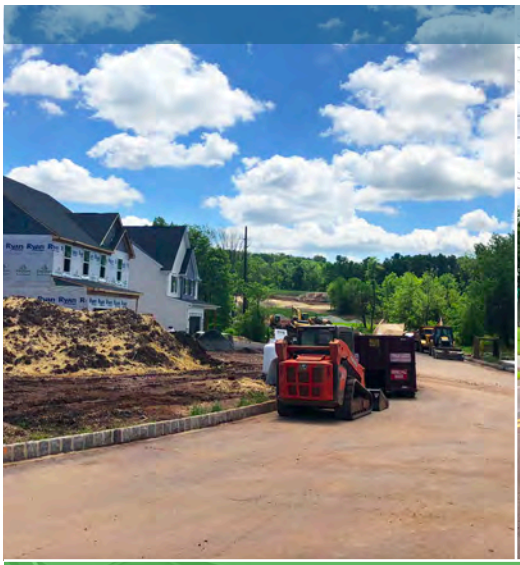
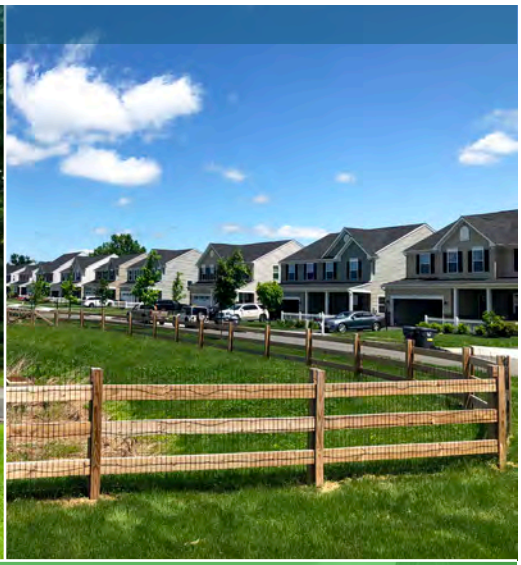
POTTSTOWN REGION

TRAFFIC ANALYSIS





August 2019

DELAWARE VALLEY
dvrpc
REGIONAL
PLANNING COMMISSION

The Delaware Valley Regional Planning Commission is the federally designated Metropolitan Planning Organization for a diverse nine-county region in two states: Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer in New Jersey.

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

DVRPC's vision for the Greater Philadelphia Region is a prosperous, innovative, equitable, resilient, and sustainable region that increases mobility choices by investing in a safe and modern transportation system; that protects and preserves our natural resources while creating healthy communities; and that fosters greater opportunities for all.

DVRPC's mission is to achieve this vision by convening the widest array of partners to inform and facilitate data-driven decision-making. We are engaged across the region, and strive to be leaders and innovators, exploring new ideas and creating best practices.

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

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EXECUTIVE SUMMARY

The Pottstown Area Regional Plan Development element in the annual Delaware Valley Regional Planning Commission (DVRPC) Work Program is dedicated for municipal assistance in the greater Pottstown area. Through this work program element, DVRPC develops transportation studies and tools to identify improvement projects.

The Pottstown area's population and economy are growing, and there is a tremendous amount of undeveloped land in the region. In June 2018, 2,752 residential units and 453,288 square feet of commercial space had been recently approved or received preliminary approval for construction. These developments will generate new commuter trips and undoubtedly affect traffic circulation patterns throughout the Pottstown area. As a result, Montgomery County Planning Commission (MCPC), Pottstown Metropolitan Regional Planning Committee (PMRPC), and DVRPC identified the need to conduct a regional traffic analysis. This study is intended to be used as a tool to plan for potential traffic growth in the region.

This traffic analysis focuses on the traffic impacts of the new developments planned for the area. The analysis aims to identify roadway improvements that support safety and future traffic growth with a focus on 18 study locations selected by the PMRPC. The study estimates short-term (future year 2025) increases in traffic volumes and identifies multimodal improvements.

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CHAPTER 1
INTRODUCTION

PROJECT OVERVIEW

Pottstown Area Regional Plan Development

The Pottstown Area Regional Plan Development element in the annual DVRPC Work Program is dedicated for municipal assistance in the greater Pottstown area. Through this work program element, DVRPC develops transportation studies and tools to identify improvement projects.[1] The study scope is developed every one or two years, depending on the time needed to complete a specific project, in collaboration with the Montgomery County Planning Commission (MCPC) and the Pottstown Metropolitan Regional Planning Committee (PMRPC).[2] The *Pottstown Region Traffic Analysis* is the transportation study that was developed and funded through the Pottstown Area Regional Plan Development element for fiscal years 2018 and 2019.

Purpose and Need

This project stems from a need to plan for the Pottstown area's population and economic growth, as well as the related development of previously undeveloped land. In 2015, 47.5 percent of the Pottstown area's land area was comprised of agriculture, open space, and undeveloped land uses (*Pottstown Metropolitan Region Comprehensive Plan Update*, 2015). Though some of these lands are preserved, large portions of these lands can be developed. In June 2018, 2,752 residential units and 453,288 square feet of commercial space had been recently approved or had received preliminary approval for construction. These developments will generate new commuter trips and undoubtedly affect traffic circulation patterns throughout the Pottstown area.

This traffic analysis focuses on the traffic impacts of the new developments planned for the area. The goal was to identify small, achievable traffic and safety improvement projects that could be funded by Act 209 funds or grant funds available to municipalities. This study estimates short-term (future year 2025) increases in traffic volumes and identifies multimodal improvements for the 18 study locations selected by the PMRPC.

Regional Setting

The Pottstown region, also referred to as the "Pottstown area" throughout this document, is comprised of the eight PMRPC municipalities:

- Douglass Township;
- New Hanover Township;
- West Pottsgrove Township;
- Pottstown Borough;
- Upper Pottsgrove Township;
- Lower Pottsgrove Township;
- North Coventry Township; and
- East Coventry Township.

The eight municipalities fall within the boundaries of the US 2010 Census-defined urbanized area of Pottstown, PA, which includes parts of Berks, Chester, and Montgomery counties. Pottstown Borough is the only borough in the region, and it was the historical activity center of the area (*Pottstown Metropolitan Region Comprehensive Plan Update*, 2015).

The region is situated along the US 422 and PA 100 corridors. It is approximately 13 miles (16 miles via highway) east of Reading and 22 miles (40 miles via highway) west of the City of Philadelphia. The Schuylkill River delineates the boundary between Chester and Montgomery counties along the southern border of Pottstown Borough (**Figure 1 on page 4)**.

Eighteen intersections were selected as the focus of this traffic analysis, after evaluating local land development activity. At least one location in each

[1] Examples of recent projects DVRPC has worked on for the PMRPC include the *PA 724 Corridor Study* (2004), *A Vision for PA Route 100* (2010), the *Transportation Asset Management Tools and Plans* (2015), and *The Greater Pottstown Trails Feasibility Study* (2018).

[2] The PMRPC is a planning committee comprised of representatives from eight municipalities – two in Chester County and six in Montgomery County – bound by the Intergovernmental Cooperative Implementation Agreement for Regional Planning. The PMRPC works to implement the goals of the multi-municipal Pottstown Metropolitan Regional Comprehensive Plan, and MCPC staff conducts administrative duties for the PMRPC.

of the eight municipalities was studied. The detailed analysis and study recommendations for each of these can be found in **"Chapter 4"** through **"Chapter 7."**

Planning Process

The Pottstown Region Traffic Analysis was conducted over the course of two years. The project work program is summarized below in two phases.

Phase I (2018)

- Development of study objectives and scope of work
- Selection of study locations
- Data collection

Phase II (2019)

- Traffic modeling
- Development of recommendations
- Final report delivery

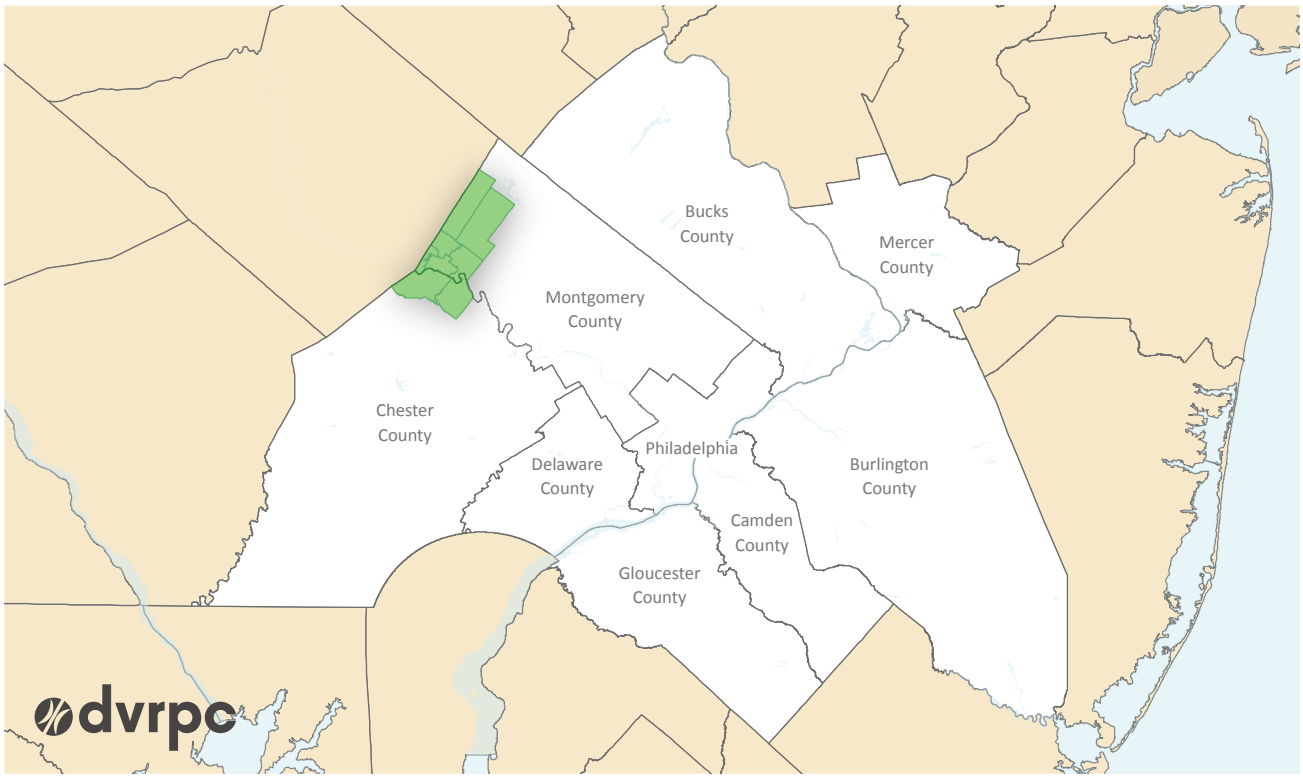
Objectives

The *Pottstown Metropolitan Region Comprehensive Plan Update* (2015) highlights one main transportation goal: to promote a safe and efficient transportation system throughout the region. This goal steered the development of the six objectives supported by this traffic study.

OBJECTIVES

1. Unify the PMRPC over common transportation objectives.
2. Promote roadway safety for all users of the transportation network.
3. Anticipate and mitigate the impacts of future land use decisions.
4. Apply best practices in the design of new connections.
5. Improve mobility and access to services, mass transit, and recreational facilities.
6. Collaborate with planning partners to identify and implement improvements and strategies.

FIGURE 1: REGIONAL SETTING



Source: DVRPC, 2019

Public Meetings

The traffic analysis was discussed publicly at four regularly scheduled PMRPC meetings in December 2017, January 2018, December 2018, and January 2019. The scope of work was discussed at the December 2017 meeting, and in January 2018 the DVRPC project team facilitated a workshop to assist the PMRPC in the selection of study locations. Transportation improvement recommendations for the 18 locations were presented at the December 2018 and January 2019 meetings.

Selection of Study Locations

The 18 study locations were selected through a collaborative, multi-municipal process. DVRPC led a workshop at the January 2018 PMRPC meeting to assist municipal leaders in this selection. DVRPC shared Pottstown area data related to roadway capacity, crashes, evacuation routes for the Limerick Generating Station, incident detour routes, traffic counts, and land developments. The PMRPC members used this information and local knowledge to identify traffic concerns, such as safety, roadway geometry, and future traffic volumes, at potential study locations. DVRPC mapped these locations and concerns using ArcGIS Online and shared these results with MCPC and the PMRPC. MCPC worked with the PMRPC to determine the final 18 study locations in March 2018.

Steering Committee

The avid participation of stakeholders was critical throughout the traffic analysis planning process. The project steering committee consisted of PMRPC, MCPC, Chester County Planning Commission (CCPC), Pennsylvania Department of Transportation District 6-0 (PennDOT 6-0), Southeastern Pennsylvania Transportation Authority (SEPTA), and Pottstown Area Rapid Transit (PART). These steering committee members contributed invaluable local knowledge and technical expertise in the development of the study recommendations presented in this report.

THE PMRPC REGION

Population, Household, and Commuter Characteristics

The Pottstown area has experienced population growth comparable to that of Chester County, which is the fastest growing county in the DVRPC region. Between 2000 and 2010, the Pottstown area population grew by 14 percent, which was double the rate of population growth of Montgomery County and only one percent below that of Chester County (US 2010 Census).

On July 28, 2016, DVRPC adopted municipal-level population forecasts for 2015 to 2045. Estimates for the PMRPC municipalities are shown in **Table 1**, which only includes estimates to the year 2025 because 2025 is the future analysis year for this traffic study. Most notably, New Hanover Township, which is the site of most of the new development in the region, is expected to experience an 18 percent increase in population in the ten-year period. The population of the Pottstown area as a whole is expected to increase by 9 percent.

TABLE 1: DVRPC 2015-2025 MUNICIPAL-LEVEL POPULATION FORECASTS

	North Coventry	East Coventry	Douglass	New Hanover	Upper Pottsgrove	Lower Pottsgrove	Pottstown	West Pottsgrove
2015 Population	8,024	6,753	10,432	12,495	5,438	12,174	22,664	3,884
2020 Forecast	8,397	7,173	10,950	13,605	5,774	12,565	22,959	3,915
2025 Forecast	8,851	7,592	11,464	14,708	6,065	12,954	23,253	3,945
Percent Change	10%	12%	10%	18%	12%	6%	3%	2%

Source: DVRPC 2015-2045 County and Municipal-Level Population Forecasts, 2016

The age composition of the population has remained similar over time, as there has been a boom in construction of single-family homes. There was a 5 percent decrease in the population between the ages of 35 and 49 and a 6 percent increase in the population between the ages of 50 and 64 between 2000 and 2017. Twenty-four percent of the Pottstown region's population is under the age of 18 (**Table 2**). This figure is only slightly higher than that for the same age group in Montgomery (22 percent) and Chester (23 percent) counties.

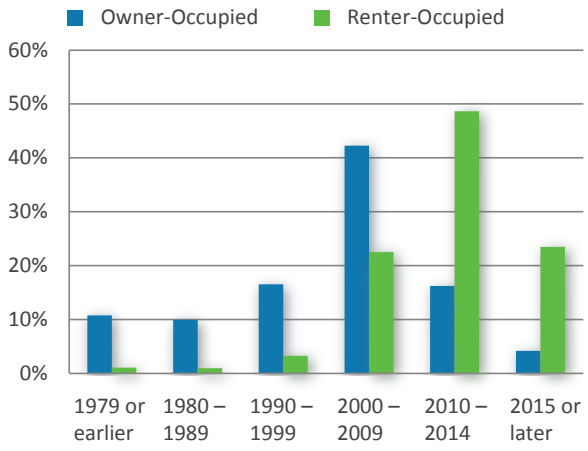
TABLE 2: POPULATION BY AGE GROUP

	Percentage
Under 18	24%
18-34	20%
35-49	20%
50-64	21%
65 and Over	15%

Source: American Community Survey, 2017 5-Year Estimates

Figure 2 compares owner-occupied housing tenure and renter-occupied housing tenure. Most homeowners in the Pottstown area moved into their current unit between 2000 and 2009. On the other hand, most renters in the area moved in more recently.

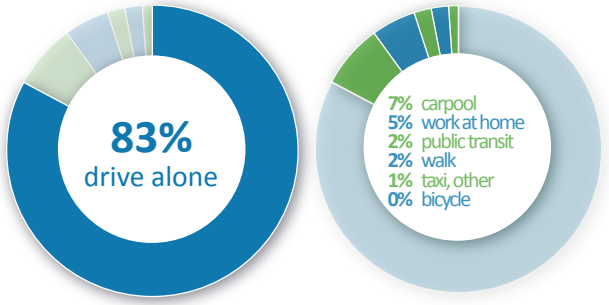
FIGURE 2: HOUSING TENURE BY MOVE IN YEAR



Source: American Community Survey, 2017 5-Year Estimates

The commute mode share for workers over the age of 16 in the Pottstown area is consistent with that of other suburban Pennsylvania communities in the DVRPC region (see **Figure 3**). Most workers drive alone. Public transit service is limited, and ridership is lower than in Chester (3 percent) and Montgomery (7 percent) counties.

FIGURE 3: WORK COMMUTE MODE SHARE



Source: American Community Survey, 2017 5-Year Estimates

Equity Analysis

DVRPC's equity analysis evaluates census tracts in the region for nine variables tied to environmental justice concerns, or indicators of potential disadvantage (IPDs). These variables are:

- Female;
- Racial Minority;
- Ethnic Minority (Hispanic);
- Foreign Born;
- Limited English Proficiency;
- Youth;
- Older Adults;
- Disabled; and
- Low Income.

For each census tract in the region, the analysis produces a percentile rank for each of these variables and classifies the tract as "well below average," "below average," "average," "above average," or "well above average." Census tracts ranking "above average" or "well above average" for any indicator may be particularly sensitive to environmental justice concerns, and may have populations that require special consideration in transportation planning.

Several study intersections are located in census tracts that rank "above average" for one or more of the following: youth, older adults, disabled, low income, and female. Youth, older adults, disabled, and low income populations were considered most relevant for informing study recommendations, and the symbols shown are used to refer to these four indicators throughout the report. **Figure 4** highlights the study intersections located in census tracts that ranked above average for one or more of these four IPDs.

