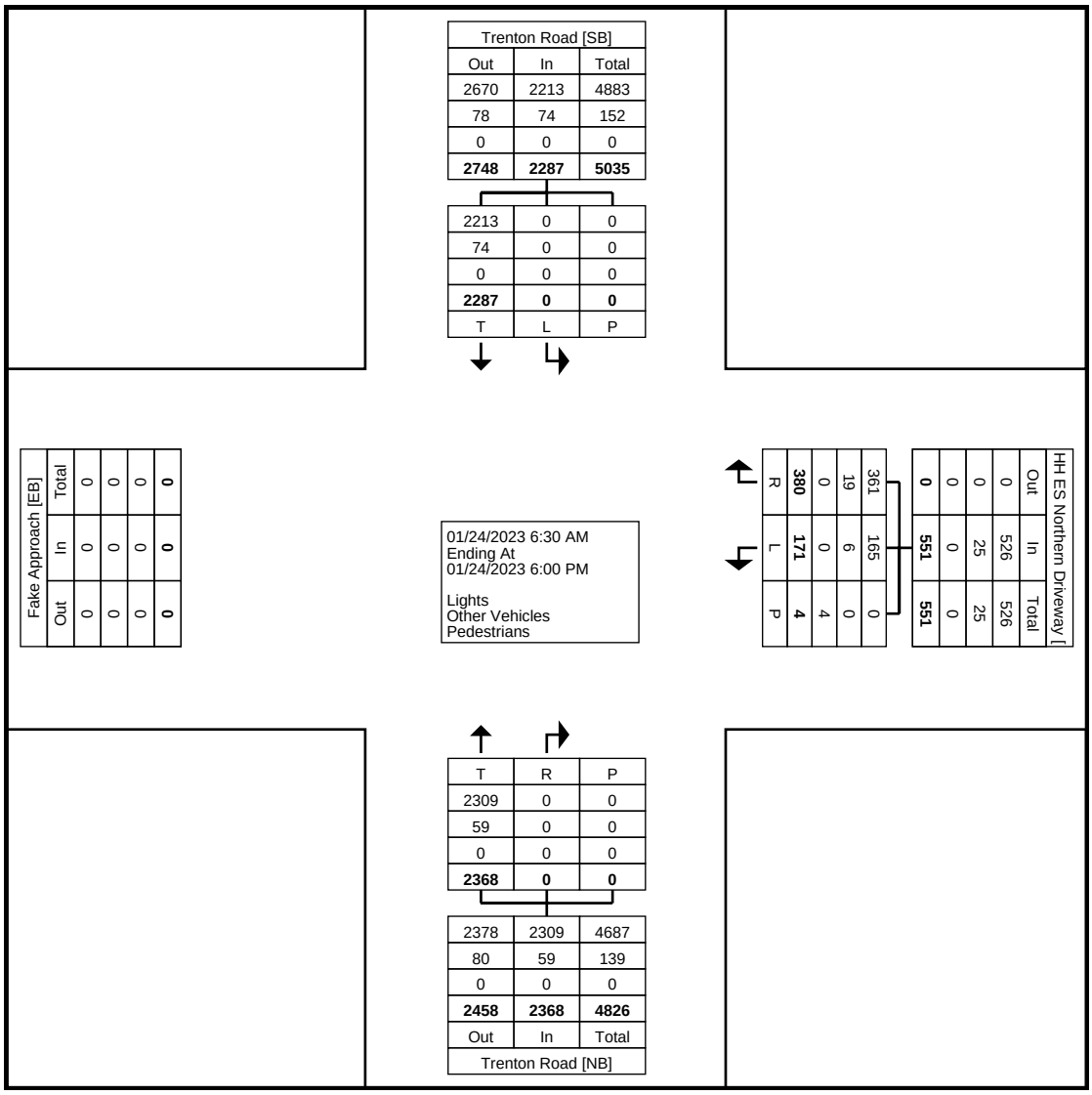
610.326.3100 mbressler@trafficpd.com

Counted By: Mio:
Set Up By: JH:
Weather:Clear:

Count Name: Trenton Road & HH ES Northern Driveway
Site Code:
Start Date: 01/24/2023



Turning Movement Data Plot

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Counted By: Mio:
Set Up By: JH:
Weather:Clear:

Count Name: Trenton Road & HH ES Northern Driveway
Site Code:
Start Date: 01/24/2023

Turning Movement Peak Hour Data (8:15 AM)

Start Time	HH ES Northern Driveway Westbound				Trenton Road Northbound				Trenton Road Southbound				
	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
8:15 AM	2	3	0	5	86	0	0	86	0	73	0	73	164
8:30 AM	0	5	0	5	70	0	0	70	0	96	0	96	171
8:45 AM	21	59	1	80	73	0	0	73	0	105	0	105	258
9:00 AM	23	70	0	93	63	0	0	63	0	72	0	72	228
Total	46	137	1	183	292	0	0	292	0	346	0	346	821
Approach %	25.1	74.9	-	-	100.0	0.0	-	-	0.0	100.0	-	-	-
Total %	5.6	16.7	-	22.3	35.6	0.0	-	35.6	0.0	42.1	-	42.1	-
PHF	0.500	0.489	-	0.492	0.849	0.000	-	0.849	0.000	0.824	-	0.824	0.796
Lights	45	126	-	171	279	0	-	279	0	332	-	332	782
% Lights	97.8	92.0	-	93.4	95.5	-	-	95.5	-	96.0	-	96.0	95.2
Other Vehicles	1	11	-	12	13	0	-	13	0	14	-	14	39
% Other Vehicles	2.2	8.0	-	6.6	4.5	-	-	4.5	-	4.0	-	4.0	4.8
Pedestrians	-	-	1	-	-	-	0	-	-	-	0	-	-
% Pedestrians	-	-	100.0	-	-	-	-	-	-	-	-	-	-

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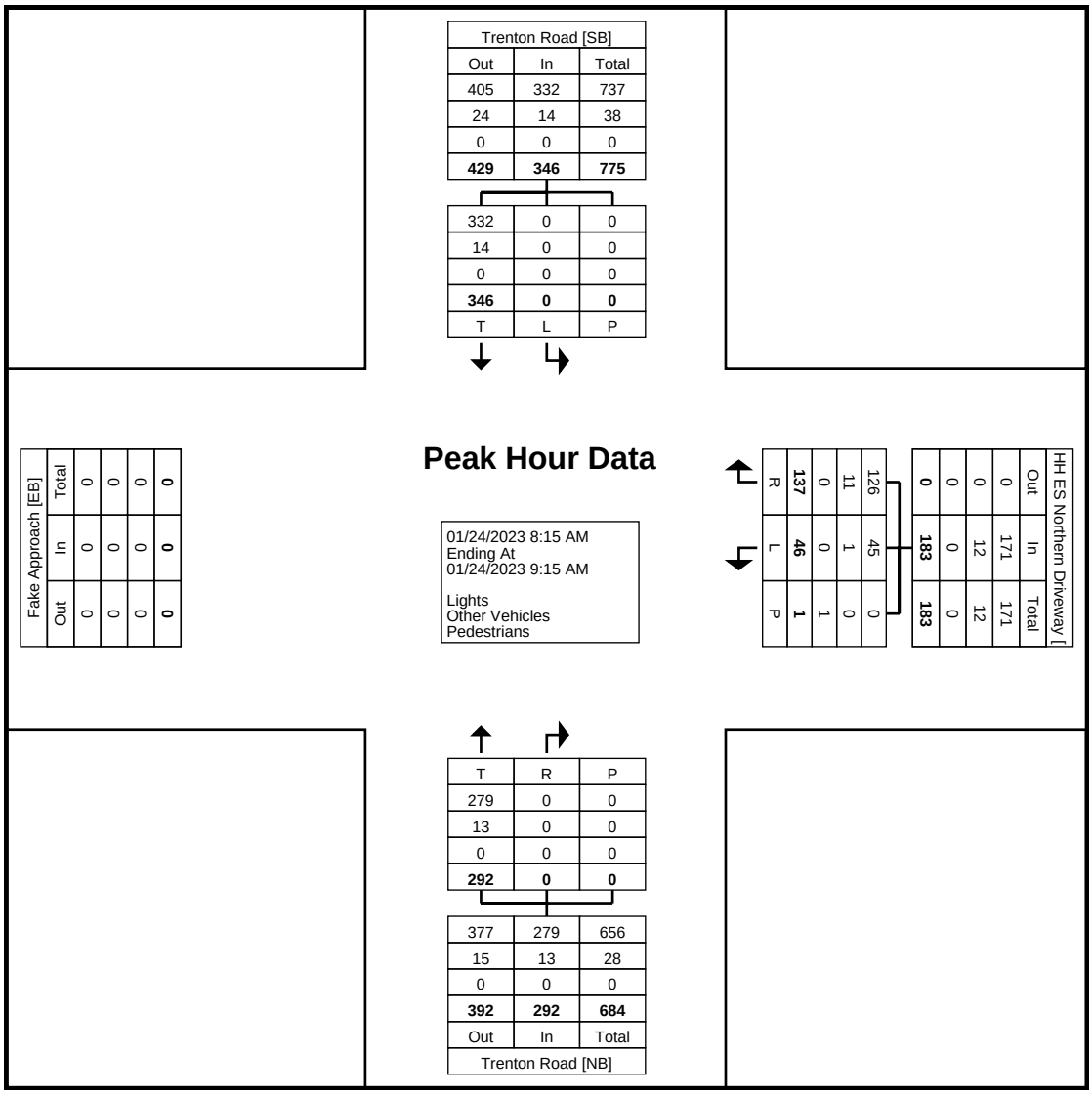
Weather:Clear:

Count Name: Trenton Road & HH ES Northern Driveway
Site Code:
Start Date: 01/24/2023



Turning Movement Peak Hour Data Plot (8:15 AM)

Traffic Planning and Design, Inc
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Counted By: Mio:
Set Up By: JH:
Weather:Clear:

Count Name: Trenton Road & HH ES Northern Driveway
Site Code:
Start Date: 01/24/2023

Turning Movement Peak Hour Data (3:30 PM)

Start Time	HH ES Northern Driveway Westbound				Trenton Road Northbound				Trenton Road Southbound				
	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
3:30 PM	41	84	2	125	102	0	0	102	0	93	0	93	320
3:45 PM	23	31	0	54	97	0	0	97	0	78	0	78	229
4:00 PM	9	18	0	27	86	0	0	86	0	99	0	99	212
4:15 PM	4	9	0	13	119	0	0	119	0	90	0	90	222
Total	77	142	2	219	404	0	0	404	0	360	0	360	983
Approach %	35.2	64.8	-	-	100.0	0.0	-	-	0.0	100.0	-	-	-
Total %	7.8	14.4	-	22.3	41.1	0.0	-	41.1	0.0	36.6	-	36.6	-
PHF	0.470	0.423	-	0.438	0.849	0.000	-	0.849	0.000	0.909	-	0.909	0.768
Lights	72	134	-	206	391	0	-	391	0	349	-	349	946
% Lights	93.5	94.4	-	94.1	96.8	-	-	96.8	-	96.9	-	96.9	96.2
Other Vehicles	5	8	-	13	13	0	-	13	0	11	-	11	37
% Other Vehicles	6.5	5.6	-	5.9	3.2	-	-	3.2	-	3.1	-	3.1	3.8
Pedestrians	-	-	2	-	-	-	0	-	-	-	0	-	-
% Pedestrians	-	-	100.0	-	-	-	-	-	-	-	-	-	-

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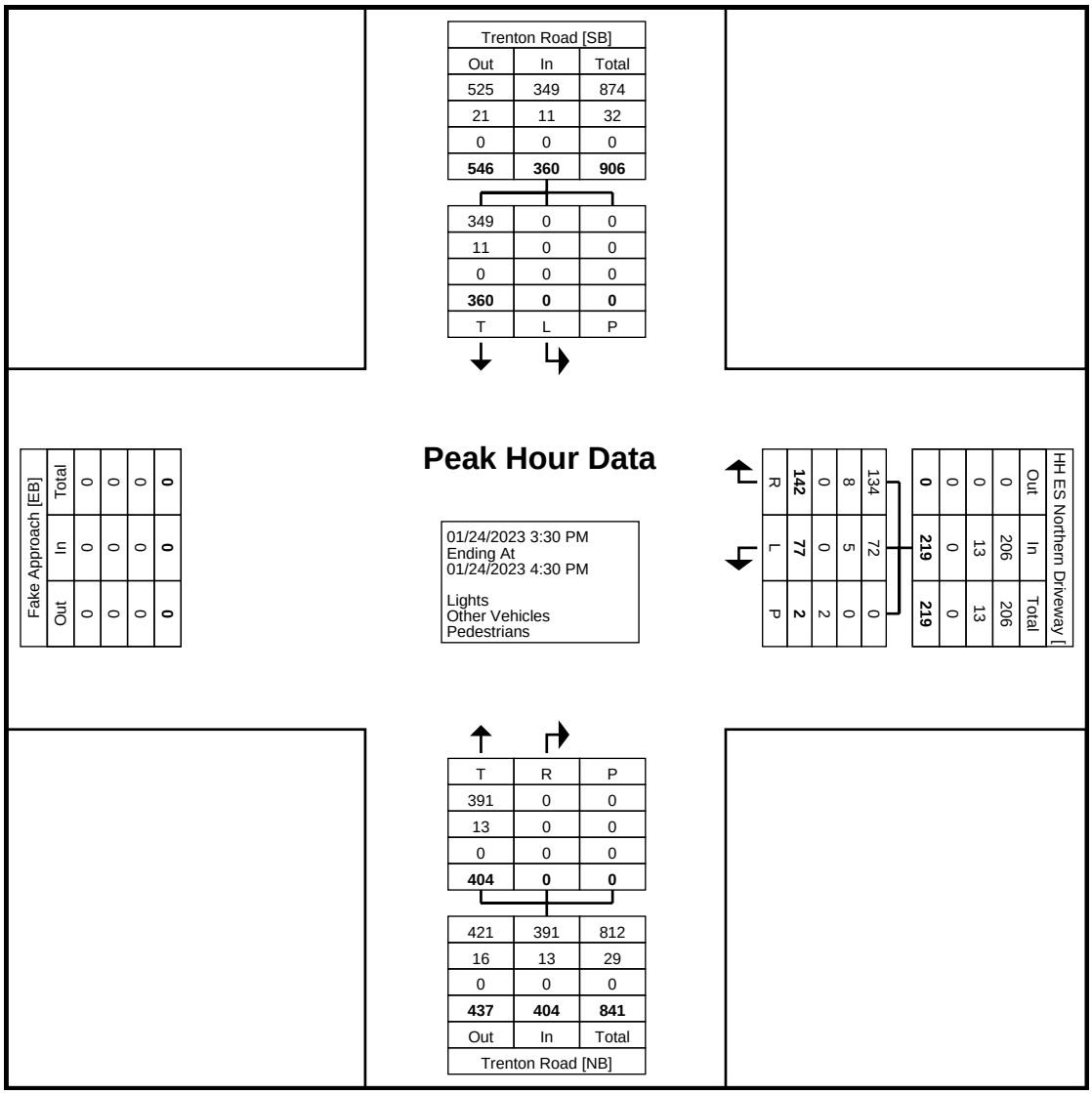
Count Name: Trenton Road & HH ES Northern Driveway
Site Code:
Start Date: 01/24/2023



Turning Movement Peak Hour Data Plot (3:30 PM)

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
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610.326.3100 mbressler@trafficpd.com

Counted By: Mio:
Set Up By: JH:
Weather:Clear:

Count Name: Trenton Road & Durham Road
Site Code:
Start Date: 01/24/2023

Turning Movement Data

Start Time	Durham Road Eastbound						Durham Road Westbound						Trenton Road Northbound						Trenton Road Southbound						Int. Total
	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
6:30 AM	9	27	4	0	0	40	10	30	5	3	0	48	5	76	6	3	0	90	4	40	26	8	0	78	256
6:45 AM	17	41	0	1	0	59	14	59	7	0	0	80	6	94	12	1	0	113	4	49	34	2	0	89	341
Hourly Total	26	68	4	1	0	99	24	89	12	3	0	128	11	170	18	4	0	203	8	89	60	10	0	167	597
7:00 AM	20	22	0	0	0	42	9	47	3	2	0	61	9	103	15	0	0	127	7	44	41	3	1	95	325
7:15 AM	17	31	1	0	0	49	16	63	13	1	0	93	9	100	13	0	0	122	8	58	33	7	0	106	370
7:30 AM	20	35	3	0	0	58	10	67	17	0	0	94	13	102	11	0	0	126	11	57	34	4	0	106	384
7:45 AM	26	49	6	1	0	82	26	67	18	3	0	114	8	98	21	0	0	127	12	69	42	3	0	126	449
Hourly Total	83	137	10	1	0	231	61	244	51	6	0	362	39	403	60	0	0	502	38	228	150	17	1	433	1528
8:00 AM	18	40	0	0	0	58	12	55	14	2	0	83	9	112	21	0	0	142	11	56	37	0	0	104	387
8:15 AM	17	36	2	0	0	55	13	60	16	5	0	94	3	79	11	1	0	94	8	73	26	7	0	114	357
8:30 AM	14	36	5	0	0	55	15	56	15	0	0	86	5	86	12	1	1	104	10	59	33	1	0	103	348
8:45 AM	23	47	6	0	0	76	12	52	14	5	0	83	8	76	23	0	0	107	13	59	22	2	0	96	362
Hourly Total	72	159	13	0	0	244	52	223	59	12	0	346	25	353	67	2	1	447	42	247	118	10	0	417	1454
9:00 AM	23	43	4	0	0	70	16	44	13	2	0	75	21	90	11	1	0	123	14	42	21	7	1	84	352
9:15 AM	17	35	4	0	0	56	8	50	11	0	0	69	8	76	14	0	0	98	6	56	32	5	0	99	322
9:30 AM	24	35	3	0	0	62	10	42	5	0	0	57	6	73	9	0	0	88	9	46	20	7	0	82	289
9:45 AM	18	45	6	0	0	69	9	31	5	3	0	48	8	76	12	0	0	96	7	43	24	9	0	83	296
Hourly Total	82	158	17	0	0	257	43	167	34	5	0	249	43	315	46	1	0	405	36	187	97	28	1	348	1259
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	27	54	4	0	0	85	23	59	10	2	0	94	9	73	14	0	0	96	20	101	29	1	0	151	426
3:15 PM	26	58	5	0	0	89	19	50	11	4	0	84	7	68	15	0	0	90	13	121	29	1	0	164	427
3:30 PM	31	73	2	0	0	106	22	53	10	0	0	85	12	111	22	0	0	145	14	80	39	0	0	133	469
3:45 PM	30	71	1	1	0	103	17	55	17	1	0	90	6	99	21	0	0	126	19	81	27	3	0	130	449
Hourly Total	114	256	12	1	0	383	81	217	48	7	0	353	34	351	72	0	0	457	66	383	124	5	0	578	1771
4:00 PM	23	84	2	0	0	109	25	55	8	1	0	89	7	80	19	3	0	109	16	95	30	2	0	143	450
4:15 PM	22	63	5	0	0	90	29	68	14	2	0	113	5	101	13	0	0	119	23	79	23	9	0	134	456
4:30 PM	28	76	3	0	0	107	9	47	6	6	0	68	6	104	26	2	0	138	16	110	18	1	0	145	458
4:45 PM	29	64	7	0	0	100	35	59	18	2	1	114	9	101	21	1	1	132	18	99	12	2	0	131	477
Hourly Total	102	287	17	0	0	406	98	229	46	11	1	384	27	386	79	6	1	498	73	383	83	14	0	553	1841
5:00 PM	24	66	5	1	0	96	26	44	9	6	0	85	7	97	24	1	0	129	20	107	19	2	0	148	458
5:15 PM	36	51	2	0	0	89	24	55	9	2	0	90	5	98	21	1	0	125	14	94	30	3	0	141	445
5:30 PM	27	82	3	0	0	112	18	37	7	5	0	67	14	116	21	4	0	155	13	121	25	5	0	164	498
5:45 PM	24	80	1	0	0	105	37	45	11	0	0	93	7	72	12	2	0	93	24	82	13	4	0	123	414
Hourly Total	111	279	11	1	0	402	105	181	36	13	0	335	33	383	78	8	0	502	71	404	87	14	0	576	1815
Grand Total	590	1344	84	4	0	2022	464	1350	286	57	1	2157	212	2361	420	21	2	3014	334	1921	719	98	2	3072	10265
Approach %	29.2	66.5	4.2	0.2	-	-	21.5	62.6	13.3	2.6	-	-	7.0	78.3	13.9	0.7	-	-	10.9	62.5	23.4	3.2	-	-	-
Total %	5.7	13.1	0.8	0.0	-	19.7	4.5	13.2	2.8	0.6	-	21.0	2.1	23.0	4.1	0.2	-	29.4	3.3	18.7	7.0	1.0	-	29.9	-
Lights	563	1285	71	4	-	1923	447	1294	274	57	-	2072	205	2309	406	20	-	2940	324	1877	693	95	-	2989	9924
% Lights	95.4	95.6	84.5	100.0	-	95.1	96.3	95.9	95.8	100.0	-	96.1	96.7	97.8	96.7	95.2	-	97.5	97.0	97.7	96.4	96.9	-	97.3	96.7
Other Vehicles	27	59	13	0	-	99	17	56	12	0	-	85	7	52	14	1	-	74	10	44	26	3	-	83	341
% Other Vehicles	4.6	4.4	15.5	0.0	-	4.9	3.7	4.1	4.2	0.0	-	3.9	3.3	2.2	3.3	4.8	-	2.5	3.0	2.3	3.6	3.1	-	2.7	3.3
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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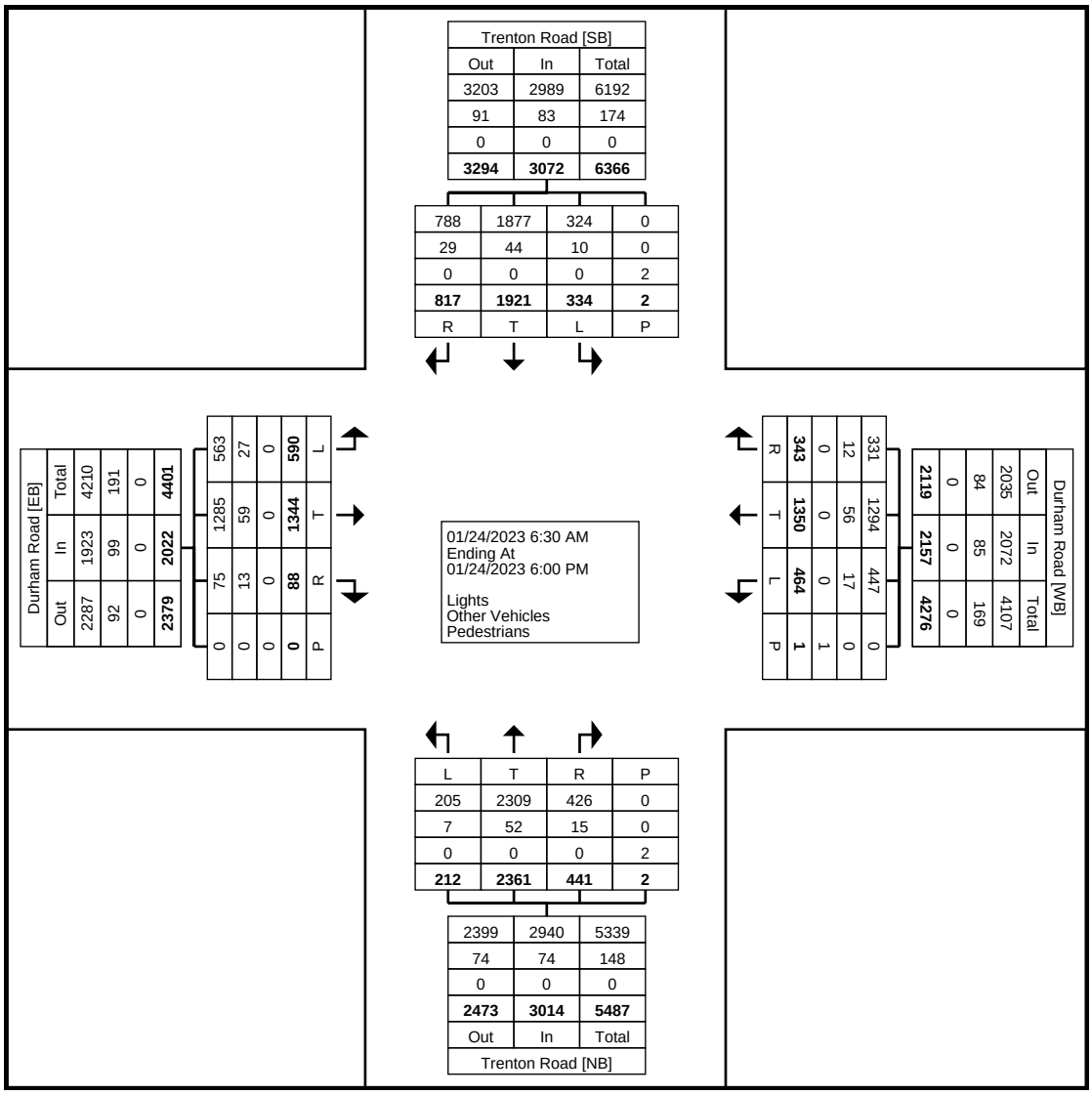
Weather:Clear:

Count Name: Trenton Road & Durham Road
Site Code:
Start Date: 01/24/2023



Turning Movement Data Plot

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Counted By: Mio:
Set Up By: JH:
Weather:Clear:

Count Name: Trenton Road & Durham Road
Site Code:
Start Date: 01/24/2023

Turning Movement Peak Hour Data (7:15 AM)

Start Time	Durham Road Eastbound						Durham Road Westbound						Trenton Road Northbound						Trenton Road Southbound						Int. Total
	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
7:15 AM	17	31	1	0	0	49	16	63	13	1	0	93	9	100	13	0	0	122	8	58	33	7	0	106	370
7:30 AM	20	35	3	0	0	58	10	67	17	0	0	94	13	102	11	0	0	126	11	57	34	4	0	106	384
7:45 AM	26	49	6	1	0	82	26	67	18	3	0	114	8	98	21	0	0	127	12	69	42	3	0	126	449
8:00 AM	18	40	0	0	0	58	12	55	14	2	0	83	9	112	21	0	0	142	11	56	37	0	0	104	387
Total	81	155	10	1	0	247	64	252	62	6	0	384	39	412	66	0	0	517	42	240	146	14	0	442	1590
Approach %	32.8	62.8	4.0	0.4	-	-	16.7	65.6	16.1	1.6	-	-	7.5	79.7	12.8	0.0	-	-	9.5	54.3	33.0	3.2	-	-	-
Total %	5.1	9.7	0.6	0.1	-	15.5	4.0	15.8	3.9	0.4	-	24.2	2.5	25.9	4.2	0.0	-	32.5	2.6	15.1	9.2	0.9	-	27.8	-
PHF	0.779	0.791	0.417	0.250	-	0.753	0.615	0.940	0.861	0.500	-	0.842	0.750	0.920	0.786	0.000	-	0.910	0.875	0.870	0.869	0.500	-	0.877	0.885
Lights	76	148	6	1	-	231	62	242	58	6	-	368	37	401	64	0	-	502	40	231	143	13	-	427	1528
% Lights	93.8	95.5	60.0	100.0	-	93.5	96.9	96.0	93.5	100.0	-	95.8	94.9	97.3	97.0	-	-	97.1	95.2	96.3	97.9	92.9	-	96.6	96.1
Other Vehicles	5	7	4	0	-	16	2	10	4	0	-	16	2	11	2	0	-	15	2	9	3	1	-	15	62
% Other Vehicles	6.2	4.5	40.0	0.0	-	6.5	3.1	4.0	6.5	0.0	-	4.2	5.1	2.7	3.0	-	-	2.9	4.8	3.8	2.1	7.1	-	3.4	3.9
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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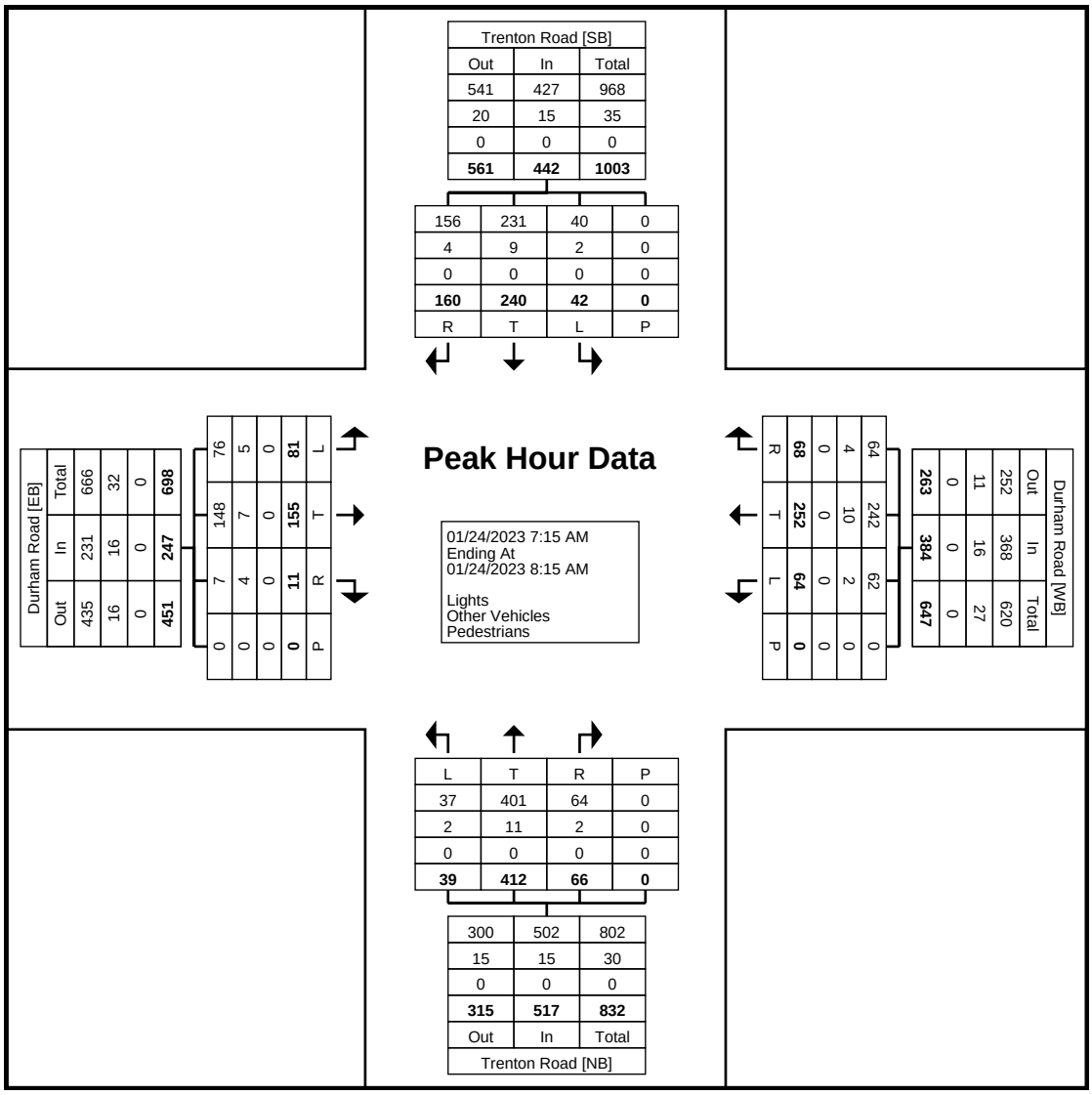

Turning Movement Peak Hour Data Plot (7:15 AM)

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Counted By: Mio:
Set Up By: JH:
Weather:Clear:

Count Name: Trenton Road & Durham Road
Site Code:
Start Date: 01/24/2023

Turning Movement Peak Hour Data (4:45 PM)

Start Time	Durham Road Eastbound						Durham Road Westbound						Trenton Road Northbound						Trenton Road Southbound						Int. Total
	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
4:45 PM	29	64	7	0	0	100	35	59	18	2	1	114	9	101	21	1	1	132	18	99	12	2	0	131	477
5:00 PM	24	66	5	1	0	96	26	44	9	6	0	85	7	97	24	1	0	129	20	107	19	2	0	148	458
5:15 PM	36	51	2	0	0	89	24	55	9	2	0	90	5	98	21	1	0	125	14	94	30	3	0	141	445
5:30 PM	27	82	3	0	0	112	18	37	7	5	0	67	14	116	21	4	0	155	13	121	25	5	0	164	498
Total	116	263	17	1	0	397	103	195	43	15	1	356	35	412	87	7	1	541	65	421	86	12	0	584	1878
Approach %	29.2	66.2	4.3	0.3	-	-	28.9	54.8	12.1	4.2	-	-	6.5	76.2	16.1	1.3	-	-	11.1	72.1	14.7	2.1	-	-	-
Total %	6.2	14.0	0.9	0.1	-	21.1	5.5	10.4	2.3	0.8	-	19.0	1.9	21.9	4.6	0.4	-	28.8	3.5	22.4	4.6	0.6	-	31.1	-
PHF	0.806	0.802	0.607	0.250	-	0.886	0.736	0.826	0.597	0.625	-	0.781	0.625	0.888	0.906	0.438	-	0.873	0.813	0.870	0.717	0.600	-	0.890	0.943
Lights	115	255	17	1	-	388	100	187	41	15	-	343	35	412	85	6	-	538	65	419	85	12	-	581	1850
% Lights	99.1	97.0	100.0	100.0	-	97.7	97.1	95.9	95.3	100.0	-	96.3	100.0	100.0	97.7	85.7	-	99.4	100.0	99.5	98.8	100.0	-	99.5	98.5
Other Vehicles	1	8	0	0	-	9	3	8	2	0	-	13	0	0	2	1	-	3	0	2	1	0	-	3	28
% Other Vehicles	0.9	3.0	0.0	0.0	-	2.3	2.9	4.1	4.7	0.0	-	3.7	0.0	0.0	2.3	14.3	-	0.6	0.0	0.5	1.2	0.0	-	0.5	1.5
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

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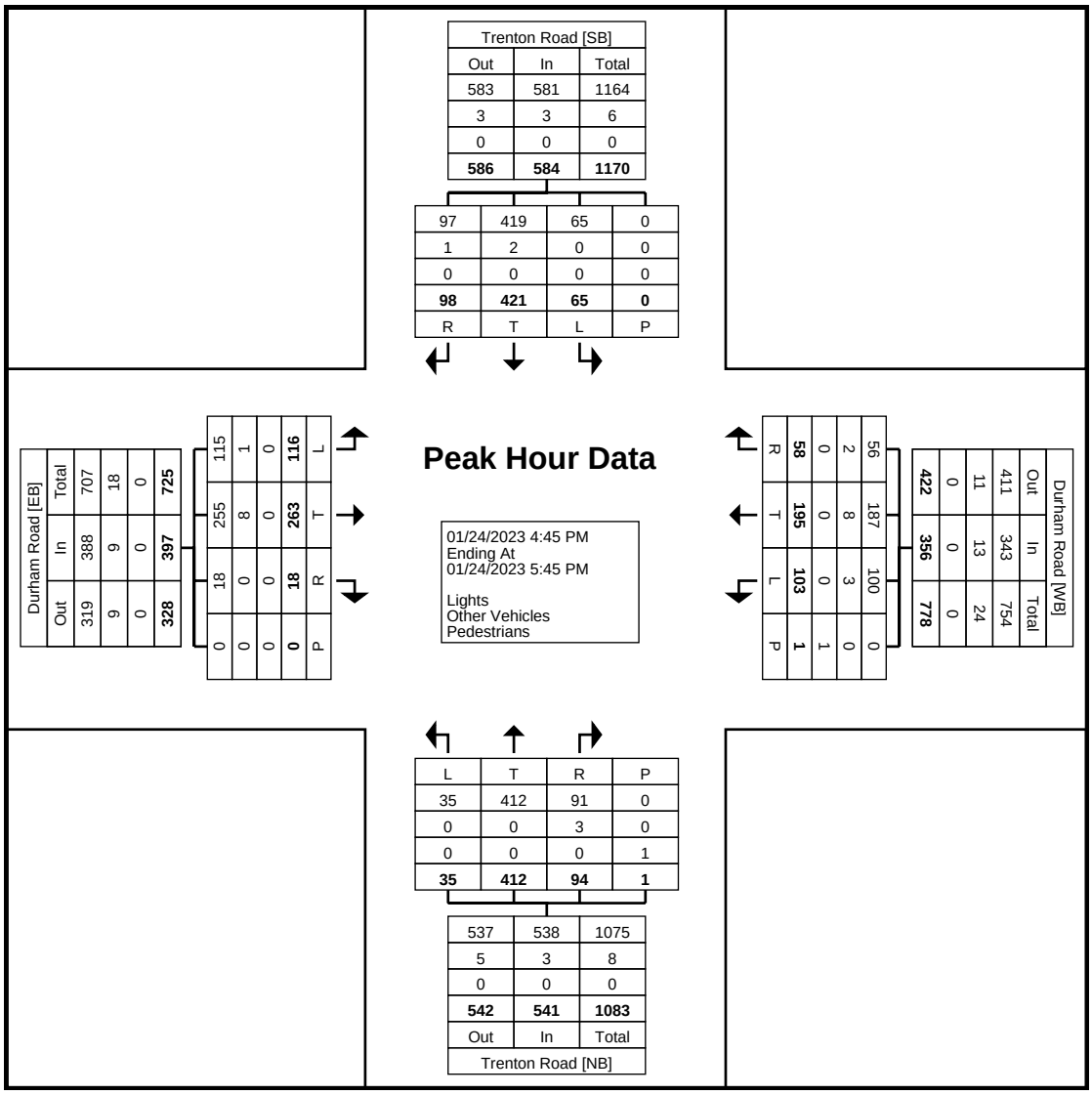
Weather:Clear:

Count Name: Trenton Road & Durham Road
Site Code:
Start Date: 01/24/2023



Turning Movement Peak Hour Data Plot (4:45 PM)

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Counted By: Mio:
Set Up By: JH:
Weather:Clear:

Count Name: Hulmeville Road & Bensalem Boulevard
Site Code:
Start Date: 01/24/2023

