DELAWARE VALLEY
dvrpc
REGIONAL
PLANNING COMMISSION

Taming Traffic:
Bethlehem Pike Phase II - Road Diet Evaluation

March 2012

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Executive Summary

This report marks the culmination of a process that began in 2008 with the DVRPC study *Taming Traffic: Context-Sensitive Solutions in the DVRPC Region* (December 2008, #08044). The 2008 study focused on a 2.5-mile section of Bethlehem Pike through Springfield and Whitemarsh townships in Montgomery County. One of the main goals of the *Taming Traffic* studies was to address situations where the behavior of traffic is inconsistent with the existing or desired land-use context. Utilizing a multi-disciplinary study team comprised of stakeholders from the local, county, regional, and state levels, the process identified multi-modal transportation issues that could be addressed using context sensitive solutions and traffic calming.

The most important recommendation from the 2008 report was a road diet for the majority of the Bethlehem Pike study corridor, converting the existing four-lane configuration to three lanes—one lane per direction with a two-way-left-turn-lane. The road diet concept addresses safety, parking, traffic flow problems, turning movements, and speeding—all priority issues identified in the 2008 *Taming Traffic* study. In particular, the corridor's current on-street parking provision allows curbside parking at various points during off-peak travel times. This presents a hazardous situation as the right travel lane becomes intermittently obstructed by parked vehicles causing through traffic to weave in and out to avoid them. The existing four-lane cross-section has a posted speed limit of 35 miles per hour (mph), though higher speeds are inherently common with this design.

Also important to note is the difficulty in making left turns across two live traffic lanes. The proposed road diet's two-way-left-turn-lane reduces the number of potential conflict points, and allows turning drivers to queue out of the way of through traffic. This is an especially useful feature on Bethlehem Pike due to the frequent number of driveways and side streets where left turns can be made.

The road diet received overwhelming support from the study advisory committee, and was identified as the desired long-term improvement in other studies of the corridor which preceded the 2008 *Taming Traffic* study. This change would also match the existing three-lane configuration at the northern end of the study area in Whitemarsh Township.

In Phase II, the objective was to measure the effect of the road diet scenario on traffic and travel conditions as compared to existing conditions, using both existing traffic volumes and future traffic volumes. Using level-of-service (LOS) as the metric, this process was tailored to meet PennDOT requirements. DVRPC conducted four iterations of SimTraffic and Synchro analyses, each one incorporating changes requested by PennDOT District 6-0. The fourth iteration successfully met PennDOT analysis criteria. Upon review of the fourth iteration, PennDOT stated that the proposal appeared acceptable operationally, providing specific conditions were met as part of the implementation (see PennDOT's response in Chapter 2 for details).

DVRPC's role in the project was to help coordinate the effort between the municipality and PennDOT, and to provide necessary data and technical assistance in evaluating the suitability of Bethlehem Pike for a road diet. This marks the only time in the five-year history of the *Taming Traffic* project that a Phase II effort was conducted. It is an achievement which helps advance a recommendation from planning stage to implementation.

CHAPTER 1

Background

Introduction

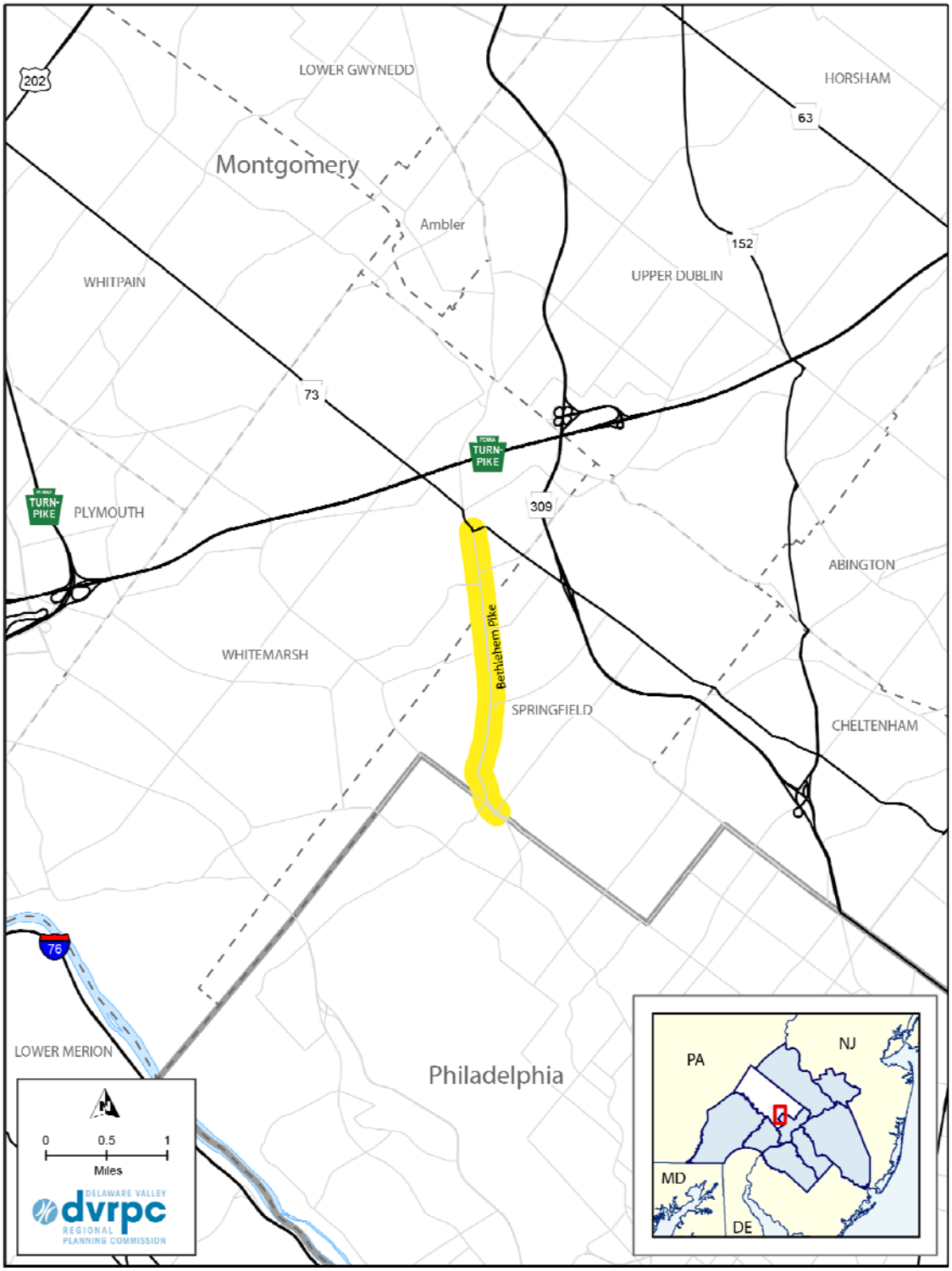
DVRPC initiated Phase II of the Bethlehem Pike *Taming Traffic* study to assist with the implementation of the study's most significant improvement recommendation: road diet. DVRPC coordinated the effort between the municipality and PennDOT, and conducted the technical evaluation of the suitability of Bethlehem Pike for a road diet. After four iterations of the analysis using Synchro and SimTraffic modeling software, a preferred signal timing scenario combined with select improvements was considered operationally acceptable by PennDOT. The following pages summarize the original Bethlehem Pike *Taming Traffic* study, corridor characteristics, the Phase II study process, and the analysis findings. As of September 2011, the final analysis files were made available to PennDOT and Springfield Township.

Taming Traffic: Context-Sensitive Solutions in the DVRPC Region – Bethlehem Pike Study Site

Each year between 2005 and 2010, DVRPC's *Taming Traffic* study focused on the application of context-sensitive solutions (CSS) principles and best practices at two case study sites in the region. In 2008, the Montgomery County Planning Commission, in collaboration with Springfield and Whitemarsh townships, proposed a 2.5-mile section of Bethlehem Pike for that year's Pennsylvania study corridor (see Figure 1). This year-long effort yielded a list of issues and recommended improvements that were the result of study deliberations over two meetings, several emails, and multiple field visits. The main recommendation was the application of a road diet to the Springfield Township portion of the study corridor, which would dovetail with the existing three-lane configuration of the Whitemarsh section of Bethlehem Pike.

Building on several previous studies, the *Taming Traffic* work synthesized the best parts of the other studies and laid out a solid framework for Springfield Township to realize its desired context for the corridor. Bethlehem Pike has the potential to become a vibrant and prosperous corridor. It already has the types of mixed-use, street-edge, historic buildings and thriving commercial infrastructure that make places like neighboring Chestnut Hill and Ambler attractive to locals and visitors. The road diet offers the right roadway configuration to properly handle Bethlehem Pike's high frequency of turning movements, retain important on-street parking, and help to realize the walkable downtown destination that is a keystone of the Springfield Township comprehensive plan.

Figure 1: Study Area



What is a Road Diet?

A “road diet” is a strategy for calming traffic and improving roadway safety, while maintaining an appropriate level of service. Typically, a road diet refers to the conversion of a four-lane roadway with two through lanes in each direction, into a three-lane roadway with one through lane in each direction and a two-way-left-turn-lane. This application is not suitable in every situation, and works best where the traffic volume is at or below 20,000 vehicles per day, and the candidate corridor has many driveways and turning opportunities. Even with these conditions, the first question regarding road diets is typically about what happens to traffic when the capacity of the roadway is reduced from two through lanes per direction to one. The answer is that when the left or inner lane of a four-way road is frequently occupied by drivers waiting to turn left, then the roadway never really had the capacity of two through lanes. The road diet removes the turning vehicles from the through lane, allowing them to queue in the two-way-left-turn-lane.