FIGURE 4: STUDY LOCATION IPD SUMMARY

	Youth	Older Adults	Disabled	Low Income
High Street & Armand Hammer Boulevard	✓		✓	✓
High Street & Moser Road	✓		✓	✓
Bleim Road & New Hanover Square Road		✓	✓	
Pleasantview Road & Bleim Road		✓	✓	
Glasgow Street & Manatawny Street			✓	
Bleim Road & PA 663		✓		
Middle Creek Road & Congo Road		✓		
PA 73 & Middle Creek Road	✓			

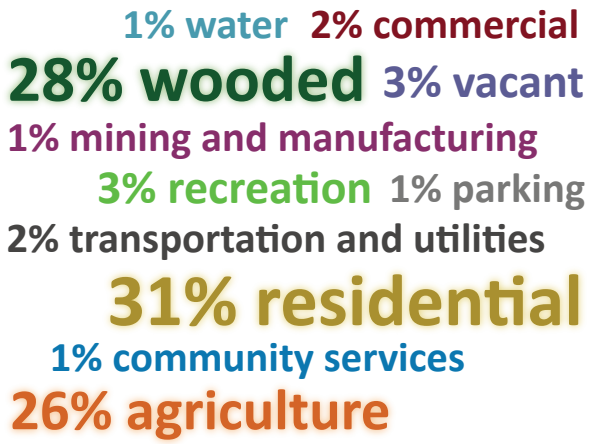
Source: DVRPC, 2018

Intersections ranking above average for one or more equity indicators are especially strong candidates for multimodal safety improvements. For example, intersections ranking above average for disabled residents may benefit the most from sidewalk repair and ADA improvements. Youth and older adults may be particularly vulnerable to the safety risks of unmarked crossings, and low income residents may benefit from the increased transportation choices spurred by multimodal improvements.

Land Use

The Pottstown region has a land use area of approximately 52,316 acres, or 82 square miles. The region is rich in natural lands; 54 percent of the total land area is wooded or designated for agricultural use (**Figure 5**).

FIGURE 5: LAND USE PERCENTAGES

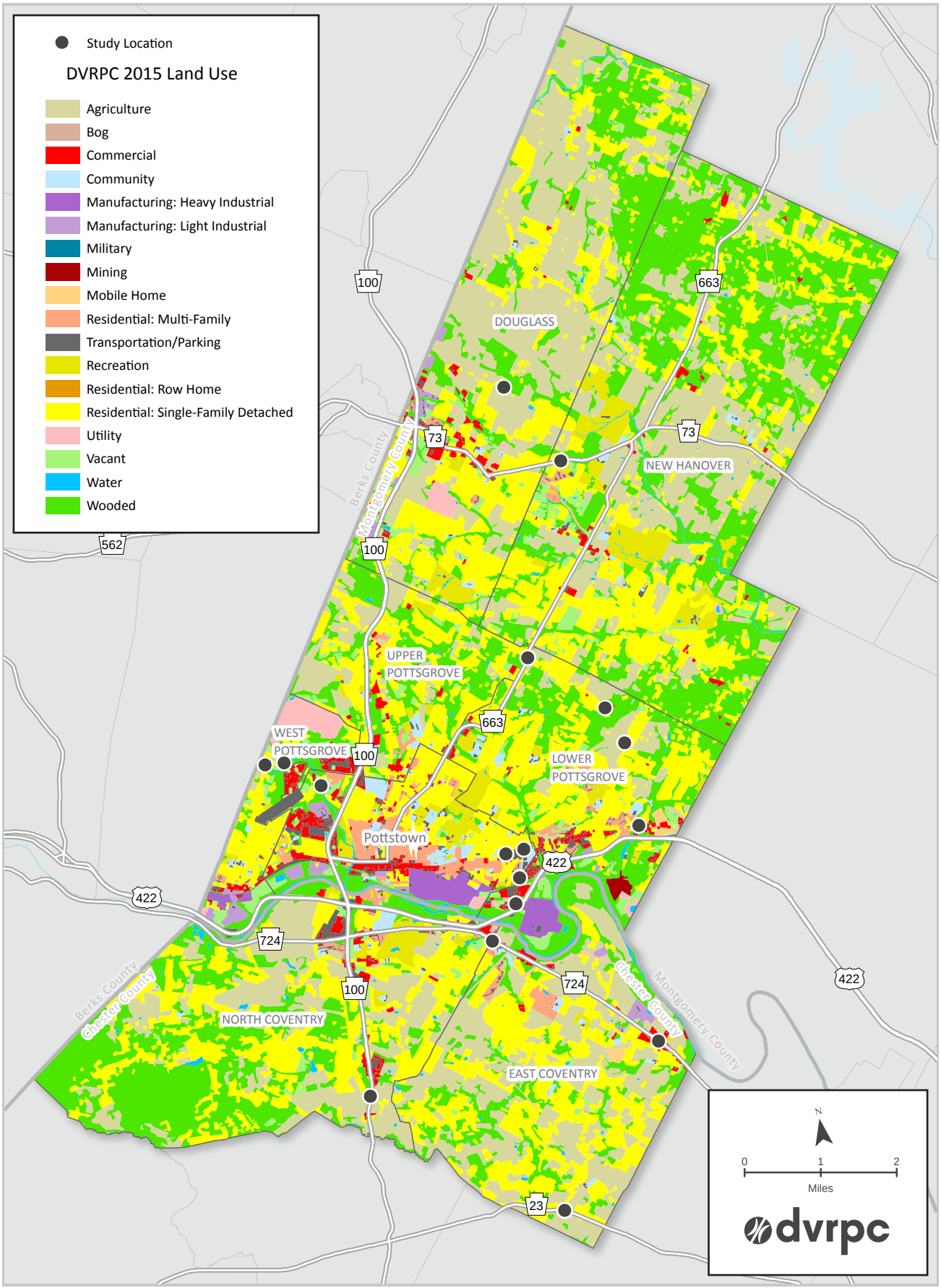


Source: DVRPC, 2019

Residential land uses occupy only 31 percent of the land area in the region. Single-family detached homes are the predominant residential land use, accounting for 94 percent of residential land area. Multi-family residential uses occupy 5 percent of residential land area, and manufactured homes and townhomes comprise the remaining 1 percent.

Pottstown's economic history is rooted in the production of metal—iron and steel. However, only 1 percent of the region's land area is dedicated to manufacturing and mining uses, which are concentrated along the Schuylkill River. The land use map (**Figure 6**) on the next page shows related patterns.

FIGURE 6: LAND USE MAP



DOCUMENT ORGANIZATION

Categories of Concern

The PMRPC identified transportation concerns for each of the 18 study locations. In **Chapters 4** through **7**, the sections are color-coded based on the main transportation concern highlighted for each intersection (**Table 3**). The concerns fall into three broad categories:

- roadway user safety;
- traffic impact of future development; and
- roadway geometry and lane configuration.

Roadway user safety encompasses concerns about car crashes and pedestrian safety. Traffic impact of future development includes concerns about an intersection experiencing a dramatic increase in traffic volumes due to nearby development, as well as the location's potential to be used as a cut-through. Roadway geometry and lane configuration addresses concerns about misaligned intersections and poorly maintained or confusing pavement markings.

Analysis and Recommendations

This document is comprised of nine chapters. **Chapter 2** provides an overview of the existing regional transportation network. **Chapter 3** contains details on the new land developments that were considered for this traffic analysis. Travel demand modeling and traffic modeling concepts are also explained in this chapter. **Chapters 4** through **7** are organized by geography, and they contain the analyses and recommendations for each study intersection. Peak hour traffic volumes are shown by approach direction, based on true north. Volumes are given for each movement: left (L), right (R), and through (T). Improvements are shown in two stages: **Stage 1** (low-cost and typically short-term) and **Stage 2** (higher cost and typically medium- or long-term). **Chapter 8** includes cost estimates and crash reduction factors (CRF) for recommended improvements. **Chapter 9** provides a regional vision for the Pottstown area, outlines next steps, and identifies potential project funding sources.

TABLE 3: STUDY LOCATION TRANSPORTATION CONCERNS

Location	Municipality	Transportation Concern
Middle Creek Rd and Congo Rd	Douglass Township	roadway user safety
PA 73 and Middle Creek Rd	New Hanover Township	traffic impact of future development
State St and Farmington Ave	Upper Pottsgrove Township	roadway user safety
Grosstown Rd and Manatawny St	West Pottsgrove Township	traffic impact of future development
Sell Rd and Manatawny St	West Pottsgrove Township	roadway user safety
Glasgow St and Manatawny St	Pottstown Borough	roadway geometry and lane configuration
High St and Moser Rd	Pottstown Borough	roadway geometry and lane configuration
High St and Armand Hammer Blvd	Pottstown Borough	roadway user safety
Armand Hammer Blvd and Medical Dr	Pottstown Borough	roadway user safety
Armand Hammer Blvd and Industrial Hwy	Lower Pottsgrove Township	roadway user safety
High Stand Sanatoga Rd	Lower Pottsgrove Township	traffic impact of future development
Bleim Rd and PA 663	Lower Pottsgrove Township	traffic impact of future development
Bleim Rd and New Hanover Square Rd	Lower Pottsgrove Township	traffic impact of future development
Bleim Rd and Pleasantview Rd	Lower Pottsgrove Township	traffic impact of future development
Hoffecker Rd and PA 100	North Coventry Township	roadway geometry and lane configuration
Vaughn Rd and PA 724	North Coventry Township	roadway geometry and lane configuration
Wells Rd and PA 724	East Coventry Township	roadway user safety
Bethel Church Rd and PA 23	East Coventry Township	roadway user safety

Source: PMRPC, 2018; DVRPC, 2019

CHAPTER 2
TRANSPORTATION NETWORK

ROADWAYS

The Pottstown area is located along the US 422 and PA 100 corridors. US 422 is the only US Route and Freeway in the region, and it provides access to Philadelphia in the east and Reading in the west. PA 100 is one of five Pennsylvania Traffic Routes and four Principal Arterials in the region. PA 100 connects south to US 202 in Chester County and north to US 222 in Lehigh County (**Figure 7**).

High Street is a Principal Arterial that runs through the core of Pottstown Borough. It is the area's primary small business commercial corridor and main street. It connects West Pottsgrove Township, Pottstown Borough, and Lower Pottsgrove Township.

Manatawny Street and Bleim Road are Major Collectors. These two routes provide important connections from other Major Collectors and Local roads to PA 100 and PA 663, respectively.

PA 73 (Principal Arterial) and PA 724 (Minor Arterial) are important east-west routes in the Pottstown area. PA 73 extends across Montgomery County, while PA 724 connects to PA 23 in Chester County. PA 23 is another Minor Arterial; a 1.3-mile segment of this route runs through East Coventry Township.

Most of the study locations are at the intersection of state and local roads that are Principal Arterials, Minor Arterials, or Major Collectors. Ownership and federal functional classification are important factors to consider in the process of identifying funding sources for transportation improvements.

PEDESTRIAN INFRASTRUCTURE

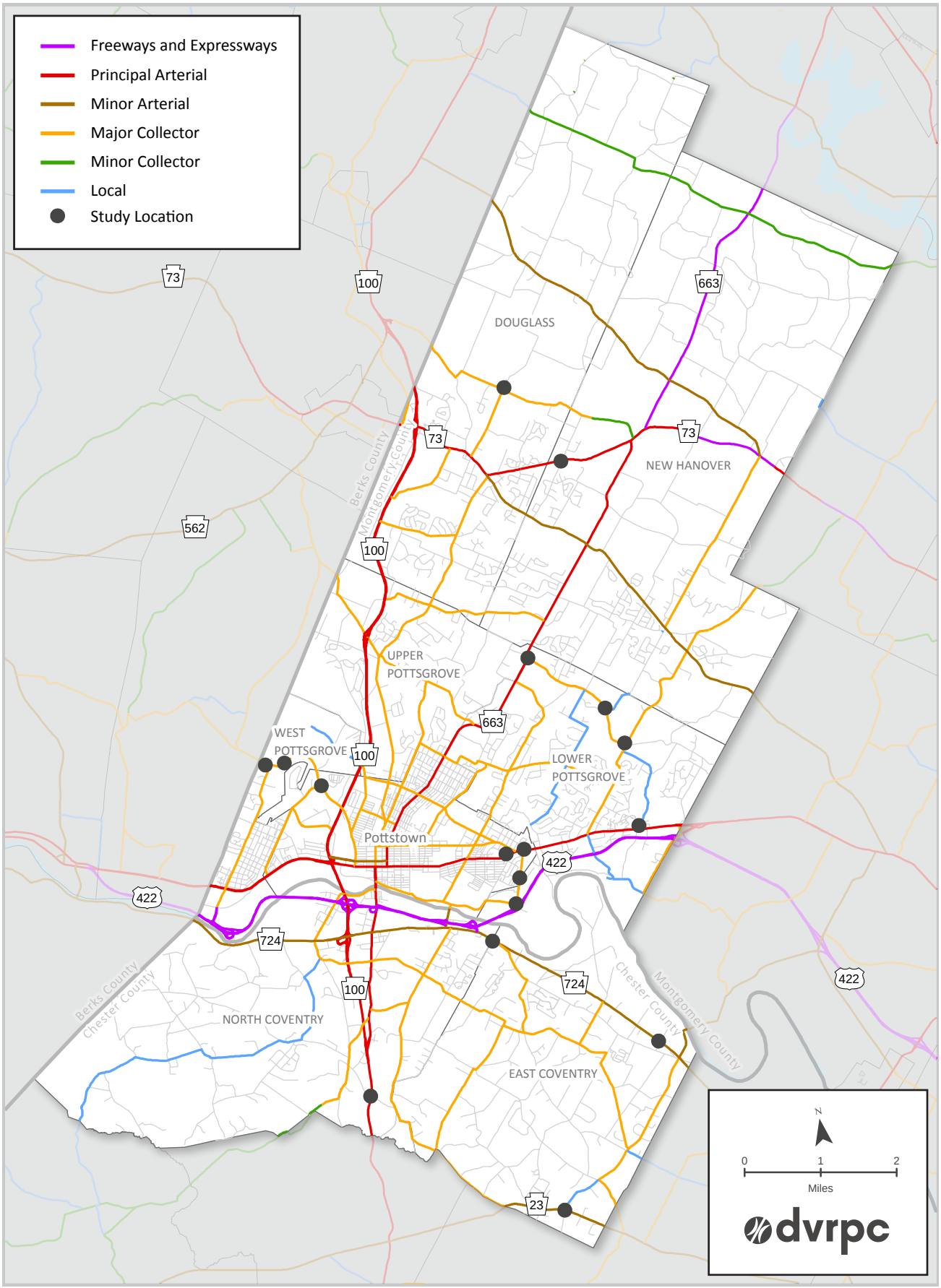
Pottstown Borough has the most comprehensive sidewalk network in the region. East of PA 100, sidewalks reach every corner of the borough, but the pedestrian infrastructure is older in this part of the region. Many sidewalks and ramps are not ADA-compliant, and they pose obstacles for pedestrians of all abilities in reaching their destinations.

Most of the sidewalk and curb ramps along Armand Hammer Blvd are not ADA-compliant. Source: DVRPC, 2018

In the other municipalities in the region, new residential subdivisions boast complete sidewalk networks in excellent condition. However, there are often no pedestrian connections between adjacent developments. Improving existing pedestrian infrastructure and creating new connections can drastically increase mobility options throughout the Pottstown region, as well as mitigate potential traffic impacts of population and economic changes.

New residential subdivisions in the area are constructed with sidewalks. However, there are no pedestrian connections between adjacent developments. Source: DVRPC, 2018

FIGURE 7: HIGHWAY FEDERAL FUNCTIONAL CLASSIFICATION



Source: PennDOT, 2019; DVRPC, 2019

TRANSIT SERVICE

SEPTA

The High Street corridor is served by SEPTA bus route 93, which connects Pottstown Borough (Montgomery County Community College) in the west to Norristown Transportation Center in the east. The eastbound trip takes about one hour. Between 6:03 AM and 8:35 PM, service frequency ranges from 22 minutes to one hour and 19 minutes. Reverse trip service frequency between 5:00 AM and 11:00 PM ranges from 25 minutes to one hour. **Figure 8** shows the stops along High Street through the Pottstown region.

PART

PART provides bus service to local employment centers and destinations in Pottstown Borough, West Pottsgrove Township, Lower Pottsgrove Township, and North Coventry Township. It also extends to the Philadelphia Premium outlets in Limerick Township, immediately east of the Pottstown region.

PART operates daytime (Day Line) and nighttime (Night Line) bus service on Monday through Saturday, except holidays. There are five Day Lines and three Night Lines. Day Line buses run from 6:00 AM to 5:00 PM, and Night Line buses operate from 6:00 PM to 10:00 PM. The service frequency of both lines is one hour. PART is in the process of evaluating and updating its bus routes; new information should be available in 2019.

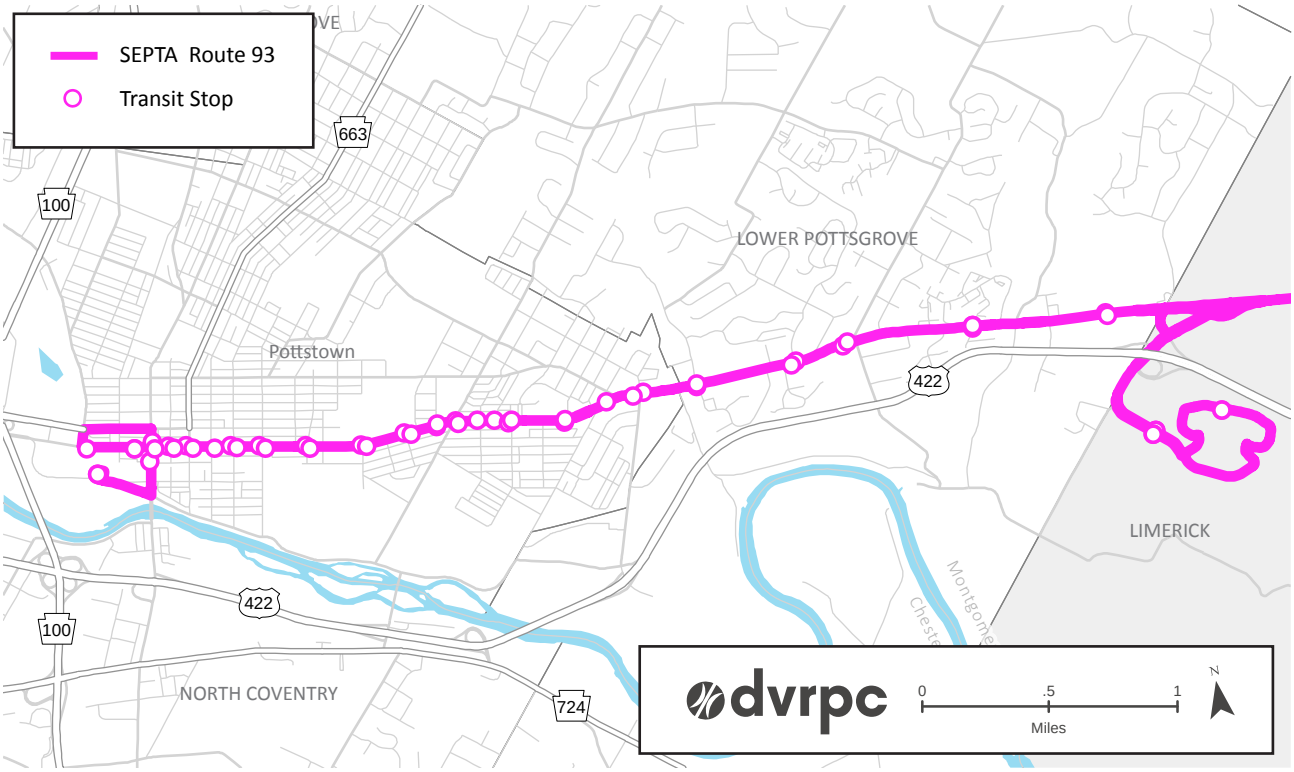
BICYCLE FACILITIES

Existing Facilities

There are five on-road bicycle facilities in the Pottstown area, all within Pottstown Borough. High Street is the longest continuous bicycle-friendly roadway. It has a westbound bicycle lane between Manatawny Street and College Drive and bicycle lanes in each direction from Manatawny to Roland streets. There is a bicycle lane in each direction on King Street between PA 100 and Manatawny Street. In 2018, bicycle lanes were constructed on Jackson and Beech Streets and Roland Avenue to connect Pottstown High School to the borough's downtown.