Turning Movement Data

Start Time	Bensalem Boulevard Eastbound						Bensalem Boulevard Westbound						Hulmeville Road Northbound						Hulmeville Road Southbound						Int. Total
	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
6:30 AM	43	35	7	1	0	86	2	19	25	6	0	52	3	52	5	3	0	63	8	44	17	4	0	73	274
6:45 AM	47	35	6	1	0	89	8	11	34	14	0	67	2	56	1	2	0	61	15	54	23	6	0	98	315
Hourly Total	90	70	13	2	0	175	10	30	59	20	0	119	5	108	6	5	0	124	23	98	40	10	0	171	589
7:00 AM	60	42	10	1	0	113	5	23	22	7	0	57	3	59	3	2	0	67	15	45	13	1	0	74	311
7:15 AM	47	30	7	0	0	84	5	29	38	6	0	78	5	65	1	3	0	74	21	57	22	2	0	102	338
7:30 AM	59	47	10	2	0	118	4	24	35	9	0	72	11	83	3	0	0	97	20	52	14	3	0	89	376
7:45 AM	60	37	4	1	0	102	9	19	39	11	0	78	3	87	5	1	0	96	28	85	35	7	0	155	431
Hourly Total	226	156	31	4	0	417	23	95	134	33	0	285	22	294	12	6	0	334	84	239	84	13	0	420	1456
8:00 AM	64	36	5	1	0	106	6	28	36	11	0	81	7	75	5	0	0	87	13	49	27	7	0	96	370
8:15 AM	46	28	7	2	0	83	5	30	19	5	0	59	9	73	4	0	0	86	22	47	26	4	0	99	327
8:30 AM	46	39	9	2	0	96	10	27	28	8	0	73	14	65	3	1	0	83	23	51	35	4	0	113	365
8:45 AM	43	53	16	5	0	117	11	33	30	2	0	76	9	74	5	0	0	88	24	66	24	5	0	119	400
Hourly Total	199	156	37	10	0	402	32	118	113	26	0	289	39	287	17	1	0	344	82	213	112	20	0	427	1462
9:00 AM	47	19	3	1	0	70	5	22	16	13	0	56	3	60	2	1	0	66	15	59	24	2	0	100	292
9:15 AM	46	18	3	1	0	68	4	18	24	5	0	51	3	55	3	1	0	62	19	69	18	6	0	112	293
9:30 AM	41	15	1	0	0	57	6	16	18	9	0	49	6	54	3	0	0	63	13	57	18	3	0	91	260
9:45 AM	36	11	1	0	0	48	4	23	21	3	0	51	3	66	3	0	0	72	18	71	24	0	0	113	284
Hourly Total	170	63	8	2	0	243	19	79	79	30	0	207	15	235	11	2	0	263	65	256	84	11	0	416	1129
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	48	30	6	4	0	88	4	39	16	0	0	59	9	83	4	1	0	97	29	67	36	5	0	137	381
3:15 PM	46	25	6	3	0	80	6	34	17	3	0	60	8	78	10	1	0	97	41	100	47	2	0	190	427
3:30 PM	43	32	10	3	0	88	10	55	15	8	0	88	11	88	6	1	0	106	41	105	54	4	0	204	486
3:45 PM	44	34	17	2	1	97	15	40	15	2	0	72	13	72	8	1	0	94	36	92	51	0	1	179	442
Hourly Total	181	121	39	12	1	353	35	168	63	13	0	279	41	321	28	4	0	394	147	364	188	11	1	710	1736
4:00 PM	47	37	12	0	0	96	11	34	16	4	0	65	10	86	8	3	0	107	41	105	53	5	0	204	472
4:15 PM	72	33	7	0	0	112	13	45	24	8	0	90	5	93	9	0	0	107	43	78	63	3	0	187	496
4:30 PM	50	40	8	2	0	100	17	39	22	6	0	84	7	96	7	1	0	111	40	87	56	3	0	186	481
4:45 PM	41	29	9	4	0	83	6	56	22	4	0	88	7	96	4	1	0	108	56	95	59	3	0	213	492
Hourly Total	210	139	36	6	0	391	47	174	84	22	0	327	29	371	28	5	0	433	180	365	231	14	0	790	1941
5:00 PM	77	29	6	1	0	113	5	45	20	8	0	78	7	93	5	3	0	108	49	83	57	5	0	194	493
5:15 PM	54	26	15	1	0	96	16	55	24	8	0	103	10	99	5	0	0	114	31	92	59	9	0	191	504
5:30 PM	62	31	3	0	0	96	9	42	14	0	0	65	11	104	7	0	0	122	47	108	64	1	0	220	503
5:45 PM	37	28	5	1	0	71	3	31	19	5	0	58	7	76	4	0	0	87	35	120	70	0	0	225	441
Hourly Total	230	114	29	3	0	376	33	173	77	21	0	304	35	372	21	3	0	431	162	403	250	15	0	830	1941
Grand Total	1306	819	193	39	1	2357	199	837	609	165	0	1810	186	1988	123	26	0	2323	743	1938	989	94	1	3764	10254
Approach %	55.4	34.7	8.2	1.7	-	-	11.0	46.2	33.6	9.1	-	-	8.0	85.6	5.3	1.1	-	-	19.7	51.5	26.3	2.5	-	-	-
Total %	12.7	8.0	1.9	0.4	-	23.0	1.9	8.2	5.9	1.6	-	17.7	1.8	19.4	1.2	0.3	-	22.7	7.2	18.9	9.6	0.9	-	36.7	-
Lights	1285	789	185	36	-	2295	186	816	588	162	-	1752	176	1946	116	25	-	2263	720	1899	973	90	-	3682	9992
% Lights	98.4	96.3	95.9	92.3	-	97.4	93.5	97.5	96.6	98.2	-	96.8	94.6	97.9	94.3	96.2	-	97.4	96.9	98.0	98.4	95.7	-	97.8	97.4
Other Vehicles	21	30	8	3	-	62	13	21	21	3	-	58	10	42	7	1	-	60	23	39	16	4	-	82	262
% Other Vehicles	1.6	3.7	4.1	7.7	-	2.6	6.5	2.5	3.4	1.8	-	3.2	5.4	2.1	5.7	3.8	-	2.6	3.1	2.0	1.6	4.3	-	2.2	2.6
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

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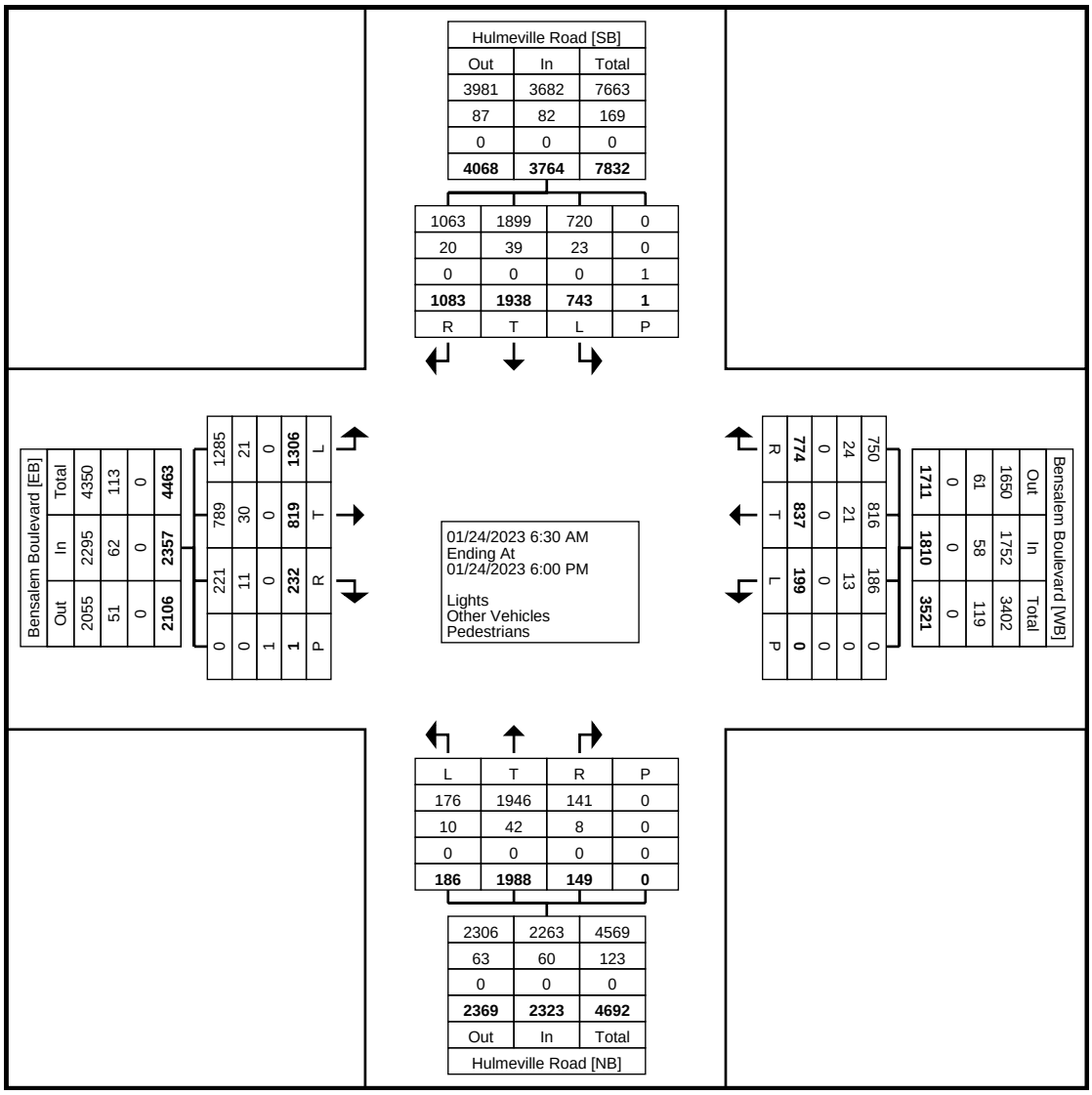
Set Up By: JH:
Weather:Clear:

Count Name: Hulmeville Road & Bensalem Boulevard
Site Code:
Start Date: 01/24/2023



Turning Movement Data Plot

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Counted By: Mio:
Set Up By: JH:
Weather:Clear:

Count Name: Hulmeville Road & Bensalem Boulevard
Site Code:
Start Date: 01/24/2023

Turning Movement Peak Hour Data (7:15 AM)

Start Time	Bensalem Boulevard Eastbound						Bensalem Boulevard Westbound						Hulmeville Road Northbound						Hulmeville Road Southbound						Int. Total
	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
7:15 AM	47	30	7	0	0	84	5	29	38	6	0	78	5	65	1	3	0	74	21	57	22	2	0	102	338
7:30 AM	59	47	10	2	0	118	4	24	35	9	0	72	11	83	3	0	0	97	20	52	14	3	0	89	376
7:45 AM	60	37	4	1	0	102	9	19	39	11	0	78	3	87	5	1	0	96	28	85	35	7	0	155	431
8:00 AM	64	36	5	1	0	106	6	28	36	11	0	81	7	75	5	0	0	87	13	49	27	7	0	96	370
Total	230	150	26	4	0	410	24	100	148	37	0	309	26	310	14	4	0	354	82	243	98	19	0	442	1515
Approach %	56.1	36.6	6.3	1.0	-	-	7.8	32.4	47.9	12.0	-	-	7.3	87.6	4.0	1.1	-	-	18.6	55.0	22.2	4.3	-	-	-
Total %	15.2	9.9	1.7	0.3	-	27.1	1.6	6.6	9.8	2.4	-	20.4	1.7	20.5	0.9	0.3	-	23.4	5.4	16.0	6.5	1.3	-	29.2	-
PHF	0.898	0.798	0.650	0.500	-	0.869	0.667	0.862	0.949	0.841	-	0.954	0.591	0.891	0.700	0.333	-	0.912	0.732	0.715	0.700	0.679	-	0.713	0.879
Lights	227	149	24	4	-	404	21	92	144	37	-	294	24	301	12	3	-	340	78	231	97	18	-	424	1462
% Lights	98.7	99.3	92.3	100.0	-	98.5	87.5	92.0	97.3	100.0	-	95.1	92.3	97.1	85.7	75.0	-	96.0	95.1	95.1	99.0	94.7	-	95.9	96.5
Other Vehicles	3	1	2	0	-	6	3	8	4	0	-	15	2	9	2	1	-	14	4	12	1	1	-	18	53
% Other Vehicles	1.3	0.7	7.7	0.0	-	1.5	12.5	8.0	2.7	0.0	-	4.9	7.7	2.9	14.3	25.0	-	4.0	4.9	4.9	1.0	5.3	-	4.1	3.5
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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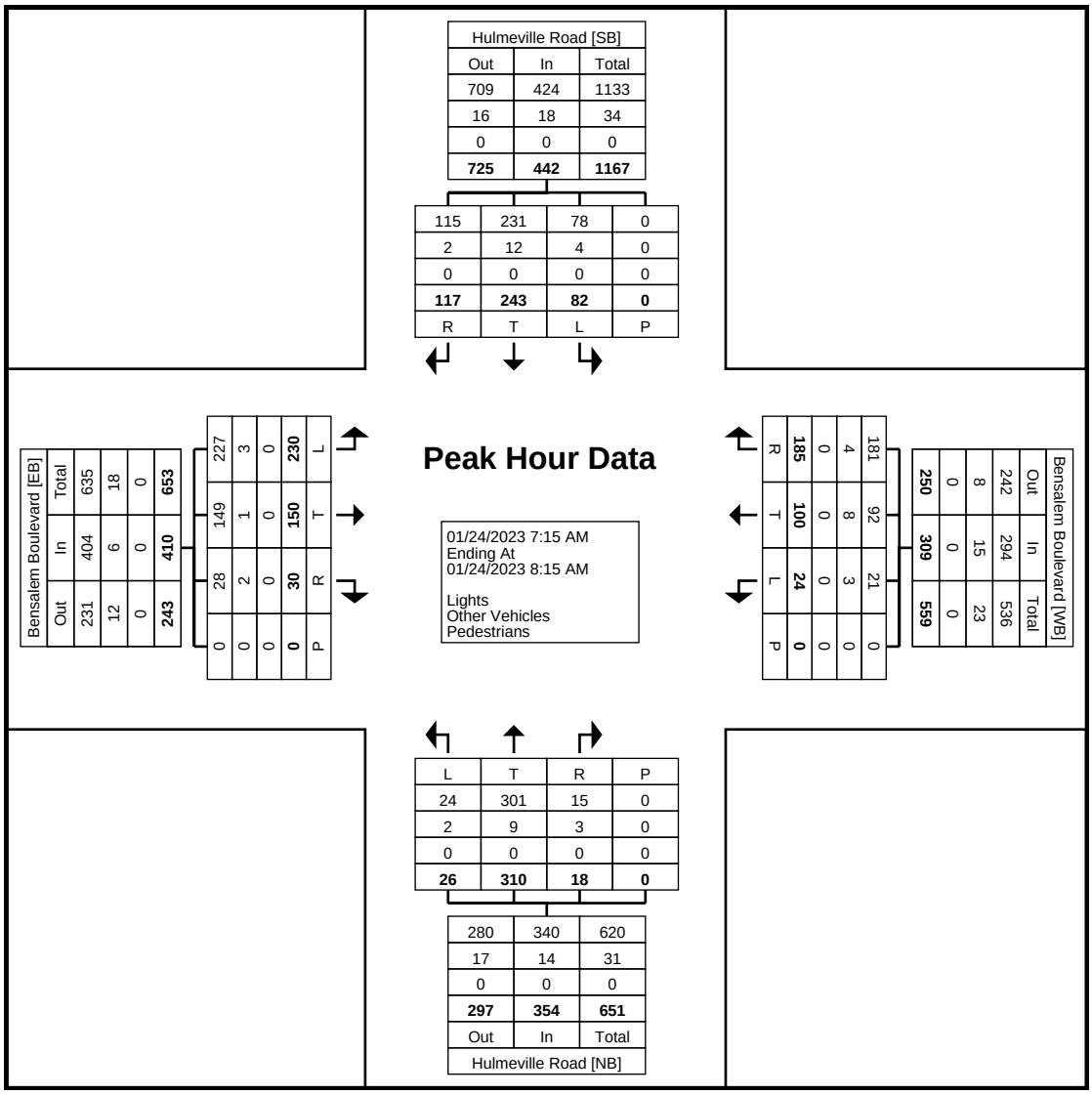

Turning Movement Peak Hour Data Plot (7:15 AM)

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Site Code:
Start Date: 01/24/2023

Turning Movement Peak Hour Data (4:45 PM)

Start Time	Bensalem Boulevard Eastbound						Bensalem Boulevard Westbound						Hulmeville Road Northbound						Hulmeville Road Southbound						Int. Total
	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
4:45 PM	41	29	9	4	0	83	6	56	22	4	0	88	7	96	4	1	0	108	56	95	59	3	0	213	492
5:00 PM	77	29	6	1	0	113	5	45	20	8	0	78	7	93	5	3	0	108	49	83	57	5	0	194	493
5:15 PM	54	26	15	1	0	96	16	55	24	8	0	103	10	99	5	0	0	114	31	92	59	9	0	191	504
5:30 PM	62	31	3	0	0	96	9	42	14	0	0	65	11	104	7	0	0	122	47	108	64	1	0	220	503
Total	234	115	33	6	0	388	36	198	80	20	0	334	35	392	21	4	0	452	183	378	239	18	0	818	1992
Approach %	60.3	29.6	8.5	1.5	-	-	10.8	59.3	24.0	6.0	-	-	7.7	86.7	4.6	0.9	-	-	22.4	46.2	29.2	2.2	-	-	-
Total %	11.7	5.8	1.7	0.3	-	19.5	1.8	9.9	4.0	1.0	-	16.8	1.8	19.7	1.1	0.2	-	22.7	9.2	19.0	12.0	0.9	-	41.1	-
PHF	0.760	0.927	0.550	0.375	-	0.858	0.563	0.884	0.833	0.625	-	0.811	0.795	0.942	0.750	0.333	-	0.926	0.817	0.875	0.934	0.500	-	0.930	0.988
Lights	231	112	33	6	-	382	35	197	79	20	-	331	34	390	21	4	-	449	181	376	238	18	-	813	1975
% Lights	98.7	97.4	100.0	100.0	-	98.5	97.2	99.5	98.8	100.0	-	99.1	97.1	99.5	100.0	100.0	-	99.3	98.9	99.5	99.6	100.0	-	99.4	99.1
Other Vehicles	3	3	0	0	-	6	1	1	1	0	-	3	1	2	0	0	-	3	2	2	1	0	-	5	17
% Other Vehicles	1.3	2.6	0.0	0.0	-	1.5	2.8	0.5	1.3	0.0	-	0.9	2.9	0.5	0.0	0.0	-	0.7	1.1	0.5	0.4	0.0	-	0.6	0.9
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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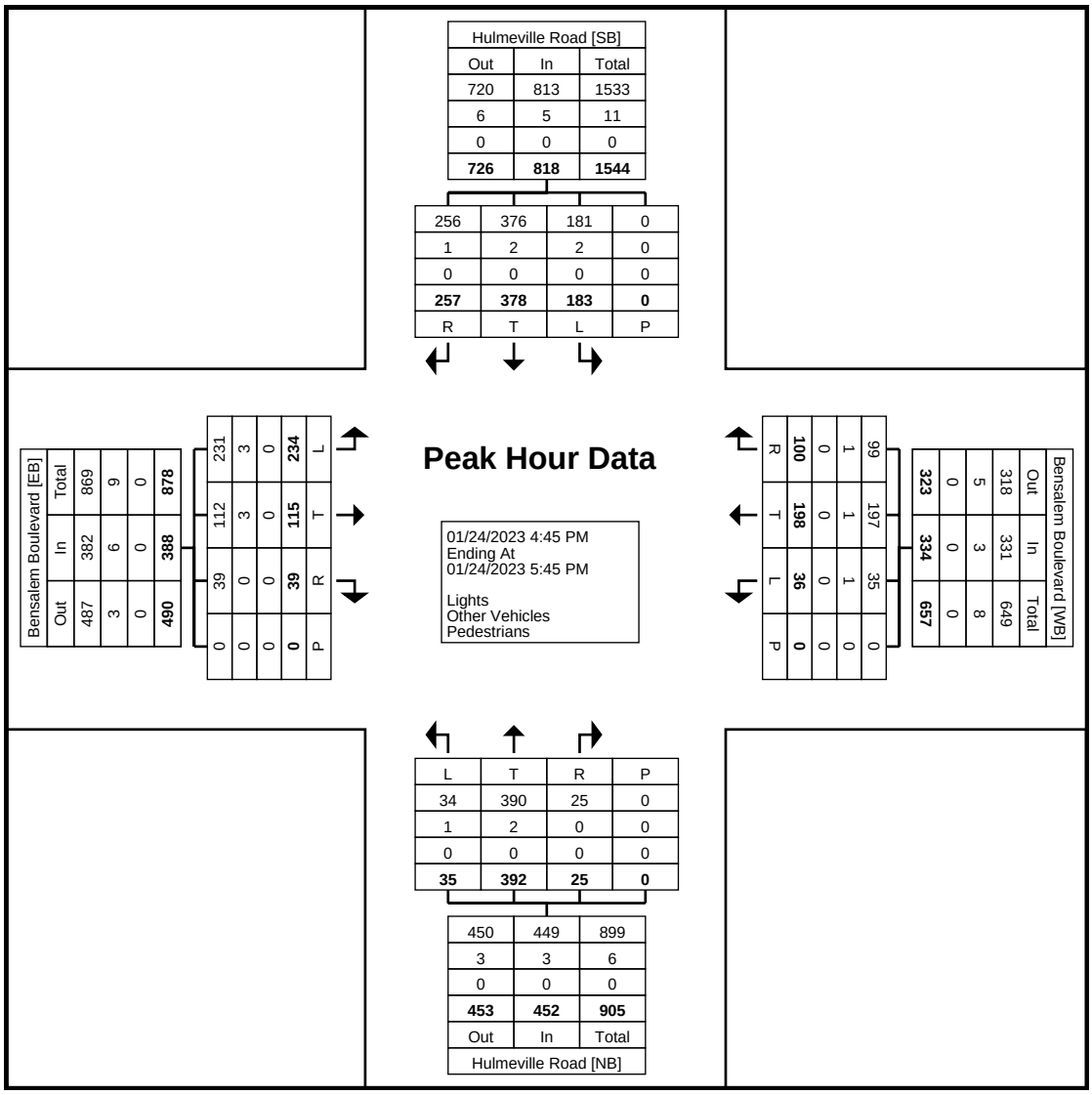

Turning Movement Peak Hour Data Plot (4:45 PM)

APPENDIX D

Volume Development Spreadsheets & Trip Assignment Data

TPD# SUPE.00001
2/18/2023
Traffic Volumes Worksheet

Intersection:	**Trenton Road (SR 2018) & Main Street (SR 2027)**									
Synchro Node:	**1**	**Adjacent intersections:**	**West**	**0**	**East**	**0**	**North**	**0**	**South**	**0**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2022 Existing Counts	**1**	**0**	**0**	**18**	**4**	**60**	**0**	**380**	**22**	**30**	**275**	**3**	**793**
Balancing													0
Existing Volumes (Balanced)	**1**	**0**	**0**	**18**	**4**	**60**	**0**	**380**	**22**	**30**	**275**	**3**	**793**
Base growth (BPR: 0.22% compounded for 5 yrs)	0	0	0	0	0	1	0	4	0	0	3	0	8
2027 Base Volumes	**1**	**0**	**0**	**18**	**4**	**61**	**0**	**384**	**22**	**30**	**278**	**3**	**801**

ENTER =	**22**	
EXIT =	**67**	

Trip Assignment % - New Enter						6.0%		50.0%	2.0%	1.0%			
Trip Assignment % - New Exit				2.0%		1.0%				6.0%	50.0%		
New Trips				1		2		11	1	4	34		**53**
2027 Projected Volumes	**1**	**0**	**0**	**19**	**4**	**63**	**0**	**395**	**23**	**34**	**312**	**3**	**854**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2022 Existing Counts	**0**	**0**	**3**	**12**	**6**	**64**	**2**	**473**	**13**	**50**	**377**	**4**	**1004**
Balancing													0
Existing Volumes (Balanced)	**0**	**0**	**3**	**12**	**6**	**64**	**2**	**473**	**13**	**50**	**377**	**4**	**1004**
Base growth (BPR: 0.22% compounded for 5 yrs)	0	0	0	0	0	1	0	5	0	1	4	0	11
2027 Base Volumes	**0**	**0**	**3**	**12**	**6**	**65**	**2**	**478**	**13**	**51**	**381**	**4**	**1015**

ENTER =	**64**	
EXIT =	**40**	

Trip Assignment % - New Enter						6.0%		50.0%	2.0%	1.0%			
Trip Assignment % - New Exit				2.0%		1.0%				6.0%	50.0%		
New Trips				1		4		32	1	3	20		**61**
2027 Projected Volumes	**0**	**0**	**3**	**13**	**6**	**69**	**2**	**510**	**14**	**54**	**401**	**4**	**1076**

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Traffic Volumes Worksheet

Intersection:	**Trenton Road (SR 2018) & Herbert Hoover ES Driveway/Willow Avenue**									
Synchro Node:	**2**	**Adjacent intersections:**	**West**	**0**	**East**	**0**	**North**	**0**	**South**	**0**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2022 Existing Counts	**7**	**28**	**4**				**1**	**344**	**74**	**114**	**308**	**17**	**897**
Balancing													0
Existing Volumes (Balanced)	**7**	**28**	**4**				**1**	**344**	**74**	**114**	**308**	**17**	**897**
Base growth (BPR: 0.22% compounded for 5 yrs)	0		0				0	4			3	0	7
2027 Base Volumes	**7**	**28**	**4**				**1**	**348**	**74**	**114**	**311**	**17**	**904**
ENTER =	**22**												
EXIT =	**67**												
Trip Assignment % - New Enter											42.0%		
Trip Assignment % - New Exit								42.0%					
New Trips								28			9		**37**
2027 Projected Volumes	**7**	**28**	**4**				**1**	**376**	**74**	**114**	**320**	**17**	**941**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2022 Existing Counts	**6**	**4**	**2**				**7**	**506**	**19**	**24**	**420**	**33**	**1021**
Balancing													0
Existing Volumes (Balanced)	**6**	**4**	**2**				**7**	**506**	**19**	**24**	**420**	**33**	**1021**
Base growth (BPR: 0.22% compounded for 5 yrs)	0		0				0	6			5	0	11
2027 Base Volumes	**6**	**4**	**2**				**7**	**512**	**19**	**24**	**425**	**33**	**1032**
ENTER =	**64**												
EXIT =	**40**												
Trip Assignment % - New Enter											42.0%		
Trip Assignment % - New Exit								42.0%					
New Trips								17			27		**44**
2027 Projected Volumes	**6**	**4**	**2**				**7**	**529**	**19**	**24**	**452**	**33**	**1076**

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Traffic Volumes Worksheet

Intersection:	**Trenton Rd (SR 2018)/Hulmeville Rd (SR 0513) & Bellevue Ave (SR 0513)/Hulmeville Ave**									
Synchro Node:	**3**	**Adjacent intersections:**	**West**	**0**	**East**	**0**	**North**	**0**	**South**	**0**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2022 Existing Counts	**40**	**76**	**243**	**15**	**102**	**7**	**363**	**344**	**26**	**1**	**233**	**52**	**1502**
Balancing													0
Existing Volumes (Balanced)	**40**	**76**	**243**	**15**	**102**	**7**	**363**	**344**	**26**	**1**	**233**	**52**	**1502**
Base growth (BPR: 0.22% compounded for 5 yrs)	0	1	3	0	1	0	4	4	0	0	3	1	17
2027 Base Volumes	**40**	**77**	**246**	**15**	**103**	**7**	**367**	**348**	**26**	**1**	**236**	**53**	**1519**

ENTER =	**22**	
EXIT =	**67**	

Trip Assignment % - New Enter	17.0%							35.0%					
Trip Assignment % - New Exit											35.0%	17.0%	
New Trips	4							8			24	11	**47**
2027 Projected Volumes	**44**	**77**	**246**	**15**	**103**	**7**	**367**	**356**	**26**	**1**	**260**	**64**	**1566**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2022 Existing Counts	**58**	**132**	**472**	**30**	**153**	**1**	**291**	**430**	**36**	**0**	**317**	**65**	**1985**
Balancing													0
Existing Volumes (Balanced)	**58**	**132**	**472**	**30**	**153**	**1**	**291**	**430**	**36**	**0**	**317**	**65**	**1985**
Base growth (BPR: 0.22% compounded for 5 yrs)	1	1	5	0	2	0	3	5	0	0	3	1	21
2027 Base Volumes	**59**	**133**	**477**	**30**	**155**	**1**	**294**	**435**	**36**	**0**	**320**	**66**	**2006**

ENTER =	**64**	
EXIT =	**40**	

Trip Assignment % - New Enter	17.0%							35.0%					
Trip Assignment % - New Exit											35.0%	17.0%	
New Trips	11							22			14	7	**54**
2027 Projected Volumes	**70**	**133**	**477**	**30**	**155**	**1**	**294**	**457**	**36**	**0**	**334**	**73**	**2060**

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Traffic Volumes Worksheet

Intersection:	**Bellevue Avenue (SR 0513)/Neshaminy Street (SR 2027) & Bellevue Avenue (SR 0513)**									
Synchro Node:	**4**	**Adjacent intersections:**	**West**	**0**	**East**	**0**	**North**	**0**	**South**	**0**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2022 Existing Counts	**2**		**100**				**158**	**373**			**257**	**1**	**891**
Balancing													0
Existing Volumes (Balanced)	**2**		**100**				**158**	**373**			**257**	**1**	**891**
Base growth (BPR: 0.22% compounded for 5 yrs)	0		1				2	4			3	0	10
2027 Base Volumes	**2**		**101**				**160**	**377**			**260**	**1**	**901**
ENTER =	**22**		
EXIT =	**67**		
Trip Assignment % - New Enter			5.0%								12.0%		
Trip Assignment % - New Exit							5.0%	12.0%					
New Trips			1				3	8			3		**15**
2027 Projected Volumes	**2**		**102**				**163**	**385**			**263**	**1**	**916**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2022 Existing Counts	**1**		**158**				**216**	**317**			**514**	**1**	**1207**
Balancing													0
Existing Volumes (Balanced)	**1**		**158**				**216**	**317**			**514**	**1**	**1207**
Base growth (BPR: 0.22% compounded for 5 yrs)	0		2				2	3			6	0	13
2027 Base Volumes	**1**		**160**				**218**	**320**			**520**	**1**	**1220**
ENTER =	**64**		
EXIT =	**40**		
Trip Assignment % - New Enter			5.0%								12.0%		
Trip Assignment % - New Exit							5.0%	12.0%					
New Trips			3				2	5			8		**18**
2027 Projected Volumes	**1**		**163**				**220**	**325**			**528**	**1**	**1238**

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Traffic Volumes Worksheet

Intersection:	**Main Street (SR 2027) & Pennsylvania Avenue**											
Synchro Node:	**5**	**Adjacent intersections:**	**West**	**0**	**East**	**0**	**North**	**0**	**South**	**0**		

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2022 Existing Counts	**4**	**133**			**174**	**1**				**1**		**11**	**324**
Balancing													0
Existing Volumes (Balanced)	**4**	**133**			**174**	**1**				**1**		**11**	**324**
Base growth (BPR: 0.22% compounded for 5 yrs)		1			2								3
2027 Base Volumes	**4**	**134**			**176**	**1**				**1**		**11**	**327**

ENTER =	**22**	
EXIT =	**67**	

Trip Assignment % - New Enter	3.0%				6.0%								
Trip Assignment % - New Exit		6.0%										3.0%	
New Trips	1	4			1							2	**8**
2027 Projected Volumes	**5**	**138**			**177**	**1**				**1**		**13**	**335**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2022 Existing Counts	**16**	**202**			**245**	**0**				**1**		**9**	**473**
Balancing													0
Existing Volumes (Balanced)	**16**	**202**			**245**	**0**				**1**		**9**	**473**
Base growth (BPR: 0.22% compounded for 5 yrs)		2			3								5
2027 Base Volumes	**16**	**204**			**248**	**0**				**1**		**9**	**478**

ENTER =	**64**	
EXIT =	**40**	

Trip Assignment % - New Enter	3.0%				6.0%								
Trip Assignment % - New Exit		6.0%										3.0%	
New Trips	2	2			4							1	**9**
2027 Projected Volumes	**18**	**206**			**252**	**0**				**1**		**10**	**487**

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Traffic Volumes Worksheet

Intersection:	**Trenton Road (SR 2018) & Herbert Hoover ES Driveway**									
Synchro Node:	**6**	**Adjacent intersections:**	**West**	**0**	**East**	**0**	**North**	**0**	**South**	**0**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2023 Existing Counts				**46**		**137**		**292**			**346**		**821**
Balancing													0
Existing Volumes (Balanced)				**46**		**137**		**292**			**346**		**821**
Base growth (BPR: 0.22% compounded for 5 yrs)								3			4		7
2027 Base Volumes				**46**		**137**		**295**			**350**		**828**

ENTER =	**22**	
EXIT =	**67**	

Trip Assignment % - New Enter											42.0%		
Trip Assignment % - New Exit								42.0%					
New Trips								28			9		**37**
2027 Projected Volumes				**46**		**137**		**323**			**359**		**865**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2023 Existing Counts				**77**		**142**		**404**			**360**		**983**
Balancing													0
Existing Volumes (Balanced)				**77**		**142**		**404**			**360**		**983**
Base growth (BPR: 0.22% compounded for 5 yrs)								4			4		8
2027 Base Volumes				**77**		**142**		**408**			**364**		**991**

ENTER =	**64**	
EXIT =	**40**	

Trip Assignment % - New Enter											42.0%		
Trip Assignment % - New Exit								42.0%					
New Trips								17			27		**44**
2027 Projected Volumes				**77**		**142**		**425**			**391**		**1035**

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2/18/2023
Traffic Volumes Worksheet

Intersection:	**Trenton Road (SR 2018) & Durham Road**											
Synchro Node:	**7**	**Adjacent intersections:**	**West**	**0**	**East**	**0**	**North**	**0**	**South**	**0**		

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2023 Existing Counts	**81**	**155**	**11**	**64**	**252**	**68**	**39**	**412**	**66**	**42**	**240**	**160**	**1590**
Balancing													0
Existing Volumes (Balanced)	**81**	**155**	**11**	**64**	**252**	**68**	**39**	**412**	**66**	**42**	**240**	**160**	**1590**
Base growth (BPR: 0.22% compounded for 5 yrs)	1	2	0	1	3	1	0	5	1	0	3	2	19
2027 Base Volumes	**82**	**157**	**11**	**65**	**255**	**69**	**39**	**417**	**67**	**42**	**243**	**162**	**1609**
ENTER =	**22**												
EXIT =	**67**												
Trip Assignment % - New Enter			12.0%	12.0%							18.0%		
Trip Assignment % - New Exit							12.0%	18.0%	12.0%				
New Trips			2	3			8	12	8		4		**37**
2027 Projected Volumes	**82**	**157**	**13**	**68**	**255**	**69**	**47**	**429**	**75**	**42**	**247**	**162**	**1646**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2023 Existing Counts	**116**	**263**	**18**	**103**	**195**	**58**	**35**	**412**	**94**	**65**	**421**	**98**	**1878**
Balancing													0
Existing Volumes (Balanced)	**116**	**263**	**18**	**103**	**195**	**58**	**35**	**412**	**94**	**65**	**421**	**98**	**1878**
Base growth (BPR: 0.22% compounded for 5 yrs)	1	3	0	1	2	1	0	5	1	1	5	1	21
2027 Base Volumes	**117**	**266**	**18**	**104**	**197**	**59**	**35**	**417**	**95**	**66**	**426**	**99**	**1899**
ENTER =	**64**												
EXIT =	**40**												
Trip Assignment % - New Enter			12.0%	12.0%							18.0%		
Trip Assignment % - New Exit							12.0%	18.0%	12.0%				
New Trips			8	8			5	7	5		11		**44**
2027 Projected Volumes	**117**	**266**	**26**	**112**	**197**	**59**	**40**	**424**	**100**	**66**	**437**	**99**	**1943**

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2/18/2023
Traffic Volumes Worksheet

Intersection:	**Hulmeville Road (SR 0513) & Bensalem Boulevard**											
Synchro Node:	**8**	**Adjacent intersections:**	**West**	**0**	**East**	**0**	**North**	**0**	**South**	**0**		

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2023 Existing Counts	**230**	**150**	**30**	**24**	**100**	**185**	**26**	**310**	**18**	**82**	**243**	**117**	**1515**
Balancing													0
Existing Volumes (Balanced)	**230**	**150**	**30**	**24**	**100**	**185**	**26**	**310**	**18**	**82**	**243**	**117**	**1515**
Base growth (BPR: 0.22% compounded for 5 yrs)	3	2	0	0	1	2	0	3	0	1	3	1	16
2027 Base Volumes	**233**	**152**	**30**	**24**	**101**	**187**	**26**	**313**	**18**	**83**	**246**	**118**	**1531**

ENTER =	**22**	
EXIT =	**67**	

Trip Assignment % - New Enter	12.0%					10.0%		13.0%					
Trip Assignment % - New Exit										10.0%	13.0%	12.0%	
New Trips	3					2		3		7	9	8	**32**
2027 Projected Volumes	**236**	**152**	**30**	**24**	**101**	**189**	**26**	**316**	**18**	**90**	**255**	**126**	**1563**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2023 Existing Counts	**234**	**115**	**39**	**36**	**198**	**100**	**35**	**392**	**25**	**183**	**378**	**257**	**1992**
Balancing													0
Existing Volumes (Balanced)	**234**	**115**	**39**	**36**	**198**	**100**	**35**	**392**	**25**	**183**	**378**	**257**	**1992**
Base growth (BPR: 0.22% compounded for 5 yrs)	3	1	0	0	2	1	0	4	0	2	4	3	20
2027 Base Volumes	**237**	**116**	**39**	**36**	**200**	**101**	**35**	**396**	**25**	**185**	**382**	**260**	**2012**

ENTER =	**64**	
EXIT =	**40**	

Trip Assignment % - New Enter	12.0%					10.0%		13.0%					
Trip Assignment % - New Exit										10.0%	13.0%	12.0%	
New Trips	8					6		8		4	5	5	**36**
2027 Projected Volumes	**245**	**116**	**39**	**36**	**200**	**107**	**35**	**404**	**25**	**189**	**387**	**265**	**2048**

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2/18/2023
Traffic Volumes Worksheet

Intersection:	**Pennsylvania Avenue & Proposed Single-Family Driveways (combined)**											
Synchro Node:	**9**	**Adjacent intersections:**	**West**	**0**	**East**	**0**	**North**	**0**	**South**	**0**		

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2022 Existing Counts													**0**
Balancing								5			12		17
Existing Volumes (Balanced)								**5**			**12**		**17**
Base growth (BPR: 0.22% compounded for 5 yrs)													0
2027 Base Volumes								**5**			**12**		**17**

ENTER =	**22**	
EXIT =	**67**	

Trip Assignment % - New Enter							3.0%						
Trip Assignment % - New Exit			3.0%										
New Trips			2				1						**3**
2027 Projected Volumes	**0**		**2**				**1**	**5**			**12**	**0**	**20**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2022 Existing Counts													**0**
Balancing								16			10		26
Existing Volumes (Balanced)								**16**			**10**		**26**
Base growth (BPR: 0.22% compounded for 5 yrs)													0
2027 Base Volumes								**16**			**10**		**26**

ENTER =	**64**	
EXIT =	**40**	

Trip Assignment % - New Enter							3.0%						
Trip Assignment % - New Exit			3.0%										
New Trips			1				2						**3**
2027 Projected Volumes	**0**		**1**				**2**	**16**			**10**	**0**	**29**

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2/18/2023
Traffic Volumes Worksheet