The road diet configuration also offers benefits to bicyclists and pedestrians as compared to the four-lane configuration by slowing travel speeds and reducing the number of traffic lanes to cross over. These benefits also improve safety as the road diet’s fewer lanes translate into fewer conflict points for drivers, pedestrians, and bicyclists. Often the newly found excess roadway space is used for new bike lanes, on-street parking, or even sidewalks if none are available.

Application to Bethlehem Pike

The road diet concept, as proposed for Bethlehem Pike in the original *Taming Traffic* study, maintains on-street parking in an alternating fashion by providing spaces intermittently on both sides of the roadway. This important provision addresses the need for business district parking, and serves as a traffic calming device as it alternates over the length of the corridor. Figures 2 and 3, taken from the 2008 *Taming Traffic* report, depict current and future cross-section scenarios and parking configurations. The study team envisioned the future concept for the Bethlehem Pike corridor.

Study Area Setting

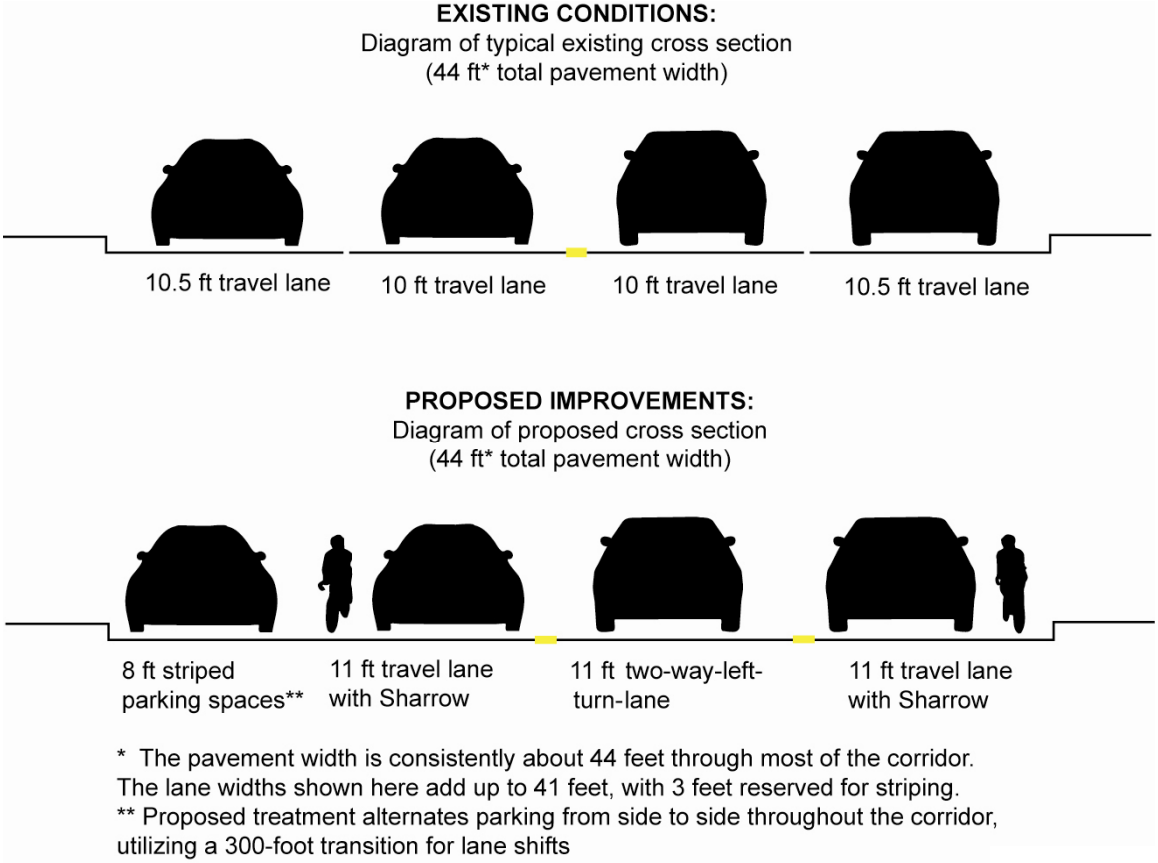
Land Use

Bethlehem Pike is a suburban-style corridor in Springfield and Whitemarsh townships, Montgomery County, Pennsylvania, with nodes of traditional town center development. This roadway provides access to Philadelphia from many communities in eastern Montgomery County and is also a major thoroughfare between municipalities in the region.

Study area development is a mix of uses with a largely auto-dependent design style, though lined with a number of historic buildings that are constructed up to the sidewalk line, maintaining a

character of a past age. Many of these structures are active or preserved and create a strong foundation for defining the corridor's character. However, the auto-oriented feel of the corridor prevents the desired identity sought by the study committee: a walkable, downtown destination.

Figure 2: Bethlehem Pike — Existing and Proposed Cross-Sections



Source: DVRPC

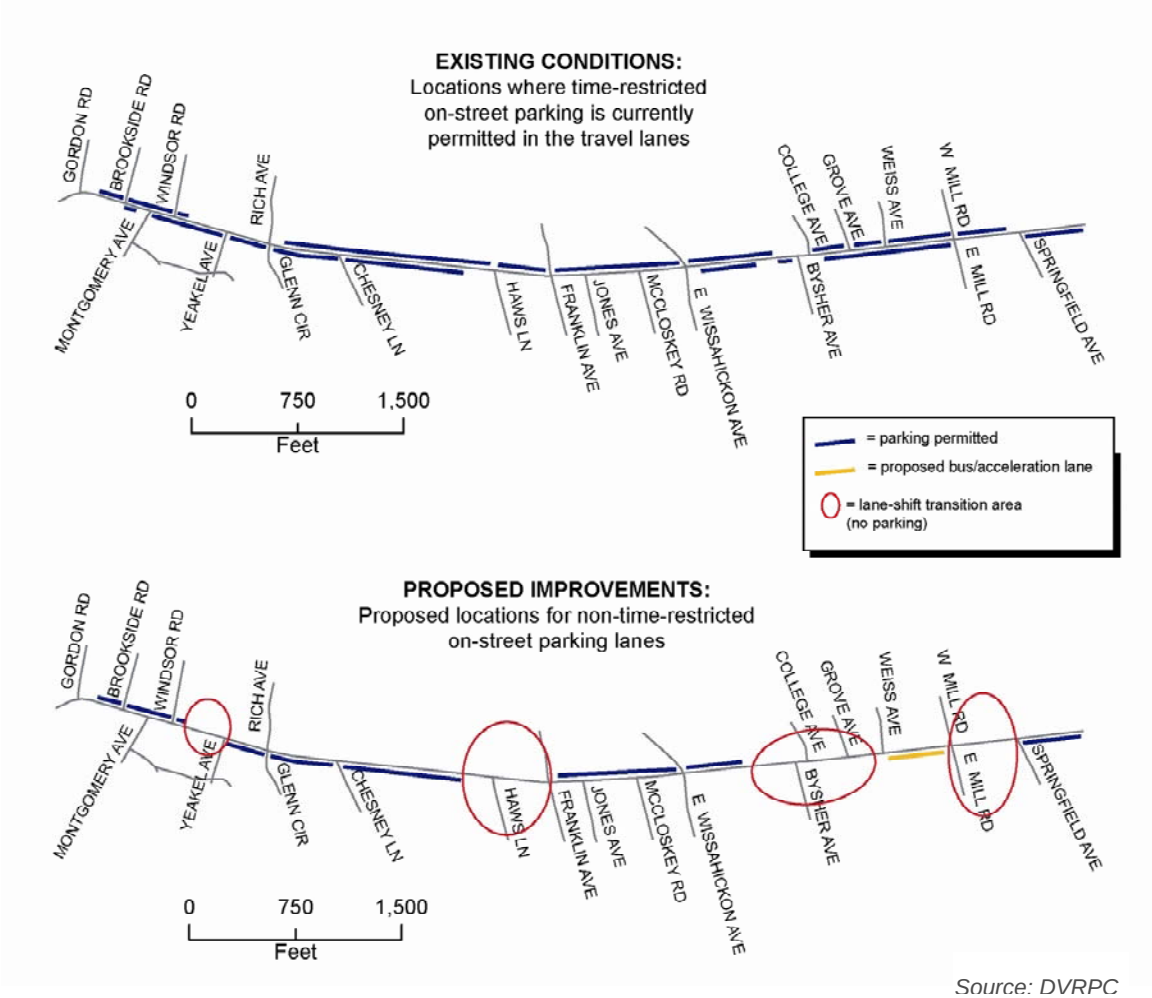
The roadway has two travel lanes in each direction in Springfield Township, and transitions to a three-lane roadway with a two-way-left-turn lane in Whitemarsh Township. On-street parking is currently permitted in the rightmost travel lane at certain points during non-peak hours as posted, but within Springfield Township only. There are certain sections with a number of businesses and midblock turns, creating a high potential for conflicts between turning and through vehicles. Also, while there are several bus transit lines that utilize the corridor, a recreational trailhead, and significant pedestrian activity, there are inadequate amenities for pedestrians, cyclists, and transit users.

Transit

The study corridor is proximate to rail transit, with the southern end of the corridor less than half a mile from the Chestnut Hill East SEPTA Regional Rail station on the Chestnut Hill East line. The study corridor is served by SEPTA's 94, 134 and L Bus routes. The Routes 94 and 134 both

traverse the corridor on Bethlehem Pike, originating in Chestnut Hill and terminating at the Montgomery Mall —though their routes deviate past Ft. Washington. The Route L Bus only travels briefly on Bethlehem Pike, making a loop around Paper Mill Road, Montgomery Avenue, and Bethlehem Pike, before returning to its primary route along Stenton Avenue and Germantown Pike, between the Olney Transportation Center and the Plymouth Meeting Mall.