The Schuylkill River Trail (SRT), a multi-use trail that connects communities in Southeastern Pennsylvania, runs through West Pottsgrove Township and Pottstown Borough along the north side of the

FIGURE 8: SEPTA BUS ROUTE 93



Sources: SEPTA, 2019; DVRPC, 2019

Schuylkill River. The segment between Pottstown Borough and East Coventry Township is the only missing SRT segment in the DVRPC region, and it is in the design phase. Once completed, the SRT will provide a continuous, multimodal connection from the Pottstown area to the City of Philadelphia.

Planned On-Road and Off-Road Facilities

Montgomery County adopted *Bike Montco: The Bicycle Plan for Montgomery County* in 2018. The plan includes a Planned Bicycle Network, the county's vision for on-road facilities. Because they provide connections between neighborhoods, many of the routes identified for new bicycle facilities have a level of traffic stress 3 (LTS 3).[3] High Street, PA 663, and PA 73 are highlighted as planned bicycle facilities, and Swamp Pike is identified as a priority bicycle route.

This traffic analysis considers the Planned Bicycle Network, and it highlights possibilities to create similar connections on lower speed roadways with lower motor vehicular traffic volumes. In addition, findings from *The Greater Pottstown Trails Feasibility Study* (2018)[4] are also integrated with other recommendations. The Planned Bicycle Network and Greater Pottstown Trails are shown in **Figure 9**.

Resurfacing Plan

The installation of planned bicycle facilities during roadway resurfacing projects is a cost-effective and efficient way for municipalities to expand bicycle networks (*Incorporating On-Road Bicycle Networks into Resurfacing Projects*, Federal Highway Administration [FHWA], 2016). This method is more cost-effective than implementing facilities through stand-alone projects for a number of reasons. A roadway can be restriped to be made more comfortable for cycling (for example, narrowing travel lanes and including a buffer with bicycle lane installation). Markings installed on older pavement do not adhere as well as pavement markings added during resurfacing. The following eight roadways that intersect with the 18 study locations are scheduled to be resurfaced in the next four years; the schedule is subject to change due to weather conditions (**Table 4**). On-road bicycle facilities were considered–and in some cases, recommended–for these locations.

LOCAL MULTIMODAL INITIATIVES

Pottstown is the only school district in Montgomery County with an official Safe Routes to School (SRTS) program. In 2018, PennDOT upgraded crosswalks and signage throughout the borough to improve access to local schools.

Pottstown has a free community bike share program administered by Schuylkill River Heritage Association. It is available to anyone 16 years of age or older with a driver's license or valid state ID. There are two locations in Pottstown Borough, and bicycles can be used all day or for quick trips.

TABLE 4: PENNDOT RESURFACING SCHEDULE

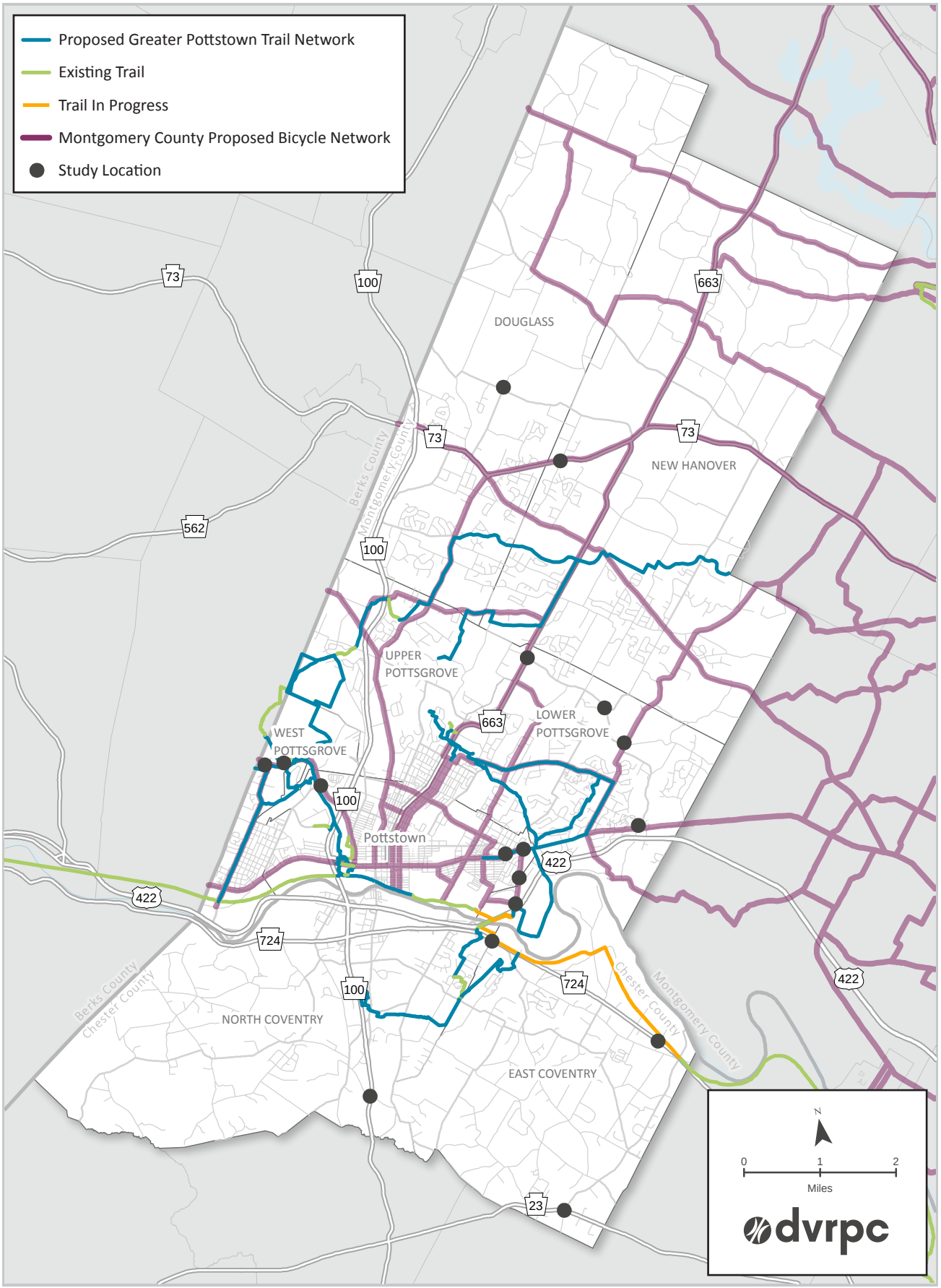
Study Segment	Limits	PennDOT Resurfacing Year
High Street	From Keim Street to Evergreen Road	2020
PA 100	From PA 724 to Cadmus Road	2020
PA 724	From Coventry Mall to Pennhurst Road	2020
High Street	From West Pottsgrove border to Keim Street	2021
Bethel Church Road	From PA 23 to north side of Schuylkill River	2021
PA 73	From Douglass Township border to Gravel Pike	2022
Armand Hammer Boulevard	From High Street to Industrial Highway	2022
Grosstown Road	From High Street to Manatawny Street	2023

Source: PennDOT, 2018

[3] LTS is a road classification scheme based on the comfort of bicyclists in the traffic stream. DVRPC's LTS assignment is based on the number of lanes, effective vehicle speed, and presence/type of bicycle facility. A facility with LTS 1 is suitable for children, and LTS 2 roadways are suitable for most adults. LTS 3 routes are comfortable for those that already ride bicycles. LTS 4 routes are high traffic stress roadways.

[4] This feasibility study details opportunities, challenges, and design characteristics of more than 40 miles of trails and on-road bicycle facilities that will comprise the Greater Pottstown Trails network when complete. The study formalizes a network of four multi-municipal trails: the Coventry Trail, the Pottsgrove Trial, the Manatawny Trail, and the West Trail (split into Lower West Trail and Upper West Trail).

FIGURE 9: PLANNED BICYCLE NETWORK AND GREATER POTTSTOWN TRAILS



Sources: MCPC, 2018; DVRPC, 2019

CHAPTER 3
TRAFFIC VOLUME PROJECTIONS

TRIP GENERATION

Definition and Method

Trip generation predicts the number of trips produced by or attracted to a specific area. Travel demand models can estimate future travel demand, and the DVRPC regional travel demand model was used to assess the impacts of new development on the region's transportation network. It is important to note that the regional model was not calibrated to the study area, and the traffic growth projections presented in this analysis are *estimates*.

In the regional model, trip generation is partially based on traffic analysis zone (TAZ)-level changes in population, number of households, and employment. Therefore, estimates for the future number of residents, households, and jobs at the TAZ-level were important inputs for estimating future year 2025 traffic volume projections.

Future Year 2025

The future year for this study is 2025, which was selected because of the focus on identifying improvements that can address the impacts of contemporary population and economic growth. Furthermore, this traffic analysis emphasizes low-cost, short-term improvements.

Step 1: Inventory New Developments

MCPC, PMRPC, and DVRPC developed a list of significant new land developments in the Pottstown region. The development locations are shown in **Figure 10 on page 18**, and the development information is detailed in **Table 5 on page 19**. The list includes development plans that were approved or received preliminary approval. Only developments that were either under construction or approved but not constructed in Spring 2018 were considered. This is because traffic counts were collected in Spring 2018.

Developments that had received preliminary approval as of Spring 2018 were included to capture the potential traffic impacts of six large developments planned for the area.

Step 2: Estimate New Population, Households, and Employment

The new development information was used to calculate population, household, and employment estimates. The factors used to determine the number of jobs were taken from county-specific job generation rates cited in the *Montgomery County Vision 2040 Comprehensive Plan* (2015) and the *PA Turnpike Revitalization Plan* (2015).

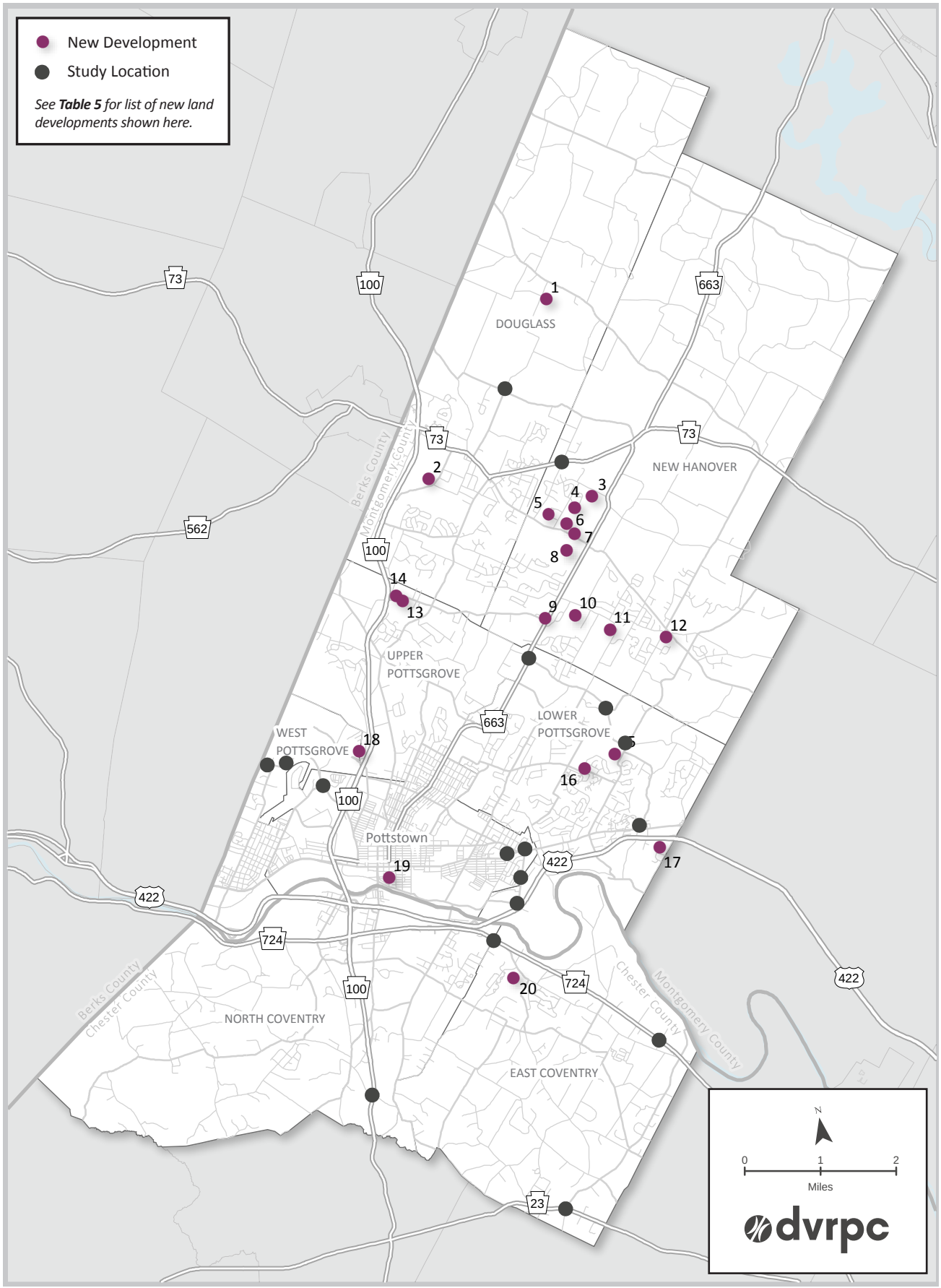
Step 3: Run the Travel Demand Model

The three aforementioned TAZ attributes that influence trip generation were updated in a future year 2025 regional model to ensure new land developments were included. Then, the travel demand model was run for updated trip generation, distribution, mode choice, and assignment. The model run results yielded an estimated growth rate for intersection volumes between the year 2015 and year 2025.

Step 4: Apply Intersection-Level Growth Rates

The intersection growth rates that resulted from the 2015-to-2025 model comparison yielded a 10-year growth rate. Because traffic counts were taken in 2018, not 2015, the data from the model run was used to calculate the seven-year growth rate. This seven-year growth rate was applied to the 2018 study location traffic counts to obtain the projected 2025 intersection-level traffic volumes. The growth rates were applied to the overall intersection volumes; the same distribution of motor vehicular turning movements was assumed for future year 2025.

FIGURE 10: NEW LAND DEVELOPMENTS (AS OF JUNE 2018)



Source: PMRPC, 2018; MCPC, 2018; DVRPC, 2018

TABLE 5: NEW LAND DEVELOPMENTS (LAST UPDATED JUNE 2018)

Map No.	Name	Construction Status	Approval Status	Municipality	Land Use	Dwelling Units	Commercial Area (sf)
1	Hallowell Tract	Not Constructed	Preliminary Approval	Douglass	Single-family detached	92	0
2	Zern Tract	Not Constructed	Preliminary Approval	Douglass	Single-family detached	240	0
3	Trotter's Gait	Not Constructed	Preliminary Approval	New Hanover	Single-family detached	29	0
4	Hanover Woods	Under Construction	Approved	New Hanover	Single-family detached	65	0
5	Renninger Tract II	Under Construction	Approved	New Hanover	Single-family (attached and detached)	115	0
6	Country Meadows	Under Construction	Approved	New Hanover	Single-family detached	32	0
7	McGee Tract	Not Constructed	Approved (approval lapsed– no longer valid*)	New Hanover	Mixed-use: single-family attached, commercial	39	10,500
8	New Hanover Town Center	Not Constructed	Preliminary Approval	New Hanover	Mixed-use: single-family (attached and detached), multi-family, commercial	852 (793*)	210,310 (169,400*)
9	Hanover Pointe	Under Construction	Approved	New Hanover	Single-family detached	145	0
10	Woodfield	Not Constructed	Approved	New Hanover	Single-family detached	121	0
11	2841 Romig Road	Not Constructed	Preliminary Approval	New Hanover	Single-family detached	52	0
12	Farm View Acres	Not Constructed	Approved	New Hanover	Single-family detached	19 (15*)	0
13	Crossroads Settlement	Under Construction	Approved	Upper Pottsgrove	Single-family attached	50	0
14	Sprogel's Run	Under Construction	Approved	Upper Pottsgrove	Single-family detached	58	0
15	Spring Valley Farms	Under Construction	Approved	Lower Pottsgrove	Single-family detached	178	0
16	Buchert Ridge	Not Constructed	Approved	Lower Pottsgrove	Multi-family	39	0
17	Sanatoga Green	Not Constructed	Preliminary Approval	Lower Pottsgrove	Mixed-use: single-family attached, multi-family, medical, hotel	490	114,335
18	1097 State Street	Not Constructed	Approved	West Pottsgrove	Commercial	0	110,843
19	Hanover Square	Under Construction	Approved	Pottstown	Mixed-use: single-family detached, commercial	16	7,300
20	Whispering Woods	Under Construction	Approved	East Coventry	Single-family	80	0

*Indicates an update to information originally provided in June 2018; the analysis was based on June 2018 data. Sources: PMRPC, 2018; MCPC, 2018; DVRPC, 2018

TRAFFIC MODELING

Modeling of Peak Hour Traffic Operations

Manual turning movement counts (MTMCs) were conducted for the study intersections. The motor vehicular volume peak hours were determined to be 7:15 to 8:15 in the morning (AM) and 4:30 to 5:30 in the afternoon (PM). Trafficware's Synchro traffic analysis software was used to perform traffic analysis for both peak hours. Synchro is a macroscopic analysis tool used to perform traffic analyses, determine intersection capacity, and optimize signal timings. Synchro uses Highway Capacity Manual (HCM) procedures to evaluate intersection Level of Service (LOS) and delay. SimTraffic, a micro-simulation application, was used in conjunction with Synchro to assess performance metrics. Analysis using Synchro and Simtraffic was performed on all signalized study intersections, located in Pottstown Borough and Lower Pottsgrove Township. The network was created using aerial photos for the geometric inputs, and traffic signal phasing for each intersection was based on PennDOT 6-0 traffic signal plans.

Existing Conditions (Year 2018)

The MTMCs were entered into the program for AM and PM peak hour conditions to evaluate existing conditions. LOS was used as the primary performance measure. At signalized intersections, average delay per vehicle is the definitive parameter of LOS. A letter grade of A through F is assigned based on the HCM as a qualitative measure of delay (**Table 6**).