Intersection:	**Trenton Road (SR 2018) & Proposed Driveway**									
Synchro Node:	**10**	**Adjacent intersections:**	**West**	**0**	**East**	**0**	**North**	**0**	**South**	**0**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2022 Existing Counts													**0**
Balancing								419			312		731
Existing Volumes (Balanced)								**419**			**312**		**731**
Base growth (BPR: 0.22% compounded for 5 yrs)								5			3		8
2027 Base Volumes								**424**			**315**		**739**

ENTER =	**22**	
EXIT =	**67**	

Trip Assignment % - New Enter									56.0%	41.0%	1.0%		
Trip Assignment % - New Exit				56.0%		41.0%		1.0%					
New Trips				38		27		1	12	9			**87**
2027 Projected Volumes				**38**		**27**		**425**	**12**	**9**	**315**		**826**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2022 Existing Counts													**0**
Balancing								532			422		954
Existing Volumes (Balanced)								**532**			**422**		**954**
Base growth (BPR: 0.22% compounded for 5 yrs)								6			5		11
2027 Base Volumes								**538**			**427**		**965**

ENTER =	**64**	
EXIT =	**40**	

Trip Assignment % - New Enter									56.0%	41.0%	1.0%		
Trip Assignment % - New Exit				56.0%		41.0%		1.0%					
New Trips				22		17			36	26	1		**102**
2027 Projected Volumes				**22**		**17**		**538**	**36**	**26**	**428**		**1067**

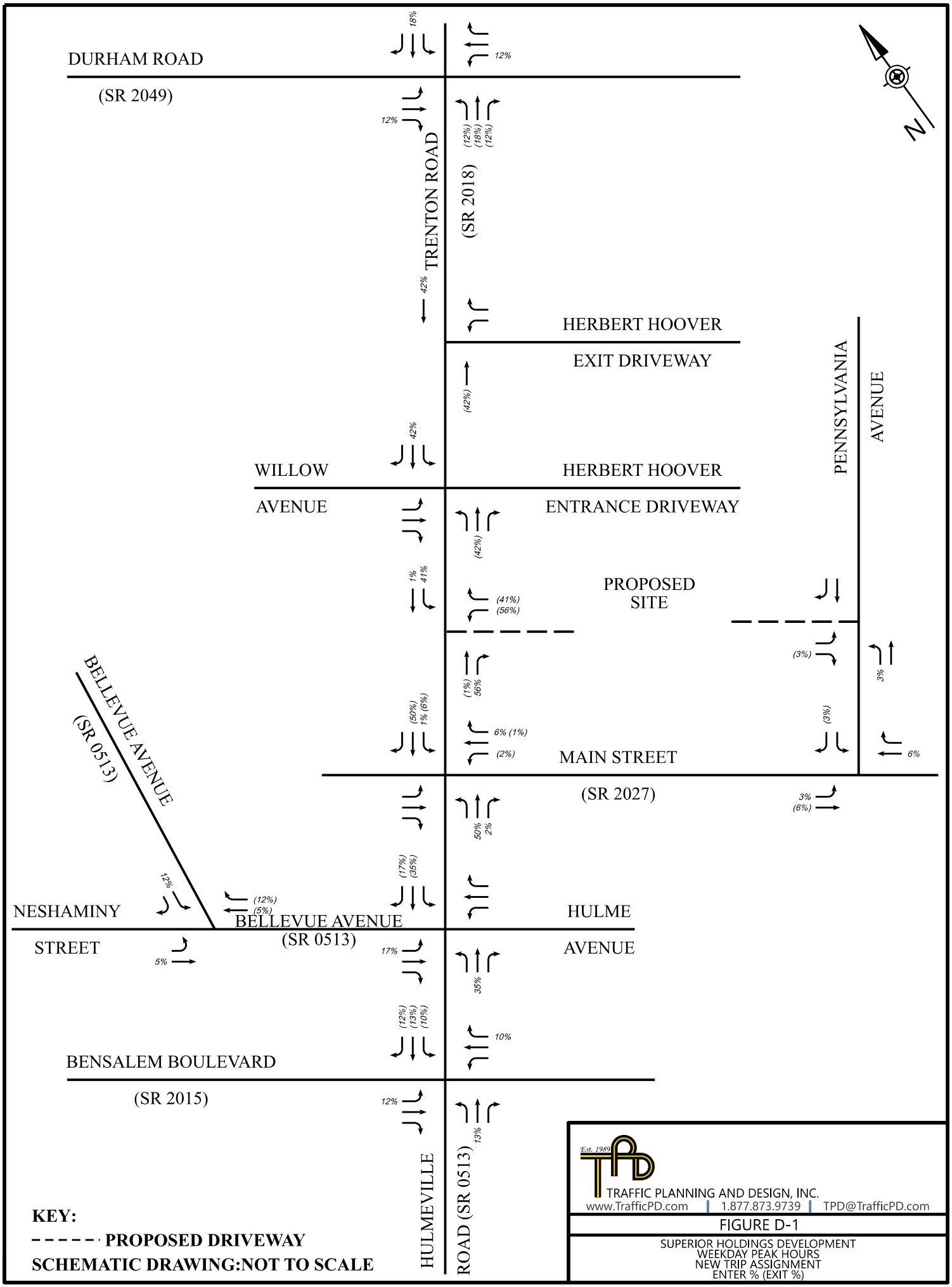
DURHAM ROAD
(SR 2049)
TRENTON ROAD
(SR 2018)
HERBERT HOOVER
EXIT DRIVEWAY
HERBERT HOOVER
ENTRANCE DRIVEWAY
WILLOW
AVENUE
PENNSYLVANIA
AVENUE
PROPOSED
SITE
BELLEVUE AVENUE
(SR 0513)
MAIN STREET
(SR 2027)
NESHAMINY
STREET
BELLEVUE AVENUE
(SR 0513)
HULME
AVENUE
BENSALEM BOULEVARD
(SR 2015)
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FIGURE D-1
SUPERIOR HOLDINGS DEVELOPMENT
WEEKDAY PEAK HOURS
NEW TRIP ASSIGNMENT
ENTER % (EXIT %)

APPENDIX E

Critical/Follow-Up Gap Data

CRITICAL HEADWAY CALCULATIONS FOR TWSC INTERSECTION WITHIN SUBURBAN LAND USE CONTEXT
BASED ON PENNSYLVANIA DEFAULT VALUES FROM CHAPTER 10 OF PENNDOT PUBLICATION 46

$t_{c,x} = t_{c,\,base} + t_{c,HV} * P_{HV} + t_{c,G} * G - t_{3,LT}$

where:

$t_{c,x}$ = critical headway for movement x (s)
$t_{c,base}$ = base crtitcal headway from Chapter 10 of PennDOT Publication 46
$t_{c,HV}$ = adjustment factor for heavy vehciles (1.0 for major streets with one lane in each direction; 2.0 for major streets with two or three lanes in each direction) (s)
P_{HV} = proportion of heavy vehciles for movement (expressed as a decimal; e.g., P_{HV}=0.02 for 2% heavy vehciles)
$t_{c,G}$ = adjustment factor for grade (0.1 for Movement 9 and 12; 0.2 for Movements 7,8,10, and 11) (s)
G = percent grade (expressed as an integer; e.g., G= -2 for a 2% downhill grade)
$t_{c,base}$ = adjustment factor for intersction geometry (0.7 for minor street left-turn movement at three-leg intersections; 0.0 otherwise) (s)

LEFT TURN FROM MAJOR ROADWAY - TWO LANES ($t_{c,\,base}$ = 4.3)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
1	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
2	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
4	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
5	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
6	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
7	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
8	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
9	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
10	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4

LEFT TURN FROM MINOR ROADWAY - TWO LANES - 4-LEG INTERSECTION ($t_{c,\,base}$ = 7.1)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	7.1	6.9	7.3	6.7	7.5	6.5	7.7	6.3	7.9	6.1	8.1	5.9	8.3	5.7	8.5	5.5	8.7	5.3	8.9	5.1	9.1
1	7.1	6.9	7.3	6.7	7.5	6.5	7.7	6.3	7.9	6.1	8.1	5.9	8.3	5.7	8.5	5.5	8.7	5.3	8.9	5.1	9.1
2	7.1	6.9	7.3	6.7	7.5	6.5	7.7	6.3	7.9	6.1	8.1	5.9	8.3	5.7	8.5	5.5	8.7	5.3	8.9	5.1	9.1
3	7.1	6.9	7.3	6.7	7.5	6.5	7.7	6.3	7.9	6.1	8.1	5.9	8.3	5.7	8.5	5.5	8.7	5.3	8.9	5.1	9.1
4	7.1	6.9	7.3	6.7	7.5	6.5	7.7	6.3	7.9	6.1	8.1	5.9	8.3	5.7	8.5	5.5	8.7	5.3	8.9	5.1	9.1
5	7.2	7.0	7.4	6.8	7.6	6.6	7.8	6.4	8.0	6.2	8.2	6.0	8.4	5.8	8.6	5.6	8.8	5.4	9.0	5.2	9.2
6	7.2	7.0	7.4	6.8	7.6	6.6	7.8	6.4	8.0	6.2	8.2	6.0	8.4	5.8	8.6	5.6	8.8	5.4	9.0	5.2	9.2
7	7.2	7.0	7.4	6.8	7.6	6.6	7.8	6.4	8.0	6.2	8.2	6.0	8.4	5.8	8.6	5.6	8.8	5.4	9.0	5.2	9.2
8	7.2	7.0	7.4	6.8	7.6	6.6	7.8	6.4	8.0	6.2	8.2	6.0	8.4	5.8	8.6	5.6	8.8	5.4	9.0	5.2	9.2
9	7.2	7.0	7.4	6.8	7.6	6.6	7.8	6.4	8.0	6.2	8.2	6.0	8.4	5.8	8.6	5.6	8.8	5.4	9.0	5.2	9.2
10	7.2	7.0	7.4	6.8	7.6	6.6	7.8	6.4	8.0	6.2	8.2	6.0	8.4	5.8	8.6	5.6	8.8	5.4	9.0	5.2	9.2

THROUGH TRAFFIC ON MINOR ROADWAY - TWO LANES ($t_{c,\,base}$ = 6.5)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
1	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
2	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
3	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
4	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
5	6.6	6.4	6.8	6.2	7.0	6.0	7.2	5.8	7.4	5.6	7.6	5.4	7.8	5.2	8.0	5.0	8.2	4.8	8.4	4.6	8.6
6	6.6	6.4	6.8	6.2	7.0	6.0	7.2	5.8	7.4	5.6	7.6	5.4	7.8	5.2	8.0	5.0	8.2	4.8	8.4	4.6	8.6
7	6.6	6.4	6.8	6.2	7.0	6.0	7.2	5.8	7.4	5.6	7.6	5.4	7.8	5.2	8.0	5.0	8.2	4.8	8.4	4.6	8.6
8	6.6	6.4	6.8	6.2	7.0	6.0	7.2	5.8	7.4	5.6	7.6	5.4	7.8	5.2	8.0	5.0	8.2	4.8	8.4	4.6	8.6
9	6.6	6.4	6.8	6.2	7.0	6.0	7.2	5.8	7.4	5.6	7.6	5.4	7.8	5.2	8.0	5.0	8.2	4.8	8.4	4.6	8.6
10	6.6	6.4	6.8	6.2	7.0	6.0	7.2	5.8	7.4	5.6	7.6	5.4	7.8	5.2	8.0	5.0	8.2	4.8	8.4	4.6	8.6

RIGHT TURN FROM MINOR ROADWAY - TWO LANES ($t_{c,\,base}$ = 6.2)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
1	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
2	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
3	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
4	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
5	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
6	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
7	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
8	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
9	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
10	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3

CRITICAL HEADWAY CALCULATIONS FOR TWSC INTERSECTION WITHIN SUBURBAN LAND USE CONTEXT
BASED ON PENNSYLVANIA DEFAULT VALUES FROM CHAPTER 10 OF PENNDOT PUBLICATION 46

$t_{c,x} = t_{c,\,base} + t_{c,HV} * P_{HV} + t_{c,G} * G - t_{3,LT}$

where:

$t_{c,x}$ = critical headway for movement x (s)
$t_{c,base}$ = base crtitcal headway from Chapter 10 of PennDOT Publication 46
$t_{c,HV}$ = adjustment factor for heavy vehciles (1.0 for major streets with one lane in each direction; 2.0 for major streets with two or three lanes in each direction) (s)
P_{HV} = proportion of heavy vehciles for movement (expressed as a decimal; e.g., P_{HV}=0.02 for 2% heavy vehciles)
$t_{c,G}$ = adjustment factor for grade (0.1 for Movement 9 and 12; 0.2 for Movements 7,8,10, and 11) (s)
G = percent grade (expressed as an integer; e.g., G= -2 for a 2% downhill grade)
$t_{c,base}$ = adjustment factor for intersction geometry (0.7 for minor street left-turn movement at three-leg intersections; 0.0 otherwise) (s)

LEFT TURN FROM MAJOR ROADWAY - TWO LANES ($t_{c,\,base}$ = 4.3)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
1	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
2	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
4	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
5	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
6	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
7	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
8	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
9	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
10	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4

LEFT TURN FROM MINOR ROADWAY - TWO LANES - 3-LEG INTERSECTION ($t_{c,\,base}$ = 7.1)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	6.4	6.2	6.6	6.0	6.8	5.8	7.0	5.6	7.2	5.4	7.4	5.2	7.6	5.0	7.8	4.8	8.0	4.6	8.2	4.4	8.4
1	6.4	6.2	6.6	6.0	6.8	5.8	7.0	5.6	7.2	5.4	7.4	5.2	7.6	5.0	7.8	4.8	8.0	4.6	8.2	4.4	8.4
2	6.4	6.2	6.6	6.0	6.8	5.8	7.0	5.6	7.2	5.4	7.4	5.2	7.6	5.0	7.8	4.8	8.0	4.6	8.2	4.4	8.4
3	6.4	6.2	6.6	6.0	6.8	5.8	7.0	5.6	7.2	5.4	7.4	5.2	7.6	5.0	7.8	4.8	8.0	4.6	8.2	4.4	8.4
4	6.4	6.2	6.6	6.0	6.8	5.8	7.0	5.6	7.2	5.4	7.4	5.2	7.6	5.0	7.8	4.8	8.0	4.6	8.2	4.4	8.4
5	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
6	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
7	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
8	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
9	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
10	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5

RIGHT TURN FROM MINOR ROADWAY - TWO LANES ($t_{c,\,base}$ = 6.2)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
1	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
2	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
3	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
4	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
5	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
6	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
7	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
8	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
9	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
10	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3

FOLLOW-UP HEADWAY CALCULATIONS FOR TWSC INTERSECTION WITHIN SUBURBAN LAND USE CONTEXT
BASED ON PENNSYLVANIA DEFAULT VALUES FROM CHAPTER 10 OF PENNDOT PUBLICATION 46

$t_{f,x} = t_{f,\,base} + t_{f,HV} * P_{HV}$

where:

$t_{f,x}$ = follow-up headway for movement x (s)
$t_{f,base}$ = base follow-up headway from Chapter 10 of PennDOT Publication 46
$t_{f,HV}$ = adjustment factor for heavy vehciles (0.9 for major streets with one lane in each direction; 1.0 for major streets with two or three lanes in each direction) (s)
P_{HV} = proportion of heavy vehciles for movement (expressed as a decimal; e.g., P_{HV}=0.02 for 2% heavy vehciles)

LEFT TURN FROM MAJOR ROADWAY - TWO LANES ($t_{f,\,base}$ = 3.0)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
1	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
3	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
7	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
8	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
9	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
10	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1

LEFT TURN FROM MINOR ROADWAY - TWO LANES ($t_{f,\,base}$ = 3.0)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
1	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
3	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
7	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
8	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
9	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
10	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1

THROUGH TRAFFIC ON MINOR ROADWAY - TWO LANES ($t_{f,\,base}$ = 4.0)

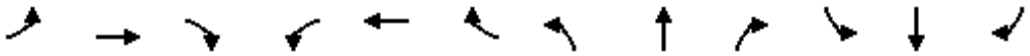
GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
1	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
2	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
3	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
4	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
6	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
7	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
8	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
9	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
10	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1

RIGHT TURN FROM MINOR ROADWAY - TWO LANES ($t_{f,\,base}$ = 3.1)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
2	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
3	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
4	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
5	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
6	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
7	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
8	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
9	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
10	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2

APPENDIX F
Capacity Analyses

2022 Existing Conditions



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	0	18	4	60	0	380	22	30	275	3
Future Volume (vph)	1	0	0	18	4	60	0	380	22	30	275	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	13	12	12	10	12	12	11	12	12	11	12
Grade (%)		2%			-2%			-2%			2%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.901			0.993			0.999	
Flt Protected		0.950			0.989						0.995	
Satd. Flow (prot)	0	1749	0	0	1405	0	0	1689	0	0	1647	0
Flt Permitted		0.950			0.989						0.995	
Satd. Flow (perm)	0	1749	0	0	1405	0	0	1689	0	0	1647	0
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		256			1808			380			1439	
Travel Time (s)		7.0			49.3			6.5			24.5	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	11%	0%	7%	0%	3%	9%	10%	3%	33%
Adj. Flow (vph)	1	0	0	20	4	66	0	418	24	33	302	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1	0	0	90	0	0	442	0	0	338	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

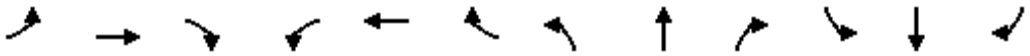
Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	0	0	18	4	60	0	380	22	30	275	3
Future Vol, veh/h	1	0	0	18	4	60	0	380	22	30	275	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-2	-	-	-2	-	-	2	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	11	0	7	0	3	9	10	3	33
Mvmt Flow	1	0	0	20	4	66	0	418	24	33	302	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	835	812	304	800	801	430	305	0	0	442	0	0
Stage 1	370	370	-	430	430	-	-	-	-	-	-	-
Stage 2	465	442	-	370	371	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.9	6.4	6.81	6.1	6.07	4.3	-	-	4.4	-	-
Critical Hdwy Stg 1	6.5	5.9	-	5.81	5.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.9	-	5.81	5.1	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.1	3.1	4	3.2	3	-	-	3.1	-	-
Pot Cap-1 Maneuver	292	288	769	354	350	656	944	-	-	813	-	-
Stage 1	715	599	-	694	616	-	-	-	-	-	-	-
Stage 2	625	552	-	746	649	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	250	274	769	341	333	656	944	-	-	813	-	-
Mov Cap-2 Maneuver	250	274	-	341	333	-	-	-	-	-	-	-
Stage 1	715	570	-	694	616	-	-	-	-	-	-	-
Stage 2	558	552	-	709	617	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.5	13.3	0	0.9
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	944	-	-	250	525	813	-	-
HCM Lane V/C Ratio	-	-	-	0.004	0.172	0.041	-	-
HCM Control Delay (s)	0	-	-	19.5	13.3	9.6	0	-
HCM Lane LOS	A	-	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.6	0.1	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	28	4	0	0	0	1	344	74	114	308	17
Future Volume (vph)	7	28	4	0	0	0	1	344	74	114	308	17
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	16	12	12	11	12	12	11	12
Grade (%)		1%			2%			0%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.985						0.976			0.995	
Flt Protected		0.991									0.987	
Satd. Flow (prot)	0	1587	0	0	0	0	0	1629	0	0	1657	0
Flt Permitted		0.991									0.987	
Satd. Flow (perm)	0	1587	0	0	0	0	0	1629	0	0	1657	0
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		357			346			1102			447	
Travel Time (s)		9.7			9.4			18.8			7.6	
Confl. Peds. (#/hr)										11		11
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	29%	7%	0%	0%	0%	0%	0%	3%	10%	4%	3%	0%
Adj. Flow (vph)	8	32	5	0	0	0	1	395	85	131	354	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	45	0	0	0	0	0	481	0	0	505	0
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	7	28	4	0	0	0	1	344	74	114	308	17
Future Vol, veh/h	7	28	4	0	0	0	1	344	74	114	308	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	11	0	11
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	2	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	29	7	0	0	0	0	0	3	10	4	3	0
Mvmt Flow	8	32	5	0	0	0	1	395	85	131	354	20

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	1077	1130	375			385	0	0	491	0	0
Stage 1	637	637	-			-	-	-	-	-	-
Stage 2	440	493	-			-	-	-	-	-	-
Critical Hdwy	6.89	6.77	6.3			4.3	-	-	4.3	-	-
Critical Hdwy Stg 1	5.89	5.77	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.89	5.77	-			-	-	-	-	-	-
Follow-up Hdwy	3.3	4.063	3.1			3	-	-	3	-	-
Pot Cap-1 Maneuver	219	187	705			886	-	-	813	-	-
Stage 1	508	448	-			-	-	-	-	-	-
Stage 2	645	524	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	171	0	698			877	-	-	813	-	-
Mov Cap-2 Maneuver	171	0	-			-	-	-	-	-	-
Stage 1	502	0	-			-	-	-	-	-	-
Stage 2	508	0	-			-	-	-	-	-	-

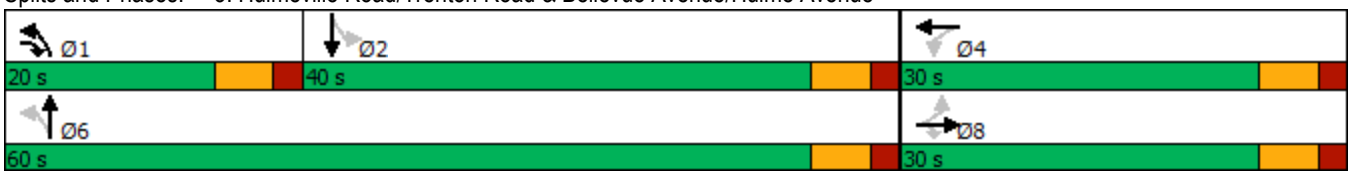
Approach	EB	NB	SB
HCM Control Delay, s	23.8	0	2.7
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	877	-	-	236	813	-	-
HCM Lane V/C Ratio	0.001	-	-	0.19	0.161	-	-
HCM Control Delay (s)	9.1	0	-	23.8	10.3	0	-
HCM Lane LOS	A	A	-	C	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0.7	0.6	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	76	243	15	102	7	363	344	26	1	233	52
Future Volume (vph)	40	76	243	15	102	7	363	344	26	1	233	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	14	15	12	14	12	10	15	12	12	12	12
Storage Length (ft)	0		75	0		0	350		0	0		0
Storage Lanes	0		1	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.992			0.989			0.975	
Flt Protected		0.983			0.994		0.950					
Satd. Flow (prot)	0	1856	1618	0	1777	0	1535	1905	0	0	1684	0
Flt Permitted		0.797			0.946		0.467				0.999	
Satd. Flow (perm)	0	1505	1618	0	1691	0	754	1905	0	0	1682	0
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			270					8				
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		638			194			1368			380	
Travel Time (s)		12.4			3.8			26.6			7.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	1%	4%	0%	8%	0%	4%	3%	0%	100%	3%	8%
Adj. Flow (vph)	44	84	270	17	113	8	403	382	29	1	259	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	128	270	0	138	0	403	411	0	0	318	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		8	1		4		1	6			2	
Permitted Phases	8		8	4	4		6			2		
Detector Phase	8	8	1	4	4		1	6		2	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0		3.0	20.0		20.0	20.0	
Minimum Split (s)	9.0	9.0	9.0	9.0	9.0		9.0	26.0		26.0	26.0	
Total Split (s)	30.0	30.0	20.0	30.0	30.0		20.0	60.0		40.0	40.0	
Total Split (%)	33.3%	33.3%	22.2%	33.3%	33.3%		22.2%	66.7%		44.4%	44.4%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0	-1.0		-1.0		-1.0	-1.0			-1.0	
Total Lost Time (s)		5.0	5.0		5.0		5.0	5.0			5.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Recall Mode	None	None	None	None	None		None	Max		Max	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 77.5	
Natural Cycle: 55	
Control Type: Semi Act-Uncoord	

Splits and Phases: 3: Hulmeville Road/Trenton Road & Bellevue Avenue/Hulme Avenue



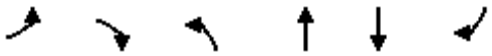
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	76	243	15	102	7	363	344	26	1	233	52
Future Volume (veh/h)	40	76	243	15	102	7	363	344	26	1	233	52
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1758	1857	1814	1800	1755	1800	1744	1828	1800	396	1758	1688
Adj Flow Rate, veh/h	44	84	0	17	113	8	403	382	29	1	259	58
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	1	4	0	8	0	4	3	0	100	3	8
Cap, veh/h	123	154		70	181	12	852	1247	95	49	723	161
Arrive On Green	0.11	0.12	0.00	0.11	0.12	0.11	0.16	0.74	0.73	0.51	0.52	0.51
Sat Flow, veh/h	475	1261	1537	126	1482	99	1661	1678	127	1	1390	310
Grp Volume(v), veh/h	128	0	0	138	0	0	403	0	411	318	0	0
Grp Sat Flow(s),veh/h/ln	1736	0	1537	1707	0	0	1661	0	1805	1701	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.7	0.0	0.0	6.9	0.0	5.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.0	0.0	0.0	5.7	0.0	0.0	6.9	0.0	5.6	8.3	0.0	0.0
Prop In Lane	0.34		1.00	0.12		0.06	1.00		0.07	0.00		0.18
Lane Grp Cap(c), veh/h	253	0		240	0	0	852	0	1341	910	0	0
V/C Ratio(X)	0.51	0.00		0.58	0.00	0.00	0.47	0.00	0.31	0.35	0.00	0.00
Avail Cap(c_a), veh/h	598	0		596	0	0	930	0	1341	910	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	30.9	0.0	0.0	31.1	0.0	0.0	4.1	0.0	3.2	10.6	0.0	0.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	2.2	0.0	0.0	0.4	0.0	0.6	1.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.0	0.0	0.0	4.4	0.0	0.0	2.9	0.0	2.5	5.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.4	0.0	0.0	33.3	0.0	0.0	4.5	0.0	3.8	11.6	0.0	0.0
LnGrp LOS	C	A		C	A	A	A	A	A	B	A	A
Approach Vol, veh/h		128			138			814			318	
Approach Delay, s/veh		32.4			33.3			4.2			11.6	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	16.5	43.5		14.0		60.0		14.0				
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s	14.0	34.0		24.0		54.0		24.0				
Max Q Clear Time (g_c+I1), s	9.4	10.3		7.7		7.6		7.0				
Green Ext Time (p_c), s	1.1	1.1		0.4		1.6		0.3				

Intersection Summary		
HCM 6th Ctrl Delay		11.3
HCM 6th LOS		B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	2	100	158	373	257	1
Future Volume (vph)	2	100	158	373	257	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	10	10	10	10
Grade (%)	-1%			3%	-3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.867					
Flt Protected	0.999			0.985		
Satd. Flow (prot)	1408	0	0	1558	1640	0
Flt Permitted	0.999			0.985		
Satd. Flow (perm)	1408	0	0	1558	1640	0
Link Speed (mph)	35			35	35	
Link Distance (ft)	562			638	742	
Travel Time (s)	10.9			12.4	14.5	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	50%	3%	6%	4%	4%	0%
Adj. Flow (vph)	2	106	168	397	273	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	108	0	0	565	274	0
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

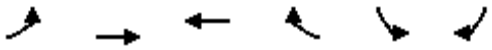
Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	100	158	373	257	1
Future Vol, veh/h	2	100	158	373	257	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-1	-	-	3	-3	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	50	3	6	4	4	0
Mvmt Flow	2	106	168	397	273	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1007	274	274	0	-	0
Stage 1	274	-	-	-	-	-
Stage 2	733	-	-	-	-	-
Critical Hdwy	6.7	6.13	4.4	-	-	-
Critical Hdwy Stg 1	5.7	-	-	-	-	-
Critical Hdwy Stg 2	5.7	-	-	-	-	-
Follow-up Hdwy	3.5	3.1	3.1	-	-	-
Pot Cap-1 Maneuver	248	818	933	-	-	-
Stage 1	759	-	-	-	-	-
Stage 2	451	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	191	818	933	-	-	-
Mov Cap-2 Maneuver	191	-	-	-	-	-
Stage 1	584	-	-	-	-	-
Stage 2	451	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.4	2.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	933	-	769	-	-
HCM Lane V/C Ratio	0.18	-	0.141	-	-
HCM Control Delay (s)	9.7	0	10.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.7	-	0.5	-	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	133	174	1	1	11
Future Volume (vph)	4	133	174	1	1	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	11	11	12	13	12
Grade (%)		0%	0%		-3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.999		0.875	
Flt Protected		0.998			0.996	
Satd. Flow (prot)	0	1690	1595	0	1410	0
Flt Permitted		0.998			0.996	
Satd. Flow (perm)	0	1690	1595	0	1410	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		1808	258		297	
Travel Time (s)		49.3	7.0		8.1	
Confl. Peds. (#/hr)	1				5	5
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	25%	2%	9%	0%	0%	18%
Adj. Flow (vph)	5	153	200	1	1	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	158	201	0	14	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	133	174	1	1	11
Future Vol, veh/h	4	133	174	1	1	11
Conflicting Peds, #/hr	1	0	0	0	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	-3	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	25	2	9	0	0	18
Mvmt Flow	5	153	200	1	1	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	202	0	-	0	370	207
Stage 1	-	-	-	-	202	-
Stage 2	-	-	-	-	168	-
Critical Hdwy	4.1	-	-	-	5.8	6.08
Critical Hdwy Stg 1	-	-	-	-	4.8	-
Critical Hdwy Stg 2	-	-	-	-	4.8	-
Follow-up Hdwy	3.2	-	-	-	3	3.3
Pot Cap-1 Maneuver	976	-	-	-	768	844
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	1028	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	975	-	-	-	762	839
Mov Cap-2 Maneuver	-	-	-	-	762	-
Stage 1	-	-	-	-	989	-
Stage 2	-	-	-	-	1027	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	975	-	-	-	832
HCM Lane V/C Ratio	0.005	-	-	-	0.017
HCM Control Delay (s)	8.7	0	-	-	9.4
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	46	137	292	0	0	346
Future Volume (vph)	46	137	292	0	0	346
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	11	12	12	10
Grade (%)	-2%		0%			0%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	1580	1335	1657	0	0	1615
Flt Permitted	0.950					
Satd. Flow (perm)	1580	1335	1657	0	0	1615
Link Speed (mph)	25		40			40
Link Distance (ft)	206		447			2610
Travel Time (s)	5.6		7.6			44.5
Confl. Peds. (#/hr)	1	1				
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	2%	8%	5%	0%	0%	4%
Adj. Flow (vph)	58	171	365	0	0	433
Shared Lane Traffic (%)						
Lane Group Flow (vph)	58	171	365	0	0	433
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	46	137	292	0	0	346
Future Vol, veh/h	46	137	292	0	0	346
Conflicting Peds, #/hr	1	1	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-2	-	0	-	-	0
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	8	5	0	0	4
Mvmt Flow	58	171	365	0	0	433

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	799	366	0	-	-	-
Stage 1	365	-	-	-	-	-
Stage 2	434	-	-	-	-	-
Critical Hdwy	6.02	6.08	-	-	-	-
Critical Hdwy Stg 1	5.02	-	-	-	-	-
Critical Hdwy Stg 2	5.02	-	-	-	-	-
Follow-up Hdwy	3	3.2	-	-	-	-
Pot Cap-1 Maneuver	432	710	-	0	0	-
Stage 1	837	-	-	0	0	-
Stage 2	781	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	432	709	-	-	-	-
Mov Cap-2 Maneuver	432	-	-	-	-	-
Stage 1	837	-	-	-	-	-
Stage 2	780	-	-	-	-	-

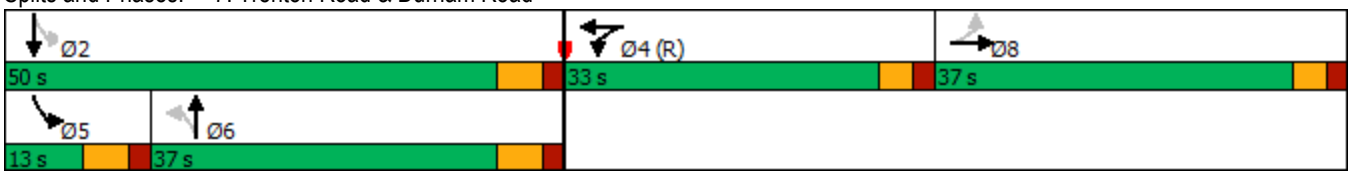
Approach	WB	NB	SB
HCM Control Delay, s	12.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	432	709	-
HCM Lane V/C Ratio	-	0.133	0.242	-
HCM Control Delay (s)	-	14.6	11.7	-
HCM Lane LOS	-	B	B	-
HCM 95th %tile Q(veh)	-	0.5	0.9	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	155	11	64	252	68	39	412	66	42	240	160
Future Volume (vph)	81	155	11	64	252	68	39	412	66	42	240	160
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	11	11	12	11	10	12
Storage Length (ft)	0		0	150		0	300		0	105		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.968			0.979			0.940	
Flt Protected		0.984		0.950			0.950			0.950		
Satd. Flow (prot)	0	1650	0	1660	1669	0	1574	1654	0	1574	1524	0
Flt Permitted		0.763		0.950			0.410			0.096		
Satd. Flow (perm)	0	1280	0	1660	1669	0	679	1654	0	159	1524	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			11			7			32	
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		515			776			2610			678	
Travel Time (s)		10.0			15.1			44.5			11.6	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	6%	5%	36%	3%	4%	6%	5%	3%	3%	5%	4%	3%
Adj. Flow (vph)	91	174	12	72	283	76	44	463	74	47	270	180
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	277	0	72	359	0	44	537	0	47	450	0
Turn Type	Perm	NA		Split	NA		Perm	NA		pm+pt	NA	
Protected Phases		8		4	4			6		5	2	
Permitted Phases	8						6			2		
Detector Phase	8	8		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		15.0	15.0		3.0	15.0	
Minimum Split (s)	8.0	8.0		8.0	8.0		21.0	21.0		9.0	21.0	
Total Split (s)	37.0	37.0		33.0	33.0		37.0	37.0		13.0	50.0	
Total Split (%)	30.8%	30.8%		27.5%	27.5%		30.8%	30.8%		10.8%	41.7%	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)		4.0		4.0	4.0		5.0	5.0		5.0	5.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	None	None		C-Max	C-Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 24 (20%), Referenced to phase 4:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	

Splits and Phases: 7: Trenton Road & Durham Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	155	11	64	252	68	39	412	66	42	240	160
Future Volume (veh/h)	81	155	11	64	252	68	39	412	66	42	240	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1716	1730	1295	1758	1744	1716	1730	1758	1758	1730	1744	1758
Adj Flow Rate, veh/h	91	174	11	72	283	69	44	463	74	47	270	164
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	6	5	36	3	4	6	5	3	3	5	4	3
Cap, veh/h	109	209	13	580	469	114	163	394	63	130	354	215
Arrive On Green	0.19	0.20	0.19	0.35	0.35	0.34	0.27	0.27	0.26	0.04	0.35	0.34
Sat Flow, veh/h	557	1065	67	1674	1354	330	883	1479	236	1647	1016	617
Grp Volume(v), veh/h	276	0	0	72	0	352	44	0	537	47	0	434
Grp Sat Flow(s),veh/h/ln	1690	0	0	1674	0	1684	883	0	1715	1647	0	1633
Q Serve(g_s), s	18.8	0.0	0.0	3.5	0.0	20.8	5.6	0.0	32.0	2.4	0.0	28.3
Cycle Q Clear(g_c), s	18.8	0.0	0.0	3.5	0.0	20.8	23.5	0.0	32.0	2.4	0.0	28.3
Prop In Lane	0.33		0.04	1.00		0.20	1.00		0.14	1.00		0.38
Lane Grp Cap(c), veh/h	332	0	0	580	0	583	163	0	457	130	0	570
V/C Ratio(X)	0.83	0.00	0.00	0.12	0.00	0.60	0.27	0.00	1.17	0.36	0.00	0.76
Avail Cap(c_a), veh/h	465	0	0	580	0	583	163	0	457	173	0	612
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	46.5	0.0	0.0	26.8	0.0	32.5	49.2	0.0	44.1	32.8	0.0	34.8
Incr Delay (d2), s/veh	12.9	0.0	0.0	0.4	0.0	4.6	1.9	0.0	99.2	3.6	0.0	6.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	14.0	0.0	0.0	2.7	0.0	14.0	2.3	0.0	37.4	1.9	0.0	17.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.4	0.0	0.0	27.2	0.0	37.1	51.1	0.0	143.3	36.4	0.0	41.4
LnGrp LOS	E	A	A	C	A	D	D	A	F	D	A	D
Approach Vol, veh/h		276			424			581			481	
Approach Delay, s/veh		59.4			35.4			136.3			40.9	
Approach LOS		E			D			F			D	

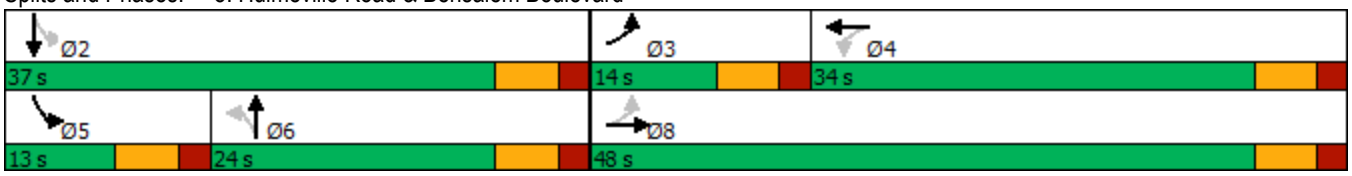
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		46.9		45.6	9.9	37.0		27.6				
Change Period (Y+Rc), s		6.0		5.0	6.0	6.0		5.0				
Max Green Setting (Gmax), s		44.0		28.0	7.0	31.0		32.0				
Max Q Clear Time (g_c+I1), s		30.3		22.8	4.9	34.0		20.8				
Green Ext Time (p_c), s		3.4		1.6	0.0	0.0		1.7				

Intersection Summary												
HCM 6th Ctrl Delay			73.9									
HCM 6th LOS			E									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	230	150	30	24	100	185	26	310	18	82	243	117
Future Volume (vph)	230	150	30	24	100	185	26	310	18	82	243	117
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	13	12	12	12	12	10	12	12	11	14	12
Storage Length (ft)	175		0	0		0	100		0	125		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.975			0.919			0.992			0.951	
Flt Protected	0.950				0.996		0.950			0.950		
Satd. Flow (prot)	1693	1778	0	0	1572	0	1478	1721	0	1574	1755	0
Flt Permitted	0.276				0.962		0.522			0.255		
Satd. Flow (perm)	492	1778	0	0	1519	0	812	1721	0	423	1755	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			96			3			33	
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		264			377			503			1368	
Travel Time (s)		5.1			7.3			8.6			23.3	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	1%	1%	7%	13%	8%	2%	8%	3%	17%	5%	5%	2%
Adj. Flow (vph)	261	170	34	27	114	210	30	352	20	93	276	133
Shared Lane Traffic (%)												
Lane Group Flow (vph)	261	204	0	0	351	0	30	372	0	93	409	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	3	8			4			6		5	2	
Permitted Phases	8			4			6			2		
Detector Phase	3	8		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		18.0	18.0		3.0	18.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		24.0	24.0		9.0	24.0	
Total Split (s)	14.0	48.0		34.0	34.0		24.0	24.0		13.0	37.0	
Total Split (%)	16.5%	56.5%		40.0%	40.0%		28.2%	28.2%		15.3%	43.5%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0			-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Recall Mode	None	None		None	None		Max	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 85	
Actuated Cycle Length: 75.7	
Natural Cycle: 65	
Control Type: Semi Act-Uncoord	