Figure 3: Bethlehem Pike — Existing and Proposed Parking Configurations



Source: DVRPC

Corridor Crash Statistics

In an effort to be consistent with PennDOT procedures, the crash analysis for the 2008 *Taming Traffic* study of Bethlehem Pike used the most recent five years (2003–2007) of data. During that period, 138 crashes were recorded on Bethlehem Pike within the corridor study limits. Angle crashes were the most frequent collision type, accounting for 46 percent (64 crashes), followed by rear-end crashes accounting for 23 percent (32 crashes). Angle crashes involve vehicles turning from and to Bethlehem Pike as they access side streets and driveways, or cross Bethlehem Pike.

This data set was re-run using the most recent five years (2006–2010) of data for comparison. Despite two years of overlapping data, five years were used in the comparison to remain consistent with PennDOT practices. The corridor crash summary shows a very similar crash experience during this latter period when 140 total crashes were recorded. The predominant collision type was again angle crashes at 46 percent (65 crashes), followed again by rear-end crashes at 19 percent (27 crashes). The rear-end crash percentage was slightly lower than in the original analysis, thought still significant.

With nearly identical crash totals, and a very similar collision type distribution, it can be surmised that the crash safety experience on Bethlehem Pike has neither worsened, nor improved. With the existing four-lane cross-section over most of the study area, speeding, weaving between lanes and around parked cars, and difficulty making left turns will persist.

CHAPTER 2

Phase II Analysis

The process to objectively evaluate the proposed road diet's effect on traffic and travel through the study corridor was conducted by DVRPC staff with guidance from the PennDOT District 6-0 office. Since Bethlehem Pike is a state facility, the implementation of the road diet requires the approval of PennDOT and will ultimately be the state's responsibility to implement the project in coordination with Springfield Township.

Between September 2009 and September 2011, the study advisory committee met three times. Meetings focused mainly on analysis results, and needed refinements based on PennDOT's criteria and standards. See Appendix A for a list of study advisory committee members.

Traffic Volume Data

The analysis required two kinds of traffic volume data: annual average daily traffic (AADT) volumes, and turning movement volumes at signalized intersections. In late October 2010, the AADT volumes were recorded at two locations along the corridor to establish a baseline of total volume moving through the study area. The data was collected by direction at a point between Hillcrest Avenue and Montgomery Avenue representing the southern portion of the corridor, and between Wissahickon Avenue and Bysher Avenue representing the northern portion. In the southern portion, an AADT of approximately 14,000 vehicles per day was recorded, and in the northern portion, the volume was higher at approximately 21,000 vehicles per day. This proportional split is due to the density of commercial developments along the corridor from Bysher Avenue north through Mill Road, which includes the corridor's biggest trip generators.

Turning movement counts were gathered at all seven signalized intersections: Paper Mill Road, Montgomery Avenue, Haws Lane, Wissahickon Avenue, Bysher Avenue, Mill Road, and at the entrance to the Flourtown Shopping Center located at the northern end of the study area where Springfield Township meets Whitemarsh Township. Counts were taken in 15-minute intervals during the morning peak period (6 AM – 9 AM), and during the evening peak period (4 PM – 7 PM). In an effort to capture the off-peak traffic common in the commercial district, mid-day (11 AM-1 PM) counts were taken on Friday and Saturday at the following intersections: Wissahickon Avenue, Bysher Avenue, and Mill Road.

In order to use turning movement counts, a peak hour was calculated for each peak period at each location. This is the highest volume hour of each three-hour count period, for all movements combined. The peak hour numbers are the main data input of the analysis. This procedure was conducted in accordance with PennDOT practices.

Analysis Tools

In order to evaluate the effects to traffic flow resulting from road diet conversion, engineers use simulation software. In the case of this study, DVRPC employed Synchro and SimTraffic to measure operating levels of service under the following conditions: existing traffic performance with no-build condition, existing traffic performance with build condition, existing traffic performance with build condition plus improvements, and future traffic conditions modeled for a 20-year horizon under the build scenario with improvements.

The major data input for this software is the traffic count data that was collected specifically for this analysis. By creating a virtual roadway network modeled after the Bethlehem Pike study corridor, it is possible to examine traffic conditions under all applicable scenarios, and determine necessary improvements for achieving acceptable level of service numbers to make the road diet feasible.

Synchro

Synchro uses the Highway Capacity Manual techniques with the primary function of analyzing roadway capacity and providing levels of service for isolated intersections. It also considers traffic signal offsets and random traffic variations as factored into the computational procedure. Traffic data input into Synchro for each signal in the Bethlehem Pike network creates the foundation for the SimTraffic analysis.

SimTraffic

SimTraffic, using the Synchro data, analyzes and simulates a network of signalized and unsignalized intersections. It provides results on measures of effectiveness such as delay, stops, queues, average speed, fuel consumption, and throughput. It also provides a visual model of intersection traffic throughput based on car-following formulas, acceleration rates, deceleration rates, reactions to yellow light, reaction times, gap acceptance, cruise speed, turning speed and vehicle driver performance characteristics.

Level of Service

Level-of-service (LOS) is a measure used commonly by traffic engineers to analyze highways by categorizing the quality of traffic flow at an intersection or network of intersections. There are six categories that describe a range of conditions. “A” is the best referring to free-flow conditions with no delay, and “F” is the worst describing a breakdown in vehicular flow where vehicles move in stop and go fashion at a very slow pace. Each letter grade has a corresponding range for seconds of delay (A, ≤ 10 seconds; F, > 80 seconds). Appendix B includes a table listing all levels of service and their corresponding seconds of delay.

Growth Factor

In coordination with PennDOT District 6-0, DVRPC's Office of Modeling and Analysis developed a suitable average annual growth rate along Bethlehem Pike in Springfield Township, Montgomery County for evaluating the traffic impacts of a "road diet" scenario over a 20-year horizon. This growth rate, 0.53 percent per year, was based on then-recent traffic counts taken on Bethlehem Pike and output from DVRPC's Regional Travel Demand Model for analysis years of 2010 and 2030. The historical traffic count data on Bethlehem Pike display a higher growth rate of approximately one percent per year between 1995 and 2005. However, counts that are more recent exhibited very little growth, or even slight declines in daily traffic volumes. PennDOT approved of the proposed rate.

Modeling Scenarios

The technical objective of this analysis was to compare operating conditions between the existing configuration at current traffic volumes, and three other scenarios: build, build with improvements, and future build with improvements, which applies the traffic growth factor. Specifically, the scenarios are:

1. Existing Four-Lane Cross-Section, Existing Coordinated Signal Timing – 2009 Volumes
2. Three-Lane "Road Diet" Cross-Section, Optimized Coordinated Timing – 2009 Volumes
3. Three-Lane "Road Diet" Cross-Section with Improvements, Optimized Coordinated Timing – 2009 Volumes
4. Three-Lane "Road Diet" Cross-Section with Improvements, Optimized Coordinated Timing – 2030 Volumes

Scenario one establishes existing traffic conditions and performance with recent traffic volumes as a baseline for comparison. In addition to the application of the three-lane road diet cross-section, scenarios two through four also include optimized, coordinated signal timing. Signal optimization refers to the adjustment of a traffic signal's timing plan. It provides more efficient, and oftentimes safer, opportunities for vehicles and pedestrians to traverse a signalized intersection. Signal coordination provides greater efficiency for travel through multiple and adjacent signalized intersections. This is beneficial because it allows a platoon of vehicles to progress smoothly through a series of signals, and is accomplished via inter-signal communication that provides the appropriate progression of starting green times.

Scenario two measures traffic condition changes when the road diet is applied (and includes optimized, coordinated signal timing). The third scenario builds upon scenario two by incorporating physical improvements to select intersections that are designed to benefit traffic flow and improve LOS. The fourth scenario tests the road diet cross-section with improvements by applying future traffic numbers resulting from the growth factor calculations. This scenario tells how the road diet will perform with future traffic volumes.

Improvements

In addition to the optimized and coordinated signals, scenarios three and four also included intersection improvements at select locations. These suggested improvements are the result of an iterative process by which the DVRPC staff devised and tested various changes to the lane configurations at select intersection approaches, in an effort to improve traffic flow and level of service. These improvements may involve right-of-way acquisition. Also, all turn lane lengths and taper lengths conform to PennDOT's recommended standards. Improvements included in scenarios three and four are:

- Flourtown Shopping Center intersection: add a right-turn lane along the northbound Bethlehem Pike approach at the shopping center entrance
- Mill Road intersection: add a westbound left-turn lane along Mill Road for movements to Bethlehem Pike southbound, and a northbound right-turn lane along Bethlehem Pike for movements to Mill Road eastbound
- Wissahickon Avenue intersection: add an eastbound left-turn lane along Wissahickon Avenue for movements to Bethlehem Pike northbound, and add a southbound right-turn lane along Bethlehem Pike for movements to Wissahickon Avenue westbound
- Haws Lane intersection: add a westbound right-turn lane along Haws Lane for movements to Bethlehem Pike northbound
- Paper Mill Road intersection: add dual left-turn lanes along southwest bound Paper Mill Road for movements to southbound Bethlehem Pike

PennDOT's Response

Upon review of the final iteration of the analysis, PennDOT District 6-0 issued the following response and corresponding conditions via email:

[1]"The Department has reviewed your submission for the Bethlehem Pike Road Diet in Springfield Township, Montgomery County. The proposal would appear acceptable operationally with the following conditions:

1. The proposed improvements are constructed as part of the project in order to maintain acceptable operations. These improvements were listed as Bethlehem/Flourtown northbound right-turn lane, Bethlehem/Mill westbound left-turn lane, Bethlehem/Mill northbound right-turn lane, Bethlehem/Wissahickon eastbound left turn lane, Bethlehem/Wissahickon southbound right-turn lane, Bethlehem/Haws westbound right-turn lane, and Bethlehem/Paper Mill dual left-turn lane from Paper Mill.
2. A concept plan for the proposed improvements shall be submitted and reviewed before the project moves forward. The Department requires that lanes be lined up properly across each

[1] Adams, David. "RE: Bethlehem Pike Road Diet: 4th Iteration". Email to Kevin Murphy. 30 Sept. 2011.

intersection, and some of the proposed improvements, in particular the side street left-turn lanes, would seem to require widening on both sides of the intersection to line up the receiving lane.