TABLE 6: LOS DEFINITIONS

LOS (v/c ≤ 1.0)	Control Delay (seconds/ vehicle)	Qualitative Description of Traffic Operations
A	≤ 10	Stable and Predictable
B	> 10-20	
C	> 20-35	
D	> 35-55	Predictable, but Approaching Unstable
E	> 55-80	Unstable and Unpredictable
F	> 80	

Source: Highway Capacity Manual, 2010

TRAFFIC ANALYSIS PERFORMANCE MEASURES

Approach Delay: Volume weighted average of total delays for each lane group (in seconds).

Intersection Delay: Total delay for the signalized intersection calculated by taking the volume weighted average of all total delays (in seconds).

Approach LOS: Approach delay in seconds converted to a letter, between A and F (see **Table 6**).

Intersection LOS: Total intersection delay in seconds converted to a letter, between A and F (see **Table 6**).

Future No Build (Year 2025)

Traffic volumes for the future scenarios were developed using a seven-year intersection-level growth rate obtained from the DVRPC regional model to reflect 2025 conditions. The Future No Build scenario was modeled to reflect an increase in traffic volumes without geometric or signal timing changes.

Future Build (Year 2025)

The Future Build scenario uses the same background growth as the Future No Build, but it includes geometric and signal timing improvements. These improvements are generally focused at intersections and are in response to the increased travel demand posed by future development. Multimodal safety and connectivity, including ADA compliance, was also considered.

Results

AM and PM peak hour traffic models were built in Synchro for the Base Year, Future No Build, and Future Build scenarios. LOS data was obtained from the Synchro reports for comparison. The four study intersections listed below were evaluated in Synchro.

- High Street and Moser Road (**Table 14 on page 43**)
- High Street and Armand Hammer Boulevard/ Wilson Street (**Table 16 on page 46**)
- Armand Hammer Boulevard and Medical Drive (**Table 18 on page 49**)
- Armand Hammer Boulevard and Industrial Highway (**Table 20 on page 57**)

CHAPTER 4
DOUGLASS, NEW HANOVER, UPPER POTTSGROVE, & WEST POTTSGROVE

N
0 1 2
Miles

dvrpc

"Sidewalk to nowhere" by Middle Creek and Congo roads. Source: DVRPC, 2018

Bicyclist at the intersection of PA 73 and Middle Creek Rd. Source: DVRPC, 2018

View eastbound on Manatawny St. Source: DVRPC, 2018

Pedestrian bridge in Murgia Park. Source: DVRPC, 2018

CHAPTER 4
DOUGLASS, NEW HANOVER, UPPER POTTSGROVE, & WEST POTTSGROVE

This chapter presents analyses and recommendations for five study locations:

- Middle Creek and Congo Roads (Douglass);
- PA 73 and Middle Creek Road (New Hanover);
- State Road and Farmington Avenue (Upper Pottsgrove);
- Grosstown Road and Manatawny Street (West Pottsgove); and
- Sell Road and Manatawny Street (West Pottsgrove).

The first three intersections are isolated but located in similarly rural areas. Douglass, New Hanover, and Upper Pottsgrove townships have the highest percentage of agricultural land area of the six Pottstown region municipalities in Montgomery County. Middle Creek and Congo Road and PA 73 and Middle Creek Road are located near newly constructed residential subdivisions.

Therefore, it is important to ensure that these two intersections are safe and can accommodate future traffic demands. The intersection of State Road and Farmington Avenue has long been a safety concern for local officials. The angle, grade, and curvature of the two roads has been a factor in crashes.

MANATAWNY ST CORRIDOR

The Manatawny Street Corridor provides an east-west connection between West Pottsgrove Township and Pottstown Borough (**Figure 11**). Manatawny Street is a Major Collector; therefore, it enhances mobility between local streets and the Principal Arterials in this part of the Pottstown region. Three study intersections are located along this corridor. The two locations in West Pottsgrove Township are addressed in this chapter, and the location in Pottstown Borough is addressed in the following chapter (**"Chapter 5"**).

FIGURE 11: MANATAWNY ST CORRIDOR

Source: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

1 MIDDLE CREEK RD & CONGO RD A

The intersection of Middle Creek Road and Congo Road is in Douglass Township, and it is listed in the township's 2005 Act 209 Study. It is surrounded predominantly by agricultural and residential land uses. The primary concern at this intersection is roadway user safety.

Peak hour traffic volumes at this intersection are low (**Table 7**). The westbound (WB) movement is the heaviest in the AM peak hour, and the eastbound (EB) movement is the heaviest in the PM peak hour. Though volumes are estimated to increase by 20 percent by 2025, a traffic signal is not warranted (**"Appendix A"**). Volumes are lower on Congo Road than on Middle Creek Road.

TABLE 7: PEAK HOUR TRAFFIC VOLUMES (2018)

Approach	AM Peak Hour	PM Peak Hour
NB (Congo)	37 (9L|8R|18T)	65 (21L|9R|35T)
SB (Congo)	31 (4L|4R|23T)	42 (5L|7R|30T)
EB (Middle Creek)	42 (2L|8R|32T)	**85** (19L|21R|**45T**)
WB (Middle Creek)	**56** (8L|1R|**47T**)	81 (8L|3R|70T)

Source: DVRPC, 2018

EQUITY ANALYSIS

Census Tract where 19 percent of residents are 65 years or older.

Three angle crashes occurred in the six-year period (**Figure 12**). Only Middle Creek Road is stop-controlled, but an all-way stop is not warranted given existing or estimated future volumes. The need for an all-way stop, and sidewalks, should be evaluated if the surrounding parcels are developed (**Figure 13** and **Figure 14**).

Visual perception is an important consideration given the high percentage of senior citizens. Visual acuity, or the sharpness of vision, decreases as a driver ages. An LED street light and upgraded signage would improve visibility at night or in inclement weather.

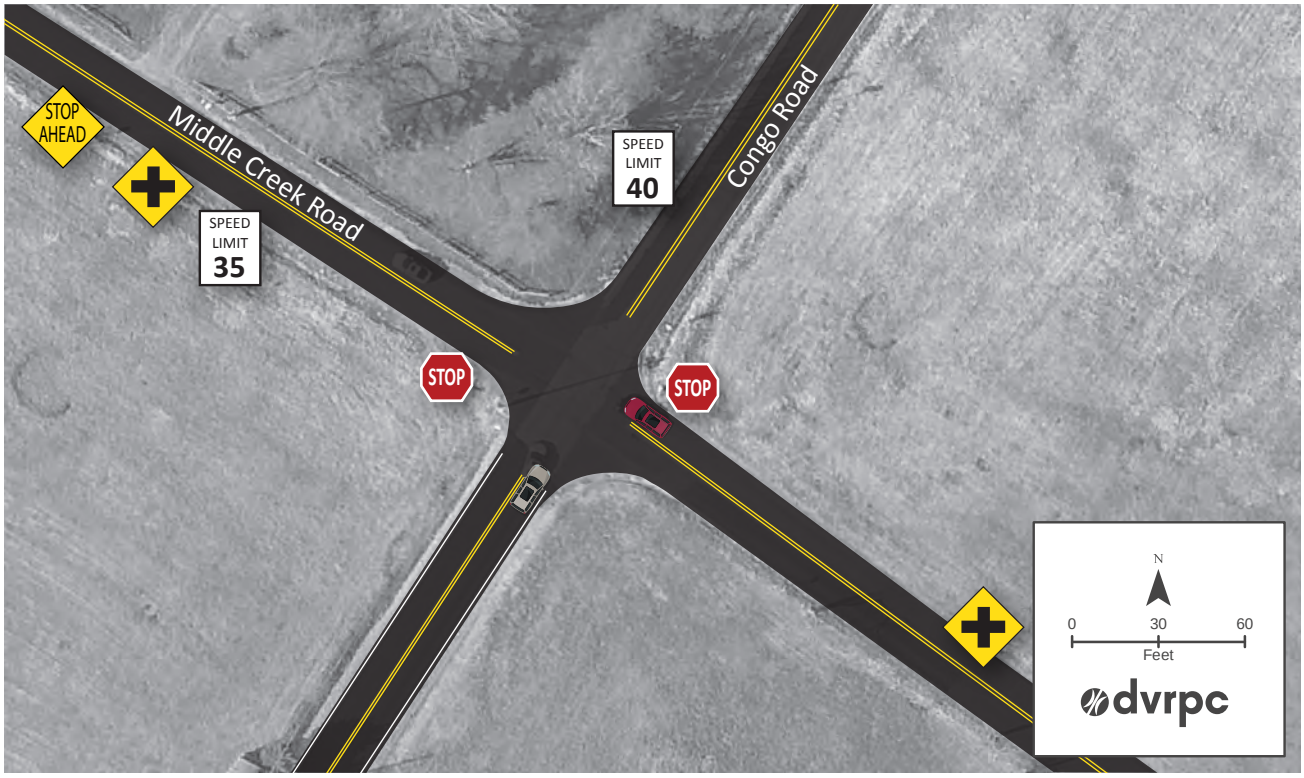
LIGHT-EMITTING-DIODE (LED) STREET LIGHTS

LEDs can reduce energy consumption and cost by 50 to 70 percent, and the longer lifespan of LEDs reduces system maintenance by 50 to 80 percent. LEDs provide improved lighting performance and quality, which can improve roadway safety.

FIGURE 12: CRASH DATA (2012–2017)

Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

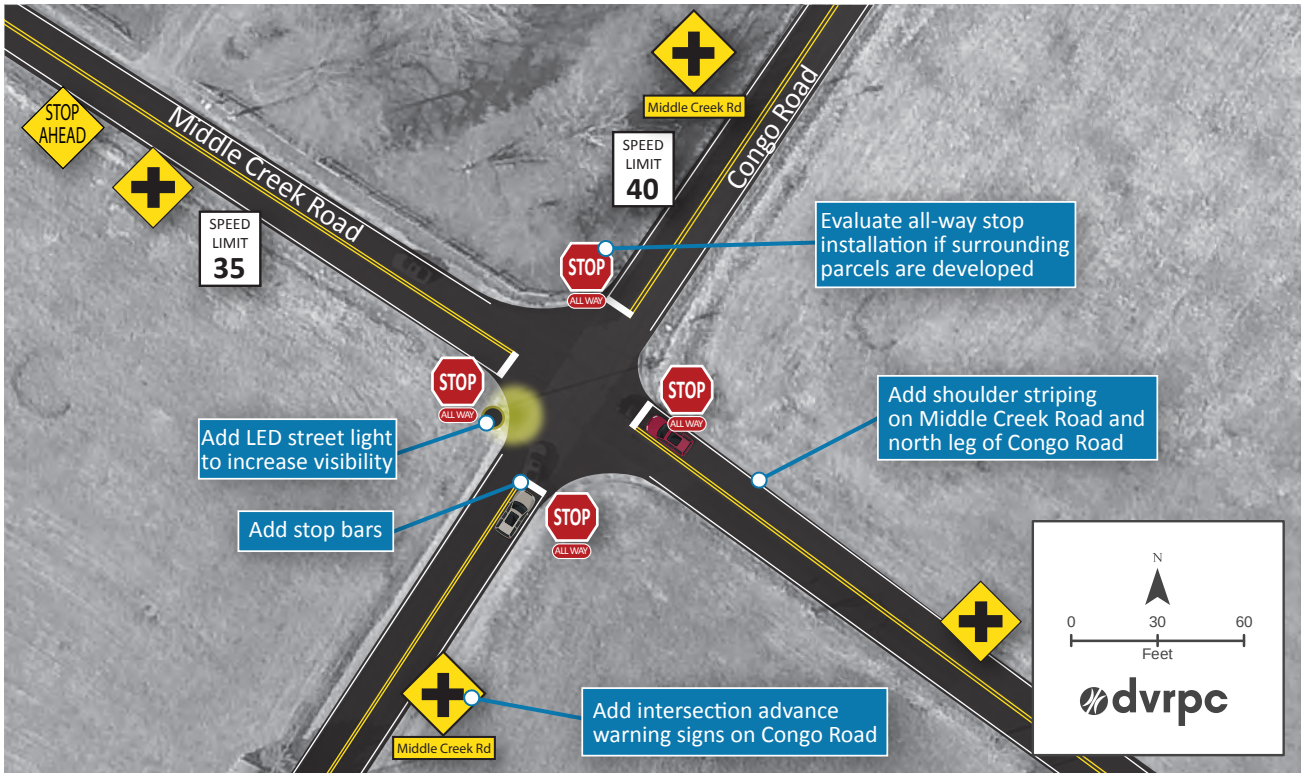
FIGURE 13: EXISTING CONDITIONS



Note: Conceptual graphics are not to scale. Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 14: RECOMMENDED TRANSPORTATION IMPROVEMENTS

This figure shows **Stage 1** (low-cost and typically short-term) recommendations: stop bars, a street light, painted shoulders, and two new advance warning signs. An all-way stop should be considered if the surrounding parcels are developed.



Note: Conceptual graphics are not to scale. Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

2 PA 73 & MIDDLE CREEK RD

The PA 73 and Middle Creek Road intersection is located in New Hanover Township, just north of many new residential developments in the township. It is the primary access point to PA 73 from these neighborhoods. As a result, the primary concern at this location is the traffic impact of future development. The EB movement is the heaviest in the AM peak hour, and the WB movement is the heaviest in the PM peak hour (**Table 8**). A traffic signal is warranted given existing four-hour volumes (**"Appendix A"**), and traffic volumes are estimated to increase by 6 percent by 2025. Though not conducted for this study, traffic counts at Short Road are recommended for final signal warrant evaluation.

TABLE 8: PEAK HOUR TRAFFIC VOLUMES (2018)

Approach	AM Peak Hour	PM Peak Hour
NB (Middle Creek)	93 (15L|61R|17T)	104 (17L|55R|32T)
NB (Middle Creek)	29 (9L|11R|9T)	21 (6L|6R|9T)
EB (PA 73)	**590** (9L|6R|**575T**)	475 (9L|16R|448T)
WB (PA 73)	333 (8L|70R|325T)	**606** (35L|0R|**571T**)

Source: DVRPC, 2018

EQUITY ANALYSIS

Census Tract where 27 percent of residents are under 18 years old.

Most crashes in the six-year period were angle crashes. Five angle crashes and one sideswipe involved a westbound-southbound collision (**Figure 15**). There is no bicycle infrastructure in the area, but PA 73 is identified as a bicycle route in the county's Planned Bicycle Network (**Figure 16**). Given the low density residential character of this area, bicycling is an appropriate alternative transportation option. The speed limit on PA 73 is 45 mph, and it is a Principal Arterial. Therefore, protected bicycle lanes are recommended (*Bike Montco,* 2018; NACTO *Urban Bikeway Design Guide*; New Jersey *Complete Streets Design Guide*) (**Figure 17**). Bicycle lanes provide visual cues that alert drivers so they also serve as a traffic calming measure. This additional benefit is important because more than one quarter of residents are children, and PA 73 is a school bus route. The grade and curvature of the roadway east of the intersection, as well as the absence of destinations, make this segment less suitable for bicycling. A wide shoulder should be maintained, and protected bicycle facilities could be considered in the future.

FIGURE 15: CRASH DATA (2012–2017)

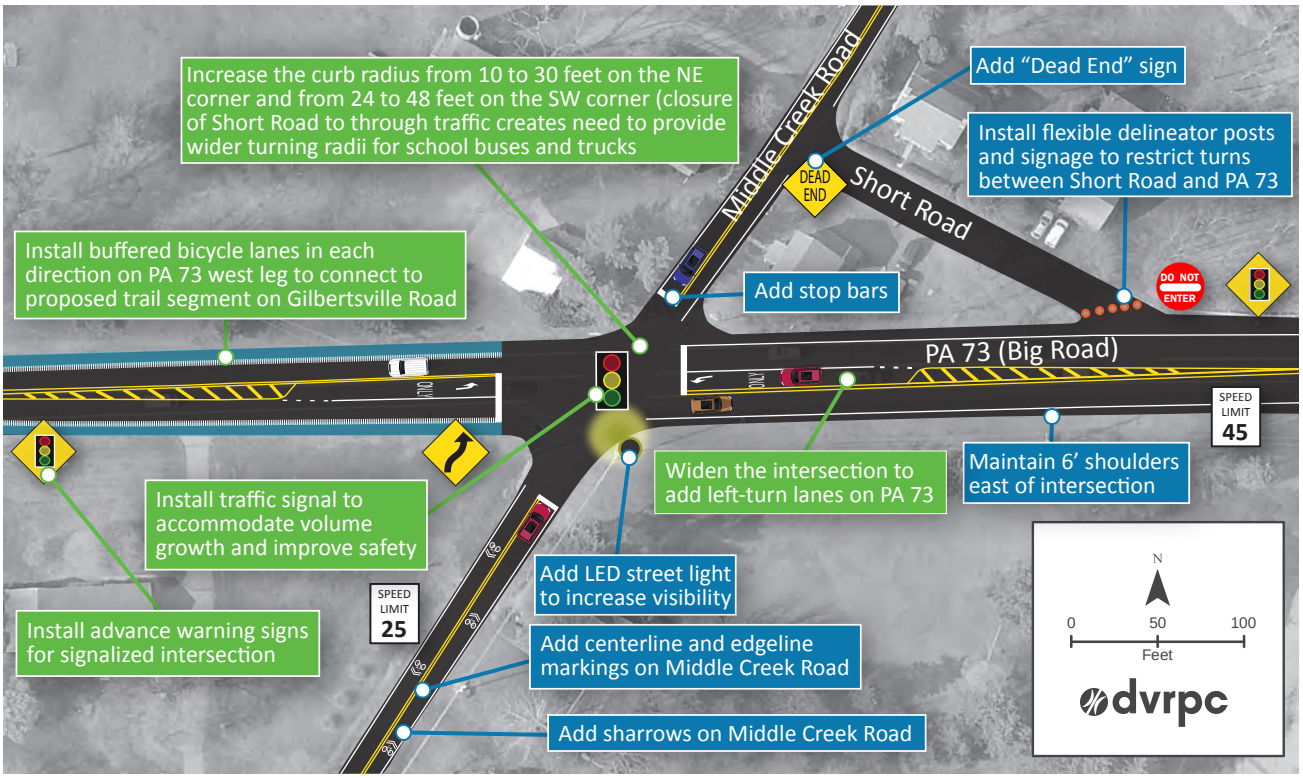
Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 16: EXISTING CONDITIONS

Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 17: RECOMMENDED TRANSPORTATION IMPROVEMENTS

This figure shows **Stage 1** and **Stage 2** (higher cost and typically medium- or long-term) recommendations, such as a street light, centerline and edgeline markings, traffic signal installation, and buffered bicycle lanes.



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

3 STATE RD & FARMINGTON AVE A

The State Road and Farmington Avenue intersection is in Upper Pottsgrove Township by the township fire company. Both roads are Local and surrounded by residential uses, small businesses, and community services. They serve as vital links to PA 100. Given the sharp approach angle on State Road and the need for vehicles on Farmington Avenue to negotiate the curve, the primary concern here is roadway user safety.

The southbound (SB) movement is the heaviest in the AM peak hour, and the EB movement is the heaviest in the PM peak hour (**Table 9**). Traffic volumes are estimated to increase by 16 percent by 2025. A traffic signal is not warranted due to low major road approach volumes (**"Appendix A"**).