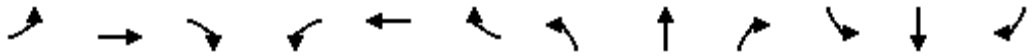
Splits and Phases: 8: Hulmeville Road & Bensalem Boulevard



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	230	150	30	24	100	185	26	310	18	82	243	117
Future Volume (veh/h)	230	150	30	24	100	185	26	310	18	82	243	117
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1857	1702	1617	1688	1772	1688	1758	1561	1730	1799	1772
Adj Flow Rate, veh/h	261	170	29	27	114	168	30	352	15	93	276	111
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	1	1	7	13	8	2	8	3	17	5	5	2
Cap, veh/h	466	679	116	70	154	205	336	481	21	315	522	210
Arrive On Green	0.12	0.44	0.43	0.24	0.25	0.24	0.29	0.29	0.27	0.07	0.43	0.41
Sat Flow, veh/h	1701	1546	264	72	612	815	899	1674	71	1647	1220	491
Grp Volume(v), veh/h	261	0	199	309	0	0	30	0	367	93	0	387
Grp Sat Flow(s),veh/h/ln	1701	0	1810	1499	0	0	899	0	1745	1647	0	1711
Q Serve(g_s), s	8.1	0.0	5.2	6.9	0.0	0.0	1.9	0.0	14.2	2.7	0.0	12.6
Cycle Q Clear(g_c), s	8.1	0.0	5.2	14.7	0.0	0.0	3.5	0.0	14.2	2.7	0.0	12.6
Prop In Lane	1.00		0.15	0.09		0.54	1.00		0.04	1.00		0.29
Lane Grp Cap(c), veh/h	466	0	794	410	0	0	336	0	502	315	0	731
V/C Ratio(X)	0.56	0.00	0.25	0.75	0.00	0.00	0.09	0.00	0.73	0.30	0.00	0.53
Avail Cap(c_a), veh/h	466	0	1040	609	0	0	336	0	502	370	0	731
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.6	0.0	13.3	26.7	0.0	0.0	20.8	0.0	24.1	16.5	0.0	16.0
Incr Delay (d2), s/veh	1.5	0.0	0.2	3.0	0.0	0.0	0.5	0.0	9.1	0.5	0.0	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.5	0.0	3.5	9.1	0.0	0.0	0.8	0.0	10.8	1.7	0.0	8.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.1	0.0	13.5	29.7	0.0	0.0	21.4	0.0	33.2	17.0	0.0	18.7
LnGrp LOS	B	A	B	C	A	A	C	A	C	B	A	B
Approach Vol, veh/h		460			309			397			480	
Approach Delay, s/veh		15.5			29.7			32.3			18.4	
Approach LOS		B			C			C			B	

Timer - Assigned Phs		2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s		37.0	14.0	23.8	10.5	26.5		37.8				
Change Period (Y+Rc), s		6.0	6.0	6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		31.0	8.0	28.0	7.0	18.0		42.0				
Max Q Clear Time (g_c+I1), s		14.6	10.6	16.7	5.2	16.2		7.2				
Green Ext Time (p_c), s		1.3	0.0	1.1	0.0	0.3		0.9				

Intersection Summary												
HCM 6th Ctrl Delay			23.1									
HCM 6th LOS			C									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	3	12	6	64	2	473	13	50	377	4
Future Volume (vph)	0	0	3	12	6	64	2	473	13	50	377	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	13	12	12	10	12	12	11	12	12	11	12
Grade (%)		2%			-2%			-2%			2%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.865			0.895			0.996			0.999	
Flt Protected					0.992						0.994	
Satd. Flow (prot)	0	1593	0	0	1436	0	0	1750	0	0	1692	0
Flt Permitted					0.992						0.994	
Satd. Flow (perm)	0	1593	0	0	1436	0	0	1750	0	0	1692	0
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		256			1808			380			1439	
Travel Time (s)		7.0			49.3			6.5			24.5	
Confl. Peds. (#/hr)							3		3			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	17%	0%	3%	0%	0%	0%	2%	1%	0%
Adj. Flow (vph)	0	0	3	13	6	67	2	498	14	53	397	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	3	0	0	86	0	0	514	0	0	454	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

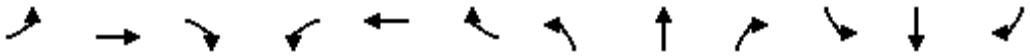
Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	0	0	3	12	6	64	2	473	13	50	377	4
Future Vol, veh/h	0	0	3	12	6	64	2	473	13	50	377	4
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	3	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-2	-	-	-2	-	-	2	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	17	0	3	0	0	0	2	1	0
Mvmt Flow	0	0	3	13	6	67	2	498	14	53	397	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1054	1027	402	1019	1022	508	404	0	0	515	0	0
Stage 1	508	508	-	512	512	-	-	-	-	-	-	-
Stage 2	546	519	-	507	510	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.9	6.4	6.87	6.1	6.03	4.3	-	-	4.3	-	-
Critical Hdwy Stg 1	6.5	5.9	-	5.87	5.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.9	-	5.87	5.1	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.1	3.2	4	3.1	3	-	-	3	-	-
Pot Cap-1 Maneuver	201	211	672	245	266	612	872	-	-	798	-	-
Stage 1	588	512	-	608	571	-	-	-	-	-	-	-
Stage 2	557	506	-	611	572	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	163	191	670	227	241	611	869	-	-	796	-	-
Mov Cap-2 Maneuver	163	191	-	227	241	-	-	-	-	-	-	-
Stage 1	584	466	-	605	568	-	-	-	-	-	-	-
Stage 2	489	503	-	556	521	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.4	14.9	0	1.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	869	-	-	670	449	796	-	-
HCM Lane V/C Ratio	0.002	-	-	0.005	0.192	0.066	-	-
HCM Control Delay (s)	9.2	0	-	10.4	14.9	9.8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.7	0.2	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	4	2	0	0	0	7	506	19	24	420	33
Future Volume (vph)	6	4	2	0	0	0	7	506	19	24	420	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	16	12	12	11	12	12	11	12
Grade (%)		1%			2%			0%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977						0.995			0.991	
Flt Protected		0.976						0.999			0.997	
Satd. Flow (prot)	0	1708	0	0	0	0	0	1730	0	0	1694	0
Flt Permitted		0.976						0.999			0.997	
Satd. Flow (perm)	0	1708	0	0	0	0	0	1730	0	0	1694	0
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		357			346			1102			447	
Travel Time (s)		9.7			9.4			18.8			7.6	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	9%
Adj. Flow (vph)	6	4	2	0	0	0	7	522	20	25	433	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	0	0	0	0	0	549	0	0	492	0
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	6	4	2	0	0	0	7	506	19	24	420	33
Future Vol, veh/h	6	4	2	0	0	0	7	506	19	24	420	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	2	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	1	9
Mvmt Flow	6	4	2	0	0	0	7	522	20	25	433	34

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	1046	1056	450			467	0	0	542	0	0
Stage 1	500	500	-			-	-	-	-	-	-
Stage 2	546	556	-			-	-	-	-	-	-
Critical Hdwy	6.6	6.7	6.3			4.3	-	-	4.3	-	-
Critical Hdwy Stg 1	5.6	5.7	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.6	5.7	-			-	-	-	-	-	-
Follow-up Hdwy	3	4	3.1			3	-	-	3	-	-
Pot Cap-1 Maneuver	264	214	637			829	-	-	781	-	-
Stage 1	674	531	-			-	-	-	-	-	-
Stage 2	639	500	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	250	0	637			829	-	-	781	-	-
Mov Cap-2 Maneuver	250	0	-			-	-	-	-	-	-
Stage 1	666	0	-			-	-	-	-	-	-
Stage 2	612	0	-			-	-	-	-	-	-

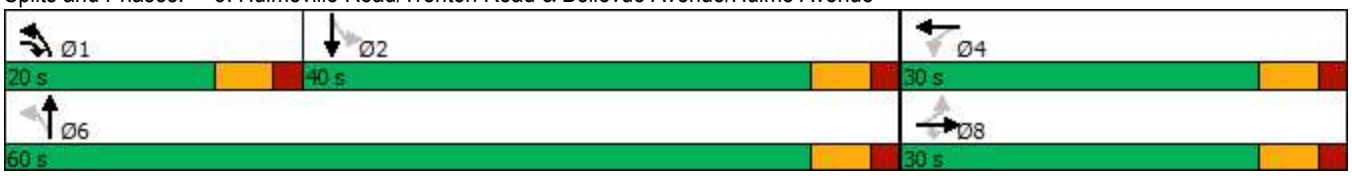
Approach	EB	NB	SB
HCM Control Delay, s	17.7	0.1	0.5
HCM LOS	C		

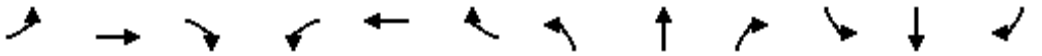
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	829	-	-	295	781	-	-
HCM Lane V/C Ratio	0.009	-	-	0.042	0.032	-	-
HCM Control Delay (s)	9.4	0	-	17.7	9.8	0	-
HCM Lane LOS	A	A	-	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	132	472	30	153	1	291	430	36	0	317	65
Future Volume (vph)	58	132	472	30	153	1	291	430	36	0	317	65
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	14	15	12	14	12	10	15	12	12	12	12
Storage Length (ft)	0		75	0		0	350		0	0		0
Storage Lanes	0		1	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor											1.00	
Frt			0.850		0.999			0.988			0.977	
Flt Protected		0.985			0.992		0.950					
Satd. Flow (prot)	0	1852	1666	0	1872	0	1565	1956	0	0	1728	0
Flt Permitted		0.764			0.892		0.367					
Satd. Flow (perm)	0	1437	1666	0	1683	0	604	1956	0	0	1728	0
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			356					9				
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		638			194			1368			380	
Travel Time (s)		12.4			3.8			26.6			7.4	
Confl. Peds. (#/hr)										3		3
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	3%	1%	0%	2%	0%	2%	0%	0%	0%	1%	3%
Adj. Flow (vph)	60	138	492	31	159	1	303	448	38	0	330	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	198	492	0	191	0	303	486	0	0	398	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA			NA	
Protected Phases		8	1		4		1	6			2	
Permitted Phases	8		8	4	4		6			2		
Detector Phase	8	8	1	4	4		1	6		2	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0		3.0	20.0		20.0	20.0	
Minimum Split (s)	24.0	24.0	9.0	24.0	24.0		9.0	26.0		26.0	26.0	
Total Split (s)	30.0	30.0	20.0	30.0	30.0		20.0	60.0		40.0	40.0	
Total Split (%)	33.3%	33.3%	22.2%	33.3%	33.3%		22.2%	66.7%		44.4%	44.4%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0	-1.0		-1.0		-1.0	-1.0			-1.0	
Total Lost Time (s)		5.0	5.0		5.0		5.0	5.0			5.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Recall Mode	None	None	None	None	None		None	Max		Max	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 81.4	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	

Splits and Phases: 3: Hulmeville Road/Trenton Road & Bellevue Avenue/Hulme Avenue





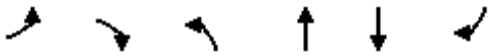
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	132	472	30	153	1	291	430	36	0	317	65
Future Volume (veh/h)	58	132	472	30	153	1	291	430	36	0	317	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1828	1857	1800	1843	1800	1772	1872	1800	1800	1786	1758
Adj Flow Rate, veh/h	60	138	0	31	159	1	303	448	35	0	330	67
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	3	1	0	2	0	2	0	0	0	1	3
Cap, veh/h	125	199		84	256	2	662	1215	95	0	743	151
Arrive On Green	0.15	0.16	0.00	0.15	0.16	0.15	0.13	0.71	0.70	0.00	0.52	0.50
Sat Flow, veh/h	394	1225	1574	186	1576	9	1688	1714	134	0	1440	292
Grp Volume(v), veh/h	198	0	0	191	0	0	303	0	483	0	0	397
Grp Sat Flow(s),veh/h/ln	1620	0	1574	1771	0	0	1688	0	1848	0	0	1732
Q Serve(g_s), s	1.3	0.0	0.0	0.0	0.0	0.0	5.5	0.0	8.0	0.0	0.0	11.2
Cycle Q Clear(g_c), s	9.1	0.0	0.0	7.8	0.0	0.0	5.5	0.0	8.0	0.0	0.0	11.2
Prop In Lane	0.30		1.00	0.16		0.01	1.00		0.07	0.00		0.17
Lane Grp Cap(c), veh/h	303	0		319	0	0	662	0	1310	0	0	894
V/C Ratio(X)	0.65	0.00		0.60	0.00	0.00	0.46	0.00	0.37	0.00	0.00	0.44
Avail Cap(c_a), veh/h	555	0		591	0	0	772	0	1310	0	0	894
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	31.1	0.0	0.0	30.5	0.0	0.0	6.6	0.0	4.5	0.0	0.0	11.9
Incr Delay (d2), s/veh	2.4	0.0	0.0	1.8	0.0	0.0	0.5	0.0	0.8	0.0	0.0	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.6	0.0	0.0	6.2	0.0	0.0	2.7	0.0	4.3	0.0	0.0	7.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.4	0.0	0.0	32.3	0.0	0.0	7.1	0.0	5.3	0.0	0.0	13.5
LnGrp LOS	C	A		C	A	A	A	A	A	A	A	B
Approach Vol, veh/h		198			191			786			397	
Approach Delay, s/veh		33.4			32.3			6.0			13.5	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	15.0	45.0		17.6		60.0		17.6				
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s	14.0	34.0		24.0		54.0		24.0				
Max Q Clear Time (g_c+I1), s	8.0	13.2		9.8		10.0		11.1				
Green Ext Time (p_c), s	1.0	1.4		0.5		1.9		0.5				

Intersection Summary			
HCM 6th Ctrl Delay		14.5	
HCM 6th LOS		B	

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	158	216	317	514	1
Future Volume (vph)	1	158	216	317	514	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	10	10	10	10
Grade (%)	-1%			3%	-3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.866					
Flt Protected				0.980		
Satd. Flow (prot)	1420	0	0	1590	1672	0
Flt Permitted				0.980		
Satd. Flow (perm)	1420	0	0	1590	1672	0
Link Speed (mph)	35			35	35	
Link Distance (ft)	562			638	742	
Travel Time (s)	10.9			12.4	14.5	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	3%	2%	2%	2%	0%
Adj. Flow (vph)	1	174	237	348	565	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	175	0	0	585	566	0
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

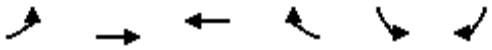
Intersection	
Int Delay, s/veh	4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	158	216	317	514	1
Future Vol, veh/h	1	158	216	317	514	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-1	-	-	3	-3	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	3	2	2	2	0
Mvmt Flow	1	174	237	348	565	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1388	566	566	0	-	0
Stage 1	566	-	-	-	-	-
Stage 2	822	-	-	-	-	-
Critical Hdwy	6.2	6.13	4.3	-	-	-
Critical Hdwy Stg 1	5.2	-	-	-	-	-
Critical Hdwy Stg 2	5.2	-	-	-	-	-
Follow-up Hdwy	3	3.1	3	-	-	-
Pot Cap-1 Maneuver	185	560	766	-	-	-
Stage 1	665	-	-	-	-	-
Stage 2	506	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	114	560	766	-	-	-
Mov Cap-2 Maneuver	114	-	-	-	-	-
Stage 1	410	-	-	-	-	-
Stage 2	506	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.6	4.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	766	-	547	-	-
HCM Lane V/C Ratio	0.31	-	0.319	-	-
HCM Control Delay (s)	11.8	0	14.6	-	-
HCM Lane LOS	B	A	B	-	-
HCM 95th %tile Q(veh)	1.3	-	1.4	-	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	16	202	245	0	1	9
Future Volume (vph)	16	202	245	0	1	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	11	11	12	13	12
Grade (%)		0%	0%		-3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.877	
Flt Protected		0.996			0.995	
Satd. Flow (prot)	0	1702	1723	0	1647	0
Flt Permitted		0.996			0.995	
Satd. Flow (perm)	0	1702	1723	0	1647	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		1808	258		297	
Travel Time (s)		49.3	7.0		8.1	
Confl. Peds. (#/hr)					3	3
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	2%	1%	0%	0%	0%
Adj. Flow (vph)	19	235	285	0	1	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	254	285	0	11	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	202	245	0	1	9
Future Vol, veh/h	16	202	245	0	1	9
Conflicting Peds, #/hr	0	0	0	0	3	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	-3	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	2	1	0	0	0
Mvmt Flow	19	235	285	0	1	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	285	0	-	0	561	288
Stage 1	-	-	-	-	285	-
Stage 2	-	-	-	-	276	-
Critical Hdwy	4.3	-	-	-	5.8	5.9
Critical Hdwy Stg 1	-	-	-	-	4.8	-
Critical Hdwy Stg 2	-	-	-	-	4.8	-
Follow-up Hdwy	3	-	-	-	3	3.1
Pot Cap-1 Maneuver	959	-	-	-	608	818
Stage 1	-	-	-	-	922	-
Stage 2	-	-	-	-	930	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	959	-	-	-	594	816
Mov Cap-2 Maneuver	-	-	-	-	594	-
Stage 1	-	-	-	-	901	-
Stage 2	-	-	-	-	930	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	959	-	-	-	787
HCM Lane V/C Ratio	0.019	-	-	-	0.015
HCM Control Delay (s)	8.8	0	-	-	9.6
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	77	142	404	0	0	360
Future Volume (vph)	77	142	404	0	0	360
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	11	12	12	10
Grade (%)	-2%		0%			0%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	1507	1361	1689	0	0	1631
Flt Permitted	0.950					
Satd. Flow (perm)	1507	1361	1689	0	0	1631
Link Speed (mph)	25		40			40
Link Distance (ft)	206		447			2610
Travel Time (s)	5.6		7.6			44.5
Confl. Peds. (#/hr)	2	2				
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Heavy Vehicles (%)	7%	6%	3%	0%	0%	3%
Adj. Flow (vph)	100	184	525	0	0	468
Shared Lane Traffic (%)						
Lane Group Flow (vph)	100	184	525	0	0	468
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	77	142	404	0	0	360
Future Vol, veh/h	77	142	404	0	0	360
Conflicting Peds, #/hr	2	2	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-2	-	0	-	-	0
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	7	6	3	0	0	3
Mvmt Flow	100	184	525	0	0	468

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	995	527	0	-	-	-
Stage 1	525	-	-	-	-	-
Stage 2	470	-	-	-	-	-
Critical Hdwy	6.07	6.06	-	-	-	-
Critical Hdwy Stg 1	5.07	-	-	-	-	-
Critical Hdwy Stg 2	5.07	-	-	-	-	-
Follow-up Hdwy	3.1	3.2	-	-	-	-
Pot Cap-1 Maneuver	323	580	-	0	0	-
Stage 1	689	-	-	0	0	-
Stage 2	728	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	322	579	-	-	-	-
Mov Cap-2 Maneuver	322	-	-	-	-	-
Stage 1	689	-	-	-	-	-
Stage 2	727	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.6	0	0
HCM LOS	C		

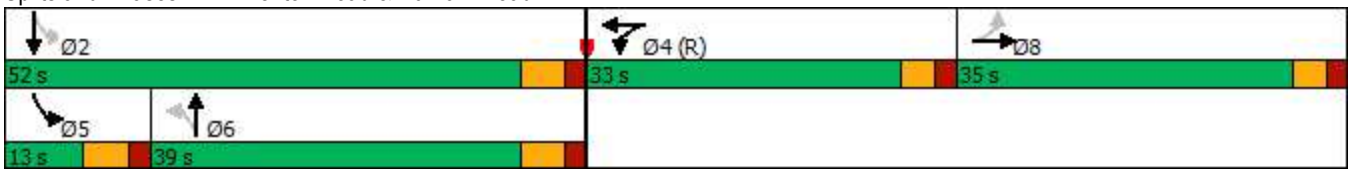
Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	322	579	-
HCM Lane V/C Ratio	-	0.311	0.319	-
HCM Control Delay (s)	-	21.1	14.1	-
HCM Lane LOS	-	C	B	-
HCM 95th %tile Q(veh)	-	1.3	1.4	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	263	18	103	195	58	35	412	94	65	421	98
Future Volume (vph)	116	263	18	103	195	58	35	412	94	65	421	98
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	11	11	12	11	10	12
Storage Length (ft)	0		0	150		0	300		0	105		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor				1.00	0.99		1.00	1.00				
Frt		0.994			0.965			0.972			0.972	
Flt Protected		0.986		0.950			0.950			0.950		
Satd. Flow (prot)	0	1725	0	1660	1665	0	1653	1675	0	1653	1617	0
Flt Permitted		0.807		0.950			0.268			0.096		
Satd. Flow (perm)	0	1412	0	1658	1665	0	466	1675	0	167	1617	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			12			10			11	
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		515			776			2610			678	
Travel Time (s)		10.0			15.1			44.5			11.6	
Confl. Peds. (#/hr)				1		1	1		1			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	3%	0%	3%	4%	3%	0%	0%	3%	0%	1%	1%
Adj. Flow (vph)	123	280	19	110	207	62	37	438	100	69	448	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	422	0	110	269	0	37	538	0	69	552	0
Turn Type	Perm	NA		Split	NA		Perm	NA		pm+pt	NA	
Protected Phases		8		4	4			6		5	2	
Permitted Phases	8						6			2		
Detector Phase	8	8		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		15.0	15.0		3.0	15.0	
Minimum Split (s)	8.0	8.0		8.0	8.0		21.0	21.0		9.0	21.0	
Total Split (s)	35.0	35.0		33.0	33.0		39.0	39.0		13.0	52.0	
Total Split (%)	29.2%	29.2%		27.5%	27.5%		32.5%	32.5%		10.8%	43.3%	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)		4.0		4.0	4.0		5.0	5.0		5.0	5.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	None	None		C-Max	C-Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 6 (5%), Referenced to phase 4:WBTL, Start of Green	
Natural Cycle: 90	

Control Type: Actuated-Coordinated

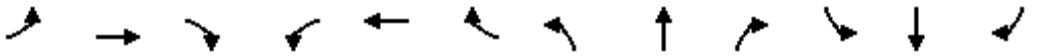
Splits and Phases: 7: Trenton Road & Durham Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	116	263	18	103	195	58	35	412	94	65	421	98
Future Volume (veh/h)	116	263	18	103	195	58	35	412	94	65	421	98
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1758	1800	1758	1744	1758	1800	1800	1758	1800	1786	1786
Adj Flow Rate, veh/h	123	280	18	110	207	46	37	438	93	69	448	91
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	3	0	3	4	3	0	0	3	0	1	1
Cap, veh/h	130	295	19	430	354	79	143	408	87	152	543	110
Arrive On Green	0.25	0.26	0.25	0.26	0.26	0.25	0.28	0.28	0.28	0.05	0.38	0.37
Sat Flow, veh/h	502	1144	74	1674	1381	307	834	1439	306	1714	1441	293
Grp Volume(v), veh/h	421	0	0	110	0	253	37	0	531	69	0	539
Grp Sat Flow(s),veh/h/ln	1720	0	0	1674	0	1688	834	0	1744	1714	0	1733
Q Serve(g_s), s	28.9	0.0	0.0	6.3	0.0	15.7	5.0	0.0	34.0	3.2	0.0	33.8
Cycle Q Clear(g_c), s	28.9	0.0	0.0	6.3	0.0	15.7	27.1	0.0	34.0	3.2	0.0	33.8
Prop In Lane	0.29		0.04	1.00		0.18	1.00		0.18	1.00		0.17
Lane Grp Cap(c), veh/h	444	0	0	430	0	433	143	0	494	152	0	653
V/C Ratio(X)	0.95	0.00	0.00	0.26	0.00	0.58	0.26	0.00	1.07	0.45	0.00	0.83
Avail Cap(c_a), veh/h	444	0	0	430	0	433	143	0	494	178	0	679
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	43.9	0.0	0.0	35.5	0.0	39.1	50.9	0.0	43.1	31.5	0.0	33.9
Incr Delay (d2), s/veh	30.3	0.0	0.0	1.4	0.0	5.7	2.0	0.0	61.9	4.5	0.0	9.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	22.3	0.0	0.0	4.9	0.0	11.5	2.0	0.0	31.9	2.7	0.0	21.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.2	0.0	0.0	36.9	0.0	44.7	53.0	0.0	105.0	35.9	0.0	43.0
LnGrp LOS	E	A	A	D	A	D	D	A	F	D	A	D
Approach Vol, veh/h		421			363			568			608	
Approach Delay, s/veh		74.2			42.4			101.6			42.2	
Approach LOS		E			D			F			D	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		50.2		34.8	11.2	39.0		35.0				
Change Period (Y+Rc), s		6.0		5.0	6.0	6.0		5.0				
Max Green Setting (Gmax), s		46.0		28.0	7.0	33.0		30.0				
Max Q Clear Time (g_c+I1), s		35.8		17.7	5.7	36.0		30.9				
Green Ext Time (p_c), s		3.6		2.2	0.0	0.0		0.0				

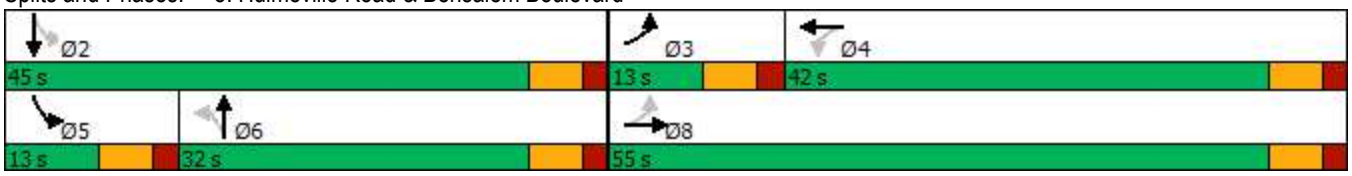
Intersection Summary												
HCM 6th Ctrl Delay			66.3									
HCM 6th LOS			E									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	234	115	39	36	198	100	35	392	25	183	378	257
Future Volume (vph)	234	115	39	36	198	100	35	392	25	183	378	257
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	13	12	12	12	12	10	12	12	11	14	12
Storage Length (ft)	175		0	0		0	100		0	125		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.962			0.960			0.991			0.939	
Flt Protected	0.950				0.995		0.950			0.950		
Satd. Flow (prot)	1693	1750	0	0	1699	0	1550	1767	0	1637	1792	0
Flt Permitted	0.309				0.949		0.309			0.224		
Satd. Flow (perm)	551	1750	0	0	1620	0	504	1767	0	386	1792	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			24			3			40	
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		264			377			503			1368	
Travel Time (s)		5.1			7.3			8.6			23.3	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	1%	3%	0%	3%	1%	1%	3%	1%	0%	1%	1%	0%
Adj. Flow (vph)	236	116	39	36	200	101	35	396	25	185	382	260
Shared Lane Traffic (%)												
Lane Group Flow (vph)	236	155	0	0	337	0	35	421	0	185	642	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	3	8			4			6		5	2	
Permitted Phases	8			4			6			2		
Detector Phase	3	8		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		18.0	18.0		3.0	18.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		24.0	24.0		9.0	24.0	
Total Split (s)	13.0	55.0		42.0	42.0		32.0	32.0		13.0	45.0	
Total Split (%)	13.0%	55.0%		42.0%	42.0%		32.0%	32.0%		13.0%	45.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Recall Mode	None	None		None	None		Max	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 86	
Natural Cycle: 80	
Control Type: Semi Act-Uncoord	

Splits and Phases: 8: Hulmeville Road & Bensalem Boulevard

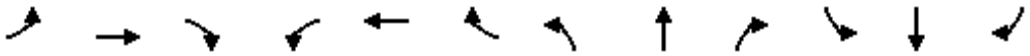


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	234	115	39	36	198	100	35	392	25	183	378	257
Future Volume (veh/h)	234	115	39	36	198	100	35	392	25	183	378	257
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1828	1800	1758	1786	1786	1758	1786	1800	1786	1857	1800
Adj Flow Rate, veh/h	236	116	33	36	200	81	35	396	21	185	382	242
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	1	3	0	3	1	1	3	1	0	1	1	0
Cap, veh/h	371	523	149	75	249	95	220	529	28	328	502	318
Arrive On Green	0.08	0.38	0.38	0.22	0.22	0.22	0.32	0.32	0.32	0.08	0.47	0.47
Sat Flow, veh/h	1701	1369	389	118	1111	422	753	1681	89	1701	1063	673
Grp Volume(v), veh/h	236	0	149	317	0	0	35	0	417	185	0	624
Grp Sat Flow(s),veh/h/ln	1701	0	1758	1650	0	0	753	0	1770	1701	0	1736
Q Serve(g_s), s	7.0	0.0	4.7	8.5	0.0	0.0	3.3	0.0	17.4	5.8	0.0	24.4
Cycle Q Clear(g_c), s	7.0	0.0	4.7	15.1	0.0	0.0	14.7	0.0	17.4	5.8	0.0	24.4
Prop In Lane	1.00		0.22	0.11		0.26	1.00		0.05	1.00		0.39
Lane Grp Cap(c), veh/h	371	0	672	419	0	0	220	0	558	328	0	820
V/C Ratio(X)	0.64	0.00	0.22	0.76	0.00	0.00	0.16	0.00	0.75	0.56	0.00	0.76
Avail Cap(c_a), veh/h	371	0	1044	761	0	0	220	0	558	328	0	820
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.0	0.0	17.2	30.6	0.0	0.0	29.3	0.0	25.3	18.2	0.0	17.9
Incr Delay (d2), s/veh	3.6	0.0	0.2	2.8	0.0	0.0	1.5	0.0	8.9	2.2	0.0	6.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.7	0.0	3.3	10.1	0.0	0.0	1.2	0.0	12.8	4.0	0.0	15.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.5	0.0	17.4	33.4	0.0	0.0	30.9	0.0	34.2	20.5	0.0	24.5
LnGrp LOS	C	A	B	C	A	A	C	A	C	C	A	C
Approach Vol, veh/h		385			317			452			809	
Approach Delay, s/veh		22.4			33.4			34.0			23.6	
Approach LOS		C			C			C			C	

Timer - Assigned Phs		2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s		45.0	13.0	24.5	13.0	32.0		37.5				
Change Period (Y+Rc), s		6.0	6.0	6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		39.0	7.0	36.0	7.0	26.0		49.0				
Max Q Clear Time (g_c+I1), s		26.4	9.0	17.1	7.8	19.4		6.7				
Green Ext Time (p_c), s		2.2	0.0	1.4	0.0	1.0		0.7				

Intersection Summary	
HCM 6th Ctrl Delay	27.3
HCM 6th LOS	C

2027 Base Conditions



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	0	18	4	61	0	384	22	30	278	3
Future Volume (vph)	1	0	0	18	4	61	0	384	22	30	278	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	13	12	12	10	12	12	11	12	12	11	12
Grade (%)		2%			-2%			-2%			2%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.901			0.993			0.999	
Flt Protected		0.950			0.989						0.995	
Satd. Flow (prot)	0	1749	0	0	1406	0	0	1689	0	0	1647	0
Flt Permitted		0.950			0.989						0.995	
Satd. Flow (perm)	0	1749	0	0	1406	0	0	1689	0	0	1647	0
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		256			1808			380			1439	
Travel Time (s)		7.0			49.3			6.5			24.5	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	11%	0%	7%	0%	3%	9%	10%	3%	33%
Adj. Flow (vph)	1	0	0	20	4	67	0	422	24	33	305	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1	0	0	91	0	0	446	0	0	341	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

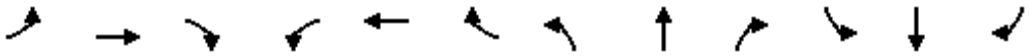
Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	0	0	18	4	61	0	384	22	30	278	3
Future Vol, veh/h	1	0	0	18	4	61	0	384	22	30	278	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-2	-	-	-2	-	-	2	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	11	0	7	0	3	9	10	3	33
Mvmt Flow	1	0	0	20	4	67	0	422	24	33	305	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	843	819	307	807	808	434	308	0	0	446	0	0
Stage 1	373	373	-	434	434	-	-	-	-	-	-	-
Stage 2	470	446	-	373	374	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.9	6.4	6.81	6.1	6.07	4.3	-	-	4.4	-	-
Critical Hdwy Stg 1	6.5	5.9	-	5.81	5.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.9	-	5.81	5.1	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.1	3.1	4	3.2	3	-	-	3.1	-	-
Pot Cap-1 Maneuver	288	285	766	350	347	652	942	-	-	811	-	-
Stage 1	712	597	-	691	613	-	-	-	-	-	-	-
Stage 2	621	550	-	744	648	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	246	271	766	337	330	652	942	-	-	811	-	-
Mov Cap-2 Maneuver	246	271	-	337	330	-	-	-	-	-	-	-
Stage 1	712	568	-	691	613	-	-	-	-	-	-	-
Stage 2	553	550	-	708	616	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.7	13.4	0	0.9
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	942	-	-	246	522	811	-	-
HCM Lane V/C Ratio	-	-	-	0.004	0.175	0.041	-	-
HCM Control Delay (s)	0	-	-	19.7	13.4	9.6	0	-
HCM Lane LOS	A	-	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.6	0.1	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	28	4	0	0	0	1	348	74	114	311	17
Future Volume (vph)	7	28	4	0	0	0	1	348	74	114	311	17
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	16	12	12	11	12	12	11	12
Grade (%)		1%			2%			0%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.985						0.976			0.995	
Flt Protected		0.991									0.987	
Satd. Flow (prot)	0	1587	0	0	0	0	0	1630	0	0	1657	0
Flt Permitted		0.991									0.987	
Satd. Flow (perm)	0	1587	0	0	0	0	0	1630	0	0	1657	0
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		357			346			1102			447	
Travel Time (s)		9.7			9.4			18.8			7.6	
Confl. Peds. (#/hr)										11		11
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	29%	7%	0%	0%	0%	0%	0%	3%	10%	4%	3%	0%
Adj. Flow (vph)	8	32	5	0	0	0	1	400	85	131	357	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	45	0	0	0	0	0	486	0	0	508	0
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕						⇕			⇕	
Traffic Vol, veh/h	7	28	4	0	0	0	1	348	74	114	311	17
Future Vol, veh/h	7	28	4	0	0	0	1	348	74	114	311	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	11	0	11
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	2	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	29	7	0	0	0	0	0	3	10	4	3	0
Mvmt Flow	8	32	5	0	0	0	1	400	85	131	357	20

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	1085	1138	378			388	0	0	496	0	0
Stage 1	640	640	-			-	-	-	-	-	-
Stage 2	445	498	-			-	-	-	-	-	-
Critical Hdwy	6.89	6.77	6.3			4.3	-	-	4.3	-	-
Critical Hdwy Stg 1	5.89	5.77	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.89	5.77	-			-	-	-	-	-	-
Follow-up Hdwy	3.3	4.063	3.1			3	-	-	3	-	-
Pot Cap-1 Maneuver	216	185	702			884	-	-	810	-	-
Stage 1	506	446	-			-	-	-	-	-	-
Stage 2	641	521	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	168	0	695			875	-	-	810	-	-
Mov Cap-2 Maneuver	168	0	-			-	-	-	-	-	-
Stage 1	500	0	-			-	-	-	-	-	-
Stage 2	504	0	-			-	-	-	-	-	-

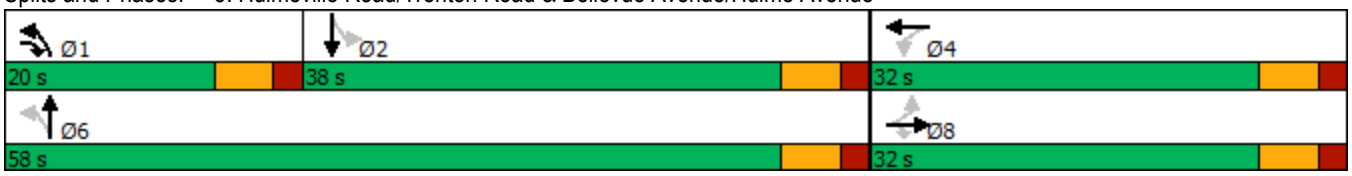
Approach	EB	NB	SB
HCM Control Delay, s	24.2	0	2.7
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	875	-	-	232	810	-	-
HCM Lane V/C Ratio	0.001	-	-	0.193	0.162	-	-
HCM Control Delay (s)	9.1	0	-	24.2	10.3	0	-
HCM Lane LOS	A	A	-	C	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0.7	0.6	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	77	246	15	103	7	367	348	26	1	236	53
Future Volume (vph)	40	77	246	15	103	7	367	348	26	1	236	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	14	15	12	14	12	10	15	12	12	12	12
Storage Length (ft)	0		75	0		0	350		0	0		0
Storage Lanes	0		1	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.992			0.990			0.975	
Flt Protected		0.983			0.994		0.950					
Satd. Flow (prot)	0	1856	1618	0	1777	0	1535	1907	0	0	1684	0
Flt Permitted		0.805			0.946		0.456				0.999	
Satd. Flow (perm)	0	1520	1618	0	1691	0	737	1907	0	0	1682	0
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			273					7				
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		638			194			1368			380	
Travel Time (s)		12.4			3.8			26.6			7.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	1%	4%	0%	8%	0%	4%	3%	0%	100%	3%	8%
Adj. Flow (vph)	44	86	273	17	114	8	408	387	29	1	262	59
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	130	273	0	139	0	408	416	0	0	322	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		8	1		4		1	6			2	
Permitted Phases	8		8	4	4		6			2		
Detector Phase	8	8	1	4	4		1	6		2	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0		3.0	20.0		20.0	20.0	
Minimum Split (s)	9.0	9.0	9.0	9.0	9.0		9.0	26.0		26.0	26.0	
Total Split (s)	32.0	32.0	20.0	32.0	32.0		20.0	58.0		38.0	38.0	
Total Split (%)	35.6%	35.6%	22.2%	35.6%	35.6%		22.2%	64.4%		42.2%	42.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0	-1.0		-1.0		-1.0	-1.0			-1.0	
Total Lost Time (s)		5.0	5.0		5.0		5.0	5.0			5.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Recall Mode	None	None	None	None	None		None	Max		Max	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 75.4	
Natural Cycle: 55	
Control Type: Semi Act-Uncoord	

Splits and Phases: 3: Hulmeville Road/Trenton Road & Bellevue Avenue/Hulme Avenue