3. A traffic adaptive signal system should be pursued to provide the latest technology in signal control and maintain adequate traffic flow through the corridor under this proposed reduced capacity condition.

4. All work must conform with the Department's Americans with Disabilities Act standards."

CHAPTER 3

Conclusions and Next Steps

The road diet concept is growing in popularity in the United States as citizens seek to improve traffic conditions, increase the number of multi-modal options, and improve safety. It has been recommended in other *Taming Traffic* studies, and DVRPC has also published two other road diet-focused works: *Regional Road Diet Analysis: A Feasibility Assessment* (2009, #08055), and *Municipal Implementation Tool #16 – Road Diets* (2008, #MIT016). Not only would the road diet provide safety and mobility benefits for Bethlehem Pike, it would also set the stage for realizing Springfield Township's vision of making the Bethlehem Pike corridor the walkable, downtown shopping destination they desire.

Although it has always had strong local support, PennDOT required that the Bethlehem Pike road diet concept pass the traffic modeling test before implementation could be sought, as is the standard with any state facility. The Synchro and SimTraffic evaluation conducted by DVRPC according to PennDOT standards was considered operationally acceptable by PennDOT, providing all specified turn-lane improvements are incorporated into the project in accordance with standard engineering practices. The details of the implementation phase will be the work of Springfield Township and PennDOT.

If the Township is to pursue implementation of the road diet strategy, they must develop and submit to PennDOT a concept plan for the proposed improvements that requires PennDOT approval in order to advance. PennDOT advises to allow six months for the concept plan stage, as it is typically an iterative process involving multiple submissions, depending on the complexity of the project. From there, the timing of the construction phase will depend on several variables including extent of work to be completed and coordination with other scheduled projects.

APPENDIX A

Study Advisory Committee

NAME	ORGANIZATION
Kevin Murphy	Principal Transportation Planner, DVRPC
Keith Hartington	Senior Transportation Planner, DVRPC
Ellis Kim	Transportation Engineer, DVRPC
Fran Hanney	Traffic Services Manager, PennDOT 6-0
Ashwin Patel	Traffic Signals and Safety Manager, PennDOT 6-0
David Adams	Traffic Signals Supervisor – Montgomery County, PennDOT 6-0
Randall Hummel	Chief, Springfield Township Police
Mike Taylor	Assistant Township Manager, Springfield Township
Don Sirianni	Public Works, Springfield Township
Don Berger	Township Manager, Springfield Township

APPENDIX B

Level of Service (LOS) Analysis Results Tables

The first table contains the definitions for each LOS letter grade. The next two tables show LOS results per intersection for the entire network, broken down by peak period. The remaining tables on the subsequent pages show LOS results for each intersection under existing conditions and for the three build scenarios for both the AM and PM peak hours. Where applicable, Friday and Saturday midday peak hour results are also provided.

Level of Service Categories

Average Delay per Vehicle (seconds)*	Level of Service
≤ 10	A
> 10 - 20	B
> 20 - 35	C
> 35 - 55	D
> 55 - 80	E
> 80	F

*Source: Highway Capacity Manual

Corridor SYNCHRO Summary

		Existing	Build		
		Existing 4-Lane Cross-Section	*3-Lane "Road Diet" Cross-Section*	*3-Lane "Road Diet" Cross-Section with Improvements*	*3-Lane "Road Diet" Cross-Section with Improvements*
		2009 Volumes			2030 Volumes
		Existing Coordinated Signal Timing (80 sec. CL)	*Optimized Coordinated Timing*	*Optimized Coordinated Timing*	*Optimized Coordinated Timing*
AM Peak Hour	Flourtown Shopping Ctr	A	B	B	B
	Mill Rd	B	C	B	C
	College Ave/Bysher Ave	B	B	C	B
	Wissahickon Ave	C	D	B	C
	Haws Ln	A	B	B	B
	Montgomery Ave	B	B	B	B
	Paper Mill Rd	F	F	F	F
PM Peak Hour	Flourtown Shopping Ctr	B	C	B	C
	Mill Rd	C	E	C	D
	College Ave/Bysher Ave	C	C	C	D
	Wissahickon Ave	B	D	C	D
	Haws Ln	B	B	B	B
	Montgomery Ave	B	B	A	B
	Paper Mill Rd	E	E	E	F
Friday Midday Peak Hour	Mill Rd	D	D	C	D
	College Ave/Bysher Ave	B	C	C	E
	Wissahickon Ave	C	C	C	C
Saturday Midday Peak Hour	Mill Rd	C	C	B	C
	College Ave/Bysher Ave	C	D	D	D
	Wissahickon Ave	C	C	B	C

CL-cycle length, sec-seconds, LOS-level of service

Corridor SIM TRAFFIC Summary

		Existing	Build		
		Existing 4-Lane Cross-Section	*3-Lane "Road Diet" Cross-Section*	*3-Lane "Road Diet" Cross-Section with Improvements*	*3-Lane "Road Diet" Cross-Section with Improvements*
		2009 Volumes			2030 Volumes
		Existing Coordinated Signal Timing	*Optimized Coordinated Timing*	*Optimized Coordinated Timing*	*Optimized Coordinated Timing*
AM Peak Hour	Flourtown Shopping Ctr	A	A	A	A
	Mill Rd	B	C	B	B
	College Ave/Bysher Ave	A	A	B	B
	Wissahickon Ave	B	C	B	B
	Haws Ln	B	B	B	B
	Montgomery Ave	B	A	B	B
	Paper Mill Rd	F	F	F	F
PM Peak Hour	Flourtown Shopping Ctr	B	C	B	C
	Mill Rd	B	D	B	C
	College Ave/Bysher Ave	B	C	C	C
	Wissahickon Ave	B	C	B	B
	Haws Ln	B	B	B	B
	Montgomery Ave	A	A	B	A
	Paper Mill Rd	F	F	F	F
Friday Midday Peak Hour	Mill Rd	B	D	C	E
	College Ave/Bysher Ave	B	B	B	C
	Wissahickon Ave	B	B	B	B
Saturday Midday Peak Hour	Mill Rd	B	C	B	B
	College Ave/Bysher Ave	C	C	C	C
	Wissahickon Ave	B	B	B	B

CL-cycle length, sec-seconds, LOS-level of service

Flourtown Shopping Center Intersection

Synchro Derived Results

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 80 sec. CL)*		*Optimized Coordinated Signal Timing 110 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
AM Peak Hour	Bethlehem Pike (NB)	1.1	A	6.3	A	5.2	A	4.9	A
	Bethlehem Pike (SB)	4.2	A	9.6	A	12.1	B	12.2	B
	Flourtown Shopping Ctr (EB)	27.7	C	48.6	D	31.9	C	46.5	D
	Flourtown Shopping Ctr (WB)	28	C	44	D	36	C	66.5	E
	Total Intersection	4.2	A	10.3	B	10.5	B	12	B

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
PM Peak Hour	Bethlehem Pike (NB)	5	A	24.4	C	9.3	A	9.9	A
	Bethlehem Pike (SB)	10.3	B	14.5	B	12.7	B	17.5	B
	Flourtown Shopping Ctr (EB)	18.5	B	33.4	C	27.6	C	31.9	C
	Flourtown Shopping Ctr (WB)	33.3	C	81.4	F	53.1	D	65.8	E
	Total Intersection	11.6	B	29.8	C	17.7	B	21.8	C

CL-cycle length, sec-seconds, LOS-level of service

Flourtown Shopping Center Intersection

SimTraffic Derived Results

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 80 sec. CL)*		*Optimized Coordinated Signal Timing 110 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
AM Peak Hour	Bethlehem Pike (NB)	4.5	A	8.5	A	5.9	A	6.4	A
	Bethlehem Pike (SB)	3.8	A	6.3	A	6.4	A	7	A
	Flourtown Shopping Ctr (EB)	24.1	C	45.5	D	28.9	C	34.9	C
	Flourtown Shopping Ctr (WB)	26.7	C	42.1	D	31.3	C	45.4	D
	Total Intersection	5.3	A	9.2	A	7.6	A	8.9	A

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
PM Peak Hour	Bethlehem Pike (NB)	9.6	A	20.2	C	13.4	B	16	B
	Bethlehem Pike (SB)	11.1	B	12.4	B	12.3	B	15.9	B
	Flourtown Shopping Ctr (EB)	22.4	C	36	D	23.6	C	32.1	C
	Flourtown Shopping Ctr (WB)	27.5	C	71.1	E	40.7	D	50.7	D
	Total Intersection	12.9	B	24.8	C	17.5	B	21.7	C