TABLE 9: PEAK HOUR TRAFFIC VOLUMES (2018)

Approach	AM Peak Hour	PM Peak Hour
NB (Farmington)	86 (13L|73T)	171 (13L|158T)
SB (Farmington)	**263** (**197R**|66T)	206 (148R|58T)
EB (State)	151 (109L|42R)	**266** (**219L**|47R)

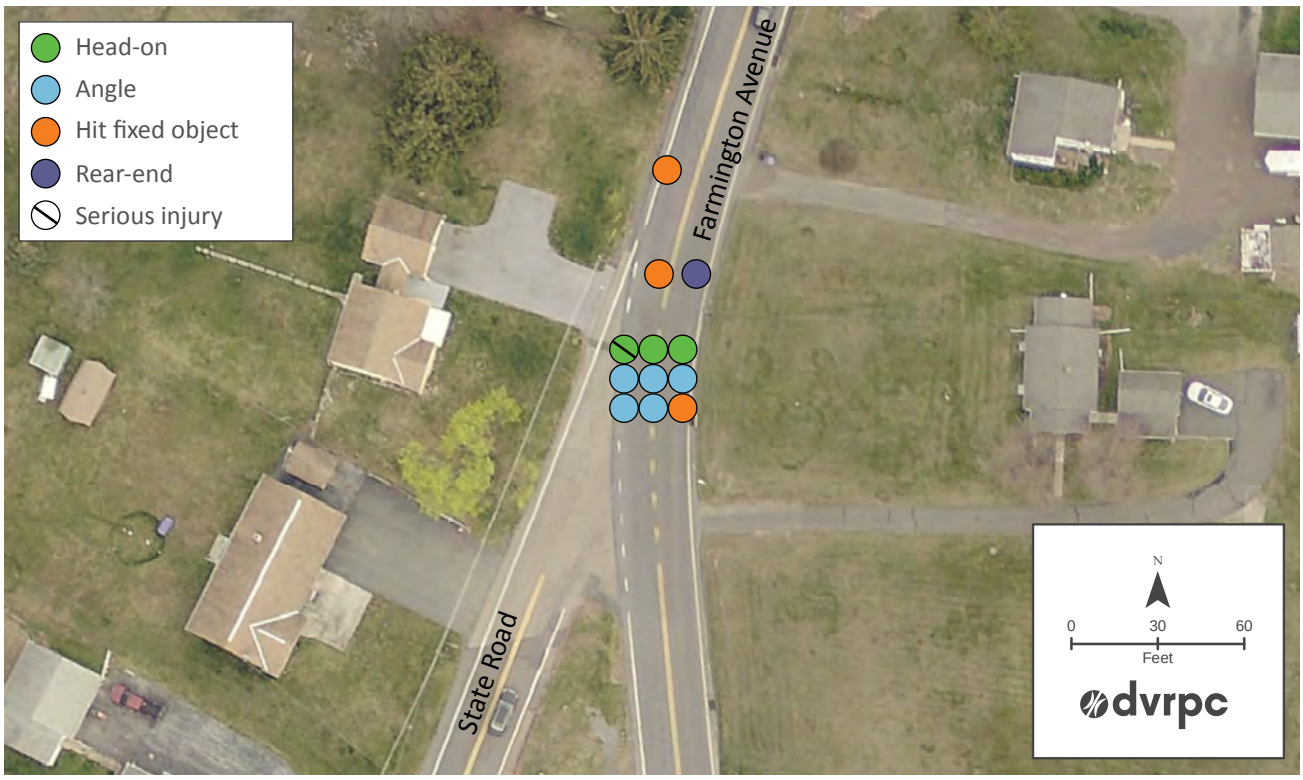
Source: DVRPC, 2018

Five (38 percent) reported crashes were angle crashes–two involved vehicles turning from State Road and two involved vehicles turning left from northbound (NB) Farmington Avenue (**Figure 18).** Vehicles were observed traveling within 5 mph of the 35 mph speed limit in free flow conditions. The approach angle and grade of State Road pose a challenge for turning vehicles. The estimated grade of State Road is steep (6.2 percent), and the estimated grade at the stop sign is between 24.7 percent and 34.5 percent (**Figure 19**). Realigning the intersection provides the following benefits:

- the heavier EB and SB movements become the through movements;
- reduces the number of turns (EB left-turns and SB right-turns) and potential conflicts;
- a SB left-turn lane can mitigate potential rear-end crashes given the higher SB through volumes;
- the sightlines are improved;
- lighting, advance warning signs, and horizontal curve signs increase visibility and inform drivers of the geometric change (**Figure 20**).

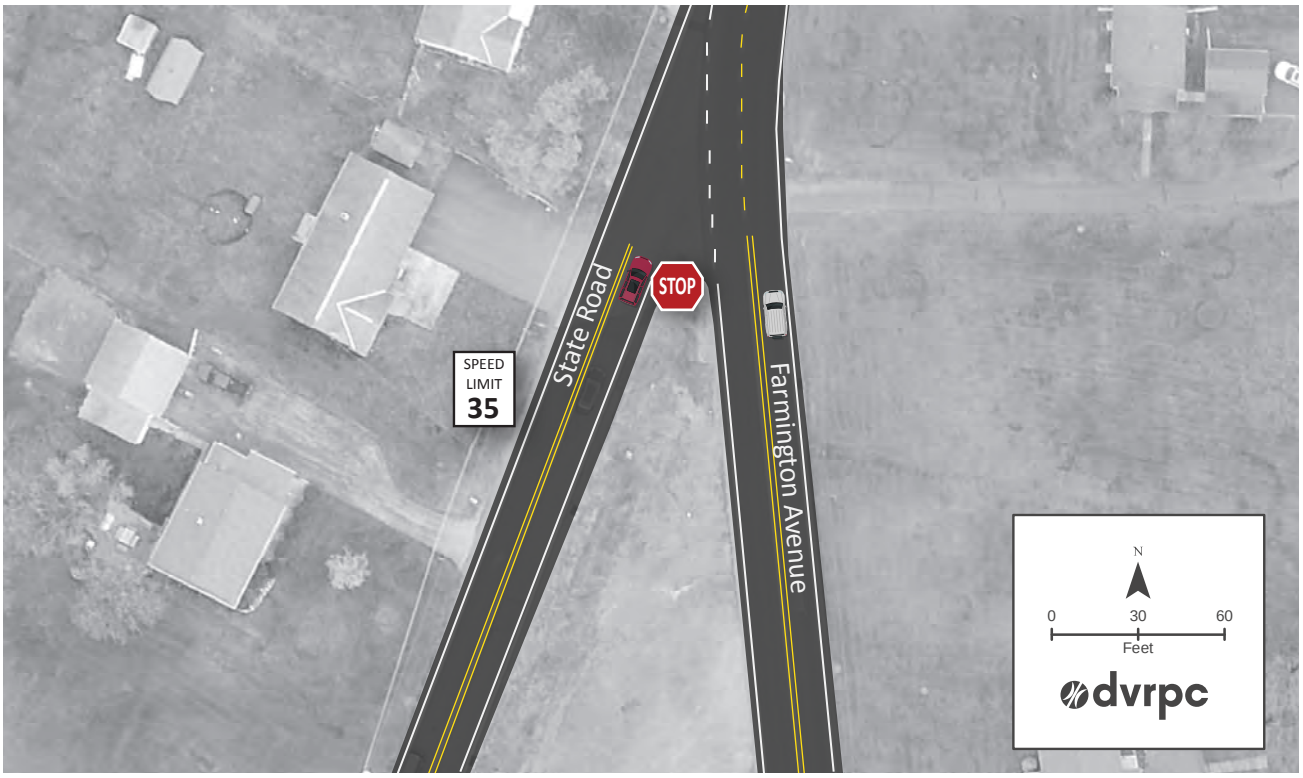
The driveway to the east would need to be extended. Containing reconstruction within the township-owned parcel can help minimize land acquisition.

FIGURE 18: CRASH DATA (2012–2017)



Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

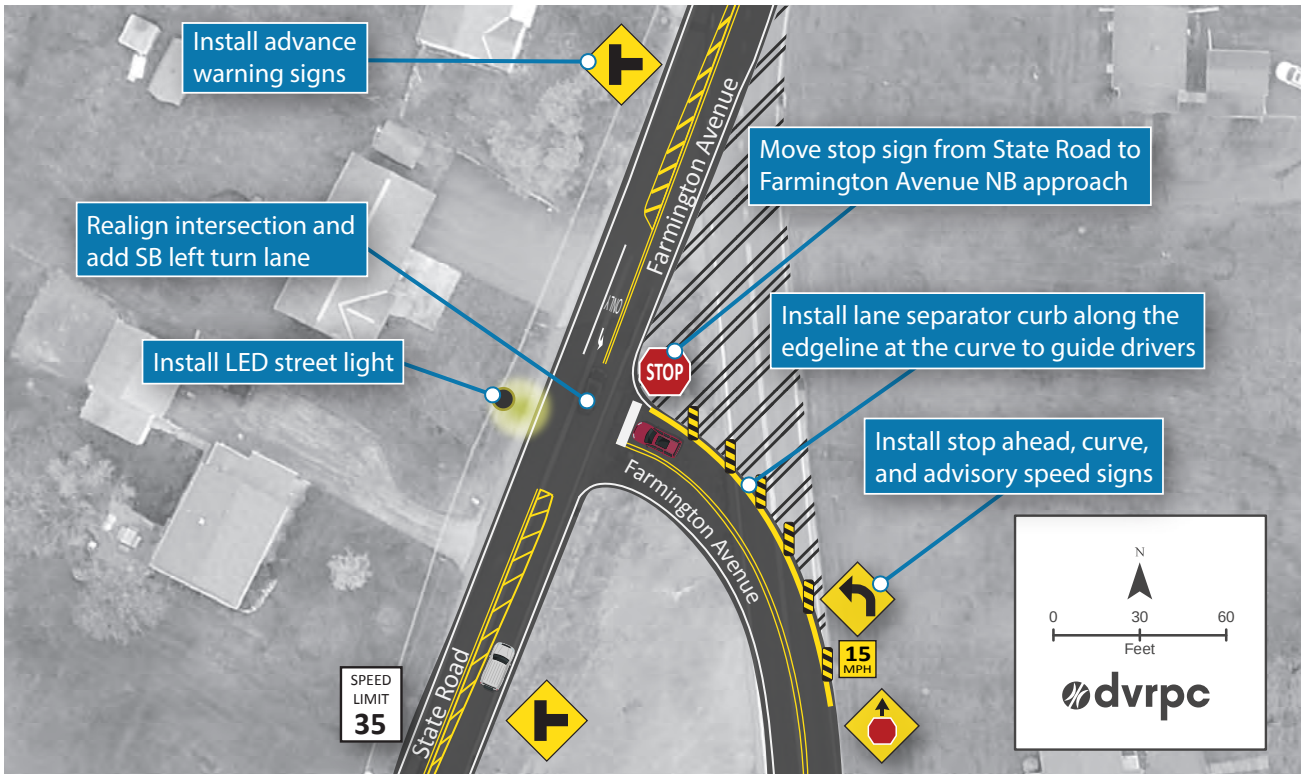
FIGURE 19: EXISTING CONDITIONS



Note: Conceptual graphics are not to scale. Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 20: RECOMMENDED TRANSPORTATION IMPROVEMENTS

This figure shows **Stage 1** recommendations: intersection realignment; advance warning signs; a street light; lane separator curb on Farmington Avenue; and stop ahead, curve, and advisory speed signs.



Note: Conceptual graphics are not to scale. Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

4 GROSSTOWN RD & MANATAWNY ST

The Grosstown Road and Manatawny Street intersection is on the Manatawny Street corridor. This intersection is important because Grosstown Road is the main north-south route through West Pottsgrove Township, and it connects directly to US 422. For this reason, the primary concern identified for this location is the traffic impact of future development.

Peak hour traffic volumes are low (**Table 10**), and a traffic signal is not warranted (**"Appendix A"**). The EB through movement is the heaviest in the AM peak hour and the WB through movement is the heaviest in the PM peak hour. This is indicative of an eastbound work or school commute. Traffic volumes are estimated to remain the same through 2025.

TABLE 10: PEAK HOUR TRAFFIC VOLUMES (2018)

Approach	AM Peak Hour	PM Peak Hour
NB (Grosstown)	66 (16L|52R)	115 (38L|77R)
EB (Manatawny)	**122** (43R|**79T**)	120 (33R|87T)
WB (Manatawny)	58 (24L|34T)	**226** (91L|**135T**)

Source: DVRPC, 2018

There are many homes along Manatawny Street west of this intersection. There was only one recent crash at this location, and it resulted in a pedestrian fatality (**Figure 21**).

The speed limit is 35 mph on this segment of Manatawny Street; no speeding was observed during free flow travel conditions (**Figure 22**). The house on the southwest corner obstructs the sight distance of vehicles stopped at the stop sign on Grosstown Road (**"Appendix C"**). While there is no direct solution to this issue, new multimodal facilities and signage will make drivers more cautious.

Grosstown Road and Manatawny Street have been identified as bicycle corridors in the *Greater Pottstown Trails Feasibility Study* and *Bike Montco*. Sharrows have been proposed on Grosstown Road and an off-road, multiuse facility has been proposed for the EB side of Manatawny Street. This on- and off-road trail would connect the Schuylkill River Trail to Murgia Park, which is a 0.25-mile, or a five-minute walk, east of this intersection. A sidewalk connection to the proposed trail and an enhanced pedestrian crossing would provide residents with safe access to recreational facilities in the future (**Figure 23**).

FIGURE 21: CRASH DATA (2012–2017)

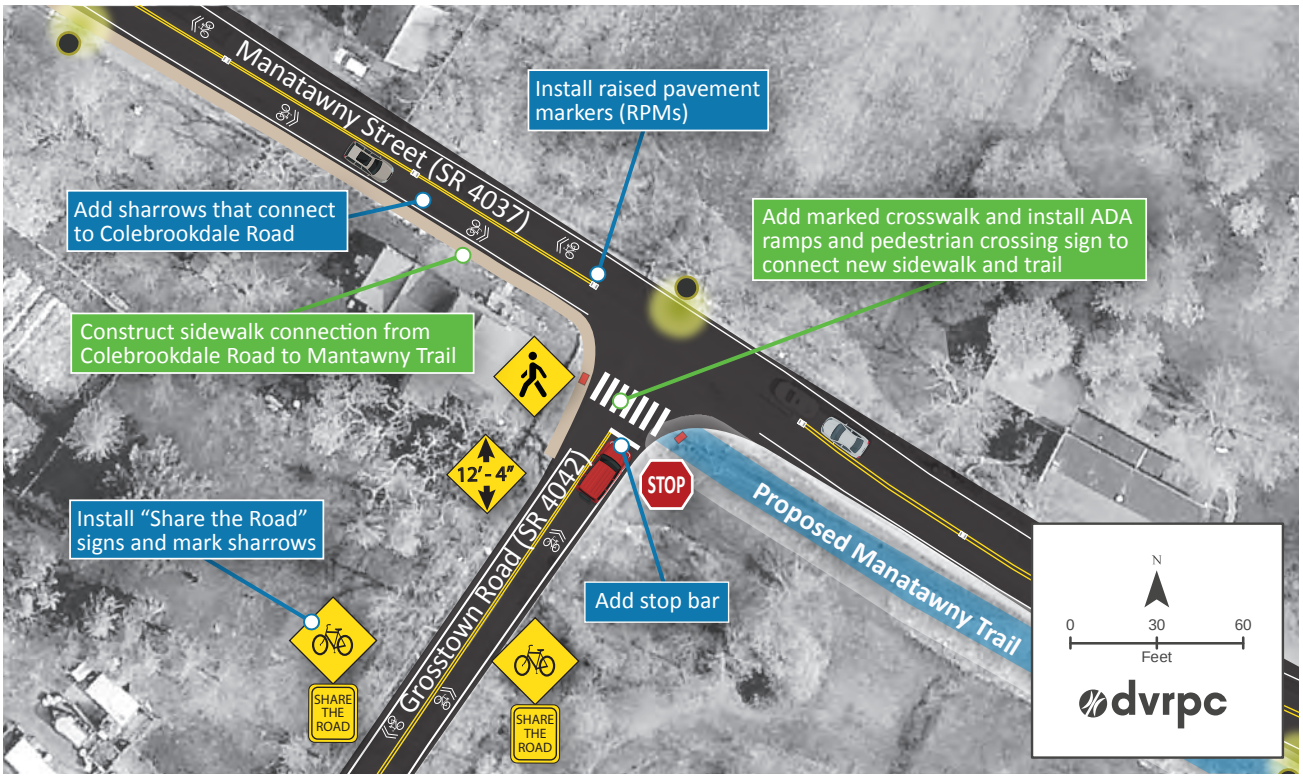
Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 22: EXISTING CONDITIONS

Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 23: RECOMMENDED TRANSPORTATION IMPROVEMENTS

This figure shows **Stage 1** and **Stage 2** recommendations, such as RPMs, sharrows, "Share the Road" signage, a stop bar, and pedestrian infrastructure improvements.



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

5 SELL RD & MANATAWNY ST A

The Sell Road and Manatawny Street intersection is immediately west of the Murgia Park entrance. Two trails are proposed for this area: the Manatawny Trail and the West Trail. The primary concern at this intersection is roadway user safety because a trail crossing is proposed to connect the two facilities.

Peak hour traffic volumes are low (**Table 11**), and, despite the potential for pedestrian traffic in the future, a traffic signal is not warranted (**"Appendix A"**). The EB through movement is the heaviest in the AM peak hour and the WB through movement is the heaviest in the PM peak hour. Traffic volumes are estimated to increase by 4 percent by 2025.