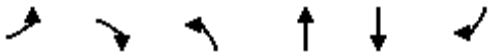
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	77	246	15	103	7	367	348	26	1	236	53
Future Volume (veh/h)	40	77	246	15	103	7	367	348	26	1	236	53
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1758	1857	1814	1800	1755	1800	1744	1828	1800	396	1758	1688
Adj Flow Rate, veh/h	44	86	0	17	114	8	408	387	29	1	262	55
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	1	4	0	8	0	4	3	0	100	3	8
Cap, veh/h	125	158		72	184	12	851	1238	93	51	713	149
Arrive On Green	0.11	0.12	0.00	0.11	0.12	0.11	0.16	0.74	0.72	0.49	0.51	0.49
Sat Flow, veh/h	469	1278	1537	125	1483	98	1661	1680	126	1	1409	295
Grp Volume(v), veh/h	130	0	0	139	0	0	408	0	416	318	0	0
Grp Sat Flow(s),veh/h/ln	1747	0	1537	1707	0	0	1661	0	1806	1704	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.6	0.0	0.0	7.0	0.0	5.7	0.0	0.0	0.0
Cycle Q Clear(g_c), s	4.9	0.0	0.0	5.6	0.0	0.0	7.0	0.0	5.7	8.2	0.0	0.0
Prop In Lane	0.34		1.00	0.12		0.06	1.00		0.07	0.00		0.17
Lane Grp Cap(c), veh/h	259	0		244	0	0	851	0	1331	889	0	0
V/C Ratio(X)	0.50	0.00		0.57	0.00	0.00	0.48	0.00	0.31	0.36	0.00	0.00
Avail Cap(c_a), veh/h	662	0		659	0	0	929	0	1331	889	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	29.9	0.0	0.0	30.1	0.0	0.0	4.2	0.0	3.2	10.9	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.0	2.1	0.0	0.0	0.4	0.0	0.6	1.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.9	0.0	0.0	4.2	0.0	0.0	2.9	0.0	2.5	5.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.4	0.0	0.0	32.2	0.0	0.0	4.6	0.0	3.9	12.0	0.0	0.0
LnGrp LOS	C	A		C	A	A	A	A	A	B	A	A
Approach Vol, veh/h		130			139			824			318	
Approach Delay, s/veh		31.4			32.2			4.2			12.0	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	16.6	41.4		13.9		58.0		13.9				
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s	14.0	32.0		26.0		52.0		26.0				
Max Q Clear Time (g_c+I1), s	9.5	10.2		7.6		7.7		6.9				
Green Ext Time (p_c), s	1.1	1.1		0.4		1.6		0.4				

Intersection Summary			
HCM 6th Ctrl Delay		11.2	
HCM 6th LOS		B	

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	2	101	160	377	260	1
Future Volume (vph)	2	101	160	377	260	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	10	10	10	10
Grade (%)	-1%			3%	-3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.867					
Flt Protected	0.999			0.985		
Satd. Flow (prot)	1408	0	0	1558	1640	0
Flt Permitted	0.999			0.985		
Satd. Flow (perm)	1408	0	0	1558	1640	0
Link Speed (mph)	35			35	35	
Link Distance (ft)	562			638	742	
Travel Time (s)	10.9			12.4	14.5	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	50%	3%	6%	4%	4%	0%
Adj. Flow (vph)	2	107	170	401	277	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	109	0	0	571	278	0
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

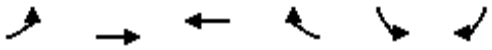
Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	101	160	377	260	1
Future Vol, veh/h	2	101	160	377	260	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-1	-	-	3	-3	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	50	3	6	4	4	0
Mvmt Flow	2	107	170	401	277	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1019	278	278	0	-	0
Stage 1	278	-	-	-	-	-
Stage 2	741	-	-	-	-	-
Critical Hdwy	6.7	6.13	4.4	-	-	-
Critical Hdwy Stg 1	5.7	-	-	-	-	-
Critical Hdwy Stg 2	5.7	-	-	-	-	-
Follow-up Hdwy	3.5	3.1	3.1	-	-	-
Pot Cap-1 Maneuver	243	813	930	-	-	-
Stage 1	756	-	-	-	-	-
Stage 2	446	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	186	813	930	-	-	-
Mov Cap-2 Maneuver	186	-	-	-	-	-
Stage 1	578	-	-	-	-	-
Stage 2	446	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.5	2.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	930	-	763	-	-
HCM Lane V/C Ratio	0.183	-	0.144	-	-
HCM Control Delay (s)	9.7	0	10.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.7	-	0.5	-	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	134	176	1	1	11
Future Volume (vph)	4	134	176	1	1	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	11	11	12	13	12
Grade (%)		0%	0%		-3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.999		0.875	
Flt Protected		0.998			0.996	
Satd. Flow (prot)	0	1690	1595	0	1410	0
Flt Permitted		0.998			0.996	
Satd. Flow (perm)	0	1690	1595	0	1410	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		1808	258		297	
Travel Time (s)		49.3	7.0		8.1	
Confl. Peds. (#/hr)	1				5	5
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	25%	2%	9%	0%	0%	18%
Adj. Flow (vph)	5	154	202	1	1	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	159	203	0	14	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	134	176	1	1	11
Future Vol, veh/h	4	134	176	1	1	11
Conflicting Peds, #/hr	1	0	0	0	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	-3	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	25	2	9	0	0	18
Mvmt Flow	5	154	202	1	1	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	204	0	-	0	373	209
Stage 1	-	-	-	-	204	-
Stage 2	-	-	-	-	169	-
Critical Hdwy	4.1	-	-	-	5.8	6.08
Critical Hdwy Stg 1	-	-	-	-	4.8	-
Critical Hdwy Stg 2	-	-	-	-	4.8	-
Follow-up Hdwy	3.2	-	-	-	3	3.3
Pot Cap-1 Maneuver	975	-	-	-	765	842
Stage 1	-	-	-	-	994	-
Stage 2	-	-	-	-	1027	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	974	-	-	-	759	837
Mov Cap-2 Maneuver	-	-	-	-	759	-
Stage 1	-	-	-	-	987	-
Stage 2	-	-	-	-	1026	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	974	-	-	-	830
HCM Lane V/C Ratio	0.005	-	-	-	0.017
HCM Control Delay (s)	8.7	0	-	-	9.4
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	46	137	295	0	0	350
Future Volume (vph)	46	137	295	0	0	350
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	11	12	12	10
Grade (%)	-2%		0%			0%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	1580	1335	1657	0	0	1615
Flt Permitted	0.950					
Satd. Flow (perm)	1580	1335	1657	0	0	1615
Link Speed (mph)	25		40			40
Link Distance (ft)	206		447			2610
Travel Time (s)	5.6		7.6			44.5
Confl. Peds. (#/hr)	1	1				
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	2%	8%	5%	0%	0%	4%
Adj. Flow (vph)	58	171	369	0	0	438
Shared Lane Traffic (%)						
Lane Group Flow (vph)	58	171	369	0	0	438
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	46	137	295	0	0	350
Future Vol, veh/h	46	137	295	0	0	350
Conflicting Peds, #/hr	1	1	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-2	-	0	-	-	0
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	8	5	0	0	4
Mvmt Flow	58	171	369	0	0	438

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	808	370	0	-	-	-
Stage 1	369	-	-	-	-	-
Stage 2	439	-	-	-	-	-
Critical Hdwy	6.02	6.08	-	-	-	-
Critical Hdwy Stg 1	5.02	-	-	-	-	-
Critical Hdwy Stg 2	5.02	-	-	-	-	-
Follow-up Hdwy	3	3.2	-	-	-	-
Pot Cap-1 Maneuver	427	707	-	0	0	-
Stage 1	833	-	-	0	0	-
Stage 2	777	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	427	706	-	-	-	-
Mov Cap-2 Maneuver	427	-	-	-	-	-
Stage 1	833	-	-	-	-	-
Stage 2	776	-	-	-	-	-

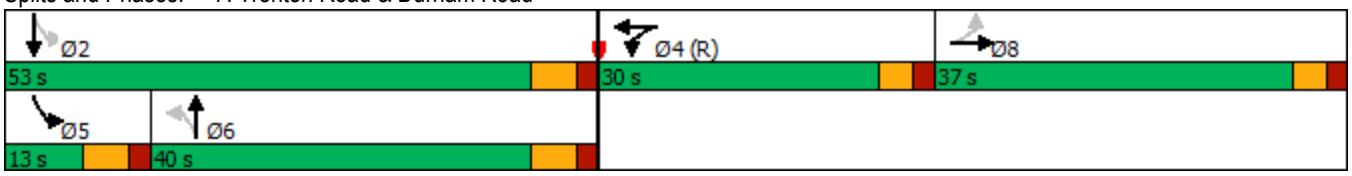
Approach	WB	NB	SB
HCM Control Delay, s	12.5	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	427	706	-
HCM Lane V/C Ratio	-	0.135	0.243	-
HCM Control Delay (s)	-	14.7	11.7	-
HCM Lane LOS	-	B	B	-
HCM 95th %tile Q(veh)	-	0.5	0.9	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	157	11	65	255	69	39	417	67	42	243	162
Future Volume (vph)	82	157	11	65	255	69	39	417	67	42	243	162
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	11	11	12	11	10	12
Storage Length (ft)	0		0	150		0	300		0	105		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.968			0.979			0.940	
Flt Protected		0.984		0.950			0.950			0.950		
Satd. Flow (prot)	0	1651	0	1660	1669	0	1574	1654	0	1574	1524	0
Flt Permitted		0.761		0.950			0.422			0.100		
Satd. Flow (perm)	0	1277	0	1660	1669	0	699	1654	0	166	1524	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			10			7			33	
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		515			776			2610			678	
Travel Time (s)		10.0			15.1			44.5			11.6	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	6%	5%	36%	3%	4%	6%	5%	3%	3%	5%	4%	3%
Adj. Flow (vph)	92	176	12	73	287	78	44	469	75	47	273	182
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	280	0	73	365	0	44	544	0	47	455	0
Turn Type	Perm	NA		Split	NA		Perm	NA		pm+pt	NA	
Protected Phases		8		4	4			6		5	2	
Permitted Phases	8						6			2		
Detector Phase	8	8		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		15.0	15.0		3.0	15.0	
Minimum Split (s)	8.0	8.0		8.0	8.0		21.0	21.0		9.0	21.0	
Total Split (s)	37.0	37.0		30.0	30.0		40.0	40.0		13.0	53.0	
Total Split (%)	30.8%	30.8%		25.0%	25.0%		33.3%	33.3%		10.8%	44.2%	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)		4.0		4.0	4.0		5.0	5.0		5.0	5.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	None	None		C-Max	C-Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 24 (20%), Referenced to phase 4:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	

Splits and Phases: 7: Trenton Road & Durham Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	82	157	11	65	255	69	39	417	67	42	243	162
Future Volume (veh/h)	82	157	11	65	255	69	39	417	67	42	243	162
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1716	1730	1295	1758	1744	1716	1730	1758	1758	1730	1744	1758
Adj Flow Rate, veh/h	92	176	11	73	287	71	44	469	75	47	273	166
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	6	5	36	3	4	6	5	3	3	5	4	3
Cap, veh/h	110	211	13	536	432	107	189	431	69	129	379	231
Arrive On Green	0.19	0.20	0.19	0.32	0.32	0.31	0.29	0.29	0.28	0.04	0.37	0.37
Sat Flow, veh/h	557	1066	67	1674	1350	334	879	1479	236	1647	1015	617
Grp Volume(v), veh/h	279	0	0	73	0	358	44	0	544	47	0	439
Grp Sat Flow(s),veh/h/ln	1690	0	0	1674	0	1684	879	0	1715	1647	0	1633
Q Serve(g_s), s	19.0	0.0	0.0	3.7	0.0	22.1	5.4	0.0	35.0	2.3	0.0	27.7
Cycle Q Clear(g_c), s	19.0	0.0	0.0	3.7	0.0	22.1	22.8	0.0	35.0	2.3	0.0	27.7
Prop In Lane	0.33		0.04	1.00		0.20	1.00		0.14	1.00		0.38
Lane Grp Cap(c), veh/h	335	0	0	536	0	539	189	0	500	129	0	610
V/C Ratio(X)	0.83	0.00	0.00	0.14	0.00	0.66	0.23	0.00	1.09	0.36	0.00	0.72
Avail Cap(c_a), veh/h	465	0	0	536	0	539	189	0	500	173	0	653
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	46.4	0.0	0.0	29.0	0.0	35.3	46.0	0.0	42.6	31.7	0.0	32.4
Incr Delay (d2), s/veh	13.1	0.0	0.0	0.5	0.0	6.3	1.3	0.0	66.0	3.6	0.0	4.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	14.1	0.0	0.0	2.8	0.0	15.0	2.2	0.0	33.1	1.8	0.0	16.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.4	0.0	0.0	29.5	0.0	41.7	47.3	0.0	108.6	35.4	0.0	37.1
LnGrp LOS	E	A	A	C	A	D	D	A	F	D	A	D
Approach Vol, veh/h		279			431			588			486	
Approach Delay, s/veh		59.4			39.6			104.0			37.0	
Approach LOS		E			D			F			D	

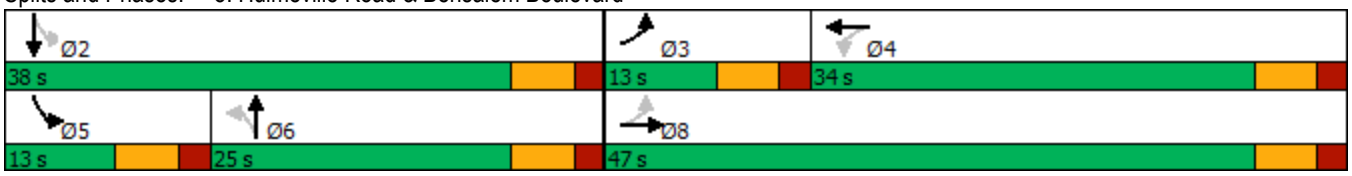
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		49.8		42.4	9.8	40.0		27.8				
Change Period (Y+Rc), s		6.0		5.0	6.0	6.0		5.0				
Max Green Setting (Gmax), s		47.0		25.0	7.0	34.0		32.0				
Max Q Clear Time (g_c+I1), s		29.7		24.1	4.8	37.0		21.0				
Green Ext Time (p_c), s		3.9		0.3	0.0	0.0		1.7				

Intersection Summary												
HCM 6th Ctrl Delay			63.2									
HCM 6th LOS			E									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	233	152	30	24	101	187	26	313	18	83	246	118
Future Volume (vph)	233	152	30	24	101	187	26	313	18	83	246	118
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	13	12	12	12	12	10	12	12	11	14	12
Storage Length (ft)	175		0	0		0	100		0	125		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.975			0.919			0.992			0.951	
Flt Protected	0.950				0.996		0.950			0.950		
Satd. Flow (prot)	1693	1778	0	0	1572	0	1478	1721	0	1574	1755	0
Flt Permitted	0.277				0.962		0.520			0.265		
Satd. Flow (perm)	494	1778	0	0	1519	0	809	1721	0	439	1755	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			96			3			33	
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		264			377			503			1368	
Travel Time (s)		5.1			7.3			8.6			23.3	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	1%	1%	7%	13%	8%	2%	8%	3%	17%	5%	5%	2%
Adj. Flow (vph)	265	173	34	27	115	213	30	356	20	94	280	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	265	207	0	0	355	0	30	376	0	94	414	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	3	8			4			6		5	2	
Permitted Phases	8			4			6			2		
Detector Phase	3	8		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		18.0	18.0		3.0	18.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		24.0	24.0		9.0	24.0	
Total Split (s)	13.0	47.0		34.0	34.0		25.0	25.0		13.0	38.0	
Total Split (%)	15.3%	55.3%		40.0%	40.0%		29.4%	29.4%		15.3%	44.7%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0			-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Recall Mode	None	None		None	None		Max	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 85	
Actuated Cycle Length: 75.9	
Natural Cycle: 65	
Control Type: Semi Act-Uncoord	

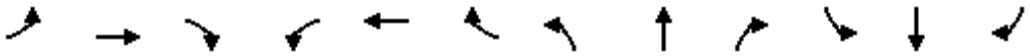
Splits and Phases: 8: Hulmeville Road & Bensalem Boulevard



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	233	152	30	24	101	187	26	313	18	83	246	118
Future Volume (veh/h)	233	152	30	24	101	187	26	313	18	83	246	118
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1857	1702	1617	1688	1772	1688	1758	1561	1730	1799	1772
Adj Flow Rate, veh/h	265	173	29	27	115	170	30	356	15	94	280	112
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	1	1	7	13	8	2	8	3	17	5	5	2
Cap, veh/h	443	662	111	70	155	207	346	502	21	327	538	215
Arrive On Green	0.11	0.43	0.41	0.24	0.25	0.24	0.30	0.30	0.29	0.07	0.44	0.43
Sat Flow, veh/h	1701	1551	260	71	611	817	895	1675	71	1647	1222	489
Grp Volume(v), veh/h	265	0	202	312	0	0	30	0	371	94	0	392
Grp Sat Flow(s),veh/h/ln	1701	0	1811	1499	0	0	895	0	1745	1647	0	1711
Q Serve(g_s), s	8.0	0.0	5.4	7.0	0.0	0.0	1.9	0.0	14.2	2.7	0.0	12.5
Cycle Q Clear(g_c), s	8.0	0.0	5.4	14.9	0.0	0.0	3.4	0.0	14.2	2.7	0.0	12.5
Prop In Lane	1.00		0.14	0.09		0.54	1.00		0.04	1.00		0.29
Lane Grp Cap(c), veh/h	443	0	773	412	0	0	346	0	524	327	0	753
V/C Ratio(X)	0.60	0.00	0.26	0.76	0.00	0.00	0.09	0.00	0.71	0.29	0.00	0.52
Avail Cap(c_a), veh/h	443	0	1014	608	0	0	346	0	524	382	0	753
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.4	0.0	13.9	26.7	0.0	0.0	20.2	0.0	23.4	16.0	0.0	15.4
Incr Delay (d2), s/veh	2.2	0.0	0.2	3.1	0.0	0.0	0.5	0.0	7.9	0.5	0.0	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.9	0.0	3.7	9.2	0.0	0.0	0.7	0.0	10.6	1.7	0.0	8.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.6	0.0	14.1	29.8	0.0	0.0	20.7	0.0	31.3	16.4	0.0	18.0
LnGrp LOS	B	A	B	C	A	A	C	A	C	B	A	B
Approach Vol, veh/h		467			312			401			486	
Approach Delay, s/veh		16.7			29.8			30.5			17.7	
Approach LOS		B			C			C			B	

Timer - Assigned Phs		2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s		38.0	13.0	24.0	10.5	27.5		37.0				
Change Period (Y+Rc), s		6.0	6.0	6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		32.0	7.0	28.0	7.0	19.0		41.0				
Max Q Clear Time (g_c+I1), s		14.5	10.5	16.9	5.2	16.2		7.4				
Green Ext Time (p_c), s		1.3	0.0	1.1	0.0	0.4		0.9				

Intersection Summary												
HCM 6th Ctrl Delay			22.7									
HCM 6th LOS			C									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	3	12	6	65	2	478	13	51	381	4
Future Volume (vph)	0	0	3	12	6	65	2	478	13	51	381	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	13	12	12	10	12	12	11	12	12	11	12
Grade (%)		2%			-2%			-2%			2%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.865			0.894			0.996			0.999	
Flt Protected					0.993						0.994	
Satd. Flow (prot)	0	1593	0	0	1436	0	0	1750	0	0	1692	0
Flt Permitted					0.993						0.994	
Satd. Flow (perm)	0	1593	0	0	1436	0	0	1750	0	0	1692	0
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		256			1808			380			1439	
Travel Time (s)		7.0			49.3			6.5			24.5	
Confl. Peds. (#/hr)							3		3			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	17%	0%	3%	0%	0%	0%	2%	1%	0%
Adj. Flow (vph)	0	0	3	13	6	68	2	503	14	54	401	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	3	0	0	87	0	0	519	0	0	459	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

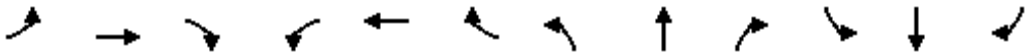
Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	3	12	6	65	2	478	13	51	381	4
Future Vol, veh/h	0	0	3	12	6	65	2	478	13	51	381	4
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	3	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-2	-	-	-2	-	-	2	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	17	0	3	0	0	0	2	1	0
Mvmt Flow	0	0	3	13	6	68	2	503	14	54	401	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1065	1038	406	1030	1033	513	408	0	0	520	0	0
Stage 1	514	514	-	517	517	-	-	-	-	-	-	-
Stage 2	551	524	-	513	516	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.9	6.4	6.87	6.1	6.03	4.3	-	-	4.3	-	-
Critical Hdwy Stg 1	6.5	5.9	-	5.87	5.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.9	-	5.87	5.1	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.1	3.2	4	3.1	3	-	-	3	-	-
Pot Cap-1 Maneuver	197	207	669	241	263	608	870	-	-	795	-	-
Stage 1	583	509	-	604	569	-	-	-	-	-	-	-
Stage 2	553	503	-	607	569	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	159	187	667	223	238	607	867	-	-	793	-	-
Mov Cap-2 Maneuver	159	187	-	223	238	-	-	-	-	-	-	-
Stage 1	580	463	-	601	566	-	-	-	-	-	-	-
Stage 2	484	500	-	551	517	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.4	15	0	1.2
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	867	-	-	667	446	793	-	-
HCM Lane V/C Ratio	0.002	-	-	0.005	0.196	0.068	-	-
HCM Control Delay (s)	9.2	0	-	10.4	15	9.9	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.7	0.2	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	4	2	0	0	0	7	512	19	24	425	33
Future Volume (vph)	6	4	2	0	0	0	7	512	19	24	425	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	16	12	12	11	12	12	11	12
Grade (%)		1%			2%			0%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977						0.995			0.991	
Flt Protected		0.976						0.999			0.997	
Satd. Flow (prot)	0	1708	0	0	0	0	0	1730	0	0	1694	0
Flt Permitted		0.976						0.999			0.997	
Satd. Flow (perm)	0	1708	0	0	0	0	0	1730	0	0	1694	0
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		357			346			1102			447	
Travel Time (s)		9.7			9.4			18.8			7.6	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	9%
Adj. Flow (vph)	6	4	2	0	0	0	7	528	20	25	438	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	0	0	0	0	0	555	0	0	497	0
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Vol, veh/h	6	4	2	0	0	0	7	512	19	24	425	33
Future Vol, veh/h	6	4	2	0	0	0	7	512	19	24	425	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	2	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	1	9
Mvmt Flow	6	4	2	0	0	0	7	528	20	25	438	34

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	1057	1067	455			472	0	0	548	0	0
Stage 1	505	505	-			-	-	-	-	-	-
Stage 2	552	562	-			-	-	-	-	-	-
Critical Hdwy	6.6	6.7	6.3			4.3	-	-	4.3	-	-
Critical Hdwy Stg 1	5.6	5.7	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.6	5.7	-			-	-	-	-	-	-
Follow-up Hdwy	3	4	3.1			3	-	-	3	-	-
Pot Cap-1 Maneuver	260	211	633			826	-	-	777	-	-
Stage 1	670	529	-			-	-	-	-	-	-
Stage 2	634	497	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	246	0	633			826	-	-	777	-	-
Mov Cap-2 Maneuver	246	0	-			-	-	-	-	-	-
Stage 1	662	0	-			-	-	-	-	-	-
Stage 2	606	0	-			-	-	-	-	-	-

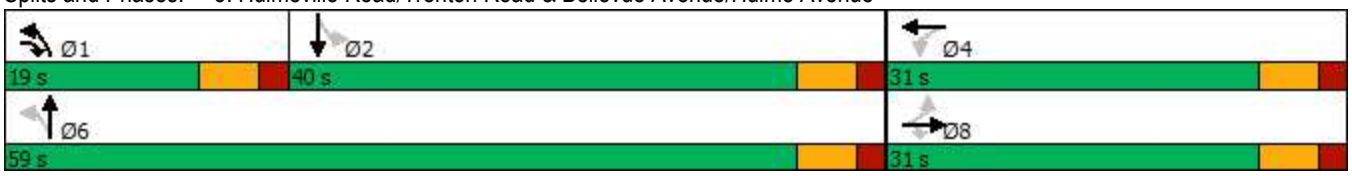
Approach	EB	NB	SB
HCM Control Delay, s	18	0.1	0.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	826	-	-	290	777	-	-
HCM Lane V/C Ratio	0.009	-	-	0.043	0.032	-	-
HCM Control Delay (s)	9.4	0	-	18	9.8	0	-
HCM Lane LOS	A	A	-	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	133	477	30	155	1	294	435	36	0	320	66
Future Volume (vph)	59	133	477	30	155	1	294	435	36	0	320	66
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	14	15	12	14	12	10	15	12	12	12	12
Storage Length (ft)	0		75	0		0	350		0	0		0
Storage Lanes	0		1	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor											1.00	
Frt			0.850		0.999			0.988			0.977	
Flt Protected		0.985			0.992		0.950					
Satd. Flow (prot)	0	1853	1666	0	1872	0	1565	1956	0	0	1728	0
Flt Permitted		0.761			0.894		0.365					
Satd. Flow (perm)	0	1431	1666	0	1687	0	601	1956	0	0	1728	0
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			353					8				
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		638			194			1368			380	
Travel Time (s)		12.4			3.8			26.6			7.4	
Confl. Peds. (#/hr)										3		3
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	3%	1%	0%	2%	0%	2%	0%	0%	0%	1%	3%
Adj. Flow (vph)	61	139	497	31	161	1	306	453	38	0	333	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	200	497	0	193	0	306	491	0	0	402	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA			NA	
Protected Phases		8	1		4		1	6			2	
Permitted Phases	8		8	4	4		6			2		
Detector Phase	8	8	1	4	4		1	6		2	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0		3.0	20.0		20.0	20.0	
Minimum Split (s)	24.0	24.0	9.0	24.0	24.0		9.0	26.0		26.0	26.0	
Total Split (s)	31.0	31.0	19.0	31.0	31.0		19.0	59.0		40.0	40.0	
Total Split (%)	34.4%	34.4%	21.1%	34.4%	34.4%		21.1%	65.6%		44.4%	44.4%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0	-1.0		-1.0		-1.0	-1.0			-1.0	
Total Lost Time (s)		5.0	5.0		5.0		5.0	5.0			5.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Recall Mode	None	None	None	None	None		None	Max		Max	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 80.3	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	

Splits and Phases: 3: Hulmeville Road/Trenton Road & Bellevue Avenue/Hulme Avenue



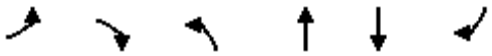
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	133	477	30	155	1	294	435	36	0	320	66
Future Volume (veh/h)	59	133	477	30	155	1	294	435	36	0	320	66
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1828	1857	1800	1843	1800	1772	1872	1800	1800	1786	1758
Adj Flow Rate, veh/h	61	139	0	31	161	1	306	453	35	0	333	69
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	3	1	0	2	0	2	0	0	0	1	3
Cap, veh/h	127	201		85	260	2	655	1209	93	0	732	152
Arrive On Green	0.15	0.16	0.00	0.15	0.16	0.15	0.13	0.70	0.69	0.00	0.51	0.50
Sat Flow, veh/h	397	1222	1574	183	1581	9	1688	1716	133	0	1434	297
Grp Volume(v), veh/h	200	0	0	193	0	0	306	0	488	0	0	402
Grp Sat Flow(s),veh/h/ln	1619	0	1574	1773	0	0	1688	0	1848	0	0	1731
Q Serve(g_s), s	1.3	0.0	0.0	0.0	0.0	0.0	5.6	0.0	8.1	0.0	0.0	11.4
Cycle Q Clear(g_c), s	9.1	0.0	0.0	7.8	0.0	0.0	5.6	0.0	8.1	0.0	0.0	11.4
Prop In Lane	0.30		1.00	0.16		0.01	1.00		0.07	0.00		0.17
Lane Grp Cap(c), veh/h	307	0		323	0	0	655	0	1303	0	0	884
V/C Ratio(X)	0.65	0.00		0.60	0.00	0.00	0.47	0.00	0.37	0.00	0.00	0.45
Avail Cap(c_a), veh/h	582	0		621	0	0	745	0	1303	0	0	884
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	30.5	0.0	0.0	30.0	0.0	0.0	6.8	0.0	4.5	0.0	0.0	12.0
Incr Delay (d2), s/veh	2.3	0.0	0.0	1.8	0.0	0.0	0.5	0.0	0.8	0.0	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.5	0.0	0.0	6.1	0.0	0.0	2.7	0.0	4.4	0.0	0.0	7.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.9	0.0	0.0	31.8	0.0	0.0	7.3	0.0	5.4	0.0	0.0	13.7
LnGrp LOS	C	A		C	A	A	A	A	A	A	A	B
Approach Vol, veh/h		200			193			794			402	
Approach Delay, s/veh		32.9			31.8			6.1			13.7	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	14.9	44.1		17.6		59.0		17.6				
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s	13.0	34.0		25.0		53.0		25.0				
Max Q Clear Time (g_c+I1), s	8.1	13.4		9.8		10.1		11.1				
Green Ext Time (p_c), s	0.8	1.4		0.5		1.9		0.5				

Intersection Summary			
HCM 6th Ctrl Delay		14.5	
HCM 6th LOS		B	

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	160	218	320	520	1
Future Volume (vph)	1	160	218	320	520	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	10	10	10	10
Grade (%)	-1%			3%	-3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.866					
Flt Protected				0.980		
Satd. Flow (prot)	1420	0	0	1590	1672	0
Flt Permitted				0.980		
Satd. Flow (perm)	1420	0	0	1590	1672	0
Link Speed (mph)	35			35	35	
Link Distance (ft)	562			638	742	
Travel Time (s)	10.9			12.4	14.5	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	3%	2%	2%	2%	0%
Adj. Flow (vph)	1	176	240	352	571	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	177	0	0	592	572	0
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

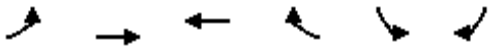
Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	160	218	320	520	1
Future Vol, veh/h	1	160	218	320	520	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-1	-	-	3	-3	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	3	2	2	2	0
Mvmt Flow	1	176	240	352	571	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1404	572	572	0	-	0
Stage 1	572	-	-	-	-	-
Stage 2	832	-	-	-	-	-
Critical Hdwy	6.2	6.13	4.3	-	-	-
Critical Hdwy Stg 1	5.2	-	-	-	-	-
Critical Hdwy Stg 2	5.2	-	-	-	-	-
Follow-up Hdwy	3	3.1	3	-	-	-
Pot Cap-1 Maneuver	181	555	762	-	-	-
Stage 1	660	-	-	-	-	-
Stage 2	500	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	110	555	762	-	-	-
Mov Cap-2 Maneuver	110	-	-	-	-	-
Stage 1	402	-	-	-	-	-
Stage 2	500	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.9	4.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	762	-	541	-	-
HCM Lane V/C Ratio	0.314	-	0.327	-	-
HCM Control Delay (s)	11.9	0	14.9	-	-
HCM Lane LOS	B	A	B	-	-
HCM 95th %tile Q(veh)	1.3	-	1.4	-	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	16	204	248	0	1	9
Future Volume (vph)	16	204	248	0	1	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	11	11	12	13	12
Grade (%)		0%	0%		-3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.877	
Flt Protected		0.996			0.995	
Satd. Flow (prot)	0	1702	1723	0	1647	0
Flt Permitted		0.996			0.995	
Satd. Flow (perm)	0	1702	1723	0	1647	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		1808	258		297	
Travel Time (s)		49.3	7.0		8.1	
Confl. Peds. (#/hr)					3	3
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	2%	1%	0%	0%	0%
Adj. Flow (vph)	19	237	288	0	1	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	256	288	0	11	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	204	248	0	1	9
Future Vol, veh/h	16	204	248	0	1	9
Conflicting Peds, #/hr	0	0	0	0	3	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	-3	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	2	1	0	0	0
Mvmt Flow	19	237	288	0	1	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	288	0	-	0	566	291
Stage 1	-	-	-	-	288	-
Stage 2	-	-	-	-	278	-
Critical Hdwy	4.3	-	-	-	5.8	5.9
Critical Hdwy Stg 1	-	-	-	-	4.8	-
Critical Hdwy Stg 2	-	-	-	-	4.8	-
Follow-up Hdwy	3	-	-	-	3	3.1
Pot Cap-1 Maneuver	957	-	-	-	605	815
Stage 1	-	-	-	-	919	-
Stage 2	-	-	-	-	928	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	957	-	-	-	591	813
Mov Cap-2 Maneuver	-	-	-	-	591	-
Stage 1	-	-	-	-	898	-
Stage 2	-	-	-	-	928	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	957	-	-	-	784
HCM Lane V/C Ratio	0.019	-	-	-	0.015
HCM Control Delay (s)	8.8	0	-	-	9.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	77	142	408	0	0	364
Future Volume (vph)	77	142	408	0	0	364
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	11	12	12	10
Grade (%)	-2%		0%			0%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	1507	1361	1689	0	0	1631
Flt Permitted	0.950					
Satd. Flow (perm)	1507	1361	1689	0	0	1631
Link Speed (mph)	25		40			40
Link Distance (ft)	206		447			2610
Travel Time (s)	5.6		7.6			44.5
Confl. Peds. (#/hr)	2	2				
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Heavy Vehicles (%)	7%	6%	3%	0%	0%	3%
Adj. Flow (vph)	100	184	530	0	0	473
Shared Lane Traffic (%)						
Lane Group Flow (vph)	100	184	530	0	0	473
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	77	142	408	0	0	364
Future Vol, veh/h	77	142	408	0	0	364
Conflicting Peds, #/hr	2	2	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-2	-	0	-	-	0
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	7	6	3	0	0	3
Mvmt Flow	100	184	530	0	0	473

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1005	532	0	-	-	-
Stage 1	530	-	-	-	-	-
Stage 2	475	-	-	-	-	-
Critical Hdwy	6.07	6.06	-	-	-	-
Critical Hdwy Stg 1	5.07	-	-	-	-	-
Critical Hdwy Stg 2	5.07	-	-	-	-	-
Follow-up Hdwy	3.1	3.2	-	-	-	-
Pot Cap-1 Maneuver	319	577	-	0	0	-
Stage 1	686	-	-	0	0	-
Stage 2	725	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	318	576	-	-	-	-
Mov Cap-2 Maneuver	318	-	-	-	-	-
Stage 1	686	-	-	-	-	-
Stage 2	724	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.7	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	318	576	-
HCM Lane V/C Ratio	-	0.314	0.32	-
HCM Control Delay (s)	-	21.4	14.2	-
HCM Lane LOS	-	C	B	-
HCM 95th %tile Q(veh)	-	1.3	1.4	-

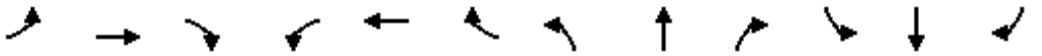
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	266	18	104	197	59	35	417	95	66	426	99
Future Volume (vph)	117	266	18	104	197	59	35	417	95	66	426	99
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	11	11	12	11	10	12
Storage Length (ft)	0		0	150		0	300		0	105		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor				1.00	0.99		1.00	1.00				
Frt		0.994			0.965			0.972			0.972	
Flt Protected		0.986		0.950			0.950			0.950		
Satd. Flow (prot)	0	1725	0	1660	1665	0	1653	1675	0	1653	1617	0
Flt Permitted		0.805		0.950			0.281			0.092		
Satd. Flow (perm)	0	1408	0	1658	1665	0	489	1675	0	160	1617	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			11			10			12	
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		515			776			2610			678	
Travel Time (s)		10.0			15.1			44.5			11.6	
Confl. Peds. (#/hr)				1		1	1		1			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	3%	0%	3%	4%	3%	0%	0%	3%	0%	1%	1%
Adj. Flow (vph)	124	283	19	111	210	63	37	444	101	70	453	105
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	426	0	111	273	0	37	545	0	70	558	0
Turn Type	Perm	NA		Split	NA		Perm	NA		pm+pt	NA	
Protected Phases		8		4	4			6		5	2	
Permitted Phases	8						6			2		
Detector Phase	8	8		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		15.0	15.0		3.0	15.0	
Minimum Split (s)	8.0	8.0		8.0	8.0		21.0	21.0		9.0	21.0	
Total Split (s)	36.0	36.0		30.0	30.0		41.0	41.0		13.0	54.0	
Total Split (%)	30.0%	30.0%		25.0%	25.0%		34.2%	34.2%		10.8%	45.0%	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)		4.0		4.0	4.0		5.0	5.0		5.0	5.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	None	None		C-Max	C-Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 6 (5%), Referenced to phase 4:WBTL, Start of Green	
Natural Cycle: 90	

Control Type: Actuated-Coordinated

Splits and Phases: 7: Trenton Road & Durham Road

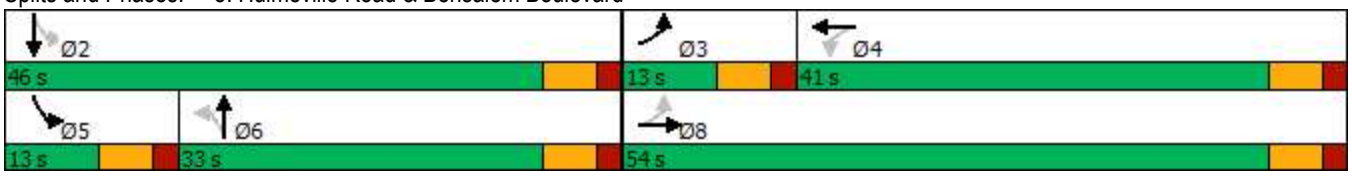
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	266	18	104	197	59	35	417	95	66	426	99
Future Volume (veh/h)	117	266	18	104	197	59	35	417	95	66	426	99
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1758	1800	1758	1744	1758	1800	1800	1758	1800	1786	1786
Adj Flow Rate, veh/h	124	283	18	111	210	47	37	444	94	70	453	92
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	3	0	3	4	3	0	0	3	0	1	1
Cap, veh/h	134	305	19	389	320	72	159	432	91	152	567	115
Arrive On Green	0.26	0.27	0.26	0.23	0.23	0.22	0.30	0.30	0.29	0.05	0.39	0.38
Sat Flow, veh/h	502	1145	73	1674	1379	309	829	1440	305	1714	1441	293
Grp Volume(v), veh/h	425	0	0	111	0	257	37	0	538	70	0	545
Grp Sat Flow(s),veh/h/ln	1720	0	0	1674	0	1687	829	0	1745	1714	0	1733
Q Serve(g_s), s	28.9	0.0	0.0	6.5	0.0	16.6	4.9	0.0	36.0	3.2	0.0	33.4
Cycle Q Clear(g_c), s	28.9	0.0	0.0	6.5	0.0	16.6	26.7	0.0	36.0	3.2	0.0	33.4
Prop In Lane	0.29		0.04	1.00		0.18	1.00		0.17	1.00		0.17
Lane Grp Cap(c), veh/h	458	0	0	389	0	392	159	0	523	152	0	682
V/C Ratio(X)	0.93	0.00	0.00	0.29	0.00	0.66	0.23	0.00	1.03	0.46	0.00	0.80
Avail Cap(c_a), veh/h	459	0	0	389	0	392	159	0	523	178	0	708
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	43.1	0.0	0.0	37.9	0.0	41.8	48.8	0.0	42.1	30.8	0.0	32.3
Incr Delay (d2), s/veh	26.0	0.0	0.0	1.8	0.0	8.3	1.6	0.0	46.7	4.6	0.0	7.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	21.8	0.0	0.0	5.2	0.0	12.3	1.9	0.0	29.9	2.7	0.0	21.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.1	0.0	0.0	39.7	0.0	50.1	50.3	0.0	88.8	35.4	0.0	39.6
LnGrp LOS	E	A	A	D	A	D	D	A	F	D	A	D
Approach Vol, veh/h		425			368			575			615	
Approach Delay, s/veh		69.1			47.0			86.3			39.2	
Approach LOS		E			D			F			D	
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		52.2		31.9	11.2	41.0		35.9				
Change Period (Y+Rc), s		6.0		5.0	6.0	6.0		5.0				
Max Green Setting (Gmax), s		48.0		25.0	7.0	35.0		31.0				
Max Q Clear Time (g_c+I1), s		35.4		18.6	5.7	38.0		30.9				
Green Ext Time (p_c), s		4.2		1.6	0.0	0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			60.7									
HCM 6th LOS			E									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	237	116	39	36	200	101	35	396	25	185	382	260
Future Volume (vph)	237	116	39	36	200	101	35	396	25	185	382	260
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	13	12	12	12	12	10	12	12	11	14	12
Storage Length (ft)	175		0	0		0	100		0	125		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.962			0.959			0.991			0.939	
Flt Protected	0.950				0.995		0.950			0.950		
Satd. Flow (prot)	1693	1750	0	0	1697	0	1550	1767	0	1637	1792	0
Flt Permitted	0.306				0.950		0.301			0.226		
Satd. Flow (perm)	545	1750	0	0	1620	0	491	1767	0	389	1792	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			24			3			41	
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		264			377			503			1368	
Travel Time (s)		5.1			7.3			8.6			23.3	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	1%	3%	0%	3%	1%	1%	3%	1%	0%	1%	1%	0%
Adj. Flow (vph)	239	117	39	36	202	102	35	400	25	187	386	263
Shared Lane Traffic (%)												
Lane Group Flow (vph)	239	156	0	0	340	0	35	425	0	187	649	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	3	8			4			6		5	2	
Permitted Phases	8			4			6			2		
Detector Phase	3	8		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		18.0	18.0		3.0	18.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		24.0	24.0		9.0	24.0	
Total Split (s)	13.0	54.0		41.0	41.0		33.0	33.0		13.0	46.0	
Total Split (%)	13.0%	54.0%		41.0%	41.0%		33.0%	33.0%		13.0%	46.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Recall Mode	None	None		None	None		Max	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 87.5	
Natural Cycle: 80	
Control Type: Semi Act-Uncoord	