CL-cycle length, sec-seconds, LOS-level of service

Mill Road Intersection

Synchro Derived Results

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 80 sec. CL)*		*Optimized Coordinated Signal Timing 110 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
AM Peak Hour	Bethlehem Pike (NB)	12	B	21.6	C	10.2	B	15.1	B
	Bethlehem Pike (SB)	13.7	B	13.6	B	13.6	B	16.1	B
	Mill Rd (EB)	23.5	C	44.4	D	29.8	C	37.5	D
	Mill Rd (WB)	34	C	69.1	E	44	D	54	D
	Total Intersection	17	B	27.8	C	18.4	B	23.3	C

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 100 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
PM Peak Hour	Bethlehem Pike (NB)	10.8	B	81.9	F	22	C	37.5	D
	Bethlehem Pike (SB)	22.7	C	18.2	B	17.1	B	30.8	C
	Mill Rd (EB)	26.1	C	43.3	D	35.6	D	40.4	D
	Mill Rd (WB)	43.9	D	102.2	F	53.3	D	65.6	E
	Total Intersection	21.9	C	58.6	E	26.6	C	40	D

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing (110 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*		*Optimized Coordinated Signal Timing 110 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Friday Midday Peak Hour	Bethlehem Pike (NB)	16.6	B	28.2	C	12.7	B	10.3	B
	Bethlehem Pike (SB)	77.4	E	52.3	D	25.4	B	39.7	D
	Mill Rd (EB)	58	D	113.8	F	78.6	E	103.8	F
	Mill Rd (WB)	26.9	C	38.9	D	60.5	E	73.4	E
	Total Intersection	51.3	D	49	D	30.4	C	40.4	D

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 100 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Saturday Midday Peak Hour	Bethlehem Pike (NB)	19.7	B	19.6	B	11.4	B	14.7	B
	Bethlehem Pike (SB)	15.2	B	15.1	B	12.8	B	17.6	B
	Mill Rd (EB)	27.4	C	48.5	D	35.7	D	40.7	D
	Mill Rd (WB)	28	C	49.5	D	38.9	D	44.9	D
	Total Intersection	20.2	C	25.8	C	19	B	23.5	C

CL-cycle length, sec-seconds, LOS-level of service

Mill Road Intersection

SimTraffic Derived Results

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 80 sec. CL)*		*Optimized Coordinated Signal Timing 110 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
AM Peak Hour	Bethlehem Pike (NB)	10.2	B	13.9	B	9.9	A	10.2	B
	Bethlehem Pike (SB)	10.7	B	12.5	B	11.9	B	13.5	B
	Mill Rd (EB)	27.6	C	40.6	D	35.9	D	40.1	D
	Mill Rd (WB)	27.3	C	56.5	E	30.4	C	39.6	D
	Total Intersection	14.1	B	21.3	C	15.2	B	17.6	B

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 100 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
PM Peak Hour	Bethlehem Pike (NB)	11.7	B	16.6	B	12.8	B	21.4	C
	Bethlehem Pike (SB)	17.5	B	38.3	D	13.6	B	21.5	C
	Mill Rd (EB)	27.1	C	40.2	D	34.5	C	40.3	D
	Mill Rd (WB)	33	C	91.4	F	36.9	D	48.9	D
	Total Intersection	18.4	B	38.3	D	18.6	B	27.3	C

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing (110 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*		*Optimized Coordinated Signal Timing 110 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Friday Midday Peak Hour	Bethlehem Pike (NB)	12.5	B	21.2	C	11.8	B	10.3	B
	Bethlehem Pike (SB)	18.6	B	50.2	D	31.6	C	102.5	F
	Mill Rd (EB)	30.9	C	44.8	D	55.6	E	126.5	F
	Mill Rd (WB)	25.6	C	35.3	D	46.1	D	47	D
	Total Intersection	18.1	B	38.2	D	28	C	66	E

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 100 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Saturday Midday Peak Hour	Bethlehem Pike (NB)	14.4	B	15.9	B	9.7	A	11.6	B
	Bethlehem Pike (SB)	11.7	B	15.4	B	12.9	B	16.8	B
	Mill Rd (EB)	27.2	C	41.4	D	36.9	D	44	D
	Mill Rd (WB)	23.1	C	43.2	D	30.4	C	34.9	C
	Total Intersection	15.7	B	22	C	16	B	19.4	B

CL-cycle length, sec-seconds, LOS-level of service

College Ave./Bysher Ave. Intersection

Synchro Derived Results

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 80 sec. CL)*		*Optimized Coordinated Signal Timing 110 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
AM Peak Hour	Bethlehem Pike (NB)	12.5	B	6.8	A	15.3	B	14.4	B
	Bethlehem Pike (SB)	13.8	B	10.3	B	23	C	13.5	B
	College Ave (EB)	38	D	72.1	E	45	D	80.7	F
	Bysher Ave (WB)	37.8	D	67.7	E	43.9	D	76.9	E
	Total Intersection	14.8	B	12.6	B	21	C	18.1	B

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing (110 sec. CL)*		*Optimized Coordinated Signal Timing 100 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
PM Peak Hour	Bethlehem Pike (NB)	16	B	11.6	B	11.7	B	21.9	C
	Bethlehem Pike (SB)	26.8	C	39.2	D	35.7	D	70.6	E
	College Ave (EB)	38.1	D	78.6	E	66.5	E	103.7	F
	Bysher Ave (WB)	39.2	D	113.6	F	111.7	F	139.7	F
	Total Intersection	23.3	C	33.3	C	31.2	C	55.4	D

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*		*Optimized Coordinated Signal Timing 110 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Friday Midday Peak Hour	Bethlehem Pike (NB)	17.6	B	12.6	B	10.7	B	15.1	B
	Bethlehem Pike (SB)	17.8	B	22.2	C	23.2	C	83.5	F
	College Ave (EB)	38.6	D	100.6	F	122.9	F	119	F
	Bysher Ave (WB)	38.8	D	111.4	F	108.3	F	136.1	F
	Total Intersection	19.5	B	25.7	C	26.2	C	60.1	E

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 100 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Saturday Midday Peak Hour	Bethlehem Pike (NB)	27.5	C	16.4	B	17.7	B	24.2	C
	Bethlehem Pike (SB)	27.6	C	34.5	C	37.1	D	56.8	D
	College Ave (EB)	39.2	D	99.8	F	98.8	F	125.3	F
	Bysher Ave (WB)	40.1	D	112.2	F	108.6	F	115.9	F
	Total Intersection	29.1	C	36.7	D	38.1	D	52	D

CL-cycle length, sec-seconds, LOS-level of service

College Ave./Bysher Ave. Intersection

SimTraffic Derived Results

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 800 sec. CL)*		*Optimized Coordinated Signal Timing 110 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
AM Peak Hour	Bethlehem Pike (NB)	8.8	A	6.3	A	10.1	B	11.4	B
	Bethlehem Pike (SB)	7.5	A	8.1	A	13.2	B	11.3	B
	College Ave (EB)	39.2	D	51.3	D	44.5	D	58.1	E
	Bysher Ave (WB)	39.4	D	64.8	E	42	D	65.9	E
	Total Intersection	9.8	A	9.9	A	13.3	B	14	B

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing (110 sec. CL)*		*Optimized Coordinated Signal Timing 100 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
PM Peak Hour	Bethlehem Pike (NB)	11.3	B	11.2	B	9.1	A	16.1	B
	Bethlehem Pike (SB)	19.2	B	24.7	C	27.5	C	32.2	C
	College Ave (EB)	37.7	D	53.6	E	53.2	D	74.7	E
	Bysher Ave (WB)	35.3	D	67.5	E	68	E	96.2	F
	Total Intersection	17	B	22.1	C	23	C	30.6	C

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*		*Optimized Coordinated Signal Timing 110 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Friday Midday Peak Hour	Bethlehem Pike (NB)	13.6	B	9.5	A	9	A	12.5	B
	Bethlehem Pike (SB)	11	B	12.1	B	13.2	B	24.6	C
	College Ave (EB)	33.5	C	61.1	E	68.5	E	59.8	E
	Bysher Ave (WB)	36	D	74	E	72.9	E	68.1	E
	Total Intersection	13.6	B	14.7	B	15.4	B	22.2	C

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 100 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Saturday Midday Peak Hour	Bethlehem Pike (NB)	20.9	C	13	B	13.9	B	15.9	B
	Bethlehem Pike (SB)	16.9	B	22	C	23.7	C	32.9	C
	College Ave (EB)	34.9	D	64.1	E	58	E	73.2	E
	Bysher Ave (WB)	37.1	C	76.9	E	81.1	F	70.4	E
	Total Intersection	20.8	C	23.7	C	24.8	C	29.3	C

CL-cycle length, sec-seconds, LOS-level of service

Wissahickon Ave. Intersection

Synchro Derived Results

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 80 sec. CL)*		*Optimized Coordinated Signal Timing 110 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
AM Peak Hour	Bethlehem Pike (NB)	8.2	A	13.8	B	5.5	A	16.1	B
	Bethlehem Pike (SB)	25.9	C	38.9	D	6	A	11.1	B
	Wissahickon Ave (EB)	55.1	E	117.8	F	52.1	D	64.6	E
	Wissahickon Ave (WB)	24.4	C	37.2	D	29.3	C	35.9	D
	Total Intersection	23.4	C	40.7	D	13.6	B	21.9	C

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 100 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
PM Peak Hour	Bethlehem Pike (NB)	15.7	B	14.1	B	12	B	9.9	A
	Bethlehem Pike (SB)	4.5	A	50.4	D	10.8	B	36.8	D
	Wissahickon Ave (EB)	58.6	E	181.2	F	89.7	F	99	F
	Wissahickon Ave (WB)	25.6	C	42	D	41.4	D	45.9	D
	Total Intersection	16.4	B	53.1	D	22.4	C	35	D