TABLE 11: PEAK HOUR TRAFFIC VOLUMES (2018)

Approach	AM Peak Hour	PM Peak Hour
SB (Sell)	48 (4L|44R)	131 (16L|115R)
EB (Manatawny)	**137** (58L|**79T**)	145 (62T|83L)
WB (Manatawny)	59 (8R|51T)	**146** (18R|**128T**)

Source: DVRPC, 2018

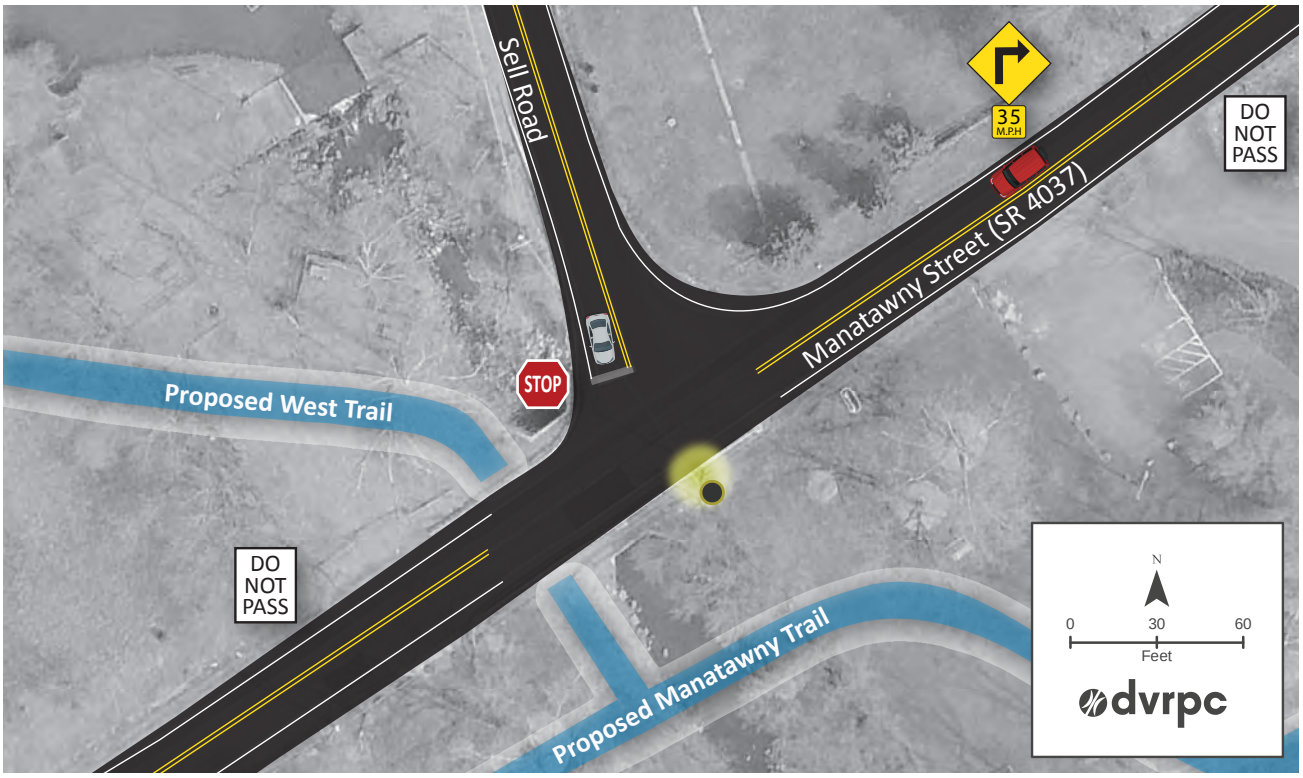
The posted speed limit on Manatawny Street is 35 mph; no speeding was observed in free flow conditions. Five crashes involved a vehicle hitting a fixed object, and three of these occurred at dusk or in the dark (**Figure 24**). In both nighttime crash events, the vehicle was traveling in the oncoming traffic lane. There were no recorded pedestrian crashes in the six-year period. The pedestrian bridge within Murgia park will be incorporated into the proposed Manatawny Trail. This is the only pedestrian facility near the intersection, and there are no existing bicycle facilities.

Advance warning signs on Manatawny Street notify drivers traveling in both directions of the presence of this T intersection and the sharp curve in the road (**Figure 25**). Raised pavement markers (RPMs) are recommended for Manatawny Street to mitigate lane departure and help vehicles negotiate the curve (**Figure 26**). The intersection sight distance on Sell Road is inadequate, and the brush on the northwest (NW) and northeast (NE) corners should be removed to maintain a clear zone (**"Appendix C"**). Lighting is recommended to increase intersection visibility.

FIGURE 24: CRASH DATA (2012–2017)

Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

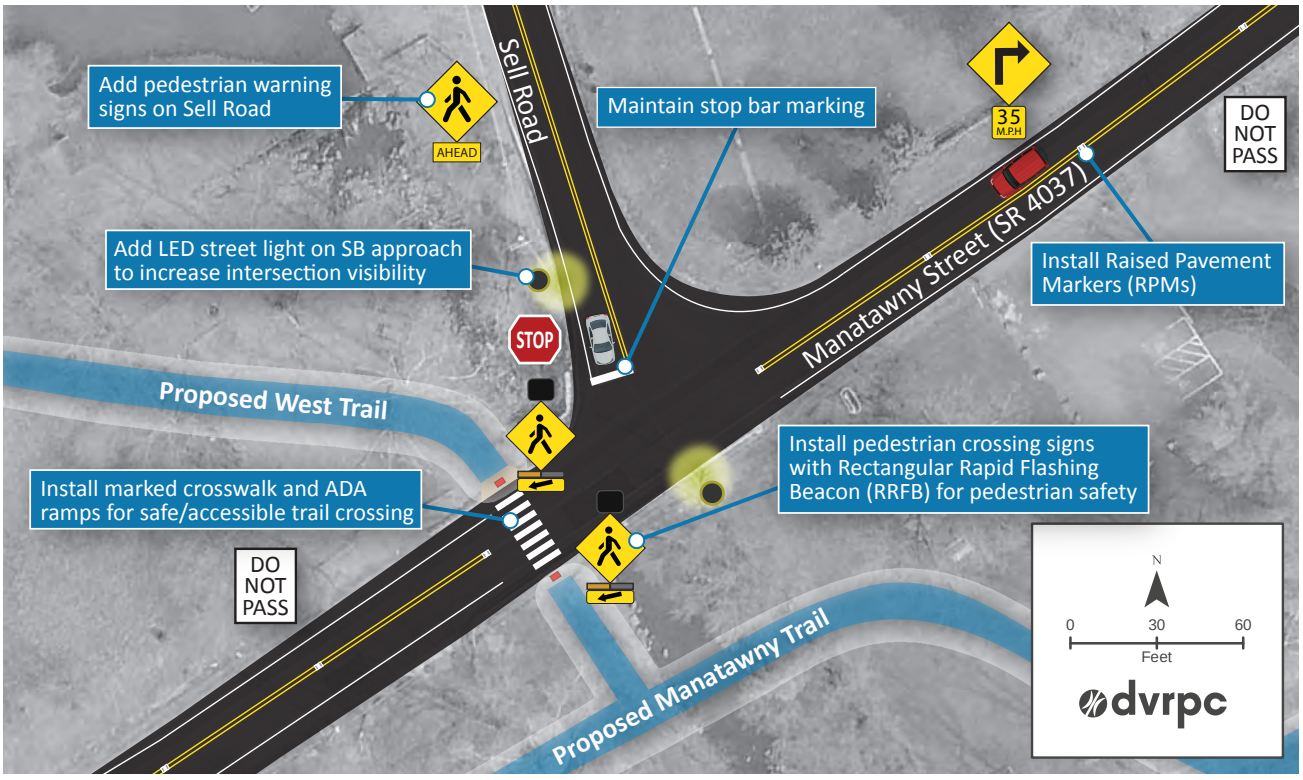
FIGURE 25: EXISTING CONDITIONS



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 26: RECOMMENDED TRANSPORTATION IMPROVEMENTS

This figure shows **Stage 1** recommendations: RPMs, pedestrian warning signs, a marked crosswalk and RRFB, ADA ramps, and a street light.



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

7

HIGH ST &
MOSER RD

6

GLASGOW ST &
MANATAWNY ST

8

HIGH ST & ARMAND
HAMMER BLVD

9

ARMAND HAMMER BLVD
& MEDICAL DR

- Roadway User Safety
- Roadway Geometry and Lane Configuration
- Study Location

CHAPTER 5
POTTSTOWN

N

0 1 2
Miles

dvrpc

Driveway pedestrian crossing at High St and Moser Rd. Source: DVRPC, 2018

The intersection of High St and Moser Rd is 200-feet-wide. Source: DVRPC, 2018

Narrow sidewalk on SB side of Armand Hammer Blvd. Source: DVRPC, 2018

SB through PM queue at intersection with Industrial Hwy. Source: DVRPC, 2018

CHAPTER 5
POTTSTOWN

This chapter presents analyses and recommendations for the four study locations in Pottstown Borough:

- Glasgow and Manatawny Streets;
- High Street and Moser Road;
- High Street and Armand Hammer Boulevard; and
- Armand Hammer Boulevard and Medical Drive.

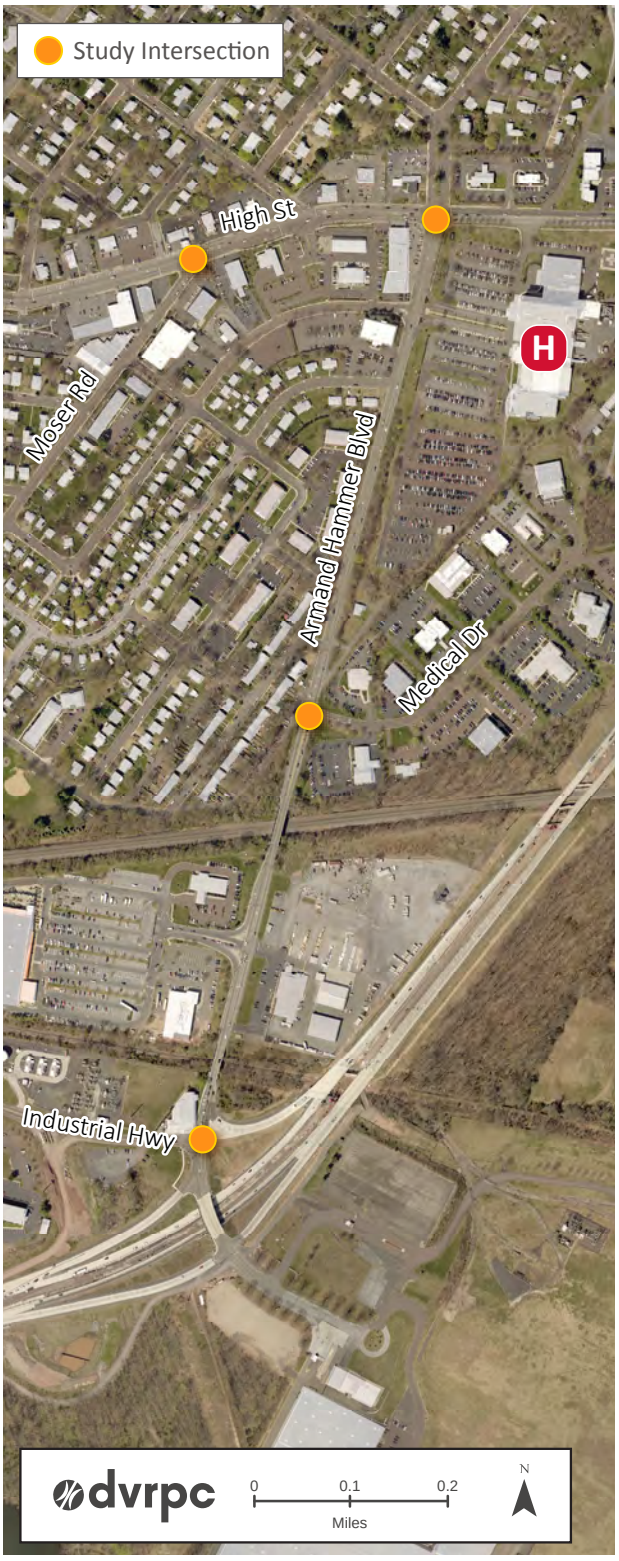
The Glasgow Street and Manatawny Street intersection is the third location along the Manatawny Street Corridor. It is located in a denser residential area with nearby big box commercial uses. The pedestrian infrastructure is more robust along this part of the corridor, and there is a PART stop.

HIGH ST & ARMAND HAMMER BLVD CORRIDOR

The other three study intersections in Pottstown Borough are part of the High Street/Armand Hammer Boulevard Corridor. High Street is a major east-west Principal Arterial that serves as a Main Street through the Pottstown area, and Armand Hammer Boulevard provides direct access to US 422. This area has a mix of commercial, residential, and office uses, and the Pottstown Hospital shown in **Figure 27** is accessible from both roadways.

Armand Hammer Boulevard is a two-lane roadway; it has a wide (7'11") shoulder on the southbound side from High Street to north of Medical Drive. Though there is a sidewalk on this same side, it is narrow (between 2'6" and 3'11"), not ADA-compliant, and not continuous. There is a significant gap in the sidewalk at the intersection with Medical Drive, where there is a PART stop. ADA ramp and sidewalk improvements are underway at all of these intersections as part of a PennDOT project (SR 4031-PSS). In this chapter, additional improvements are identified for the pedestrian infrastructure between these signalized intersections. Synchro traffic analysis software was used to measure AM and PM peak hour performance measures at locations along this corridor.

FIGURE 27: HIGH ST & ARMAND HAMMER BLVD CORRIDOR



Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

6 GLASGOW ST & MANATAWNY ST

The Glasgow Street and Manatawny Street intersection is the third study location on the Manatawny Street Corridor (see **"Manatawny St Corridor" on page 25**). The primary concern at this location is roadway geometry and lane configuration. The intersection is misaligned so the intersection sight distance, or driver's line of sight, on Glasgow Street does not meet the minimum recommendation (**"Appendix C"**).

Peak hour traffic volumes at this intersection are low (**Table 12**). The northbound (NB) movement is the heaviest in both the AM and PM peak hours. Traffic volumes are estimated to increase by 4 percent by 2025.

TABLE 12: PEAK HOUR TRAFFIC VOLUMES (2018)

Approach	AM Peak Hour	PM Peak Hour
NB (Manatawny)	**133** (**84L**|9R|40T)	**210** (91L|36R|83T)
SB (Manatawny)	86 (2L|27R|57T)	96 (6L|27R|63T)
EB (Glasgow)	72 (14L|56R|2T)	190 (54L|**122R**|14T)
WB (Glasgow)	38 (17L|7R|14T)	38 (27L|3R|8T)

Source: DVRPC, 2018

EQUITY ANALYSIS

Census Tract where 16 percent of residents have one or more disabilities.

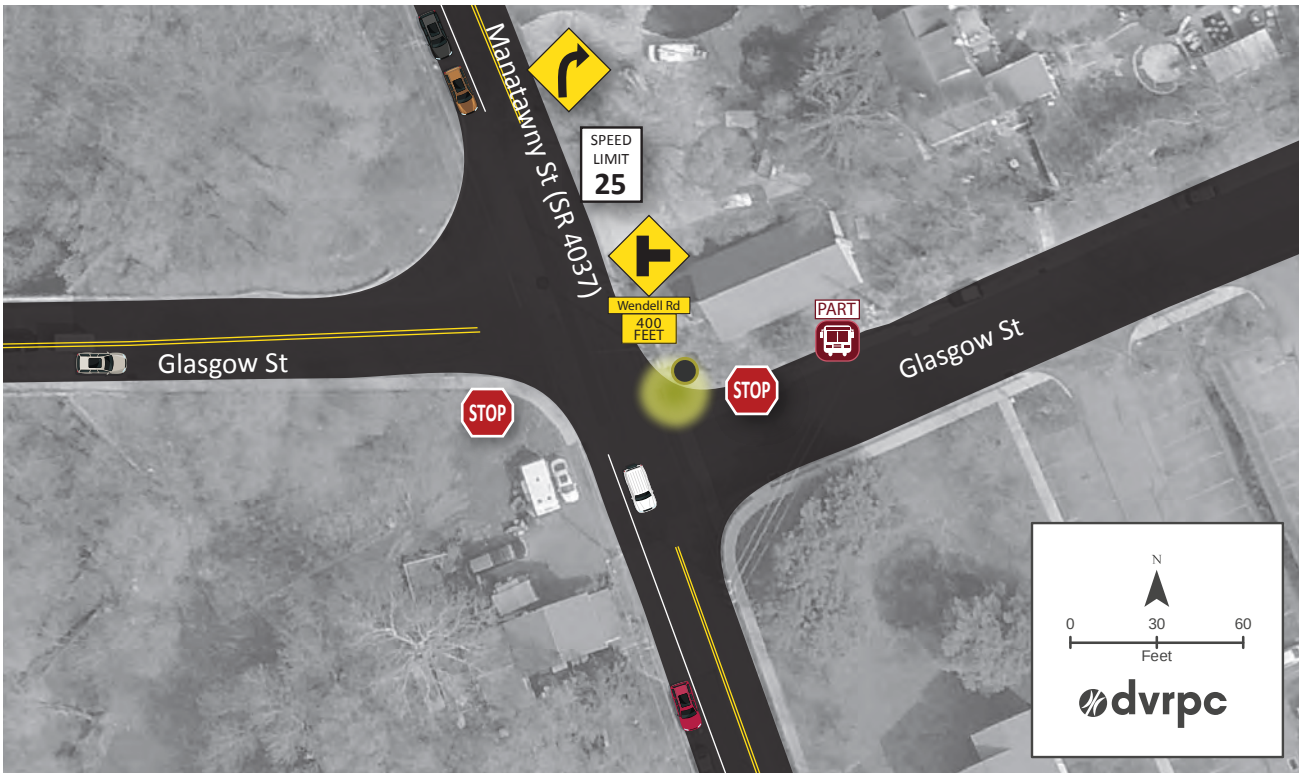
Angle crashes were most common at this intersection, and one crash in the six-year period resulted in a serious injury (**Figure 28**). There are no marked crosswalks, and the sidewalk network is inconsistent (**Figure 29**). In addition, on-street parking is located away from many homes and the local church; this leaves residents and visitors no safe way to cross the street. PART provides Day and Night Line service from this location to Stowe, Pottstown Center, and Coventry Mall. Given the presence of a vulnerable population, access to transit is critical at this location.

The posted speed limit on Manatawny Street is 25 mph; vehicles were observed traveling at an average free flow speed of 35 mph. A traffic signal is not warranted (**"Appendix A"**), but traffic calming measures can lead to reduced vehicle speeds on Manatawny Street. They are more cost-effective than intersection realignment and can improve safety (**Figure 30**).