Splits and Phases: 8: Hulmeville Road & Bensalem Boulevard

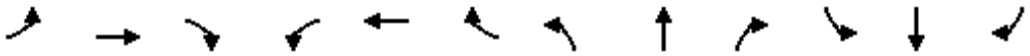


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	237	116	39	36	200	101	35	396	25	185	382	260
Future Volume (veh/h)	237	116	39	36	200	101	35	396	25	185	382	260
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1828	1800	1758	1786	1786	1758	1786	1800	1786	1857	1800
Adj Flow Rate, veh/h	239	117	33	36	202	82	35	400	21	187	386	245
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	1	3	0	3	1	1	3	1	0	1	1	0
Cap, veh/h	365	522	147	74	250	95	219	541	28	329	506	321
Arrive On Green	0.08	0.38	0.38	0.23	0.23	0.23	0.32	0.32	0.32	0.08	0.48	0.48
Sat Flow, veh/h	1701	1372	387	117	1110	423	748	1682	88	1701	1062	674
Grp Volume(v), veh/h	239	0	150	320	0	0	35	0	421	187	0	631
Grp Sat Flow(s),veh/h/ln	1701	0	1759	1650	0	0	748	0	1770	1701	0	1736
Q Serve(g_s), s	7.0	0.0	4.8	8.8	0.0	0.0	3.4	0.0	17.8	5.9	0.0	25.1
Cycle Q Clear(g_c), s	7.0	0.0	4.8	15.6	0.0	0.0	15.5	0.0	17.8	5.9	0.0	25.1
Prop In Lane	1.00		0.22	0.11		0.26	1.00		0.05	1.00		0.39
Lane Grp Cap(c), veh/h	365	0	669	420	0	0	219	0	569	329	0	827
V/C Ratio(X)	0.65	0.00	0.22	0.76	0.00	0.00	0.16	0.00	0.74	0.57	0.00	0.76
Avail Cap(c_a), veh/h	365	0	1006	730	0	0	219	0	569	329	0	827
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.7	0.0	17.6	31.1	0.0	0.0	29.8	0.0	25.3	18.3	0.0	18.1
Incr Delay (d2), s/veh	4.2	0.0	0.2	2.9	0.0	0.0	1.6	0.0	8.4	2.3	0.0	6.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.2	0.0	3.4	10.3	0.0	0.0	1.2	0.0	12.9	4.1	0.0	15.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.9	0.0	17.8	34.0	0.0	0.0	31.3	0.0	33.7	20.6	0.0	24.6
LnGrp LOS	C	A	B	C	A	A	C	A	C	C	A	C
Approach Vol, veh/h		389			320			456			818	
Approach Delay, s/veh		23.4			34.0			33.5			23.7	
Approach LOS		C			C			C			C	

Timer - Assigned Phs		2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s		46.0	13.0	24.9	13.0	33.0		37.9				
Change Period (Y+Rc), s		6.0	6.0	6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		40.0	7.0	35.0	7.0	27.0		48.0				
Max Q Clear Time (g_c+I1), s		27.1	9.0	17.6	7.9	19.8		6.8				
Green Ext Time (p_c), s		2.2	0.0	1.4	0.0	1.1		0.7				

Intersection Summary												
HCM 6th Ctrl Delay			27.6									
HCM 6th LOS			C									

2027 Projected Conditions



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	0	19	4	63	0	395	23	34	312	3
Future Volume (vph)	1	0	0	19	4	63	0	395	23	34	312	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	13	12	12	10	12	12	11	12	12	11	12
Grade (%)		2%			-2%			-2%			2%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.901			0.993			0.999	
Flt Protected		0.950			0.989						0.995	
Satd. Flow (prot)	0	1749	0	0	1405	0	0	1689	0	0	1648	0
Flt Permitted		0.950			0.989						0.995	
Satd. Flow (perm)	0	1749	0	0	1405	0	0	1689	0	0	1648	0
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		256			1808			380			1439	
Travel Time (s)		7.0			49.3			6.5			24.5	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	11%	0%	7%	0%	3%	9%	10%	3%	33%
Adj. Flow (vph)	1	0	0	21	4	69	0	434	25	37	343	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1	0	0	94	0	0	459	0	0	383	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

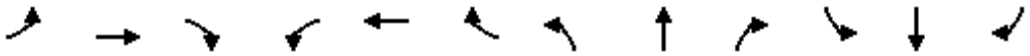
Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	0	0	19	4	63	0	395	23	34	312	3
Future Vol, veh/h	1	0	0	19	4	63	0	395	23	34	312	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-2	-	-	-2	-	-	2	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	11	0	7	0	3	9	10	3	33
Mvmt Flow	1	0	0	21	4	69	0	434	25	37	343	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	902	878	345	866	867	447	346	0	0	459	0	0
Stage 1	419	419	-	447	447	-	-	-	-	-	-	-
Stage 2	483	459	-	419	420	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.9	6.4	6.81	6.1	6.07	4.3	-	-	4.4	-	-
Critical Hdwy Stg 1	6.5	5.9	-	5.81	5.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.9	-	5.81	5.1	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.1	3.1	4	3.2	3	-	-	3.1	-	-
Pot Cap-1 Maneuver	261	262	727	320	323	642	914	-	-	802	-	-
Stage 1	667	566	-	680	606	-	-	-	-	-	-	-
Stage 2	609	541	-	703	621	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	220	247	727	306	305	642	914	-	-	802	-	-
Mov Cap-2 Maneuver	220	247	-	306	305	-	-	-	-	-	-	-
Stage 1	667	534	-	680	606	-	-	-	-	-	-	-
Stage 2	539	541	-	663	586	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.4	14	0	0.9
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	914	-	-	220	496	802	-	-
HCM Lane V/C Ratio	-	-	-	0.005	0.191	0.047	-	-
HCM Control Delay (s)	0	-	-	21.4	14	9.7	0	-
HCM Lane LOS	A	-	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.7	0.1	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	28	4	0	0	0	1	376	74	114	320	17
Future Volume (vph)	7	28	4	0	0	0	1	376	74	114	320	17
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	16	12	12	11	12	12	11	12
Grade (%)		1%			2%			0%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.985						0.978			0.995	
Flt Protected		0.991									0.988	
Satd. Flow (prot)	0	1587	0	0	0	0	0	1634	0	0	1659	0
Flt Permitted		0.991									0.988	
Satd. Flow (perm)	0	1587	0	0	0	0	0	1634	0	0	1659	0
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		357			346			1102			447	
Travel Time (s)		9.7			9.4			18.8			7.6	
Confl. Peds. (#/hr)										11		11
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	29%	7%	0%	0%	0%	0%	0%	3%	10%	4%	3%	0%
Adj. Flow (vph)	8	32	5	0	0	0	1	432	85	131	368	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	45	0	0	0	0	0	518	0	0	519	0
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕						⇕			⇕	
Traffic Vol, veh/h	7	28	4	0	0	0	1	376	74	114	320	17
Future Vol, veh/h	7	28	4	0	0	0	1	376	74	114	320	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	11	0	11
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	2	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	29	7	0	0	0	0	0	3	10	4	3	0
Mvmt Flow	8	32	5	0	0	0	1	432	85	131	368	20

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	1128	1181	389	399	0	0	528	0	0
Stage 1	651	651	-	-	-	-	-	-	-
Stage 2	477	530	-	-	-	-	-	-	-
Critical Hdwy	6.89	6.77	6.3	4.3	-	-	4.3	-	-
Critical Hdwy Stg 1	5.89	5.77	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.89	5.77	-	-	-	-	-	-	-
Follow-up Hdwy	3.3	4.063	3.1	3	-	-	3	-	-
Pot Cap-1 Maneuver	202	174	692	876	-	-	789	-	-
Stage 1	499	441	-	-	-	-	-	-	-
Stage 2	617	503	-	-	-	-	-	-	-
Platoon blocked, %					-	-		-	-
Mov Cap-1 Maneuver	156	0	685	867	-	-	789	-	-
Mov Cap-2 Maneuver	156	0	-	-	-	-	-	-	-
Stage 1	493	0	-	-	-	-	-	-	-
Stage 2	481	0	-	-	-	-	-	-	-

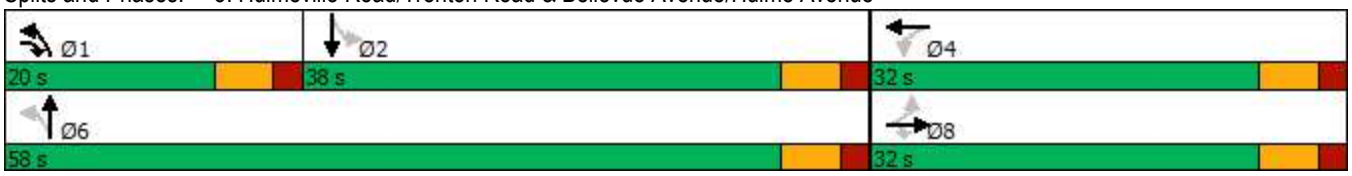
Approach	EB	NB	SB
HCM Control Delay, s	25.9	0	2.6
HCM LOS	D		

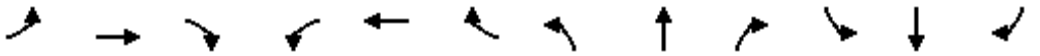
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	867	-	-	217	789	-	-
HCM Lane V/C Ratio	0.001	-	-	0.207	0.166	-	-
HCM Control Delay (s)	9.2	0	-	25.9	10.5	0	-
HCM Lane LOS	A	A	-	D	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0.8	0.6	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	77	246	15	103	7	367	356	26	1	260	64
Future Volume (vph)	44	77	246	15	103	7	367	356	26	1	260	64
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	14	15	12	14	12	10	15	12	12	12	12
Storage Length (ft)	0		75	0		0	350		0	0		0
Storage Lanes	0		1	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.992			0.990			0.973	
Flt Protected		0.982			0.994		0.950					
Satd. Flow (prot)	0	1853	1618	0	1777	0	1535	1907	0	0	1680	0
Flt Permitted		0.795			0.946		0.425				0.999	
Satd. Flow (perm)	0	1501	1618	0	1691	0	687	1907	0	0	1678	0
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			273					7				
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		638			194			1368			380	
Travel Time (s)		12.4			3.8			26.6			7.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	1%	4%	0%	8%	0%	4%	3%	0%	100%	3%	8%
Adj. Flow (vph)	49	86	273	17	114	8	408	396	29	1	289	71
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	135	273	0	139	0	408	425	0	0	361	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		8	1		4		1	6			2	
Permitted Phases	8		8	4	4		6			2		
Detector Phase	8	8	1	4	4		1	6		2	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0		3.0	20.0		20.0	20.0	
Minimum Split (s)	9.0	9.0	9.0	9.0	9.0		9.0	26.0		26.0	26.0	
Total Split (s)	32.0	32.0	20.0	32.0	32.0		20.0	58.0		38.0	38.0	
Total Split (%)	35.6%	35.6%	22.2%	35.6%	35.6%		22.2%	64.4%		42.2%	42.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0	-1.0		-1.0		-1.0	-1.0			-1.0	
Total Lost Time (s)		5.0	5.0		5.0		5.0	5.0			5.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Recall Mode	None	None	None	None	None		None	Max		Max	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 75.7	
Natural Cycle: 55	
Control Type: Semi Act-Uncoord	

Splits and Phases: 3: Hulmeville Road/Trenton Road & Bellevue Avenue/Hulme Avenue





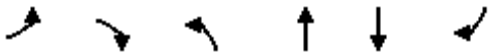
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	77	246	15	103	7	367	356	26	1	260	64
Future Volume (veh/h)	44	77	246	15	103	7	367	356	26	1	260	64
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1758	1857	1814	1800	1755	1800	1744	1828	1800	396	1758	1688
Adj Flow Rate, veh/h	49	86	0	17	114	8	408	396	29	1	289	71
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	1	4	0	8	0	4	3	0	100	3	8
Cap, veh/h	132	149		72	184	12	816	1241	91	51	690	169
Arrive On Green	0.11	0.12	0.00	0.11	0.12	0.11	0.16	0.74	0.72	0.49	0.51	0.49
Sat Flow, veh/h	512	1208	1537	126	1486	98	1661	1683	123	1	1363	334
Grp Volume(v), veh/h	135	0	0	139	0	0	408	0	425	361	0	0
Grp Sat Flow(s),veh/h/ln	1720	0	1537	1710	0	0	1661	0	1806	1697	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.3	0.0	0.0	7.0	0.0	5.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.2	0.0	0.0	5.6	0.0	0.0	7.0	0.0	5.8	9.7	0.0	0.0
Prop In Lane	0.36		1.00	0.12		0.06	1.00		0.07	0.00		0.20
Lane Grp Cap(c), veh/h	257	0		244	0	0	816	0	1331	886	0	0
V/C Ratio(X)	0.52	0.00		0.57	0.00	0.00	0.50	0.00	0.32	0.41	0.00	0.00
Avail Cap(c_a), veh/h	656	0		660	0	0	895	0	1331	886	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	30.0	0.0	0.0	30.1	0.0	0.0	4.2	0.0	3.3	11.2	0.0	0.0
Incr Delay (d2), s/veh	1.7	0.0	0.0	2.1	0.0	0.0	0.5	0.0	0.6	1.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.1	0.0	0.0	4.3	0.0	0.0	2.9	0.0	2.6	6.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.7	0.0	0.0	32.2	0.0	0.0	4.7	0.0	3.9	12.6	0.0	0.0
LnGrp LOS	C	A		C	A	A	A	A	A	B	A	A
Approach Vol, veh/h		135			139			833			361	
Approach Delay, s/veh		31.7			32.2			4.3			12.6	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	16.6	41.4		13.9		58.0		13.9				
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s	14.0	32.0		26.0		52.0		26.0				
Max Q Clear Time (g_c+I1), s	9.5	11.7		7.6		7.8		7.2				
Green Ext Time (p_c), s	1.1	1.3		0.4		1.6		0.4				

Intersection Summary		
HCM 6th Ctrl Delay		11.5
HCM 6th LOS		B

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	2	102	163	385	263	1
Future Volume (vph)	2	102	163	385	263	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	10	10	10	10
Grade (%)	-1%			3%	-3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.867					
Flt Protected	0.999			0.985		
Satd. Flow (prot)	1408	0	0	1558	1640	0
Flt Permitted	0.999			0.985		
Satd. Flow (perm)	1408	0	0	1558	1640	0
Link Speed (mph)	35			35	35	
Link Distance (ft)	562			638	742	
Travel Time (s)	10.9			12.4	14.5	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	50%	3%	6%	4%	4%	0%
Adj. Flow (vph)	2	109	173	410	280	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	111	0	0	583	281	0
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

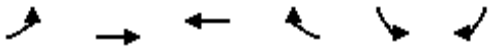
Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	102	163	385	263	1
Future Vol, veh/h	2	102	163	385	263	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-1	-	-	3	-3	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	50	3	6	4	4	0
Mvmt Flow	2	109	173	410	280	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1037	281	281	0	-	0
Stage 1	281	-	-	-	-	-
Stage 2	756	-	-	-	-	-
Critical Hdwy	6.7	6.13	4.4	-	-	-
Critical Hdwy Stg 1	5.7	-	-	-	-	-
Critical Hdwy Stg 2	5.7	-	-	-	-	-
Follow-up Hdwy	3.5	3.1	3.1	-	-	-
Pot Cap-1 Maneuver	237	810	927	-	-	-
Stage 1	753	-	-	-	-	-
Stage 2	439	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	180	810	927	-	-	-
Mov Cap-2 Maneuver	180	-	-	-	-	-
Stage 1	571	-	-	-	-	-
Stage 2	439	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	2.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	927	-	759	-	-
HCM Lane V/C Ratio	0.187	-	0.146	-	-
HCM Control Delay (s)	9.8	0	10.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.7	-	0.5	-	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	138	177	1	1	13
Future Volume (vph)	5	138	177	1	1	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	11	11	12	13	12
Grade (%)		0%	0%		-3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.999		0.873	
Flt Protected		0.998			0.997	
Satd. Flow (prot)	0	1689	1595	0	1406	0
Flt Permitted		0.998			0.997	
Satd. Flow (perm)	0	1689	1595	0	1406	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		1808	258		297	
Travel Time (s)		49.3	7.0		8.1	
Confl. Peds. (#/hr)	1				5	5
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	25%	2%	9%	0%	0%	18%
Adj. Flow (vph)	6	159	203	1	1	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	165	204	0	16	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	138	177	1	1	13
Future Vol, veh/h	5	138	177	1	1	13
Conflicting Peds, #/hr	1	0	0	0	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	-3	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	25	2	9	0	0	18
Mvmt Flow	6	159	203	1	1	15

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	205	0	-	0	381	210
Stage 1	-	-	-	-	205	-
Stage 2	-	-	-	-	176	-
Critical Hdwy	4.1	-	-	-	5.8	6.08
Critical Hdwy Stg 1	-	-	-	-	4.8	-
Critical Hdwy Stg 2	-	-	-	-	4.8	-
Follow-up Hdwy	3.2	-	-	-	3	3.3
Pot Cap-1 Maneuver	974	-	-	-	758	841
Stage 1	-	-	-	-	993	-
Stage 2	-	-	-	-	1020	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	973	-	-	-	751	836
Mov Cap-2 Maneuver	-	-	-	-	751	-
Stage 1	-	-	-	-	985	-
Stage 2	-	-	-	-	1019	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	973	-	-	-	829
HCM Lane V/C Ratio	0.006	-	-	-	0.019
HCM Control Delay (s)	8.7	0	-	-	9.4
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	46	137	323	0	0	359
Future Volume (vph)	46	137	323	0	0	359
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	11	12	12	10
Grade (%)	-2%		0%			0%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	1580	1335	1657	0	0	1615
Flt Permitted	0.950					
Satd. Flow (perm)	1580	1335	1657	0	0	1615
Link Speed (mph)	25		40			40
Link Distance (ft)	206		447			2610
Travel Time (s)	5.6		7.6			44.5
Confl. Peds. (#/hr)	1	1				
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	2%	8%	5%	0%	0%	4%
Adj. Flow (vph)	58	171	404	0	0	449
Shared Lane Traffic (%)						
Lane Group Flow (vph)	58	171	404	0	0	449
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	46	137	323	0	0	359
Future Vol, veh/h	46	137	323	0	0	359
Conflicting Peds, #/hr	1	1	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-2	-	0	-	-	0
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	8	5	0	0	4
Mvmt Flow	58	171	404	0	0	449

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	854	405	0	-	-	-
Stage 1	404	-	-	-	-	-
Stage 2	450	-	-	-	-	-
Critical Hdwy	6.02	6.08	-	-	-	-
Critical Hdwy Stg 1	5.02	-	-	-	-	-
Critical Hdwy Stg 2	5.02	-	-	-	-	-
Follow-up Hdwy	3	3.2	-	-	-	-
Pot Cap-1 Maneuver	402	676	-	0	0	-
Stage 1	805	-	-	0	0	-
Stage 2	768	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	402	675	-	-	-	-
Mov Cap-2 Maneuver	402	-	-	-	-	-
Stage 1	805	-	-	-	-	-
Stage 2	767	-	-	-	-	-

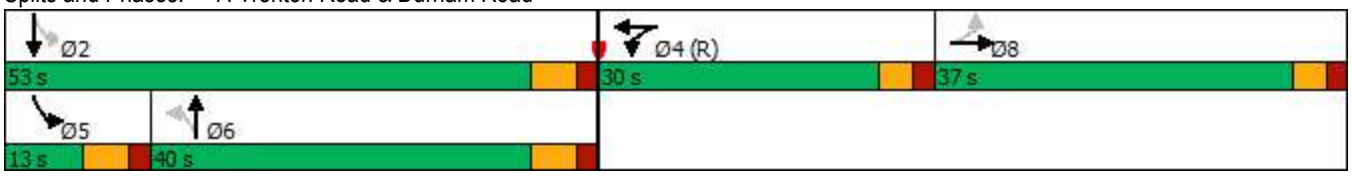
Approach	WB	NB	SB
HCM Control Delay, s	12.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	402	675	-
HCM Lane V/C Ratio	-	0.143	0.254	-
HCM Control Delay (s)	-	15.4	12.1	-
HCM Lane LOS	-	C	B	-
HCM 95th %tile Q(veh)	-	0.5	1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	157	13	68	255	69	47	429	75	42	247	162
Future Volume (vph)	82	157	13	68	255	69	47	429	75	42	247	162
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	11	11	12	11	10	12
Storage Length (ft)	0		0	150		0	300		0	105		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.968			0.978			0.941	
Flt Protected		0.984		0.950			0.950			0.950		
Satd. Flow (prot)	0	1644	0	1660	1669	0	1574	1652	0	1574	1526	0
Flt Permitted		0.763		0.950			0.415			0.090		
Satd. Flow (perm)	0	1275	0	1660	1669	0	688	1652	0	149	1526	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			10			7			33	
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		515			776			2610			678	
Travel Time (s)		10.0			15.1			44.5			11.6	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	6%	5%	36%	3%	4%	6%	5%	3%	3%	5%	4%	3%
Adj. Flow (vph)	92	176	15	76	287	78	53	482	84	47	278	182
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	283	0	76	365	0	53	566	0	47	460	0
Turn Type	Perm	NA		Split	NA		Perm	NA		pm+pt	NA	
Protected Phases		8		4	4			6		5	2	
Permitted Phases	8						6			2		
Detector Phase	8	8		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		15.0	15.0		3.0	15.0	
Minimum Split (s)	8.0	8.0		8.0	8.0		21.0	21.0		9.0	21.0	
Total Split (s)	37.0	37.0		30.0	30.0		40.0	40.0		13.0	53.0	
Total Split (%)	30.8%	30.8%		25.0%	25.0%		33.3%	33.3%		10.8%	44.2%	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)		4.0		4.0	4.0		5.0	5.0		5.0	5.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	None	None		C-Max	C-Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 24 (20%), Referenced to phase 4:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	

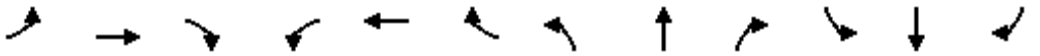
Splits and Phases: 7: Trenton Road & Durham Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	82	157	13	68	255	69	47	429	75	42	247	162
Future Volume (veh/h)	82	157	13	68	255	69	47	429	75	42	247	162
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1716	1730	1295	1758	1744	1716	1730	1758	1758	1730	1744	1758
Adj Flow Rate, veh/h	92	176	14	76	287	71	53	482	84	47	278	166
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	6	5	36	3	4	6	5	3	3	5	4	3
Cap, veh/h	110	211	17	533	429	106	185	425	74	129	382	228
Arrive On Green	0.19	0.20	0.19	0.32	0.32	0.31	0.29	0.29	0.28	0.04	0.37	0.37
Sat Flow, veh/h	550	1053	84	1674	1350	334	875	1458	254	1647	1023	611
Grp Volume(v), veh/h	282	0	0	76	0	358	53	0	566	47	0	444
Grp Sat Flow(s),veh/h/ln	1687	0	0	1674	0	1684	875	0	1712	1647	0	1634
Q Serve(g_s), s	19.3	0.0	0.0	3.9	0.0	22.1	6.6	0.0	35.0	2.3	0.0	28.1
Cycle Q Clear(g_c), s	19.3	0.0	0.0	3.9	0.0	22.1	24.4	0.0	35.0	2.3	0.0	28.1
Prop In Lane	0.33		0.05	1.00		0.20	1.00		0.15	1.00		0.37
Lane Grp Cap(c), veh/h	338	0	0	533	0	536	185	0	499	129	0	610
V/C Ratio(X)	0.84	0.00	0.00	0.14	0.00	0.67	0.29	0.00	1.13	0.36	0.00	0.73
Avail Cap(c_a), veh/h	464	0	0	533	0	536	185	0	499	173	0	654
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	46.3	0.0	0.0	29.2	0.0	35.5	46.9	0.0	42.6	31.7	0.0	32.5
Incr Delay (d2), s/veh	13.3	0.0	0.0	0.6	0.0	6.5	1.8	0.0	82.4	3.6	0.0	5.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	14.2	0.0	0.0	3.0	0.0	15.1	2.7	0.0	36.7	1.8	0.0	17.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.5	0.0	0.0	29.8	0.0	42.0	48.7	0.0	124.9	35.4	0.0	37.5
LnGrp LOS	E	A	A	C	A	D	D	A	F	D	A	D
Approach Vol, veh/h		282			434			619			491	
Approach Delay, s/veh		59.5			39.9			118.4			37.3	
Approach LOS		E			D			F			D	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		49.8		42.2	9.8	40.0		28.0				
Change Period (Y+Rc), s		6.0		5.0	6.0	6.0		5.0				
Max Green Setting (Gmax), s		47.0		25.0	7.0	34.0		32.0				
Max Q Clear Time (g_c+I1), s		30.1		24.1	4.8	37.0		21.3				
Green Ext Time (p_c), s		3.9		0.3	0.0	0.0		1.7				

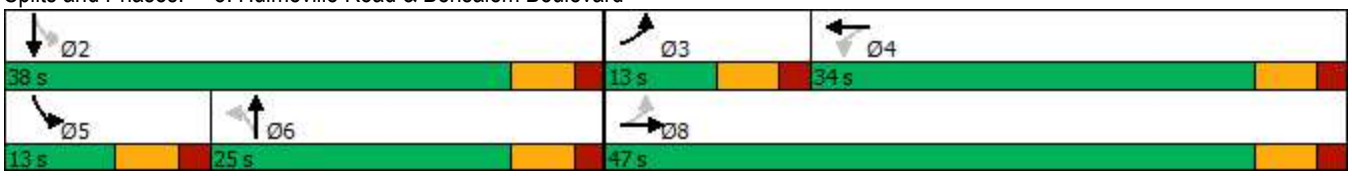
Intersection Summary												
HCM 6th Ctrl Delay			68.8									
HCM 6th LOS			E									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	236	152	30	24	101	189	26	316	18	90	255	126
Future Volume (vph)	236	152	30	24	101	189	26	316	18	90	255	126
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	13	12	12	12	12	10	12	12	11	14	12
Storage Length (ft)	175		0	0		0	100		0	125		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.975			0.919			0.992			0.950	
Flt Protected	0.950				0.996		0.950			0.950		
Satd. Flow (prot)	1693	1778	0	0	1573	0	1478	1721	0	1574	1754	0
Flt Permitted	0.275				0.962		0.511			0.261		
Satd. Flow (perm)	490	1778	0	0	1519	0	795	1721	0	433	1754	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			97			3			34	
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		264			377			503			1368	
Travel Time (s)		5.1			7.3			8.6			23.3	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	1%	1%	7%	13%	8%	2%	8%	3%	17%	5%	5%	2%
Adj. Flow (vph)	268	173	34	27	115	215	30	359	20	102	290	143
Shared Lane Traffic (%)												
Lane Group Flow (vph)	268	207	0	0	357	0	30	379	0	102	433	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	3	8			4			6		5	2	
Permitted Phases	8			4			6			2		
Detector Phase	3	8		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		18.0	18.0		3.0	18.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		24.0	24.0		9.0	24.0	
Total Split (s)	13.0	47.0		34.0	34.0		25.0	25.0		13.0	38.0	
Total Split (%)	15.3%	55.3%		40.0%	40.0%		29.4%	29.4%		15.3%	44.7%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0			-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Recall Mode	None	None		None	None		Max	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 85	
Actuated Cycle Length: 75.9	
Natural Cycle: 65	
Control Type: Semi Act-Uncoord	

Splits and Phases: 8: Hulmeville Road & Bensalem Boulevard



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	236	152	30	24	101	189	26	316	18	90	255	126
Future Volume (veh/h)	236	152	30	24	101	189	26	316	18	90	255	126
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1857	1702	1617	1688	1772	1688	1758	1561	1730	1799	1772
Adj Flow Rate, veh/h	268	173	29	27	115	173	30	359	15	102	290	121
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	1	1	7	13	8	2	8	3	17	5	5	2
Cap, veh/h	441	664	111	70	155	210	330	494	21	325	529	221
Arrive On Green	0.11	0.43	0.42	0.24	0.26	0.24	0.29	0.29	0.28	0.08	0.44	0.43
Sat Flow, veh/h	1701	1551	260	71	605	823	880	1675	70	1647	1205	503
Grp Volume(v), veh/h	268	0	202	315	0	0	30	0	374	102	0	411
Grp Sat Flow(s),veh/h/ln	1701	0	1811	1498	0	0	880	0	1745	1647	0	1708
Q Serve(g_s), s	8.0	0.0	5.4	7.1	0.0	0.0	1.9	0.0	14.5	3.0	0.0	13.4
Cycle Q Clear(g_c), s	8.0	0.0	5.4	15.1	0.0	0.0	4.0	0.0	14.5	3.0	0.0	13.4
Prop In Lane	1.00		0.14	0.09		0.55	1.00		0.04	1.00		0.29
Lane Grp Cap(c), veh/h	441	0	776	415	0	0	330	0	514	325	0	749
V/C Ratio(X)	0.61	0.00	0.26	0.76	0.00	0.00	0.09	0.00	0.73	0.31	0.00	0.55
Avail Cap(c_a), veh/h	441	0	1011	606	0	0	330	0	514	372	0	749
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.4	0.0	13.9	26.7	0.0	0.0	20.9	0.0	23.8	16.2	0.0	15.7
Incr Delay (d2), s/veh	2.4	0.0	0.2	3.3	0.0	0.0	0.5	0.0	8.7	0.5	0.0	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.0	0.0	3.7	9.4	0.0	0.0	0.8	0.0	10.9	1.9	0.0	8.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.8	0.0	14.1	30.0	0.0	0.0	21.5	0.0	32.6	16.7	0.0	18.6
LnGrp LOS	B	A	B	C	A	A	C	A	C	B	A	B
Approach Vol, veh/h		470			315			404			513	
Approach Delay, s/veh		16.8			30.0			31.7			18.2	
Approach LOS		B			C			C			B	

Timer - Assigned Phs		2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s		38.0	13.0	24.2	10.8	27.2		37.2				
Change Period (Y+Rc), s		6.0	6.0	6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		32.0	7.0	28.0	7.0	19.0		41.0				
Max Q Clear Time (g_c+I1), s		15.4	10.5	17.1	5.5	16.5		7.4				
Green Ext Time (p_c), s		1.4	0.0	1.1	0.0	0.4		0.9				

Intersection Summary												
HCM 6th Ctrl Delay			23.2									
HCM 6th LOS			C									

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	38	27	425	12	9	315
Future Volume (vph)	38	27	425	12	9	315
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	11	12	12	11
Grade (%)	0%		3%			-1%
Storage Length (ft)	0	0		0	75	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.944		0.996			
Flt Protected	0.972				0.950	
Satd. Flow (prot)	1619	0	1642	0	1685	1698
Flt Permitted	0.972				0.950	
Satd. Flow (perm)	1619	0	1642	0	1685	1698
Link Speed (mph)	25		40			40
Link Distance (ft)	204		1439			1102
Travel Time (s)	5.6		24.5			18.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	4%	2%	2%	3%
Adj. Flow (vph)	41	29	462	13	10	342
Shared Lane Traffic (%)						
Lane Group Flow (vph)	70	0	475	0	10	342
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

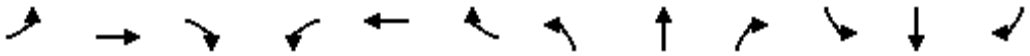
Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	38	27	425	12	9	315
Future Vol, veh/h	38	27	425	12	9	315
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	3	-	-	-1
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	4	2	2	3
Mvmt Flow	41	29	462	13	10	342

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	831	469	0	0	475	0
Stage 1	469	-	-	-	-	-
Stage 2	362	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.3	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3	3.1	-	-	3	-
Pot Cap-1 Maneuver	378	628	-	-	824	-
Stage 1	716	-	-	-	-	-
Stage 2	806	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	373	628	-	-	824	-
Mov Cap-2 Maneuver	373	-	-	-	-	-
Stage 1	716	-	-	-	-	-
Stage 2	796	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.5	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	449	824	-
HCM Lane V/C Ratio	-	-	0.157	0.012	-
HCM Control Delay (s)	-	-	14.5	9.4	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.6	0	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	3	13	6	69	2	510	14	54	401	4
Future Volume (vph)	0	0	3	13	6	69	2	510	14	54	401	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	13	12	12	10	12	12	11	12	12	11	12
Grade (%)		2%			-2%			-2%			2%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.865			0.894			0.996			0.999	
Flt Protected					0.993						0.994	
Satd. Flow (prot)	0	1593	0	0	1436	0	0	1750	0	0	1692	0
Flt Permitted					0.993						0.994	
Satd. Flow (perm)	0	1593	0	0	1436	0	0	1750	0	0	1692	0
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		256			1808			380			1439	
Travel Time (s)		7.0			49.3			6.5			24.5	
Confl. Peds. (#/hr)							3		3			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	17%	0%	3%	0%	0%	0%	2%	1%	0%
Adj. Flow (vph)	0	0	3	14	6	73	2	537	15	57	422	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	3	0	0	93	0	0	554	0	0	483	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

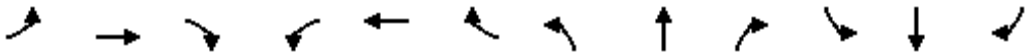
Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	3	13	6	69	2	510	14	54	401	4
Future Vol, veh/h	0	0	3	13	6	69	2	510	14	54	401	4
Conflicting Peds, #/hr	0	0	0	0	0	0	3	0	3	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-2	-	-	-2	-	-	2	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	17	0	3	0	0	0	2	1	0
Mvmt Flow	0	0	3	14	6	73	2	537	15	57	422	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1129	1100	427	1092	1095	548	429	0	0	555	0	0
Stage 1	541	541	-	552	552	-	-	-	-	-	-	-
Stage 2	588	559	-	540	543	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.9	6.4	6.87	6.1	6.03	4.3	-	-	4.3	-	-
Critical Hdwy Stg 1	6.5	5.9	-	5.87	5.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.9	-	5.87	5.1	-	-	-	-	-	-	-
Follow-up Hdwy	3	4	3.1	3.2	4	3.1	3	-	-	3	-	-
Pot Cap-1 Maneuver	176	189	650	219	243	582	855	-	-	772	-	-
Stage 1	561	493	-	579	551	-	-	-	-	-	-	-
Stage 2	525	483	-	587	555	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	139	169	648	201	218	581	852	-	-	770	-	-
Mov Cap-2 Maneuver	139	169	-	201	218	-	-	-	-	-	-	-
Stage 1	558	444	-	576	548	-	-	-	-	-	-	-
Stage 2	453	481	-	527	500	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.6	16.1	0	1.2
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	852	-	-	648	417	770	-	-
HCM Lane V/C Ratio	0.002	-	-	0.005	0.222	0.074	-	-
HCM Control Delay (s)	9.2	0	-	10.6	16.1	10	0	-
HCM Lane LOS	A	A	-	B	C	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.8	0.2	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	4	2	0	0	0	7	529	19	24	452	33
Future Volume (vph)	6	4	2	0	0	0	7	529	19	24	452	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	16	12	12	11	12	12	11	12
Grade (%)		1%			2%			0%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977						0.995			0.991	
Flt Protected		0.976						0.999			0.998	
Satd. Flow (prot)	0	1708	0	0	0	0	0	1730	0	0	1696	0
Flt Permitted		0.976						0.999			0.998	
Satd. Flow (perm)	0	1708	0	0	0	0	0	1730	0	0	1696	0
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		357			346			1102			447	
Travel Time (s)		9.7			9.4			18.8			7.6	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	9%
Adj. Flow (vph)	6	4	2	0	0	0	7	545	20	25	466	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	0	0	0	0	0	572	0	0	525	0
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕						⇕			⇕	
Traffic Vol, veh/h	6	4	2	0	0	0	7	529	19	24	452	33
Future Vol, veh/h	6	4	2	0	0	0	7	529	19	24	452	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	2	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	1	9
Mvmt Flow	6	4	2	0	0	0	7	545	20	25	466	34

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	1102	1112	483			500	0	0	565	0	0
Stage 1	533	533	-			-	-	-	-	-	-
Stage 2	569	579	-			-	-	-	-	-	-
Critical Hdwy	6.6	6.7	6.3			4.3	-	-	4.3	-	-
Critical Hdwy Stg 1	5.6	5.7	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.6	5.7	-			-	-	-	-	-	-
Follow-up Hdwy	3	4	3.1			3	-	-	3	-	-
Pot Cap-1 Maneuver	243	198	610			808	-	-	766	-	-
Stage 1	649	513	-			-	-	-	-	-	-
Stage 2	622	488	-			-	-	-	-	-	-
Platoon blocked, %							-	-		-	-
Mov Cap-1 Maneuver	229	0	610			808	-	-	766	-	-
Mov Cap-2 Maneuver	229	0	-			-	-	-	-	-	-
Stage 1	641	0	-			-	-	-	-	-	-
Stage 2	594	0	-			-	-	-	-	-	-