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing (110 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*		*Optimized Coordinated Signal Timing 110 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Friday Midday Peak Hour	Bethlehem Pike (NB)	11.6	B	13.2	B	14.1	B	19.1	B
	Bethlehem Pike (SB)	21.3	C	29	C	12.1	B	14.6	B
	Wissahickon Ave (EB)	46.2	D	126.1	F	81.1	F	92.3	F
	Wissahickon Ave (WB)	27.7	C	45.5	D	45.1	D	42.5	D
	Total Intersection	20	C	32.2	C	20.9	C	24.9	C

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 100 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Saturday Midday Peak Hour	Bethlehem Pike (NB)	13.2	B	14.7	B	12	B	19.7	B
	Bethlehem Pike (SB)	20.4	C	28.5	C	8.3	A	19.6	B
	Wissahickon Ave (EB)	47.4	D	135.7	F	77.7	E	89.7	F
	Wissahickon Ave (WB)	29.8	C	50.9	D	49.7	D	55.7	E
	Total Intersection	20.5	C	33.8	C	18.6	B	28.1	C

CL-cycle length, sec-seconds, LOS-level of service

Wissahickon Ave. Intersection

SimTraffic Derived Results

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 800 sec. CL)*		*Optimized Coordinated Signal Timing 110 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
AM Peak Hour	Bethlehem Pike (NB)	5.9	A	10	B	5.3	A	9.7	A
	Bethlehem Pike (SB)	12.7	B	19.4	B	7.5	A	7.1	A
	Wissahickon Ave (EB)	35.9	D	54.6	D	37.5	D	48.6	D
	Wissahickon Ave (WB)	25.8	C	39.5	D	29.3	C	37	D
	Total Intersection	13.4	B	20.4	C	10.6	B	13.7	B

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 100 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
PM Peak Hour	Bethlehem Pike (NB)	9.5	A	12.3	B	9.8	A	6.1	A
	Bethlehem Pike (SB)	7.4	A	19.7	B	8.5	A	10.1	B
	Wissahickon Ave (EB)	35.3	D	75.6	E	56	E	59.3	E
	Wissahickon Ave (WB)	29	C	40.1	D	38	D	48.4	D
	Total Intersection	11.3	B	23.3	C	14.4	B	14.9	B

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing (110 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*		*Optimized Coordinated Signal Timing 110 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Friday Midday Peak Hour	Bethlehem Pike (NB)	7.6	A	10.7	B	10.1	B	12.3	B
	Bethlehem Pike (SB)	10.6	B	14.6	B	7.4	A	9	A
	Wissahickon Ave (EB)	33.3	C	67.4	E	58.9	E	58.8	E
	Wissahickon Ave (WB)	28	C	40.5	D	41	D	41.9	D
	Total Intersection	11.7	B	18	B	13.3	B	15	B

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 100 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Saturday Midday Peak Hour	Bethlehem Pike (NB)	7.2	A	10.8	B	9.1	A	12.1	B
	Bethlehem Pike (SB)	12	B	15.7	B	6.9	A	7.8	A
	Wissahickon Ave (EB)	24.7	C	62.9	E	50.3	D	67.7	E
	Wissahickon Ave (WB)	33.3	C	45.7	D	42.7	D	49.8	D
	Total Intersection	12.4	B	18.3	B	12.1	B	15.7	B

CL-cycle length, sec-seconds, LOS-level of service

Haws Lane Intersection

Synchro Derived Results

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 80 sec. CL)*		*Optimized Coordinated Signal Timing 110 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
AM Peak Hour	Bethlehem Pike (NB)	7.5	A	16.1	B	11.9	B	13.7	B
	Bethlehem Pike (SB)	3.7	A	4.7	A	3.1	A	4.8	A
	Haws Ln (WB)	25.6	C	49.7	D	21.6	C	27.5	C
	Total Intersection	8.7	A	16.5	B	9.8	B	12.2	B

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 100 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
PM Peak Hour	Bethlehem Pike (NB)	4.7	A	17	B	13.6	B	17.4	B
	Bethlehem Pike (SB)	12.2	B	5.7	A	3.2	A	10.6	B
	Haws Ln (WB)	24.9	C	51.2	D	26	C	30.9	C
	Total Intersection	10.8	B	15.7	B	10	B	15.7	B

CL-cycle length, sec-seconds, LOS-level of service

Haws Lane Intersection

SimTraffic Derived Results

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 80 sec. CL)*		*Optimized Coordinated Signal Timing 110 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
AM Peak Hour	Bethlehem Pike (NB)	7.7	A	13.3	B	10	A	14.1	B
	Bethlehem Pike (SB)	7.7	A	10.5	B	7.1	A	7.1	A
	Haws Ln (WB)	23.7	C	37.4	D	20.6	C	28	C
	Total Intersection	10.2	B	15.6	B	10.2	B	13	B

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 110 sec. CL)*		*Optimized Coordinated Signal Timing 100 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
PM Peak Hour	Bethlehem Pike (NB)	7	A	13.3	B	11.3	B	9.1	A
	Bethlehem Pike (SB)	13.1	B	12.1	B	7.9	A	11.2	B
	Haws Ln (WB)	22.4	C	37.8	D	22.4	C	26.5	C
	Total Intersection	11.9	B	15.5	B	10.7	B	12.4	B

CL-cycle length, sec-seconds, LOS-level of service

Montgomery Ave. Intersection

Synchro Derived Results

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 55 sec. CL)*		*Optimized Coordinated Signal Timing 80 sec. CL)*		*Optimized Coordinated Signal Timing 55 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
AM Peak Hour	Bethlehem Pike (NB)	7.2	A	8.7	A	9.5	A	8.8	A
	Bethlehem Pike (SB)	15.4	B	9.5	A	5.1	A	9.2	A
	Montgomery Ave (WB)	32.1	C	28.7	C	34.5	C	28.4	C
	Total Intersection	15.4	B	12.8	B	12.3	B	12.6	B

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 55 sec. CL)*		*Optimized Coordinated Signal Timing 100 sec. CL)*		*Optimized Coordinated Signal Timing 80 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
PM Peak Hour	Bethlehem Pike (NB)	4.8	A	5.9	A	6.2	A	7	A
	Bethlehem Pike (SB)	3	A	7.3	A	8.4	A	6.8	A
	Montgomery Ave (WB)	26.9	C	27.2	C	42.5	D	29	C
	Total Intersection	6.4	A	9	A	11.5	B	9.4	A

CL-cycle length, sec-seconds, LOS-level of service

Montgomery Ave. Intersection

SimTraffic Derived Results

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 55 sec. CL)*		*Optimized Coordinated Signal Timing 80 sec. CL)*		*Optimized Coordinated Signal Timing 55 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
AM Peak Hour	Bethlehem Pike (NB)	5.6	A	7.4	A	9.2	A	8	A
	Bethlehem Pike (SB)	8.7	A	8.6	A	6.9	A	8.7	A
	Montgomery Ave (WB)	25.4	C	20.3	B	26.5	C	19.6	B
	Total Intersection	10.4	B	9.9	A	10.5	B	10	B

		Existing Coordinated Signal Timing (80 sec. CL)		*Optimized Coordinated Signal Timing 55 sec. CL)*		*Optimized Coordinated Signal Timing 100 sec. CL)*		*Optimized Coordinated Signal Timing 60 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
PM Peak Hour	Bethlehem Pike (NB)	4.8	A	7.1	A	6.5	A	7	A
	Bethlehem Pike (SB)	5.7	A	8.6	A	9.5	A	6.8	A
	Montgomery Ave (WB)	23.1	C	18	B	34.1	C	29	C
	Total Intersection	6.8	A	8.8	A	10.5	B	9.4	A

CL-cycle length, sec-seconds, LOS-level of service

Paper Mill Rd. Intersection

Synchro Derived Results

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Existing Signal Timing (110 sec. CL)		*Optimized Coordinated Signal Timing 130 sec. CL)*		*Optimized Coordinated Signal Timing 130 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
AM Peak Hour	Bethlehem Pike (NB)	144.8	F	99.8	F	53.2	D	53.9	D
	Bethlehem Pike (SB)	52	D	99.1	F	74.7	E	85.1	F
	Stenton Ave (EB)	80	F	134.9	F	76.6	E	76.6	E
	Paper Mill Rd (WB)	182.9	F	147.1	F	125.1	F	107.9	F
	Total Intersection	126.1	F	121.3	F	83.5	F	80.4	F

		Existing Signal Timing (100 sec. CL)		*Optimized Coordinated Signal Timing 130 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
PM Peak Hour	Bethlehem Pike (NB)	34.2	C	62.9	E	59.5	E	81.1	F
	Bethlehem Pike (SB)	44.3	D	88.2	F	89.1	F	87.9	F
	Stenton Ave (EB)	81.3	F	66.2	E	72.5	E	106.9	F
	Paper Mill Rd (WB)	65	E	39.7	D	17.9	B	21.3	C
	Total Intersection	56	E	65	E	63	E	82.5	F

CL-cycle length, sec-seconds, LOS-level of service

Paper Mill Rd. Intersection

SimTraffic Derived Results

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Existing Signal Timing (110 sec. CL)		*Optimized Coordinated Signal Timing 130 sec. CL)*		*Optimized Coordinated Signal Timing 130 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
AM Peak Hour	Bethlehem Pike (NB)	1190.9	F	633.3	F	291.3	F	363.3	F
	Bethlehem Pike (SB)	48.5	D	108.6	F	69.5	E	103.4	F
	Stenton Ave (EB)	252.4	F	458.6	F	161.1	F	179.8	F
	Paper Mill Rd (WB)	1191.7	F	953.4	F	853	F	690.2	F
	Total Intersection	680.4	F	565.6	F	357.3	F	352.7	F

		Existing Signal Timing (100 sec. CL)		*Optimized Coordinated Signal Timing 130 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*		*Optimized Coordinated Signal Timing 120 sec. CL)*	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
PM Peak Hour	Bethlehem Pike (NB)	40.8	D	357.6	F	577.5	F	1034.4	F
	Bethlehem Pike (SB)	31.5	C	59.4	E	70	E	73.1	E
	Stenton Ave (EB)	271.4	F	240.1	F	219.4	F	568.2	F
	Paper Mill Rd (WB)	101.3	F	77.1	E	32.3	C	36	D
	Total Intersection	117.7	F	213.1	F	263.4	F	489.3	F

CL-cycle length, sec-seconds, LOS-level of service

APPENDIX C

Queue Length Tables

Queue length is the distance in feet back from the intersection on the approach leg. The 50th percentile queue is the maximum back of queue on a typical cycle. The 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes. The reported queue length is for the lane with the highest queue in the lane group, divided by the number of lanes and the lane utilization factor.