FIGURE 28: CRASH DATA (2012–2017)

Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

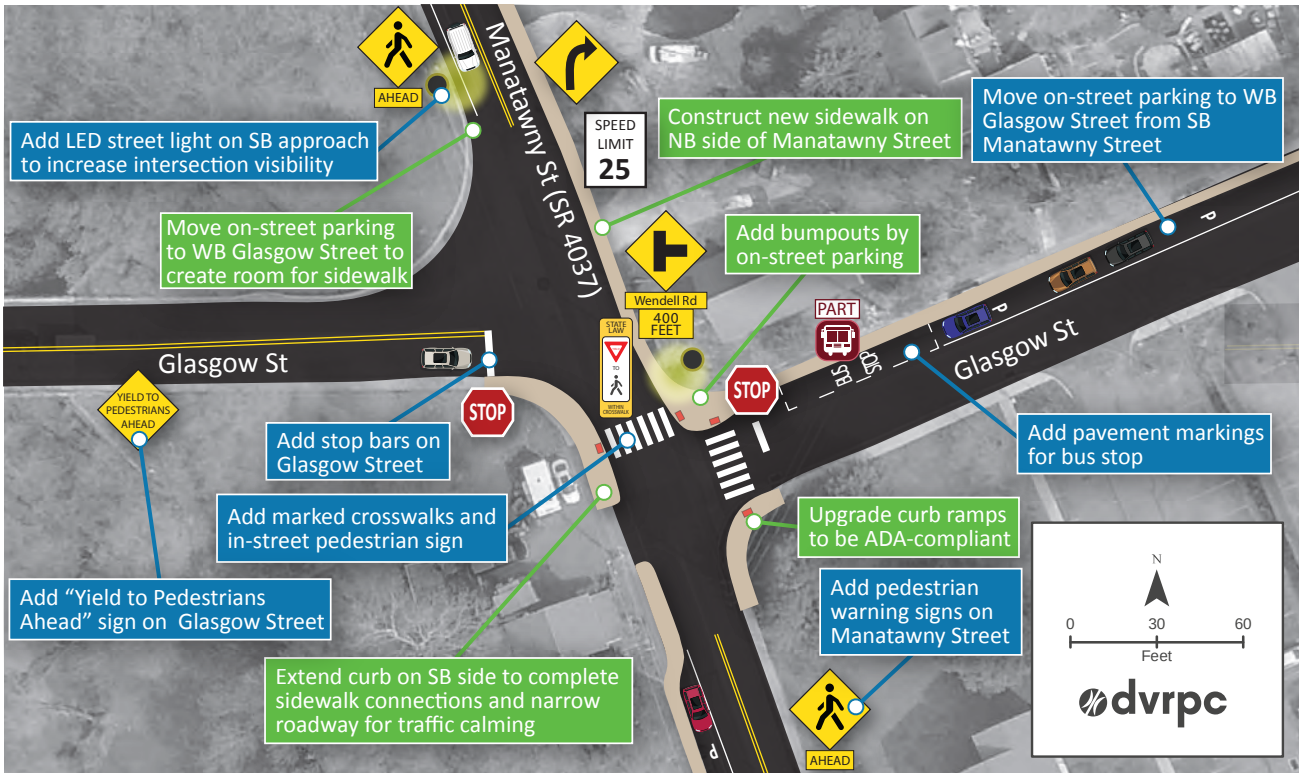
FIGURE 29: EXISTING CONDITIONS



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 30: RECOMMENDED TRANSPORTATION IMPROVEMENTS

This figure shows **Stage 1** and **Stage 2** recommendations, such as curb extensions, new sidewalk, advance warning signs, marked crosswalks, and ADA ramps.



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

7 HIGH ST & MOSER RD

The primary concern is roadway geometry and lane configuration. The intersection geometry is confusing for all road users. The east driveway of the gas station on the north side has its own traffic signal because it is aligned with the south leg of the intersection. The west driveway is uncontrolled, which allows conflicting movements to be made simultaneously.

Peak hour traffic volumes at this location are among the highest of the study locations (**Table 13**). The EB through movement is the heaviest in the AM peak hour and the WB through movement is the heaviest in the PM peak hour. Traffic volumes are estimated to increase by 35 percent by 2025.

TABLE 13: PEAK HOUR TRAFFIC VOLUMES (2018)

Approach	AM Peak Hour	PM Peak Hour
NB (Moser)	145 (99L|44R|2T)	175 (52L|121R|2T)
SB (Moser)	4 (1L|1R|2T)	7 (3L|4R|0T)
EB (High)	224 (2L|14R|**208T**)	330 (3L|43R|284T)
WB (High)	**256** (66L|1R|189T)	**488** (130L|12R|**346T**)

Source: DVRPC, 2018

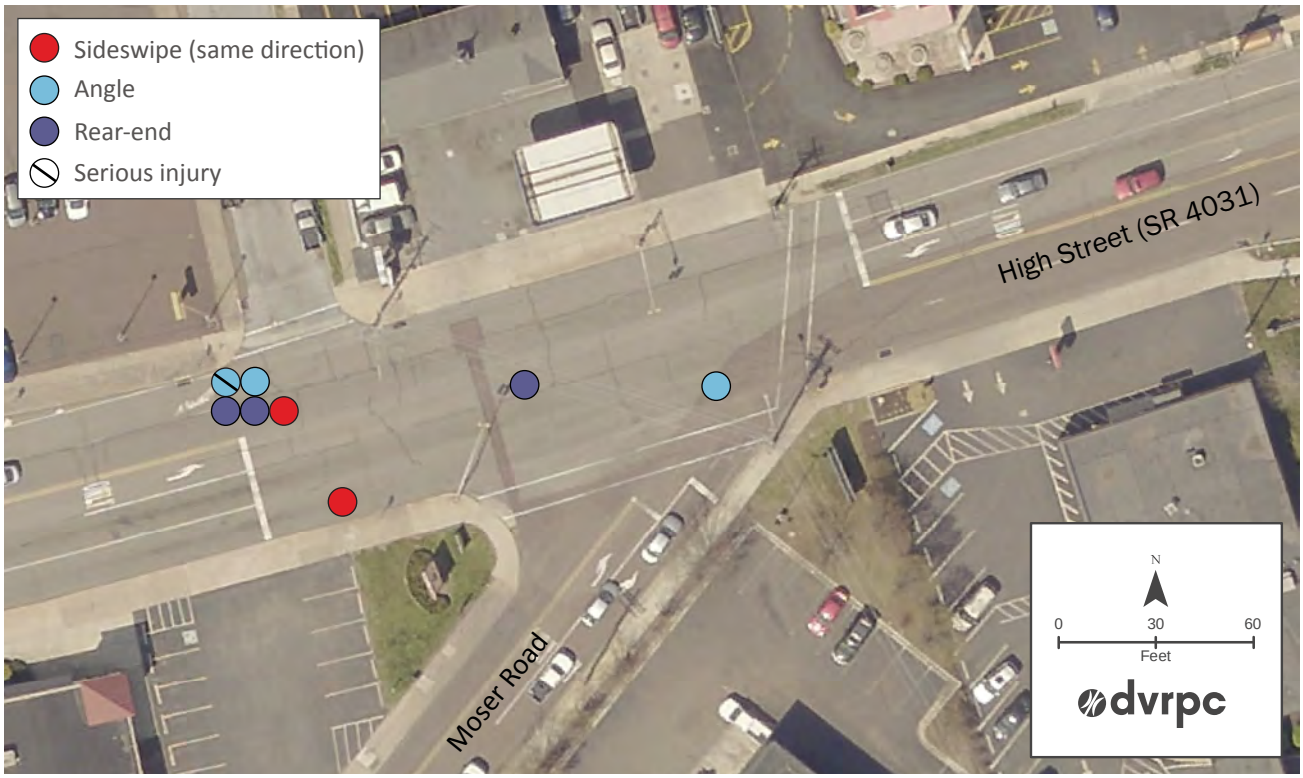
EQUITY ANALYSIS

Census Tract where 29 percent of residents are under 18 years old, 17 percent of residents have one or more disabilities, and 53 percent of residents live in households with an income below 200 percent of the national poverty level.

Most crashes at this location occurred in the WB direction, where High Street merges from two lanes to one (**Figure 31**). There are no advance warning signs on the east leg of the intersection, and it is so expansive (200 feet) that it is difficult for drivers to see the change in lane configuration ahead (**Table 14**).

Three PART lines and SEPTA bus route 93 serve this location. Access to transit, increased mobility options, and a safe pedestrian infrastructure are priorities at this location given the presence of vulnerable populations. PennDOT installed ADA-compliant ramps and pedestrian countdown signals as part of the signal upgrade project (SR 4031-PSS). ADA access to the PART bus shelter can be achieved through the provision of a wider concrete pad. A Leading Pedestrian Interval (LPI) is recommended for the east

FIGURE 31: CRASH DATA (2012–2017)



Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

crosswalk (**Figure 33**). The wide turning radius for the NB right-turn may encourage speeding and put pedestrians at risk. LPIs allow pedestrians to begin crossing the roadway before the light turns green for vehicles; so it is easier for drivers to spot pedestrians in the crosswalk. It also increases available crossing time; pedestrians must cross five lanes of traffic at this location.

The pedestrian signals are actuated because pedestrian volumes are low at this intersection. In the three-hour AM and PM peak periods evaluated, a maximum of nine pedestrians crossed Moser Road and a maximum of two pedestrians crossed High Street. It is important to provide safe multimodal mobility options because the corridor has numerous bus stops and businesses. For example, east-west neighborhood greenway connections can be made in the residential area just south of this intersection to accommodate bicycle travel. The Stage 2 cost estimates include sharrows and new sidewalk on Moser Road south of this intersection to the Industrial Highway intersection. At-grade safety measures at the railroad crossing are therefore also recommended (**"Appendix B"**).

Traffic Analysis

LOS and delay were analyzed to identify and evaluate operational improvements, such as changes in lane configuration or signal timing, that could enhance vehicular traffic flow and pedestrian comfort. The traffic analysis results are summarized below.

- The approach LOS remained the same in the Future No Build scenario, but delay increased slightly due to higher traffic volumes.
- EB LOS decreased in the Future Build scenario because red time was extended for this movement to allow for a 3-second LPI.
- Though green time was reduced for the north-south movements in the Future Build scenario to accommodate an LPI, this had no effect on the LOS of these movements.
- Delay increased in the Future Build scenario, but the LOS remained stable at level B.

SCENARIOS TESTED

Existing Conditions (Year 2018): This scenario is based on 2018 traffic volumes and incorporates the SR 4031-PSS traffic signal timing. It does not include the lane reconfiguration programmed as part of the same project because it had not been implemented in the base year (2018).

Future No Build (2025): This scenario includes all SR 4031-PSS programmed upgrades. Most notably, the NB left-turn on Moser Road has changed to a NB left-turn and through movement. Intersection volumes were increased by 35 percent, and 2018 turning movement distributions were applied.

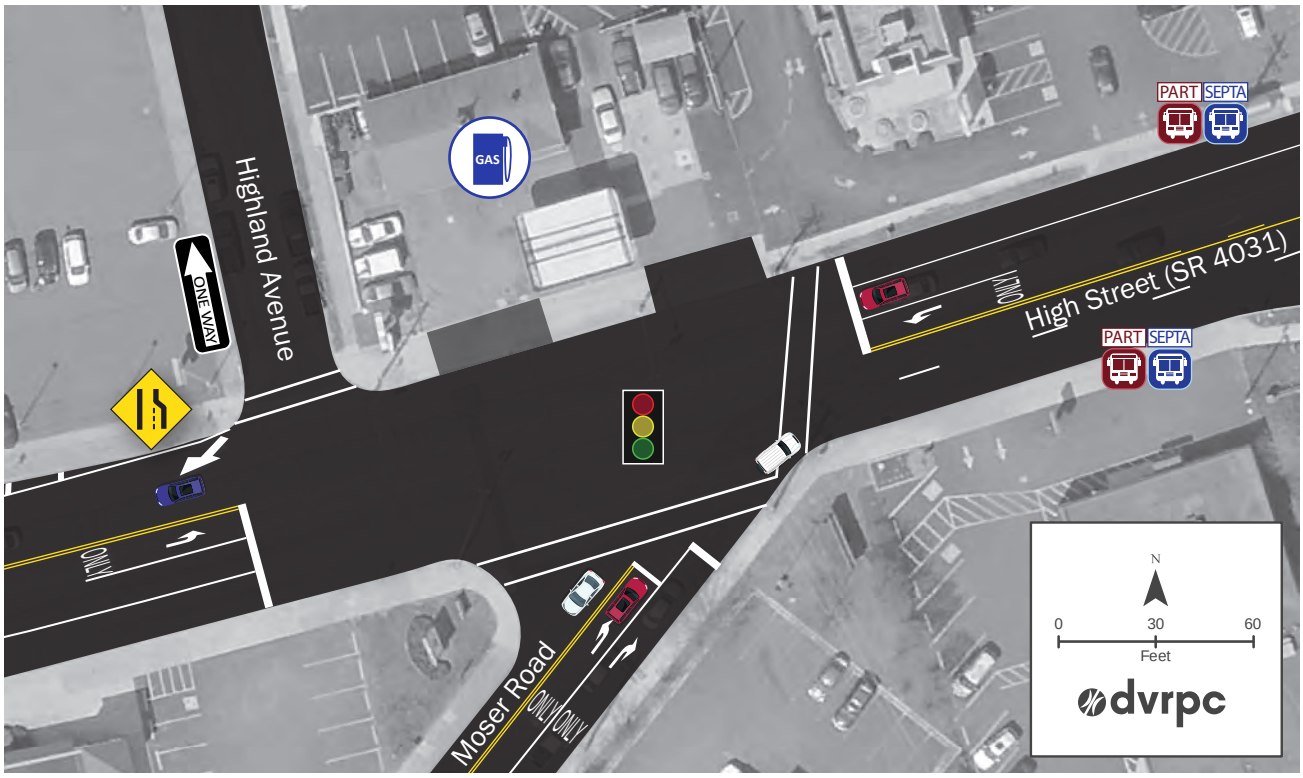
Future Build (2025): This scenario includes all elements of the Future No Build scenario with the addition of a 3-second LPI. The 3 seconds were taken from the north-south movement.

TABLE 14: HIGH ST & MOSER RD LOS SUMMARY

Approach		Existing Conditions (2018)	Future No Build (2025)	Future Build (2025)
NB (Moser)	AM	C	C	C
	PM	B	B	B
SB (Moser)	AM	A	A	A
	PM	A	A	A
EB (High)	AM	B	B	B
	PM	B	B	C
WB (High)	AM	A	A	A
	PM	A	A	A
Intersection Delay (seconds)	AM	12.3	13.0	13.5
	PM	11.7	12.6	13.8
Intersection LOS	AM	B	B	B
	PM	B	B	B

Source: DVRPC, 2019

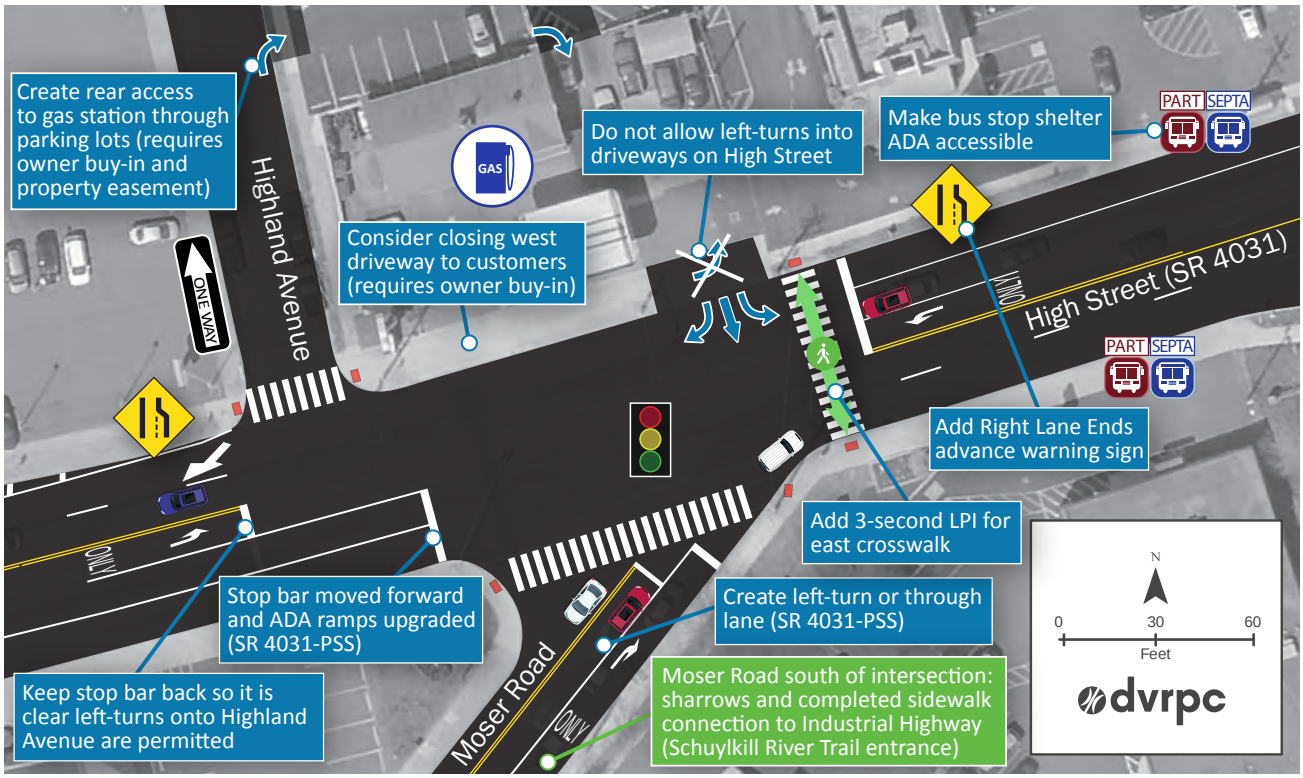
FIGURE 32: EXISTING CONDITIONS



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 33: RECOMMENDED TRANSPORTATION IMPROVEMENTS

This figure shows **Stage 1** recommendations (i.e., an LPI, EB left-turning movement restrictions, access management suggestions) and references **Stage 2** recommendations for Moser Road south of the study location.



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

8 HIGH ST & ARMAND HAMMER BLVD

The primary concern at this location is roadway user safety. Forty-eight percent of all crashes at this location were angle crashes, and one was a hit pedestrian crash (**Figure 34**).

Peak hour traffic volumes at this location are the highest along the corridor (**Table 15**). The EB through movement is the heaviest in the AM peak hour and the WB through movement is the heaviest in the PM peak hour. Traffic volumes are estimated to increase by 8 percent by 2025.

TABLE 15: PEAK HOUR TRAFFIC VOLUMES (2018)

Approach	AM Peak Hour	PM Peak Hour
SB (Armand Hammer)	247 (43L|5R|199T)	810 (290L|320R|200T)
SB (Wilson)	335 (115L|151R|69T)	142 (37L|22R|83T)
EB (High)	**641** (6L|284R|**351T**)	603 (22L|142R|439T)
WB (High)	527 (252L|32R|243T)	**849** (257L|44R|**548T**)

Source: DVRPC, 2018

EQUITY ANALYSIS

Census Tract where 29 percent of residents are under 18 years old, 17 percent of residents have one or more disabilities, and 53 percent of residents live in households with an income below 200% of the national poverty level.

There is a SEPTA bus route 93 stop on the northeast corner, across from the Pottstown Hospital, and there is a shared PART and SEPTA bus stop on the southwest corner (**Table 16**). Therefore, it is imperative that pedestrian conditions be improved so that transit users may access these stops and the hospital safely. EB buses stop at the Firestone driveway so a bus pull-out in front of the Wawa is recommended. The gore area can be used for buses to pull over, and a concrete pad can be installed in the vegetated buffer to make this stop ADA-accessible (**Figure 36**). PennDOT installed ADA-compliant ramps and actuated pedestrian countdown signals as part of the signal upgrade project (SR 4031-PSS).

FIGURE 34: CRASH DATA (2012–2017)

Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

Gore area/EB intersection approach in front of Wawa on High St. Source: DVRPC, 2018

Traffic Analysis

LOS and delay were analyzed to identify and evaluate operational improvements, such as changes in lane configuration or signal timing, that could enhance vehicular traffic flow and pedestrian comfort. The traffic analysis results are summarized below.

- The EB and NB approaches experience greater delays than the WB and SB approaches under Existing Conditions. In the PM peak hour, the LOS for the NB left-turn is a D; the NB approach LOS is a C. The intersection LOS remained the same in the Future No Build scenario in the AM, but it decreased in the PM.
- The future increase in traffic volumes had only a minor impact on intersection LOS.
- The allocation of additional green time to the protected WB left-turn minimally affected delay, while making this movement safer.