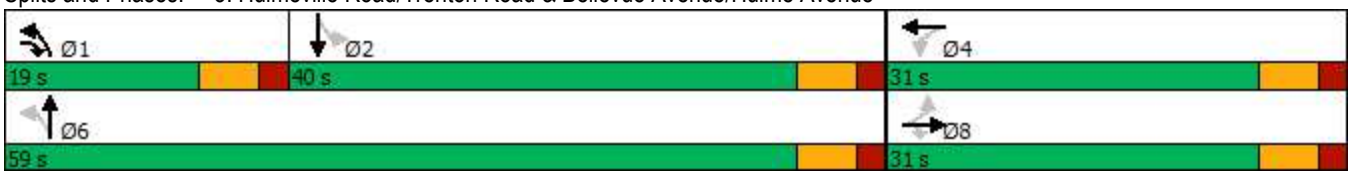
Approach	EB	NB	SB
HCM Control Delay, s	18.9	0.1	0.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	808	-	-	271	766	-	-
HCM Lane V/C Ratio	0.009	-	-	0.046	0.032	-	-
HCM Control Delay (s)	9.5	0	-	18.9	9.9	0	-
HCM Lane LOS	A	A	-	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	133	477	30	155	1	294	457	36	0	334	73
Future Volume (vph)	70	133	477	30	155	1	294	457	36	0	334	73
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	14	15	12	14	12	10	15	12	12	12	12
Storage Length (ft)	0		75	0		0	350		0	0		0
Storage Lanes	0		1	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor											1.00	
Frt			0.850		0.999			0.989			0.976	
Flt Protected		0.983			0.992		0.950					
Satd. Flow (prot)	0	1851	1666	0	1872	0	1565	1958	0	0	1726	0
Flt Permitted		0.734			0.896		0.341					
Satd. Flow (perm)	0	1382	1666	0	1690	0	562	1958	0	0	1726	0
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			335					8				
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		638			194			1368			380	
Travel Time (s)		12.4			3.8			26.6			7.4	
Confl. Peds. (#/hr)										3		3
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	3%	1%	0%	2%	0%	2%	0%	0%	0%	1%	3%
Adj. Flow (vph)	73	139	497	31	161	1	306	476	38	0	348	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	212	497	0	193	0	306	514	0	0	424	0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA			NA	
Protected Phases		8	1		4		1	6			2	
Permitted Phases	8		8	4	4		6			2		
Detector Phase	8	8	1	4	4		1	6		2	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0	3.0	3.0	3.0		3.0	20.0		20.0	20.0	
Minimum Split (s)	24.0	24.0	9.0	24.0	24.0		9.0	26.0		26.0	26.0	
Total Split (s)	31.0	31.0	19.0	31.0	31.0		19.0	59.0		40.0	40.0	
Total Split (%)	34.4%	34.4%	21.1%	34.4%	34.4%		21.1%	65.6%		44.4%	44.4%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0	-1.0		-1.0		-1.0	-1.0			-1.0	
Total Lost Time (s)		5.0	5.0		5.0		5.0	5.0			5.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Recall Mode	None	None	None	None	None		None	Max		Max	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 81.6	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	

Splits and Phases: 3: Hulmeville Road/Trenton Road & Bellevue Avenue/Hulme Avenue



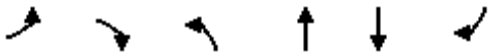
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	133	477	30	155	1	294	457	36	0	334	73
Future Volume (veh/h)	70	133	477	30	155	1	294	457	36	0	334	73
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1828	1857	1800	1843	1800	1772	1872	1800	1800	1786	1758
Adj Flow Rate, veh/h	73	139	0	31	161	1	306	476	35	0	348	75
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	3	1	0	2	0	2	0	0	0	1	3
Cap, veh/h	142	196		85	277	2	627	1198	88	0	713	154
Arrive On Green	0.16	0.18	0.00	0.16	0.18	0.16	0.13	0.70	0.68	0.00	0.50	0.49
Sat Flow, veh/h	455	1117	1574	179	1578	9	1688	1723	127	0	1423	307
Grp Volume(v), veh/h	212	0	0	193	0	0	306	0	511	0	0	423
Grp Sat Flow(s),veh/h/ln	1572	0	1574	1766	0	0	1688	0	1849	0	0	1730
Q Serve(g_s), s	2.3	0.0	0.0	0.0	0.0	0.0	5.8	0.0	9.0	0.0	0.0	12.6
Cycle Q Clear(g_c), s	10.1	0.0	0.0	7.8	0.0	0.0	5.8	0.0	9.0	0.0	0.0	12.6
Prop In Lane	0.34		1.00	0.16		0.01	1.00		0.07	0.00		0.18
Lane Grp Cap(c), veh/h	318	0		341	0	0	627	0	1286	0	0	867
V/C Ratio(X)	0.67	0.00		0.57	0.00	0.00	0.49	0.00	0.40	0.00	0.00	0.49
Avail Cap(c_a), veh/h	565	0		613	0	0	712	0	1286	0	0	867
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	30.6	0.0	0.0	29.6	0.0	0.0	7.4	0.0	5.0	0.0	0.0	12.9
Incr Delay (d2), s/veh	2.4	0.0	0.0	1.5	0.0	0.0	0.6	0.0	0.9	0.0	0.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.0	0.0	0.0	6.1	0.0	0.0	2.9	0.0	5.0	0.0	0.0	8.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.0	0.0	0.0	31.1	0.0	0.0	8.0	0.0	5.9	0.0	0.0	14.8
LnGrp LOS	C	A		C	A	A	A	A	A	A	A	B
Approach Vol, veh/h		212			193			817			423	
Approach Delay, s/veh		33.0			31.1			6.7			14.8	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	15.1	43.9		18.6		59.0		18.6				
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s	13.0	34.0		25.0		53.0		25.0				
Max Q Clear Time (g_c+I1), s	8.3	14.6		9.8		11.0		12.1				
Green Ext Time (p_c), s	0.8	1.5		0.5		2.0		0.6				

Intersection Summary			
HCM 6th Ctrl Delay		15.0	
HCM 6th LOS		B	

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	163	220	325	528	1
Future Volume (vph)	1	163	220	325	528	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	10	10	10	10
Grade (%)	-1%			3%	-3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.866					
Flt Protected				0.980		
Satd. Flow (prot)	1420	0	0	1590	1672	0
Flt Permitted				0.980		
Satd. Flow (perm)	1420	0	0	1590	1672	0
Link Speed (mph)	35			35	35	
Link Distance (ft)	562			638	742	
Travel Time (s)	10.9			12.4	14.5	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	3%	2%	2%	2%	0%
Adj. Flow (vph)	1	179	242	357	580	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	180	0	0	599	581	0
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

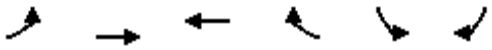
Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	163	220	325	528	1
Future Vol, veh/h	1	163	220	325	528	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-1	-	-	3	-3	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	3	2	2	2	0
Mvmt Flow	1	179	242	357	580	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1422	581	581	0	-	0
Stage 1	581	-	-	-	-	-
Stage 2	841	-	-	-	-	-
Critical Hdwy	6.2	6.13	4.3	-	-	-
Critical Hdwy Stg 1	5.2	-	-	-	-	-
Critical Hdwy Stg 2	5.2	-	-	-	-	-
Follow-up Hdwy	3	3.1	3	-	-	-
Pot Cap-1 Maneuver	177	549	756	-	-	-
Stage 1	654	-	-	-	-	-
Stage 2	495	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	106	549	756	-	-	-
Mov Cap-2 Maneuver	106	-	-	-	-	-
Stage 1	393	-	-	-	-	-
Stage 2	495	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.1	4.8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	756	-	535	-	-
HCM Lane V/C Ratio	0.32	-	0.337	-	-
HCM Control Delay (s)	12	0	15.1	-	-
HCM Lane LOS	B	A	C	-	-
HCM 95th %tile Q(veh)	1.4	-	1.5	-	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	18	206	252	0	1	10
Future Volume (vph)	18	206	252	0	1	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	11	11	12	13	12
Grade (%)		0%	0%		-3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.875	
Flt Protected		0.996			0.996	
Satd. Flow (prot)	0	1702	1723	0	1645	0
Flt Permitted		0.996			0.996	
Satd. Flow (perm)	0	1702	1723	0	1645	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		1808	258		297	
Travel Time (s)		49.3	7.0		8.1	
Confl. Peds. (#/hr)					3	3
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	2%	1%	0%	0%	0%
Adj. Flow (vph)	21	240	293	0	1	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	261	293	0	13	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	18	206	252	0	1	10
Future Vol, veh/h	18	206	252	0	1	10
Conflicting Peds, #/hr	0	0	0	0	3	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	-3	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	2	1	0	0	0
Mvmt Flow	21	240	293	0	1	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	293	0	-	0	578	296
Stage 1	-	-	-	-	293	-
Stage 2	-	-	-	-	285	-
Critical Hdwy	4.3	-	-	-	5.8	5.9
Critical Hdwy Stg 1	-	-	-	-	4.8	-
Critical Hdwy Stg 2	-	-	-	-	4.8	-
Follow-up Hdwy	3	-	-	-	3	3.1
Pot Cap-1 Maneuver	953	-	-	-	596	810
Stage 1	-	-	-	-	915	-
Stage 2	-	-	-	-	922	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	953	-	-	-	581	808
Mov Cap-2 Maneuver	-	-	-	-	581	-
Stage 1	-	-	-	-	892	-
Stage 2	-	-	-	-	922	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	953	-	-	-	780
HCM Lane V/C Ratio	0.022	-	-	-	0.016
HCM Control Delay (s)	8.9	0	-	-	9.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	77	142	425	0	0	391
Future Volume (vph)	77	142	425	0	0	391
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	10	10	11	12	12	10
Grade (%)	-2%		0%			0%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	1507	1361	1689	0	0	1631
Flt Permitted	0.950					
Satd. Flow (perm)	1507	1361	1689	0	0	1631
Link Speed (mph)	25		40			40
Link Distance (ft)	206		447			2610
Travel Time (s)	5.6		7.6			44.5
Confl. Peds. (#/hr)	2	2				
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Heavy Vehicles (%)	7%	6%	3%	0%	0%	3%
Adj. Flow (vph)	100	184	552	0	0	508
Shared Lane Traffic (%)						
Lane Group Flow (vph)	100	184	552	0	0	508
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	77	142	425	0	0	391
Future Vol, veh/h	77	142	425	0	0	391
Conflicting Peds, #/hr	2	2	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-2	-	0	-	-	0
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	7	6	3	0	0	3
Mvmt Flow	100	184	552	0	0	508

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1062	554	0	-	-	-
Stage 1	552	-	-	-	-	-
Stage 2	510	-	-	-	-	-
Critical Hdwy	6.07	6.06	-	-	-	-
Critical Hdwy Stg 1	5.07	-	-	-	-	-
Critical Hdwy Stg 2	5.07	-	-	-	-	-
Follow-up Hdwy	3.1	3.2	-	-	-	-
Pot Cap-1 Maneuver	296	561	-	0	0	-
Stage 1	671	-	-	0	0	-
Stage 2	700	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	295	560	-	-	-	-
Mov Cap-2 Maneuver	295	-	-	-	-	-
Stage 1	671	-	-	-	-	-
Stage 2	699	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.7	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	295	560	-
HCM Lane V/C Ratio	-	0.339	0.329	-
HCM Control Delay (s)	-	23.3	14.6	-
HCM Lane LOS	-	C	B	-
HCM 95th %tile Q(veh)	-	1.5	1.4	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	266	26	112	197	59	40	424	100	66	437	99
Future Volume (vph)	117	266	26	112	197	59	40	424	100	66	437	99
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	11	11	12	11	10	12
Storage Length (ft)	0		0	150		0	300		0	105		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor				1.00	0.99		1.00	1.00				
Frt		0.991			0.965			0.971			0.972	
Flt Protected		0.986		0.950			0.950			0.950		
Satd. Flow (prot)	0	1720	0	1660	1665	0	1653	1673	0	1653	1617	0
Flt Permitted		0.809		0.950			0.266			0.092		
Satd. Flow (perm)	0	1412	0	1658	1665	0	463	1673	0	160	1617	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			11			10			11	
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		515			776			2610			678	
Travel Time (s)		10.0			15.1			44.5			11.6	
Confl. Peds. (#/hr)				1		1	1		1			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	3%	0%	3%	4%	3%	0%	0%	3%	0%	1%	1%
Adj. Flow (vph)	124	283	28	119	210	63	43	451	106	70	465	105
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	435	0	119	273	0	43	557	0	70	570	0
Turn Type	Perm	NA		Split	NA		Perm	NA		pm+pt	NA	
Protected Phases		8		4	4			6		5	2	
Permitted Phases	8						6			2		
Detector Phase	8	8		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		15.0	15.0		3.0	15.0	
Minimum Split (s)	8.0	8.0		8.0	8.0		21.0	21.0		9.0	21.0	
Total Split (s)	36.0	36.0		30.0	30.0		41.0	41.0		13.0	54.0	
Total Split (%)	30.0%	30.0%		25.0%	25.0%		34.2%	34.2%		10.8%	45.0%	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)		4.0		4.0	4.0		5.0	5.0		5.0	5.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	None	None		C-Max	C-Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 6 (5%), Referenced to phase 4:WBTL, Start of Green	
Natural Cycle: 90	

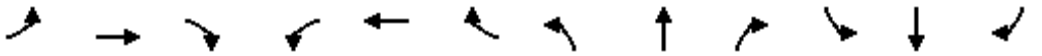
Control Type: Actuated-Coordinated

Splits and Phases: 7: Trenton Road & Durham Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	266	26	112	197	59	40	424	100	66	437	99
Future Volume (veh/h)	117	266	26	112	197	59	40	424	100	66	437	99
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1758	1800	1758	1744	1758	1800	1800	1758	1800	1786	1786
Adj Flow Rate, veh/h	124	283	27	119	210	47	43	451	99	70	465	92
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	3	0	3	4	3	0	0	3	0	1	1
Cap, veh/h	131	298	28	388	320	72	150	429	94	152	569	113
Arrive On Green	0.26	0.27	0.26	0.23	0.23	0.22	0.30	0.30	0.29	0.05	0.39	0.38
Sat Flow, veh/h	490	1118	107	1674	1379	309	820	1429	314	1714	1448	286
Grp Volume(v), veh/h	434	0	0	119	0	257	43	0	550	70	0	557
Grp Sat Flow(s),veh/h/ln	1714	0	0	1674	0	1687	820	0	1743	1714	0	1734
Q Serve(g_s), s	29.8	0.0	0.0	7.1	0.0	16.6	5.9	0.0	36.0	3.2	0.0	34.5
Cycle Q Clear(g_c), s	29.8	0.0	0.0	7.1	0.0	16.6	28.7	0.0	36.0	3.2	0.0	34.5
Prop In Lane	0.29		0.06	1.00		0.18	1.00		0.18	1.00		0.17
Lane Grp Cap(c), veh/h	457	0	0	388	0	391	150	0	523	152	0	682
V/C Ratio(X)	0.95	0.00	0.00	0.31	0.00	0.66	0.29	0.00	1.05	0.46	0.00	0.82
Avail Cap(c_a), veh/h	457	0	0	388	0	391	150	0	523	178	0	708
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	43.4	0.0	0.0	38.1	0.0	41.9	50.1	0.0	42.1	30.8	0.0	32.6
Incr Delay (d2), s/veh	30.1	0.0	0.0	2.0	0.0	8.4	2.2	0.0	53.7	4.6	0.0	8.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	22.8	0.0	0.0	5.6	0.0	12.3	2.3	0.0	31.6	2.7	0.0	21.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.5	0.0	0.0	40.2	0.0	50.2	52.3	0.0	95.8	35.4	0.0	40.9
LnGrp LOS	E	A	A	D	A	D	D	A	F	D	A	D
Approach Vol, veh/h		434			376			593			627	
Approach Delay, s/veh		73.5			47.0			92.6			40.3	
Approach LOS		E			D			F			D	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		52.2		31.8	11.2	41.0		36.0				
Change Period (Y+Rc), s		6.0		5.0	6.0	6.0		5.0				
Max Green Setting (Gmax), s		48.0		25.0	7.0	35.0		31.0				
Max Q Clear Time (g_c+I1), s		36.5		18.6	5.7	38.0		31.8				
Green Ext Time (p_c), s		4.0		1.6	0.0	0.0		0.0				

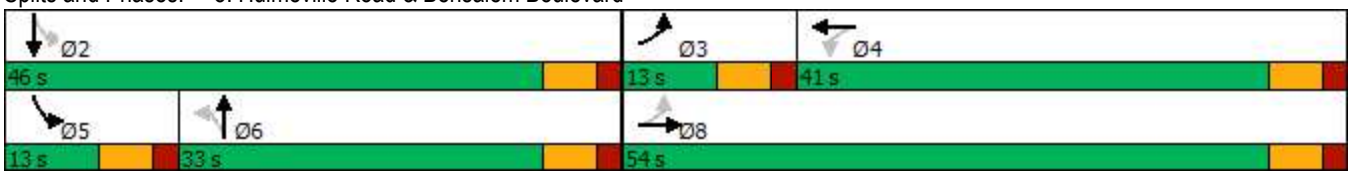
Intersection Summary												
HCM 6th Ctrl Delay			63.9									
HCM 6th LOS			E									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	245	116	39	36	200	107	35	404	25	189	387	265
Future Volume (vph)	245	116	39	36	200	107	35	404	25	189	387	265
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	13	12	12	12	12	10	12	12	11	14	12
Storage Length (ft)	175		0	0		0	100		0	125		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.962			0.958			0.991			0.939	
Flt Protected	0.950				0.995		0.950			0.950		
Satd. Flow (prot)	1693	1750	0	0	1695	0	1550	1767	0	1637	1792	0
Flt Permitted	0.304				0.951		0.285			0.215		
Satd. Flow (perm)	542	1750	0	0	1620	0	465	1767	0	370	1792	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			25			3			41	
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		264			377			503			1368	
Travel Time (s)		5.1			7.3			8.6			23.3	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	1%	3%	0%	3%	1%	1%	3%	1%	0%	1%	1%	0%
Adj. Flow (vph)	247	117	39	36	202	108	35	408	25	191	391	268
Shared Lane Traffic (%)												
Lane Group Flow (vph)	247	156	0	0	346	0	35	433	0	191	659	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	3	8			4			6		5	2	
Permitted Phases	8			4			6			2		
Detector Phase	3	8		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		18.0	18.0		3.0	18.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		24.0	24.0		9.0	24.0	
Total Split (s)	13.0	54.0		41.0	41.0		33.0	33.0		13.0	46.0	
Total Split (%)	13.0%	54.0%		41.0%	41.0%		33.0%	33.0%		13.0%	46.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Recall Mode	None	None		None	None		Max	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 87.9	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	

Splits and Phases: 8: Hulmeville Road & Bensalem Boulevard



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	245	116	39	36	200	107	35	404	25	189	387	265
Future Volume (veh/h)	245	116	39	36	200	107	35	404	25	189	387	265
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1828	1800	1758	1786	1786	1758	1786	1800	1786	1857	1800
Adj Flow Rate, veh/h	247	117	33	36	202	88	35	408	21	191	391	250
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	1	3	0	3	1	1	3	1	0	1	1	0
Cap, veh/h	363	526	148	74	250	102	209	539	28	320	502	321
Arrive On Green	0.08	0.38	0.38	0.23	0.23	0.23	0.32	0.32	0.32	0.08	0.47	0.47
Sat Flow, veh/h	1701	1372	387	115	1088	445	741	1684	87	1701	1059	677
Grp Volume(v), veh/h	247	0	150	326	0	0	35	0	429	191	0	641
Grp Sat Flow(s),veh/h/ln	1701	0	1759	1647	0	0	741	0	1770	1701	0	1736
Q Serve(g_s), s	7.0	0.0	4.8	9.0	0.0	0.0	3.5	0.0	18.3	6.1	0.0	26.0
Cycle Q Clear(g_c), s	7.0	0.0	4.8	16.0	0.0	0.0	16.5	0.0	18.3	6.1	0.0	26.0
Prop In Lane	1.00		0.22	0.11		0.27	1.00		0.05	1.00		0.39
Lane Grp Cap(c), veh/h	363	0	675	425	0	0	209	0	567	320	0	823
V/C Ratio(X)	0.68	0.00	0.22	0.77	0.00	0.00	0.17	0.00	0.76	0.60	0.00	0.78
Avail Cap(c_a), veh/h	363	0	1001	725	0	0	209	0	567	320	0	823
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.1	0.0	17.5	31.1	0.0	0.0	30.8	0.0	25.7	18.7	0.0	18.5
Incr Delay (d2), s/veh	5.1	0.0	0.2	2.9	0.0	0.0	1.7	0.0	9.1	3.0	0.0	7.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.8	0.0	3.4	10.6	0.0	0.0	1.2	0.0	13.4	4.4	0.0	16.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.2	0.0	17.7	34.0	0.0	0.0	32.5	0.0	34.9	21.7	0.0	25.7
LnGrp LOS	C	A	B	C	A	A	C	A	C	C	A	C
Approach Vol, veh/h		397			326			464			832	
Approach Delay, s/veh		24.2			34.0			34.7			24.8	
Approach LOS		C			C			C			C	

Timer - Assigned Phs		2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s		46.0	13.0	25.4	13.0	33.0		38.4				
Change Period (Y+Rc), s		6.0	6.0	6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s		40.0	7.0	35.0	7.0	27.0		48.0				
Max Q Clear Time (g_c+I1), s		28.0	9.0	18.0	8.1	20.3		6.8				
Green Ext Time (p_c), s		2.2	0.0	1.4	0.0	1.1		0.7				

Intersection Summary												
HCM 6th Ctrl Delay			28.4									
HCM 6th LOS			C									

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	22	17	538	36	26	428
Future Volume (vph)	22	17	538	36	26	428
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	11	12	12	11
Grade (%)	0%		3%			-1%
Storage Length (ft)	0	0		0	75	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.942		0.992			
Flt Protected	0.972				0.950	
Satd. Flow (prot)	1616	0	1698	0	1685	1731
Flt Permitted	0.972				0.950	
Satd. Flow (perm)	1616	0	1698	0	1685	1731
Link Speed (mph)	25		40			40
Link Distance (ft)	204		1439			1102
Travel Time (s)	5.6		24.5			18.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	0%	2%	2%	1%
Adj. Flow (vph)	24	18	585	39	28	465
Shared Lane Traffic (%)						
Lane Group Flow (vph)	42	0	624	0	28	465
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	22	17	538	36	26	428
Future Vol, veh/h	22	17	538	36	26	428
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	3	-	-	-1
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	0	2	2	1
Mvmt Flow	24	18	585	39	28	465

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1126	605	0	0	624	0
Stage 1	605	-	-	-	-	-
Stage 2	521	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.3	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3	3.1	-	-	3	-
Pot Cap-1 Maneuver	248	524	-	-	730	-
Stage 1	614	-	-	-	-	-
Stage 2	675	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	239	524	-	-	730	-
Mov Cap-2 Maneuver	239	-	-	-	-	-
Stage 1	614	-	-	-	-	-
Stage 2	649	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.3	0	0.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	313	730	-
HCM Lane V/C Ratio	-	-	0.135	0.039	-
HCM Control Delay (s)	-	-	18.3	10.1	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

APPENDIX G

Traffic Signal Diagrams

HULMEVILLE Borough

File 2474

SIGN TABULATION			
PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	R3-7L	30"x30"	LEFT LANE MUST TURN LEFT
B	R1-2	36"x36"	YIELD
C	R10-3L	9"x12"	PUSH BUTTON FOR GREEN LIGHT ←
D	R10-12	30"x36"	LEFT TURN YIELD ON GREEN ●
E	W3-3	36"X36"	SIGNAL AHEAD
F	OM1-3	18"x18"	OBJECT MARKER
G	R5-1	36"x36"	DO NOT ENTER
J	R10-3R	9"x12"	PUSH BUTTON FOR GREEN LIGHT →
K	R10-11R	30"x36"	NO TURN ON RED

EMERGENCY PRE-EMPTION PHASING

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

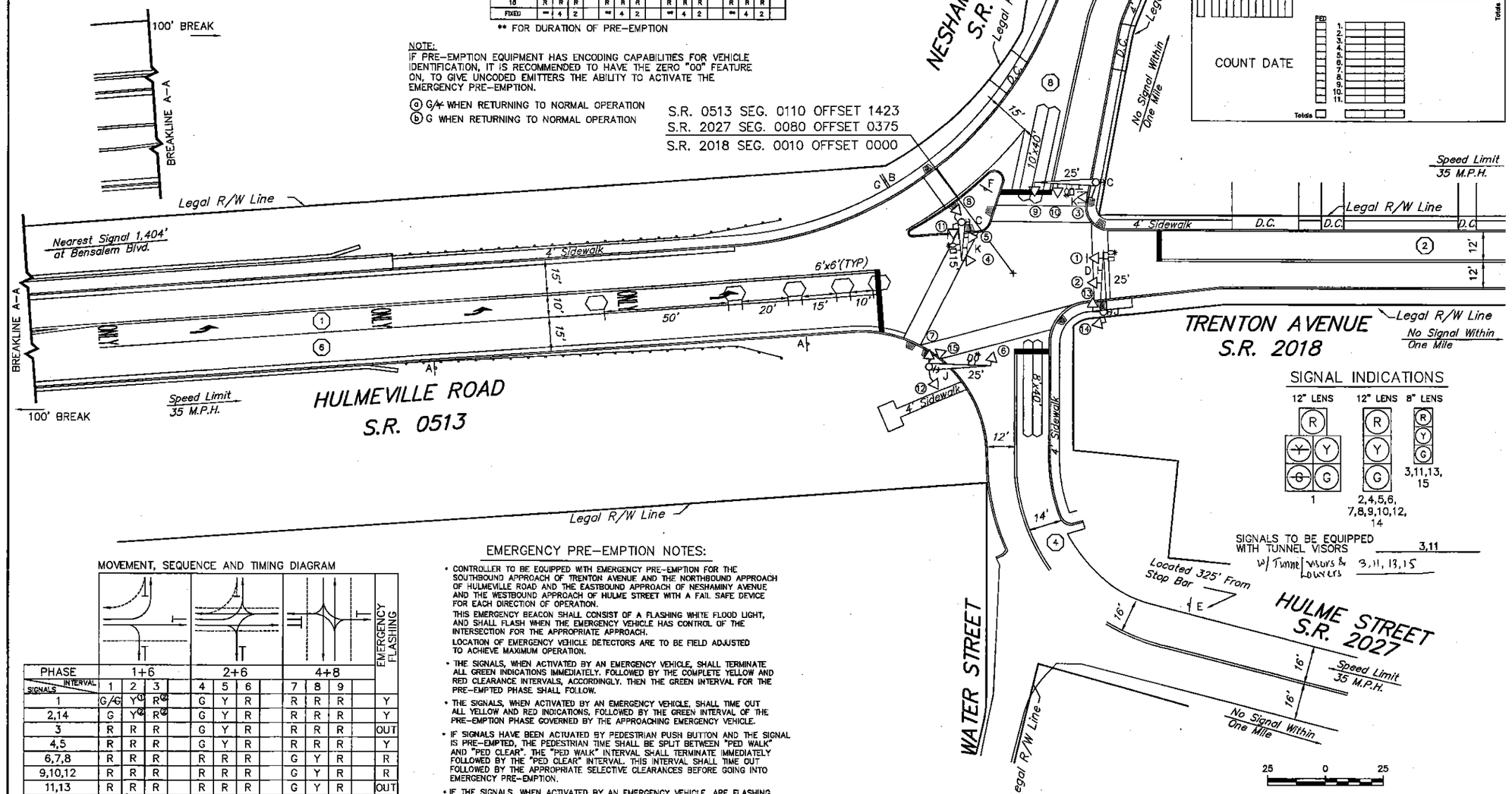
PHASE	2			4			6			8		
INTERVAL / SIGNALS	10	11	12	13	14	15	16	17	18	19	20	21
1	G/A	Y①	R②	R	R	R	R	R	R	R	R	R
2,14	G	Y①	R②	R	R	R	R	R	R	R	R	R
3	R	R	R	R	R	R	R	R	R	R	R	R
4,5	R	R	R	R	R	R	G	Y①	R②	R	R	R
6,7,8	R	R	R	R	R	R	R	R	R	G	Y	R
9,10,12	R	R	R	G	Y	R	R	R	R	R	R	R
11,13	R	R	R	R	R	R	R	R	R	R	R	R
16	R	R	R	R	R	R	R	R	R	R	R	R
FIXED	**	4	2	**	4	2	**	4	2	**	4	2

** FOR DURATION OF PRE-EMPTION

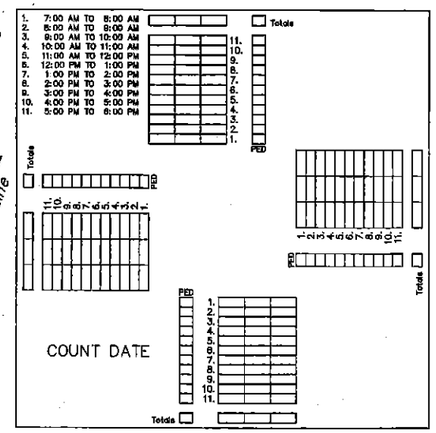
NOTE:
IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "00" FEATURE ON, TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.

ⓐ G/A WHEN RETURNING TO NORMAL OPERATION
ⓑ G WHEN RETURNING TO NORMAL OPERATION

S.R. 0513 SEG. 0110 OFFSET 1423
S.R. 2027 SEG. 0080 OFFSET 0375
S.R. 2018 SEG. 0010 OFFSET 0000



COUNT DATE



SIGNAL INDICATIONS

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS 3,11
w/ Tunnel Visors & Louvers 3,11,13,15

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	1+6			2+6			4+8			EMERGENCY FLASHING
INTERVAL / SIGNALS	1	2	3	4	5	6	7	8	9	
1	G/A	Y①	R②	G	Y	R	R	R	R	Y
2,14	G	Y②	R②	G	Y	R	R	R	R	Y
3	R	R	R	G	Y	R	R	R	R	OUT
4,5	R	R	R	G	Y	R	R	R	R	Y
6,7,8	R	R	R	R	R	R	G	Y	R	R
9,10,12	R	R	R	R	R	R	G	Y	R	R
11,13	R	R	R	R	R	R	G	Y	R	OUT
15	G	Y②	R②	G	Y	R	R	R	R	OUT

FIXED		4	2		4	2			4	2		
MINIMUM	3			20			3					
PASSAGE	3						3					
MAXIMUM 1	10			22			15					
MAXIMUM 2	14			34			24					
PEDESTRIAN*							18					
MEMORY	NL			MR			NL					

* UPON PEDESTRIAN ACTUATION ONLY

EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE SOUTHBOUND APPROACH OF TRENTON AVENUE AND THE NORTHBOUND APPROACH OF HULMEVILLE ROAD AND THE EASTBOUND APPROACH OF NESHAMINY AVENUE AND THE WESTBOUND APPROACH OF HULME STREET WITH A FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION.
  THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH.
  LOCATION OF EMERGENCY VEHICLE DETECTORS ARE TO BE FIELD ADJUSTED TO ACHIEVE MAXIMUM OPERATION.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY, FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS, ACCORDINGLY. THEN THE GREEN INTERVAL FOR THE PRE-EMPTED PHASE SHALL FOLLOW.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TIME OUT ALL YELLOW AND RED INDICATIONS, FOLLOWED BY THE GREEN INTERVAL OF THE PRE-EMPTION PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE.
- IF SIGNALS HAVE BEEN ACTUATED BY PEDESTRIAN PUSH BUTTON AND THE SIGNAL IS PRE-EMPTED, THE PEDESTRIAN TIME SHALL BE SPLIT BETWEEN "PED WALK" AND "PED CLEAR". THE "PED WALK" INTERVAL SHALL TERMINATE IMMEDIATELY FOLLOWED BY THE "PED CLEAR" INTERVAL. THIS INTERVAL SHALL TIME OUT FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES BEFORE GOING INTO EMERGENCY PRE-EMPTION.
- IF THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, ARE FLASHING ALL SIGNALS SHALL REMAIN FLASHING.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- UPON COMPLETION OF PRE-EMPTION, PHASE 2,4,6 OR 8 IN RETURNING TO NORMAL OPERATION, PHASE 2+6 INTERVAL 4 SHALL FOLLOW.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED, PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.

OPERATION NOTES

① G/A IF FOLLOWED BY PHASE 2+6
② G IF FOLLOWED BY PHASE 2+6
- SIGNAL TO DWELL IN PHASE 2+6 UNTIL ACTUATED BY PHASE 4+8

WEEKLY PROGRAM CHART

EVENT	DAY*	TIME	CYCLE	OFFSET	PROGRAM	REMARKS
1	1-5	00:00	–	–	FREE	MAX 1
2	1-5	6:00	–	–	FREE	MAX 2
3	1-5	9:00	–	–	FREE	MAX 1
4	1-5	15:00	–	–	FREE	MAX 2
5	1-5	18:00	–	–	FREE	MAX 1
6	6,7	00:00	–	–	FREE	MAX 1

* DAY 1= MONDAY

LEGEND

- 20' — MAST ARM/ IDENTIFYING LENGTH
- ② — VEHICULAR SIGNAL HEAD/ BACKPLATE/VISORS/ DIRECTIONAL ARROW/ IDENTIFYING NUMBER
- ② — PEDESTRIAN SIGNAL HEAD/ IDENTIFYING NUMBER
- PEDESTRIAN PUSHBUTTON/ SIGN
- A — SIGN/IDENTIFYING LETTER
- 12'x6' — LOOP SENSOR/SIZE
- MICROWAVE DETECTOR
- EMERGENCY PREEMPTION DEVICE
- CURB CUT RAMP
- UTILITY POLE
- (2) — PHASE NUMBER

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, EFFECTIVE DATE DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: BUCKS
MUNICIPALITY: HULMEVILLE BOROUGH
INTERSECTION: HULMEVILLE RD (SR 0513)/TRENTON AVE (SR 2018) & NESHAMINY AVE (SR 0513)/HULME ST. (SR 2027)

REVIEWED:
DATE
MUNICIPAL OFFICIAL DATE

RECOMMENDED:
Werner J. Eichorn 12/8/83
DATE
Steven B. Lester 12/8/83
DISTRICT TRAFFIC ENGINEER DATE

NO.	REVISION	DES./ REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	CHANGE SIGNAL HEAD #1 TO 5 SECTION HEAD	PAI	6/7/95	MLK	6/23/95	DWM	6/29/95
2	ADDED EMERGENCY PRE-EMPTION	BJD	7/1/15				
3							
4							
5							
6							
7							
8							

SHEET 2 OF 2 | PERMIT # 61-2474 | FILE # 2474

SIGN TABULATION

PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
B	R3-5L	30"x36"	LEFT TURN
C	R3-6SR	30"x36"	OPTIONAL RIGHT TURN
D	R10-12	30"x36"	LEFT TURN YIELD ON GREEN
E	R10-3	9"x12"	PUSH BUTTON FOR GREEN LIGHT ⟶
F	R10-3	9"x12"	PUSH BUTTON FOR GREEN LIGHT ⟵

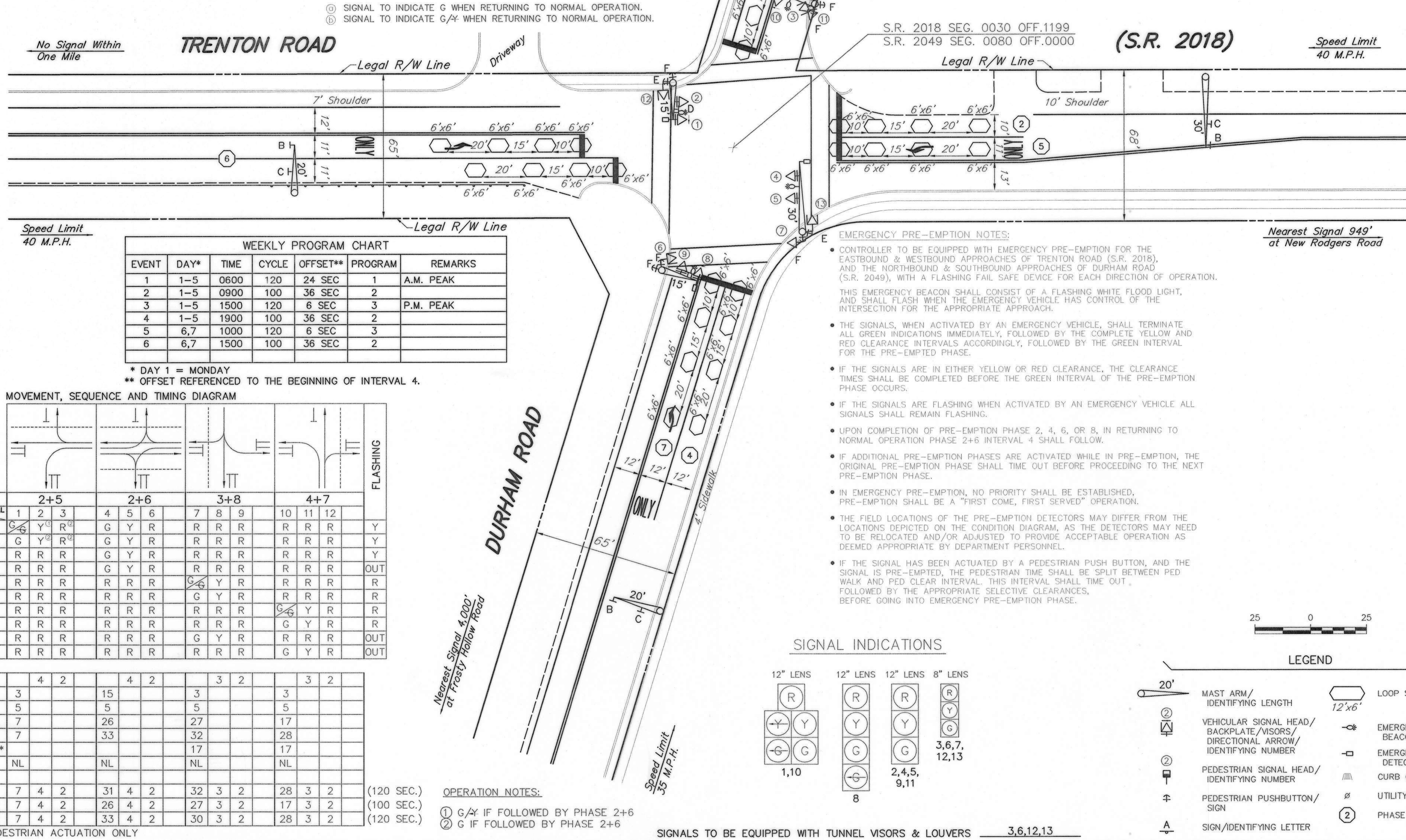
EMERGENCY PRE-EMPTION PHASING
MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	2				6				4				8			
SIGNALS \ INTERVAL		13	14	15		16	17	18		19	20	21		22	23	24
1		G/G	Y(b)	R(a)		R	R	R		R	R	R		R	R	R
2		G	Y(a)	R(a)		R	R	R		R	R	R		R	R	R
3		R	R	R		R	R	R		R	R	R		R	R	R
4,5		R	R	R		G	Y(a)	R(a)		R	R	R		R	R	R
6,7		R	R	R		R	R	R		R	R	R		R	R	R
8		R	R	R		R	R	R		R	R	R		G/G	Y	R
9		R	R	R		R	R	R		R	R	R		G	Y	R
10		R	R	R		R	R	R		G/G	Y	R		R	R	R
11		R	R	R		R	R	R		G	Y	R		R	R	R
12,13		R	R	R		R	R	R		R	R	R		R	R	R
FIXED TIME		*	4	2		*	4	2		*	3	2		*	3	2

* FOR DURATION OF PRE-EMPTION

NOTE: IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "00" FEATURE ON TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.