Flourtown Shopping Center Intersection

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Avg.	*95th*	*Avg.*	*95th*	*Avg.*	*95th*	*Avg.*	*95th*
AM Peak Hour	Bethlehem Pike (NBL)	1	9	0	6	1	9	1	9
	Bethlehem Pike (NBT)	8	35			42	97	41	95
	Bethlehem Pike (NBTR)	21	58	76	177				
	Bethlehem Pike (NBR)					6	26	6	24
	Bethlehem Pike (SBL)	27	60	28	60	27	59	27	59
	Bethlehem Pike (SBT)	35	83						
	Bethlehem Pike (SBTR)	52	117	90	199	86	182	95	206
	Flourtown Shopping Ctr (EBL)	2	13	1	9	1	11	2	15
	Flourtown Shopping Ctr (EBTR)	3	16	3	18	3	17	3	17
	Flourtown Shopping Ctr (WBL)	41	81	54	101	42	82	57	110
	Flourtown Shopping Ctr (WBTR)	20	49	22	52	16	38	16	40
		Avg.	*95th*	*Avg.*	*95th*	*Avg.*	*95th*	*Avg.*	*95th*
PM Peak Hour	Bethlehem Pike (NBL)			0	0				
	Bethlehem Pike (NBT)	46	94			109	232	127	314
	Bethlehem Pike (NBTR)	74	127	164	311				
	Bethlehem Pike (NBR)					32	94	34	89
	Bethlehem Pike (SBL)	58	103	62	118	48	103	67	143
	Bethlehem Pike (SBT)	67	142						
	Bethlehem Pike (SBTR)	74	132	135	247	145	271	193	358
	Flourtown Shopping Ctr (EBL)	9	32	10	33	8	30	9	34
	Flourtown Shopping Ctr (EBTR)	4	21	6	25	6	25	5	25
	Flourtown Shopping Ctr (WBL)	133	221	231	404	177	293	238	353
	Flourtown Shopping Ctr (WBTR)	23	53	28	120	18	47	20	47

Mill Road Intersection

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Avg.	*95th*	*Avg.*	*95th*	*Avg.*	*95th*	*Avg.*	*95th*
AM Peak Hour	Bethlehem Pike (NBL)			7	27	10	56	12	59
	Bethlehem Pike (NBLT)	58	122						
	Bethlehem Pike (NBT)					100	263	109	246
	Bethlehem Pike (NBTR)	75	147	134	288				
	Bethlehem Pike (NBR)					21	76	16	56
	Bethlehem Pike (SBL)			38	96	33	90	46	135
	Bethlehem Pike (SBLT)	96	172						
	Bethlehem Pike (SBTR)	110	196	183	338	187	318	211	409
	Mill Rd (EBLTR)	66	126	79	141	73	137	78	145
	Mill Rd (WBL)					97	160	118	187
	Mill Rd (WBLT)	142	249	231	419				
	Mill Rd (WBT)					56	134	86	235
	Mill Rd (WBR)	7	61	26	128				
		Avg.	*95th*	*Avg.*	*95th*	*Avg.*	*95th*	*Avg.*	*95th*
PM Peak Hour	Bethlehem Pike (NBL)			10	49	7	43	8	32
	Bethlehem Pike (NBLT)	73	155						
	Bethlehem Pike (NBT)					129	304	246	598
	Bethlehem Pike (NBTR)	90	181	428	938				
	Bethlehem Pike (NBR)					28	94	42	123
	Bethlehem Pike (SBL)			67	130	50	114	75	156
	Bethlehem Pike (SBLT)	130	229						
	Bethlehem Pike (SBTR)	126	223	162	300	162	319	259	556
	Mill Rd (EBLTR)	87	148	113	213	94	173	110	194
	Mill Rd (WBL)					122	187	129	203
	Mill Rd (WBLT)	169	311	97	648				
	Mill Rd (WBT)					73	226	146	456
	Mill Rd (WBR)	24	122	97	279	2	32	5	51
		Avg.	*95th*	*Avg.*	*95th*	*Avg.*	*95th*	*Avg.*	*95th*
Friday Midday Peak Hour	Bethlehem Pike (NBL)			20	75	18	52	21	54
	Bethlehem Pike (NBLT)	78	153						
	Bethlehem Pike (NBT)					133	261	85	192
	Bethlehem Pike (NBTR)	96	171	219	393				
	Bethlehem Pike (NBR)					21	71	14	45
	Bethlehem Pike (SBL)			113	230	85	185	118	235
	Bethlehem Pike (SBTL)	185	339						
	Bethlehem Pike (SBTR)	179	333	624	1124	474	863	826	1203
	Mill Rd (EBLTR)	106	168	130	210	137	229	274	520
	Mill Rd (WBL)					113	191	122	194
	Mill Rd (WBLT)	112	191	132	227				
	Mill Rd (WBT)					51	187	70	249
	Mill Rd (WBR)	5	50	8	68			1	21
		Avg.	*95th*	*Avg.*	*95th*	*Avg.*	*95th*	*Avg.*	*95th*
Saturday Midday Peak Hour	Bethlehem Pike (NBLT)	104	192						
	Bethlehem Pike (NBL)			12	39	14	52	14	41
	Bethlehem Pike (NBT)					89	192	118	245
	Bethlehem Pike (NBTR)	117	210	155	311				
	Bethlehem Pike (NBR)					17	60	25	79
	Bethlehem Pike (SBLT)	103	181						
	Bethlehem Pike (SBL)			64	132	54	112	64	141
	Bethlehem Pike (SBTR)	89	164	150	285	133	267	200	375
	Mill Rd (EBLTR)	72	125	92	165	83	143	95	177
	Mill Rd (WBLT)	136	242	209	408				
	Mill Rd (WBL)					109	179	121	194
	Mill Rd (WBT)					43	145	75	264
	Mill Rd (WBR)	14	90	46	171	1	22	8	67

College Ave./Bysher Ave. Intersection

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Avg.	*95th*	*Avg.*	*95th*	*Avg.*	*95th*	*Avg.*	*95th*
AM Peak Hour	Bethlehem Pike (NBL)			12	39	13	58	19	71
	Bethlehem Pike (NBLT)	65	140						
	Bethlehem Pike (NBTR)	85	165	79	179	156	331	178	351
	Bethlehem Pike (SBL)			0	1	0	0	1	29
	Bethlehem Pike (SBLT)	41	105						
	Bethlehem Pike (SBTR)	68	139	114	266	201	420	184	368
	College Ave (EBLTR)	36	74	40	85	37	77	47	89
	Bysher Ave (WBLTR)	40	81	47	95	39	78	48	101
		Avg.	*95th*	*Avg.*	*95th*	*Avg.*	*95th*	*Avg.*	*95th*
PM Peak Hour	Bethlehem Pike (NBL)			11	47	11	38	15	66
	Bethlehem Pike (NBLT)	93	189						
	Bethlehem Pike (NBTR)	105	197	143	338	113	256	282	474
	Bethlehem Pike (SBL)			10	76	14	90	11	77
	Bethlehem Pike (SBLT)	131	269						
	Bethlehem Pike (SBTR)	147	275	308	627	363	641	429	736
	College Ave (EBLTR)	35	73	40	80	40	83	45	101
	Bysher Ave (WBLTR)	72	123	103	177	104	177	144	261
		Avg.	*95th*	*Avg.*	*95th*	*Avg.*	*95th*	*Avg.*	*95th*
Friday Midday Peak Hour	Bethlehem Pike (NBL)			13	40	12	41	20	71
	Bethlehem Pike (NBLT)	120	224						
	Bethlehem Pike (NBTR)	142	246	142	294	162	321	203	405
	Bethlehem Pike (SBL)			6	51	8	69	13	89
	Bethlehem Pike (SBLT)	78	166						
	Bethlehem Pike (SBTR)	100	186	169	340	235	376	435	776
	College Ave (EBLTR)	40	79	48	101	48	102	56	104
	Bysher Ave (WBLTR)	63	118	84	153	81	157	83	147
		Avg.	*95th*	*Avg.*	*95th*	*Avg.*	*95th*	*Avg.*	*95th*
Saturday Midday Peak Hour	Bethlehem Pike (NBL)			26	86	23		23	65
	Bethlehem Pike (NBLT)	159	264						
	Bethlehem Pike (NBTR)	176	277	181	329	197	348	272	488
	Bethlehem Pike (SBL)			5	49	6	60	8	69
	Bethlehem Pike (SBLT)	97	195						
	Bethlehem Pike (SBTR)	123	218	261	529	284	561	410	723
	College Ave (EBLTR)	65	116	81	156	77	145	85	170
	Bysher Ave (WBLTR)	85	147	125	234	124	251	117	208