(a) SIGNAL TO INDICATE G WHEN RETURNING TO NORMAL OPERATION.
(b) SIGNAL TO INDICATE G/Y WHEN RETURNING TO NORMAL OPERATION.



WEEKLY PROGRAM CHART

EVENT	DAY*	TIME	CYCLE	OFFSET**	PROGRAM	REMARKS
1	1-5	0600	120	24 SEC	1	A.M. PEAK
2	1-5	0900	100	36 SEC	2	
3	1-5	1500	120	6 SEC	3	P.M. PEAK
4	1-5	1900	100	36 SEC	2	
5	6,7	1000	120	6 SEC	3	
6	6,7	1500	100	36 SEC	2	

* DAY 1 = MONDAY
** OFFSET REFERENCED TO THE BEGINNING OF INTERVAL 4.

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	2+5				2+6				3+8				4+7				FLASHING
SIGNALS \ INTERVAL	1	2	3		4	5	6		7	8	9		10	11	12		
1	G/G	Y(1)	R(2)		G	Y	R		R	R	R		R	R	R		Y
2,3	G	Y(2)	R(2)		G	Y	R		R	R	R		R	R	R		Y
4,5	R	R	R		G	Y	R		R	R	R		R	R	R		Y
6,7	R	R	R		G	Y	R		R	R	R		R	R	R		OUT
8	R	R	R		R	R	R		G/G	Y	R		R	R	R		R
9	R	R	R		R	R	R		G	Y	R		R	R	R		R
10	R	R	R		R	R	R		R	R	R		G/G	Y	R		R
11	R	R	R		R	R	R		R	R	R		G	Y	R		R
12	R	R	R		R	R	R		G	Y	R		R	R	R		OUT
13	R	R	R		R	R	R		R	R	R		G	Y	R		OUT

FIXED		4	2			4	2			3	2			3	2		
MINIMUM	3				15				3				3				
PASSAGE	5				5				5				5				
MAXIMUM 1	7				26				27				17				
MAXIMUM 2	7				33				32				28				
PEDESTRIAN*									17				17				
MEMORY	NL				NL				NL				NL				
PROGRAM 1	7	4	2		31	4	2		32	3	2		28	3	2		(120 SEC.)
PROGRAM 2	7	4	2		26	4	2		27	3	2		17	3	2		(100 SEC.)
PROGRAM 3	7	4	2		33	4	2		30	3	2		28	3	2		(120 SEC.)

* UPON PEDESTRIAN ACTUATION ONLY

OPERATION NOTES:

① G/Y IF FOLLOWED BY PHASE 2+6
② G IF FOLLOWED BY PHASE 2+6

EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE EASTBOUND & WESTBOUND APPROACHES OF TRENTON ROAD (S.R. 2018), AND THE NORTHBOUND & SOUTHBOUND APPROACHES OF DURHAM ROAD (S.R. 2049), WITH A FLASHING FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION.

  THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY, FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS ACCORDINGLY, FOLLOWED BY THE GREEN INTERVAL FOR THE PRE-EMPTED PHASE.
- IF THE SIGNALS ARE IN EITHER YELLOW OR RED CLEARANCE, THE CLEARANCE TIMES SHALL BE COMPLETED BEFORE THE GREEN INTERVAL OF THE PRE-EMPTION PHASE OCCURS.
- IF THE SIGNALS ARE FLASHING WHEN ACTIVATED BY AN EMERGENCY VEHICLE ALL SIGNALS SHALL REMAIN FLASHING.
- UPON COMPLETION OF PRE-EMPTION PHASE 2, 4, 6, OR 8, IN RETURNING TO NORMAL OPERATION PHASE 2+6 INTERVAL 4 SHALL FOLLOW.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED, PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVED" OPERATION.
- THE FIELD LOCATIONS OF THE PRE-EMPTION DETECTORS MAY DIFFER FROM THE LOCATIONS DEPICTED ON THE CONDITION DIAGRAM, AS THE DETECTORS MAY NEED TO BE RELOCATED AND/OR ADJUSTED TO PROVIDE ACCEPTABLE OPERATION AS DEEMED APPROPRIATE BY DEPARTMENT PERSONNEL.
- IF THE SIGNAL HAS BEEN ACTUATED BY A PEDESTRIAN PUSH BUTTON, AND THE SIGNAL IS PRE-EMPTED, THE PEDESTRIAN TIME SHALL BE SPLIT BETWEEN PED WALK AND PED CLEAR INTERVAL. THIS INTERVAL SHALL TIME OUT FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES, BEFORE GOING INTO EMERGENCY PRE-EMPTION PHASE.

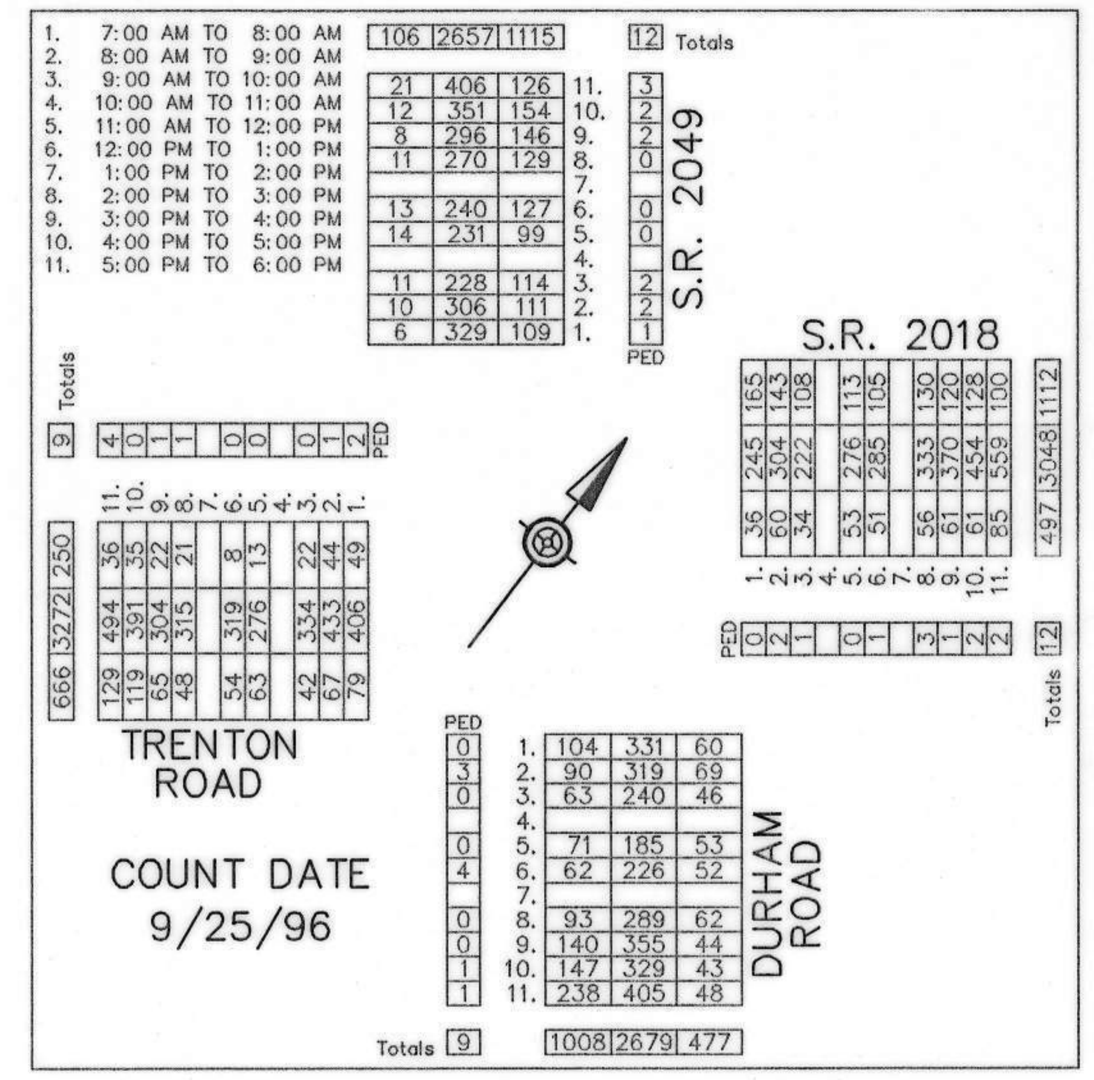
SIGNAL INDICATIONS

12" LENS: 1,10
12" LENS: 8
12" LENS: 2,4,5, 9,11
8" LENS: 3,6,7, 12,13

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS & LOUVERS 3,6,12,13

LEGEND

- MAST ARM/ IDENTIFYING LENGTH
- VEHICULAR SIGNAL HEAD/ BACKPLATE/VISORS/ DIRECTIONAL ARROW/ IDENTIFYING NUMBER
- PEDESTRIAN SIGNAL HEAD/ IDENTIFYING NUMBER
- PEDESTRIAN PUSHBUTTON/ SIGN
- SIGN/IDENTIFYING LETTER
- LOOP SENSOR/SIZE (12'x6')
- EMERGENCY PREEMPTION BEACON
- EMERGENCY PREEMPTION DETECTOR
- CURB CUT RAMP
- UTILITY POLE
- PHASE NUMBER



GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 68.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

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EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF ACT 38, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, EFFECTIVE DATE DECEMBER 12, 1991.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-7800 SERIES.

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: BUCKS
MUNICIPALITY: MIDDLETOWN TOWNSHIP
INTERSECTION: TRENTON ROAD (S.R. 2018) AND DURHAM ROAD (S.R. 2049)

REVIEWED:
________ DATE
MUNICIPAL OFFICIAL ________ DATE

RECOMMENDED:
Mark L. Kray 10-25-96 DATE
Douglas May 11-1-96
DISTRICT TRAFFIC ENGINEER DATE

NO.	REVISION	DES./ REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	New Dwg., Rev. TBC	PAI	10/25/96	MLK	10/25/96	DWM	11/1/96
2	Added Emergency Pre-emption	PAI RFW	8/20/05	MLK	8/23/5	[illegible]	2/22/06
3							
4							
5							
6							
7							
8							

SHEET 2 OF 2 | PERMIT # 61-1306 | FILE # 1306

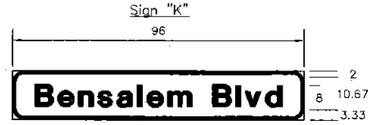
MIDT 0504 FILE 1306 08/10/05

BENSALEM TWP FILE #1994

SIGN TABULATION

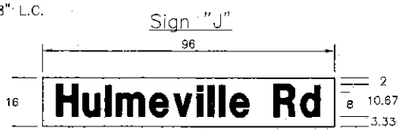
PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	R3-7L	30"x30"	LEFT LANE MUST TURN LEFT
B	R4-7	24"x30"	KEEP RIGHT
C	R10-3	9"x12"	PUSH BUTTON FOR GREEN LIGHT ←
D	R10-3	9"x12"	PUSH BUTTON FOR GREEN LIGHT →
E	R10-12	30"x36"	LEFT TURN YIELD ON GREEN ●
F	OM1-3	18"x18"	OBJECT MARKER
J	D3-4	96"x16"	HULMEVILLE RD
K	D3-4	96"x16"	BENSALEM BLVD

Sign "K"



CLEARVIEW ONE CD-45
10.6" U.C.
8" L.C.

Sign "J"

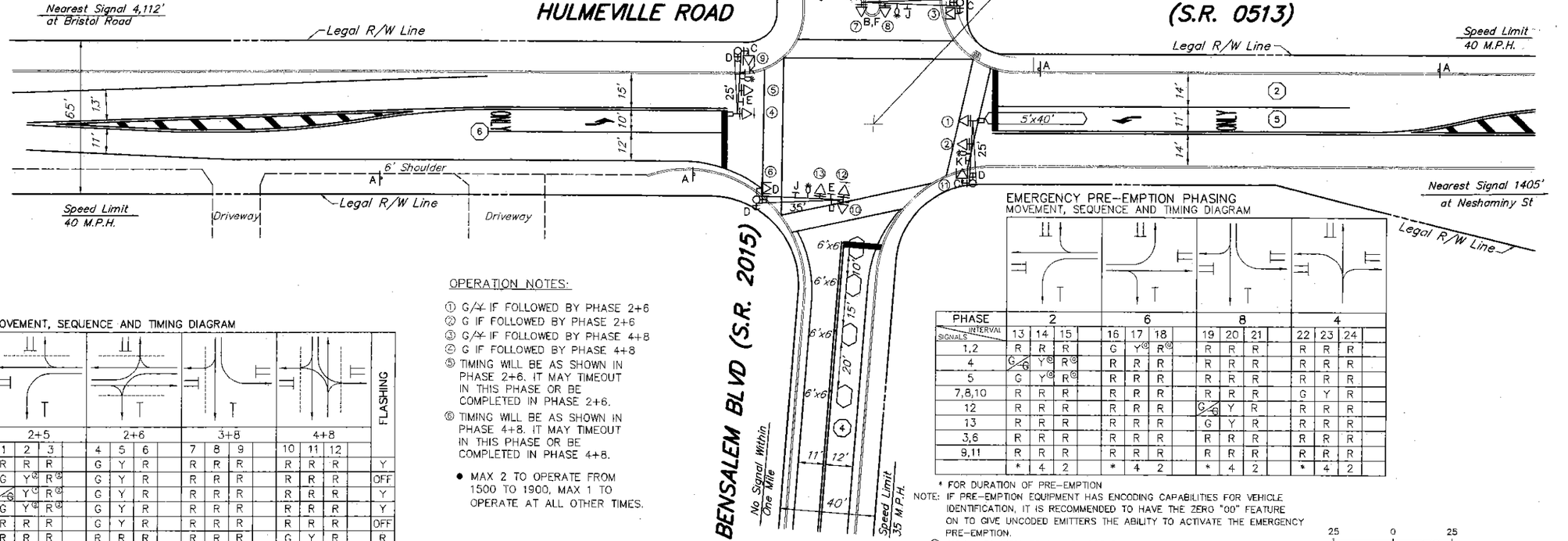


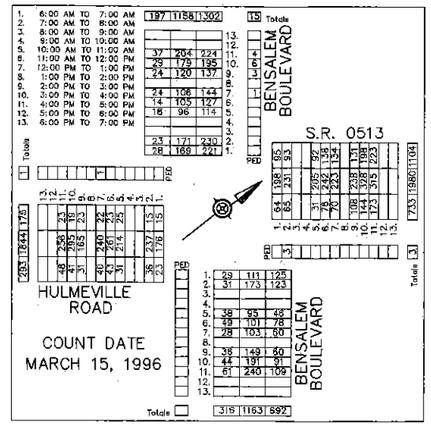
CLEARVIEW ONE CD-45 (25% REDUCTION)
10.6" U.C.
8" L.C.

EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE NORTHBOUND & SOUTHBOUND APPROACHES OF BENSALEM BOULEVARD (S.R. 2015), AND THE EASTBOUND & WESTBOUND APPROACHES OF HULMEVILLE ROAD (S.R. 0513), WITH A FLASHING FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION.

  THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY, FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS ACCORDINGLY, FOLLOWED BY THE GREEN INTERVAL FOR THE PREEMPTED PHASE.
- IF THE SIGNALS ARE IN EITHER YELLOW OR RED CLEARANCE, THE CLEARANCE TIMES SHALL BE COMPLETED BEFORE THE GREEN INTERVAL OF THE PRE-EMPTION PHASE OCCURS.
- IF THE SIGNALS ARE FLASHING WHEN ACTIVATED BY AN EMERGENCY VEHICLE ALL SIGNALS SHALL REMAIN FLASHING.
- UPON COMPLETION OF PRE-EMPTION PHASE 2, 4, 6 OR 8, IN RETURNING TO NORMAL OPERATION PHASE 2+6 INTERVAL 4 SHALL FOLLOW.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED. PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVED" OPERATION.
- THE FIELD LOCATIONS OF THE PRE-EMPTION DETECTORS MAY DIFFER FROM THE LOCATIONS DEPICTED ON THE CONDITION DIAGRAM, AS THE DETECTORS MAY NEED TO BE RELOCATED AND/OR ADJUSTED TO PROVIDE ACCEPTABLE OPERATION AS DEEMED APPROPRIATE BY DEPARTMENT PERSONNEL.
- IF THE SIGNAL HAS BEEN ACTUATED BY A PEDESTRIAN PUSH BUTTON, AND THE SIGNAL IS PRE-EMPTED, THE PEDESTRIAN TIME SHALL BE SPLIT BETWEEN "PED WALK" AND "PED CLEAR". THE "PED WALK" INTERVAL SHALL TERMINATE IMMEDIATELY FOLLOWED BY THE "PED CLEAR" INTERVAL. THIS INTERVAL SHALL TIME OUT FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES BEFORE PROCEEDING TO THE PRE-EMPTION PHASE.





MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	2+5			2+6			3+8			4+8			FLASHING
INTERVAL / SIGNALS	1	2	3	4	5	6	7	8	9	10	11	12	
1,2	R	R	R	G	Y	R	R	R	R	R	R	R	Y
3	G	Y	R⑥	G	Y	R	R	R	R	R	R	R	OFF
4	G/A	Y	R⑥	G	Y	R	R	R	R	R	R	R	Y
5	G	Y	R⑥	G	Y	R	R	R	R	R	R	R	Y
6	R	R	R	G	Y	R	R	R	R	R	R	R	OFF
7,8	R	R	R	R	R	R	R	R	R	G	Y	R	R
9	R	R	R	R	R	R	G	Y	R⑥	G	Y	R	OFF
10	R	R	R	R	R	R	R	R	R	G	Y	R	R
11	R	R	R	R	R	R	R	R	R	G	Y	R	OFF
12	R	R	R	R	R	R	G/G	Y	R⑥	G	Y	R	R
13	R	R	R	R	R	R	G	Y	R⑥	G	Y	R	R

FIXED		4	2		4	2		4	2		4	2
MINIMUM	3			18			3			3		
PASSAGE	3						3			3		
MAXIMUM 1	7			18			8			28		
MAXIMUM 2	7			26			7			36		
PEDESTRIAN*	⑤			18			⑥			15		
MEMORY	NL			MR			NL			NL		

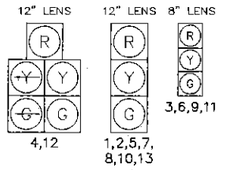
* UPON PEDESTRIAN ACTUATION ONLY

OPERATION NOTES:

① G/A IF FOLLOWED BY PHASE 2+6
② G IF FOLLOWED BY PHASE 2+6
③ G/A IF FOLLOWED BY PHASE 4+8
④ G IF FOLLOWED BY PHASE 4+8
⑤ TIMING WILL BE AS SHOWN IN PHASE 2+6. IT MAY TIMEOUT IN THIS PHASE OR BE COMPLETED IN PHASE 2+6.
⑥ TIMING WILL BE AS SHOWN IN PHASE 4+8. IT MAY TIMEOUT IN THIS PHASE OR BE COMPLETED IN PHASE 4+8.

- MAX 2 TO OPERATE FROM 1500 TO 1900, MAX 1 TO OPERATE AT ALL OTHER TIMES.

SIGNAL INDICATIONS



SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS _____
SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS & LOUVERS 3,6,9,11

EMERGENCY PRE-EMPTION PHASING
MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	2			6			8			4		
INTERVAL / SIGNALS	13	14	15	16	17	18	19	20	21	22	23	24
1,2	R	R	R	G	Y⑤	R⑤	R	R	R	R	R	R
4	G/A	Y⑤	R⑤	R	R	R	R	R	R	R	R	R
5	G	Y⑤	R⑤	R	R	R	R	R	R	R	R	R
7,8,10	R	R	R	R	R	R	R	R	R	G	Y	R
12	R	R	R	R	R	R	G/A	Y	R	R	R	R
13	R	R	R	R	R	R	G	Y	R	R	R	R
3,6	R	R	R	R	R	R	R	R	R	R	R	R
9,11	R	R	R	R	R	R	R	R	R	R	R	R
	*	4	2	*	4	2	*	4	2	*	4	2

* FOR DURATION OF PRE-EMPTION

NOTE: IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "00" FEATURE ON TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.

③ SIGNAL TO INDICATE G WHEN RETURNING TO NORMAL OPERATION.
⑤ SIGNAL TO INDICATE G/A WHEN RETURNING TO NORMAL OPERATION.

25 0 25

LEGEND

- 20' — MAST ARM/IDENTIFYING LENGTH
- ② — VEHICULAR SIGNAL HEAD/BACKPLATE/VISORS/DIRECTIONAL ARROW/IDENTIFYING NUMBER
- ② — PEDESTRIAN SIGNAL HEAD/IDENTIFYING NUMBER
- PEDESTRIAN PUSHBUTTON/SIGN
- A — SIGN/IDENTIFYING LETTER
- 12'x6' — LOOP SENSOR/SIZE
- MICROWAVE DETECTOR
- EMERGENCY PREEMPTION BEACON
- EMERGENCY PREEMPTION DETECTOR
- CURB CUT RAMP
- UTILITY POLE
- (2) — PHASE NUMBER

GENERAL NOTES

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ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 68.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF ACT 181, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, EFFECTIVE DATE MARCH 29, 2007.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-7800 SERIES.

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: BUCKS
MUNICIPALITY: BENSALEM TOWNSHIP
INTERSECTION: HULMEVILLE ROAD (S.R. 0513) AND BENSALEM BOULEVARD (S.R. 2015)

REVIEWED: _____ DATE
MUNICIPAL OFFICIAL _____ DATE

RECOMMENDED:
Mark H. Kray 8/11/92 DATE
Douglas May 9/2/92 DISTRICT TRAFFIC ENGINEER DATE

NO.	REVISION	DES./REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	Add S.H. 4,12, Signs G,E	JUL	08/21/92	MK	08/21/92	DWM	09/2/92
2	Added Emergency Pre-Emption	REV PAI	9/11/92	[illegible]	9/11/92	[illegible]	9/11/92
3							
4							
5							
6							
7							
8							

SHEET 2 OF 2 | PERMIT # 61-1994 | FILE # 1994

BENS 2008 FILE 1994

APPENDIX H

Auxiliary Turn Lane Warrant Analysis

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Hulmeville Borough	**Analysis Date:**	2/17/2023
County:	Bucks County	**Conducted By:**	BH
PennDOT Engineering District:	6	**Checked By:**	MB
		Agency/Company Name:	Traffic Planning and Design, Inc.

Intersection & Approach Description: Trenton Road (SR 2018) and Site Driveway

Analysis Period:	2027 Build	**Number of Approach Lanes:**	1
Design Hour:	AM Peak Hour	**Undivided or Divided Highway:**	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	40		**Type of Analysis**
Type of Terrain:	Level	**Left or Right-Turn Lane Analysis?:**	Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	9	2.0%	10
	Through	-	315	3.0%	320
	Right	Yes	0	2.0%	0
Opposing	Left	Yes	0	2.0%	0
	Through	-	425	4.0%	434
	Right	Yes	12	2.0%	13

Advancing Volume:	330
Opposing Volume:	447
Left Turn Volume:	10
% Left Turns in Advancing Volume:	3.03%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	2.0%	N/A
	Through	-	425	4.0%	N/A
	Right	-	12	2.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 2**

Warrant Met?: **No**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	10
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	

Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

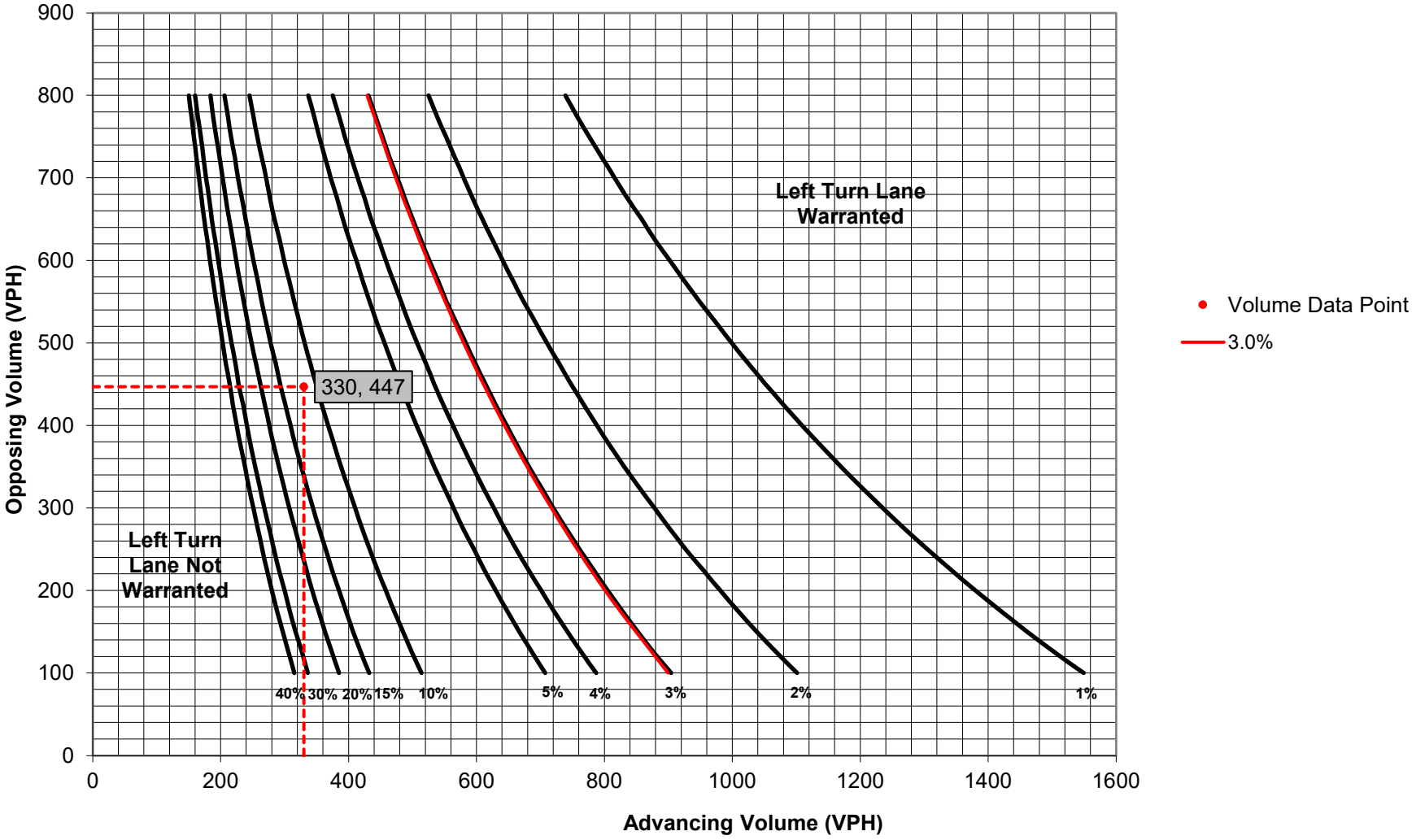
Left Turn Lane Storage Length, Condition A:	**N/A**	**Feet**
Condition B:	**N/A**	**Feet**
Condition C:	**N/A**	**Feet**
Required Left Turn Lane Storage Length:	**N/A**	**Feet**

Additional Findings:

N/A

Additional Comments / Justifications:

Figure 2. Warrant for left turn lanes on two-lane highways (40 mph speed, unsignalized and signalized intersections)
(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

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County:	Bucks County	**Conducted By:**	BH
PennDOT Engineering District:	6	**Checked By:**	MB
		Agency/Company Name:	Traffic Planning and Design, Inc.

Intersection & Approach Description: Trenton Road (SR 2018) and Site Driveway

Analysis Period:	2027 Build	**Number of Approach Lanes:**	1
Design Hour:	AM Peak Hour	**Undivided or Divided Highway:**	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	40		**Type of Analysis**
Type of Terrain:	Level	**Left or Right-Turn Lane Analysis?:**	Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	9	2.0%	N/A
	Through	-	315	3.0%	N/A
	Right	Yes	0	2.0%	N/A
Opposing	Left	Yes	0	2.0%	N/A
	Through	-	425	4.0%	N/A
	Right	Yes	12	2.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	2.0%	0
	Through	-	425	4.0%	434
	Right	-	12	2.0%	13

Advancing Volume:	447
Right Turn Volume:	13

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: N/A

Warrant Met?: N/A

Right Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 9

Warrant Met?: No

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	13
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	

Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

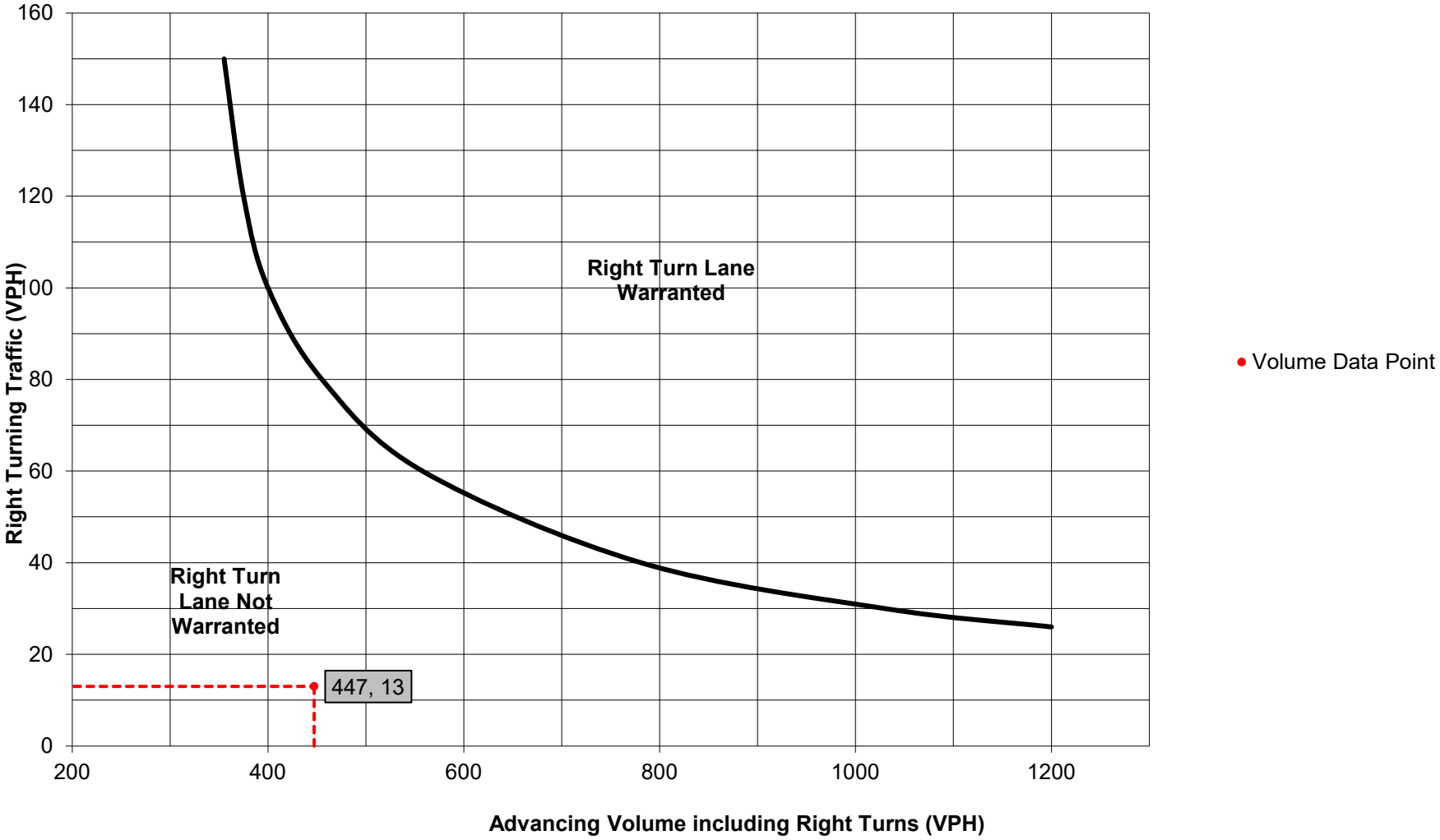
Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings:

N/A

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways
(40 mph or lower speeds, unsignalized and signalized intersections)



Turn Lane Warrant and Length Analysis Workbook

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PennDOT Engineering District:	6	**Checked By:**	MB
		Agency/Company Name:	Traffic Planning and Design, Inc.

Intersection & Approach Description: Trenton Road (SR 2018) and Site Driveway

Analysis Period:	2027 Build	**Number of Approach Lanes:**	1
Design Hour:	PM Peak Hour	**Undivided or Divided Highway:**	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	40	**Type of Analysis**	
Type of Terrain:	Level	**Left or Right-Turn Lane Analysis?:**	Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	26	2.0%	27
	Through	-	428	1.0%	431
	Right	Yes	0	2.0%	0
Opposing	Left	Yes	0	2.0%	0
	Through	-	538	0.0%	538
	Right	Yes	36	2.0%	37

Advancing Volume:	458
Opposing Volume:	575
Left Turn Volume:	27
% Left Turns in Advancing Volume:	5.90%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	2.0%	N/A
	Through	-	538	0.0%	N/A
	Right	-	36	2.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 2

Warrant Met?: Yes

Right Turn Lane Warrant Findings

Applicable Warrant Figure: N/A

Warrant Met?: N/A

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	27
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	

Average # of Vehicles/Cycle: 1.0

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	75	Feet
Condition C:	N/A	Feet
Required Left Turn Lane Storage Length:	75	Feet

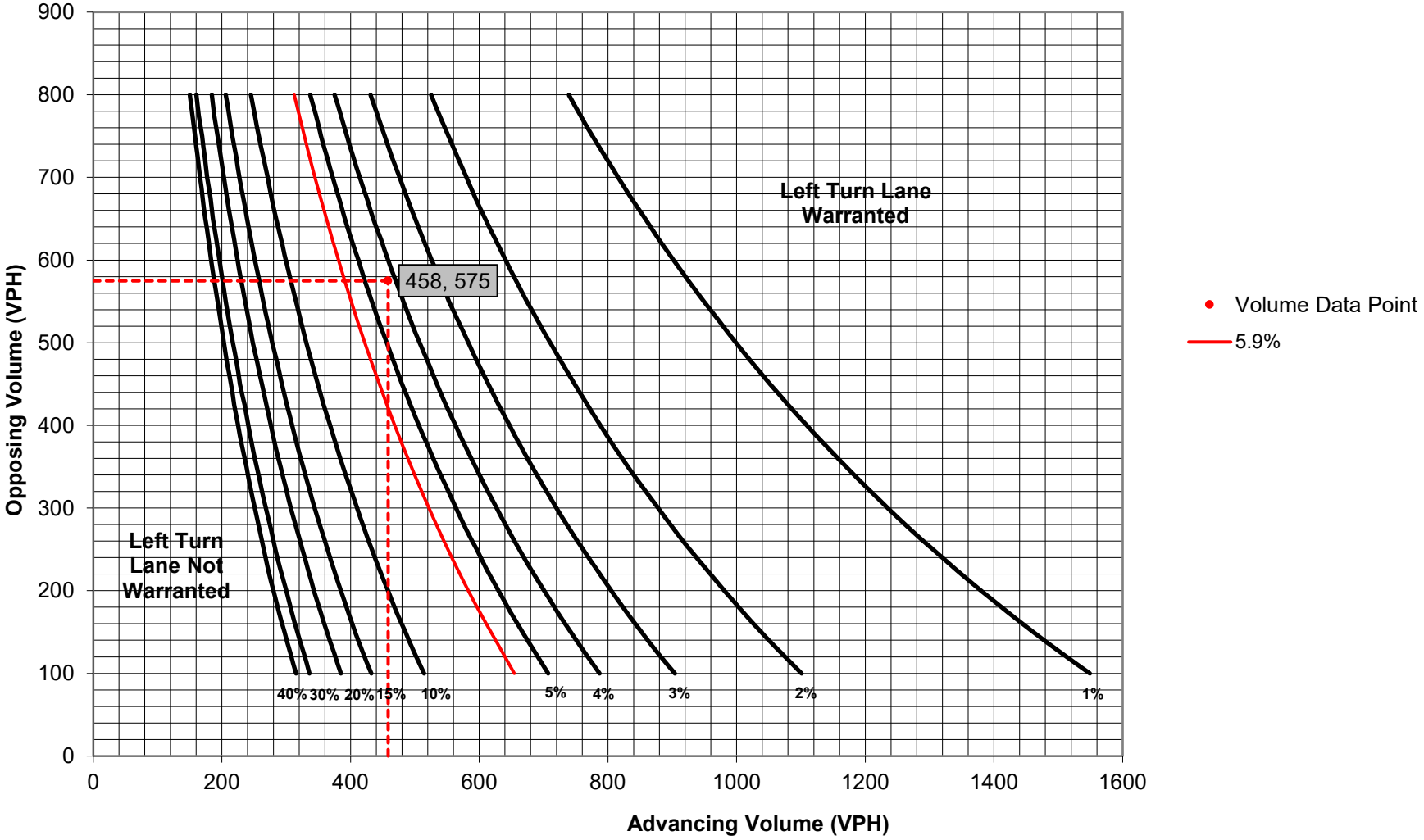
Additional Findings:

N/A

Additional Comments / Justifications:

Figure 2. Warrant for left turn lanes on two-lane highways (40 mph speed, unsignalized and signalized intersections)

(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	Hulmeville Borough	**Analysis Date:**	2/17/2023
County:	Bucks County	**Conducted By:**	BH
PennDOT Engineering District:	6	**Checked By:**	MB
		Agency/Company Name:	Traffic Planning and Design, Inc.

Intersection & Approach Description: Trenton Road (SR 2018) and Site Driveway

Analysis Period:	2027 Build	**Number of Approach Lanes:**	1
Design Hour:	PM Peak Hour	**Undivided or Divided Highway:**	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	40	**Type of Analysis**	
Type of Terrain:	Level	**Left or Right-Turn Lane Analysis?:**	Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	26	2.0%	N/A
	Through	-	428	1.0%	N/A
	Right	Yes	0	2.0%	N/A
Opposing	Left	Yes	0	2.0%	N/A
	Through	-	538	0.0%	N/A
	Right	Yes	36	2.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	2.0%	0
	Through	-	538	0.0%	538
	Right	-	36	2.0%	37

Advancing Volume:	575
Right Turn Volume:	37

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: N/A

Warrant Met?: N/A

Right Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 9

Warrant Met?: No

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	37
Cycles Per Hour (Assumed):	60
Cycles Per Hour (If Known):	

Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings:

N/A

Additional Comments / Justifications:

Figure 9. Warrant for right turn lanes on two-lane roadways
(40 mph or lower speeds, unsignalized and signalized intersections)