Wissahickon Ave. Intersection

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Avg.	*95th*	*Avg.*	*95th*	*Avg.*	*95th*	*Avg.*	*95th*
AM Peak Hour	Bethlehem Pike (NBL)			17	55	14	39	21	79
	Bethlehem Pike (NBLT)	40	89						
	Bethlehem Pike (NBTR)	47	102	139	277	59	129	157	295
	Bethlehem Pike (SBL)			5	23	5	23	5	24
	Bethlehem Pike (SBLT)	117	215						
	Bethlehem Pike (SBT)					83	205	83	188
	Bethlehem Pike (SBTR)	154	258	251	462				
	Bethlehem Pike (SBR)					35	105	33	109
	Wissahickon Ave (EBL)					85	143	109	180
	Wissahickon Ave (EBLTR)	122	210	166	276				
	Wissahickon Ave (EBTR)					46	105	67	156
	Wissahickon Ave (WBLTR)	34	76	35	71	32	66	40	82
		Avg.	*95th*	*Avg.*	*95th*	*Avg.*	*95th*	*Avg.*	*95th*
PM Peak Hour	Bethlehem Pike (NBL)			33	85	28	80	24	55
	Bethlehem Pike (NBLT)	72	148						
	Bethlehem Pike (NBTR)	77	158	154	323	126	258	66	147
	Bethlehem Pike (SBL)			14	54	10	41	12	43
	Bethlehem Pike (SBLT)	56	134						
	Bethlehem Pike (SBT)					113	221	166	275
	Bethlehem Pike (SBTR)	66	136	296	592				
	Bethlehem Pike (SBR)					21	83	29	96
	Wissahickon Ave (EBL)					102	188	119	206
	Wissahickon Ave (EBLTR)	112	192	187	317				
	Wissahickon Ave (EBTR)					59	151	54	117
	Wissahickon Ave (WBLTR)	28	68	27	65	30	63	32	74
		Avg.	*95th*	*Avg.*	*95th*	*Avg.*	*95th*	*Avg.*	*95th*
Friday Midday Peak Hour	Bethlehem Pike (NBL)			30	85	23	52	28	68
	Bethlehem Pike (NBLT)	61	123						
	Bethlehem Pike (NBTR)	63	122	136	266	165	302	183	367
	Bethlehem Pike (SBL)			18	56	13	37	16	43
	Bethlehem Pike (SBLT)	109	215						
	Bethlehem Pike (SBT)					114	233	121	278
	Bethlehem Pike (SBTR)	140	242	222	368				
	Bethlehem Pike (SBR)					18	71	18	76
	Wissahickon Ave (EBL)					91	164	105	173
	Wissahickon Ave (EBLTR)	87	146	133	221				
	Wissahickon Ave (EBTR)					21	75	31	122
	Wissahickon Ave (WBLTR)	36	78	42	89	40	89	49	101
		Avg.	*95th*	*Avg.*	*95th*	*Avg.*	*95th*	*Avg.*	*95th*
Saturday Midday Peak Hour	Bethlehem Pike (NBL)			25	66	23	54	35	101
	Bethlehem Pike (NBLT)	65	118						
	Bethlehem Pike (NBTR)	63	124	142	286	125	225	208	374
	Bethlehem Pike (SBL)			12	46	10	32	11	43
	Bethlehem Pike (SBLT)	123	241						
	Bethlehem Pike (SBT)					81	169	107	205
	Bethlehem Pike (SBTR)	149	266	208	432				
	Bethlehem Pike (SBR)					11	38	15	68
	Wissahickon Ave (EBL)					64	128	84	167
	Wissahickon Ave (EBLTR)	83	148	117	213				
	Wissahickon Ave (EBTR)					37	86	56	168
	Wissahickon Ave (WBLTR)	45	90	51	104	49	94	60	121

Haws Lane Intersection

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Avg.	*95th*	*Avg.*	*95th*	*Avg.*	*95th*	*Avg.*	*95th*
AM Peak Hour	Bethlehem Pike (NBT)	48	108	142	337	92	229	177	402
	Bethlehem Pike (NBTR)	66	128						
	Bethlehem Pike (NBR)			16	72	13	51	20	85
	Bethlehem Pike (SBL)			43	92	40	74	46	101
	Bethlehem Pike (SBLT)	64	123						
	Bethlehem Pike (SBT)	61	116	115	248	74	150	84	169
	Haws Ln (WBL)					45	93	64	117
	Haws Ln (WBLR)	106	196	138	264				
	Haws Ln (WBR)					59	109	74	132
		Avg.	*95th*	*Avg.*	*95th*	*Avg.*	*95th*	*Avg.*	*95th*
PM Peak Hour	Bethlehem Pike (NBT)	52	127	138	341	114	285	80	197
	Bethlehem Pike (NBTR)	71	151						
	Bethlehem Pike (NBR)			19	84	19	89	9	33
	Bethlehem Pike (SBL)			68	147	58	107	79	173
	Bethlehem Pike (SBLT)	127	230						
	Bethlehem Pike (SBT)	111	217	132	296	71	170	161	333
	Haws Ln (WBL)					48	96	59	124
	Haws Ln (WBLR)	97	173	134	229				
	Haws Ln (WBR)					47	81	62	116

Montgomery Ave. Intersection

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Avg.	*95th*	*Avg.*	*95th*	*Avg.*	*95th*	*Avg.*	*95th*
AM Peak Hour	Bethlehem Pike (NBT)	29	99	92	230	131	301	106	234
	Bethlehem Pike (NBTR)	40	122						
	Bethlehem Pike (NBR)			12	67	11	55	16	84
	Bethlehem Pike (SBL)			24	56	24	59	27	59
	Bethlehem Pike (SBLT)	72	149						
	Bethlehem Pike (SBT)	84	163	87	172	47	115	99	195
	Montgomery Ave (WBLR)	108	185	87	156	101	180	90	154
		Avg.	*95th*	*Avg.*	*95th*	*Avg.*	*95th*	*Avg.*	*95th*
PM Peak Hour	Bethlehem Pike (NBT)	29	92	82	218	71	223	85	234
	Bethlehem Pike (NBTR)	45	123						
	Bethlehem Pike (NBR)			15	61	13	70	15	73
	Bethlehem Pike (SBL)			36	85	38	98	34	72
	Bethlehem Pike (SBLT)	49	99						
	Bethlehem Pike (SBT)	38	91	83	198	126	278	52	126
	Montgomery Ave (WBLR)	70	122	59	102	81	149	67	122

Paper Mill Rd. Intersection

		Existing		Build					
		4-Lane Cross-Section		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*		*3-Lane "Road Diet" Cross-Section*	
		No Additional Improvements		*No Additional Improvements*		*Includes Additional Improvements*		*Includes Additional Improvements*	
		2009 Volumes		2009 Volumes		2009 Volumes		2030 Volumes	
		Avg.	*95th*	*Avg.*	*95th*	*Avg.*	*95th*	*Avg.*	*95th*
AM Peak Hour	Bethlehem Pike (NBL)	289	291	280	324	283	309	284	311
	Bethlehem Pike (NBT)	900	1082	926	943	907	1029	907	1022
	Bethlehem Pike (NBTR)	608	1191						
	Bethlehem Pike (NBR)			181	769	82	494	79	480
	Bethlehem Pike (SBL)	8	49	10	51	12	56	13	58
	Bethlehem Pike (SBT)	207	326	365	587	267	415	349	562
	Bethlehem Pike (SBTR)	224	343	379	596	280	424	360	573
	Stenton Ave (EBLT)	822	1102	881	1039	708	1171	737	1159
	Stenton Ave (EBR)	303	479	343	447	309	458	324	457
	Paper Mill Rd (WBL)	1241	1392	1252	1448	413	489	406	505
	Paper Mill Rd (WBL)					415	487	406	506
	Paper Mill Rd (WBTR)	1235	1430	1244	1472	283	530	283	520
		Avg.	*95th*	*Avg.*	*95th*	*Avg.*	*95th*	*Avg.*	*95th*
PM Peak Hour	Bethlehem Pike (NBL)	247	347	278	330	281	326	286	305
	Bethlehem Pike (NBT)	245	552	902	1079	888	1100	918	964
	Bethlehem Pike (NBTR)	200	423						
	Bethlehem Pike (NBR)			184	763	278	921	264	895
	Bethlehem Pike (SBL)	14	58	12	61	13	70	13	74
	Bethlehem Pike (SBT)	151	233	233	364	256	426	304	529
	Bethlehem Pike (SBTR)	160	250	245	373	268	430	311	525
	Stenton Ave (EBLT)	759	1174	721	1053	745	998	799	961
	Stenton Ave (EBR)	340	451	365	410	367	409	368	411
	Paper Mill Rd (WBL)	343	721	287	645	71	141	86	159
	Paper Mill Rd (WBTR)	187	592	156	436	94	176	104	204

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Abstract:

This report provides a summary of the Bethlehem Pike road diet evaluation, conducted as a second phase to the study, *Taming Traffic: Context Sensitive Solutions in the DVRPC Region (*#08044) published in December of 2008. The most important recommendation from the 2008 study was to convert Bethlehem Pike's existing four-lane configuration to a three-lane cross-section with one travel lane per direction and a two-way-left-turn-lane. This report discusses the process and results required by PennDOT for measuring the modeled traffic performance of Bethlehem Pike under a road diet configuration as compared to the existing configuration, with both current and future traffic volumes, and with improvements. The analysis showed that implementing the road diet is reasonable if done with signal and intersection improvements, under both current and future traffic volumes. This concept is ready to be advanced by PennDOT in collaboration with Springfield Township.

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