SCENARIOS TESTED

Existing Conditions (Year 2018): This scenario is based on 2018 traffic volumes and incorporates the SR 4031-PSS traffic signal timing. It does not include the design upgrades programmed as part of the same project because it had not been implemented in the base year (2018).

Future No Build (2025): This scenario incorporates the SR 4031-PSS traffic signal timing, the removal of the NB right-turn channelization, and the addition of a SB right-turn lane. Overall intersection volumes were increased by 8 percent. Turning movement volumes were based on 2018 distributions.

Future Build (2025): This scenario includes all elements of the Future No Build scenario with 4 extra seconds of green time for the WB left-turn in the AM and 3 extra seconds of green time for the same movement in the PM. The green time was taken from the EB through movement.

TABLE 16: HIGH ST & ARMAND HAMMER BLVD LOS SUMMARY

Approach		Existing Conditions (2018)	Future No Build (2025)	Future Build (2025)
NB (Armand Hammer)	AM	C	C	C
	PM	C	C	C
SB (Armand Hammer)	AM	C	C	C
	PM	B	B	B
EB (High)	AM	C	C	C
	PM	C	C	C
WB (High)	AM	B	B	B
	PM	B	B	B
Intersection Delay (seconds)	AM	22.0	22.1	22.8
	PM	19.7	21.6	21.8
Intersection LOS	AM	C	C	C
	PM	B	C	C

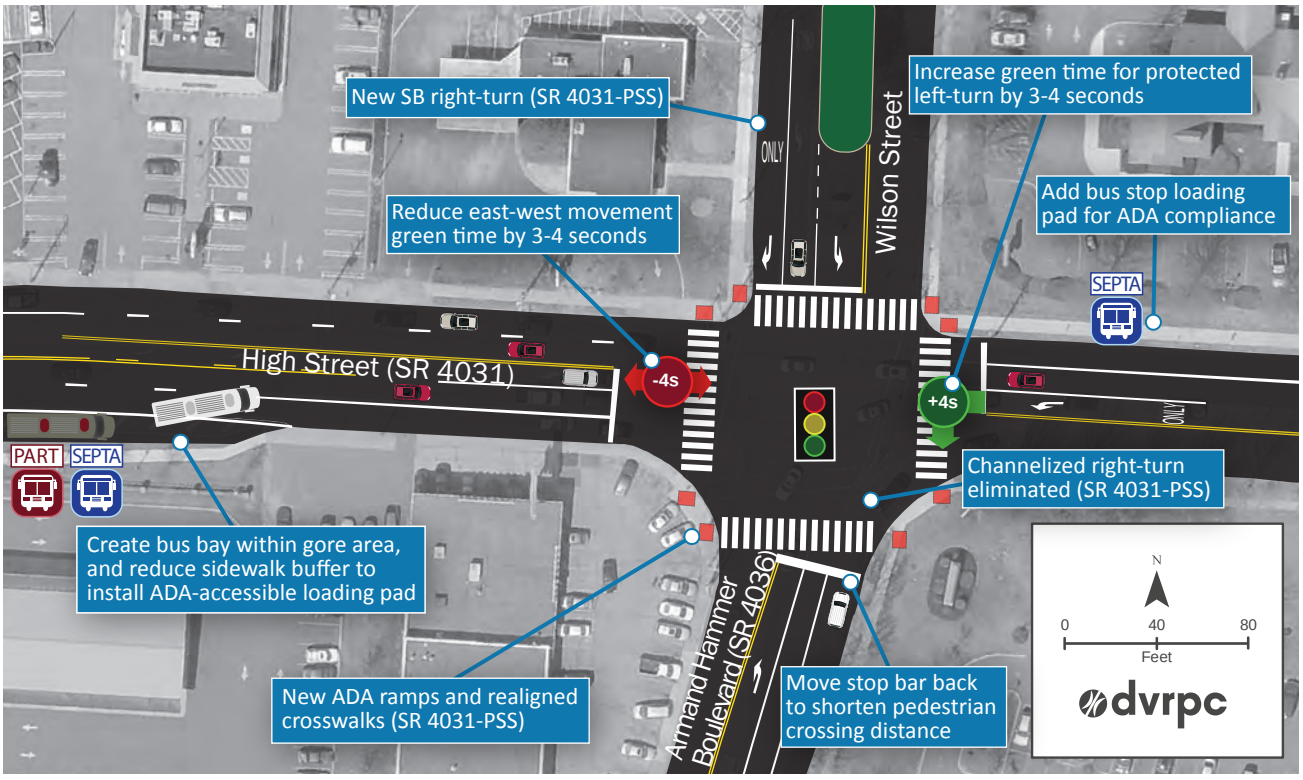
Source: DVRPC, 2019

FIGURE 35: EXISTING CONDITIONS

Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 36: RECOMMENDED TRANSPORTATION IMPROVEMENTS

This figure shows **Stage 1** recommendations, such as signal timing adjustments to add 3-4 seconds of green time to the WB left-turn, a bus bay on the EB side, and a bus stop loading pad on the WB side.



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

9 ARMAND HAMMER BLVD & MEDICAL DR A

The primary concern at this location is roadway user safety, particularly pedestrian safety. No hit pedestrian crashes were recorded from 2012 through 2017 (**Figure 37**). Four of seven rear-end crashes were caused by NB vehicles slowing or stopping in the travel lane.

Peak hour traffic volumes at this location are high (**Table 17**). The SB through movement is the heaviest in the AM peak hour and the NB through movement is the heaviest in the PM peak hour. Traffic volumes are estimated to increase by 2 percent by 2025.

TABLE 17: PEAK HOUR TRAFFIC VOLUMES (2018)

Approach	AM Peak Hour	PM Peak Hour
NB (Armand Hammer)	647 (157R|490T)	**817** (61R|**756T**)
SB (Armand Hammer)	**820** (146L|**674T**)	575 (66L|509T)
WB (Medical)	52 (19L|33R)	390 (168L|222R)

Source: DVRPC, 2018

There is a PART stop on the southbound side at this intersection, and there is a gap in the sidewalk at this location (**Figure 38**). The PennDOT signal upgrade project includes the construction of ADA-compliant ramps and the installation of a north marked crosswalk (**Figure 39**). This will help pedestrians travel safely to and from the medical offices east of the boulevard, as well as increase access to transit.

Queueing on the SB side during construction on Armand Hammer Blvd. It is a two-lane roadway so any traffic disruption can cause significant delays. Source: DVRPC, 2018

FIGURE 37: CRASH DATA (2012–2017)

Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

Traffic Analysis

LOS and delay were analyzed to identify and evaluate traffic flow improvements. The NB volumes are much higher in the PM peak hour than in the AM peak hour, which causes considerable delays (**Table 18**). Though these volumes are comparable to the SB volumes in the AM, the dedicated SB left-turn lane benefits SB traffic flow. A NB right-turn lane is recommended in Lower Pottsgrove Township's *Act 209 Transportation Capital Improvements Plan (2016)*, and it was tested as part of this traffic analysis. The traffic analysis results are summarized below.

- The NB approach operates at LOS C in the AM peak hour and LOS F in the PM peak hour under Existing Conditions.
- Two percent traffic growth results in a 7-second increase in PM peak hour delay in the Future No Build scenario.
- Approach LOS remains constant for all approaches, except the NB approach, across scenarios.
- A NB right-only lane reduces intersection delay by 6 seconds in the AM peak hour and 25 seconds in the PM peak hour.

SCENARIOS TESTED

Existing Conditions (Year 2018): This scenario is based on 2018 traffic volumes and incorporates the SR 4031-PSS traffic signal timing. It does not include the design upgrades programmed as part of the same project because it had not been implemented in the base year (2018).

Future No Build (2025): This scenario incorporates the SR 4031-PSS traffic signal timing, pedestrian infrastructure improvements, and an actuated pedestrian countdown timer. Overall intersection volumes were increased by 2 percent. Turning movement volumes were based on 2018 distributions.

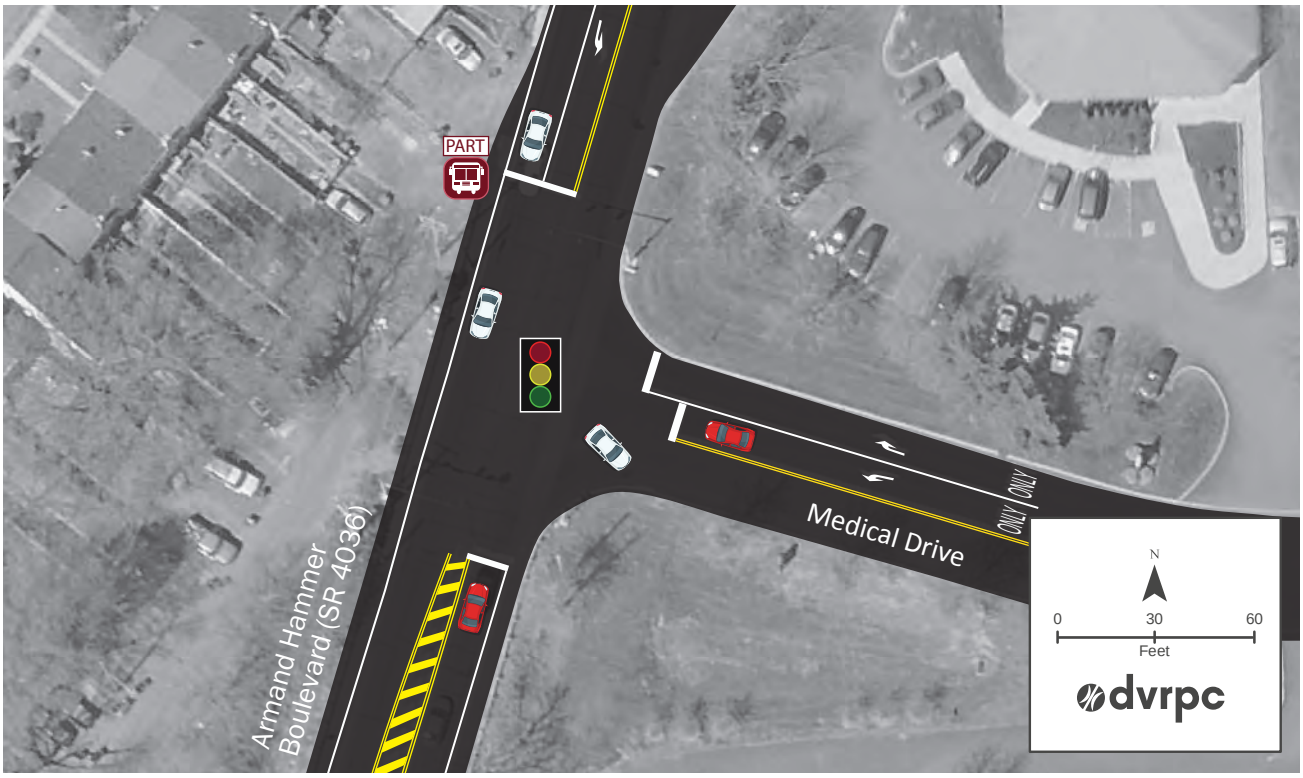
Future Build (2025): This scenario includes all elements of the Future No Build scenario and a new, NB right-only lane. The NB right-turn-only lane was introduced to address poor NB approach performance.

TABLE 18: ARMAND HAMMER BLVD & MEDICAL DR LOS SUMMARY

Approach		Existing Conditions (2018)	Future No Build (2025)	Future Build (2025)
NB (Armand Hammer)	AM	C	C	B
	PM	F	F	D
SB (Armand Hammer)	AM	B	B	B
	PM	A	A	A
WB (Medical)	AM	B	B	B
	PM	C	C	C
Intersection Delay (seconds)	AM	18.9	19.4	13.4
	PM	45.6	52.8	27.9
Intersection LOS	AM	B	B	B
	PM	D	D	C

Source: DVRPC, 2019

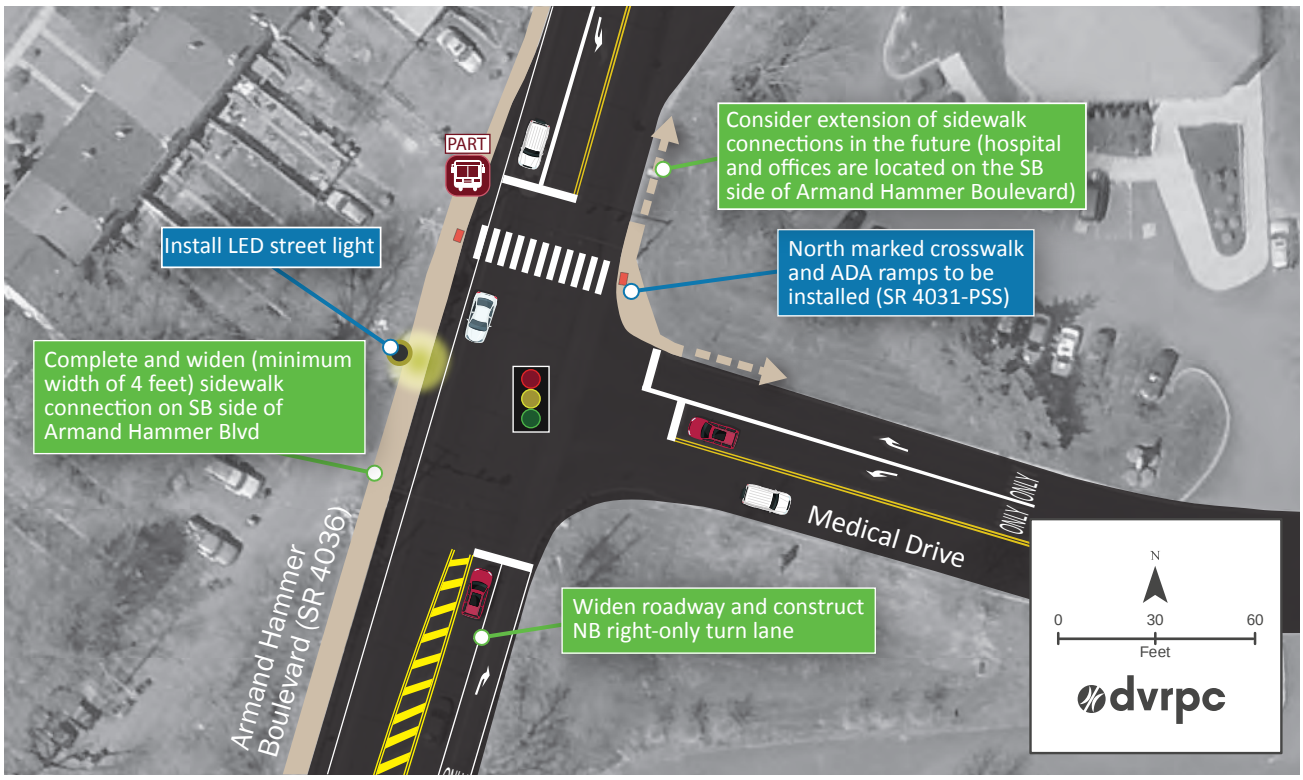
FIGURE 38: EXISTING CONDITIONS



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 39: RECOMMENDED TRANSPORTATION IMPROVEMENTS

This figure shows **Stage 1** and **Stage 2** recommendations: a NB right-turn lane, a street light, and the completion of the sidewalk gap at this intersection.



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)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CHAPTER 6
LOWER POTTSGROVE

N
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Miles

dvrpc

The PA 663 NB approach is at a steep grade and sharp curve. Source: DVRPC, 2018

Steep grade of Bleim Rd at New Hanover Square Rd. Source: DVRPC, 2018

The misaligned Bleim Rd and Pleasantview Rd intersection. Source: DVRPC, 2018

Grade of High St encourages speeding in the WB direction. Source: DVRPC, 2018

CHAPTER 6
LOWER POTTSGROVE

This chapter presents analyses and recommendations for the five study locations in Lower Pottsgrove Township:

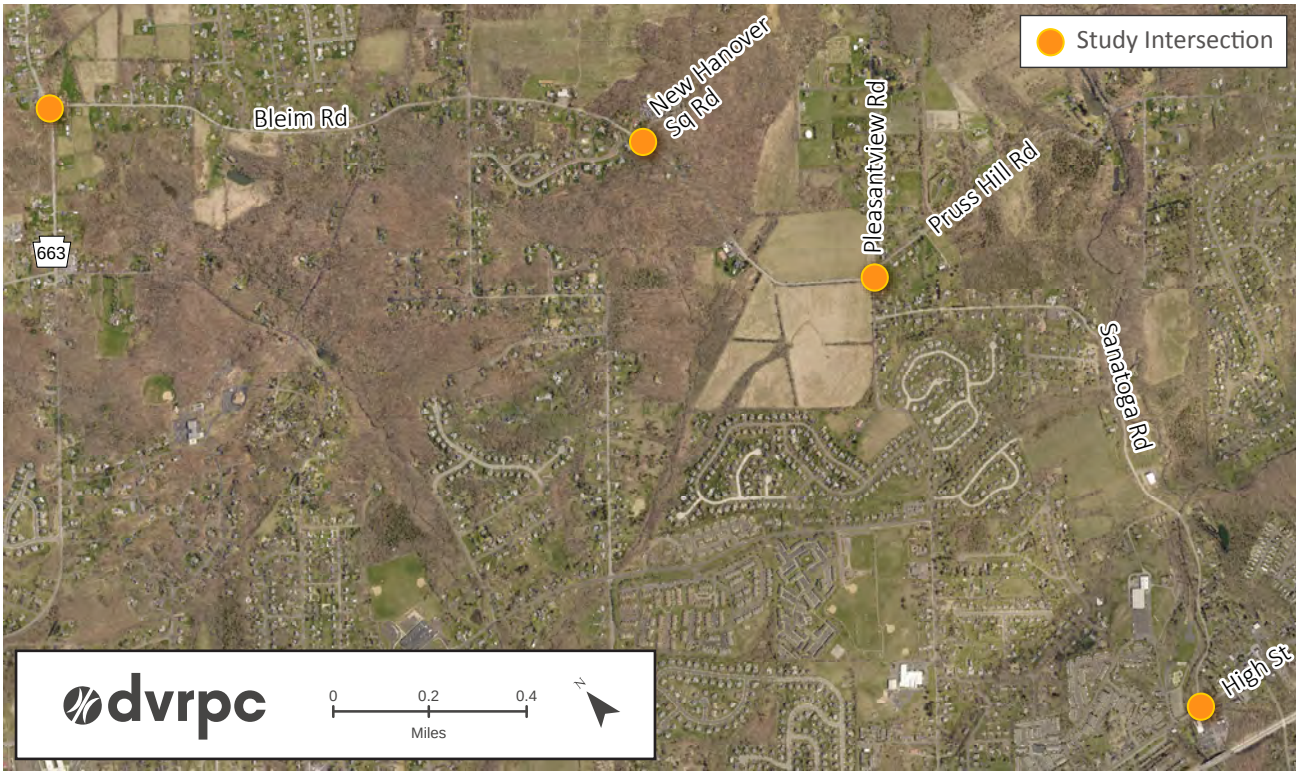
- Armand Hammer Boulevard and Industrial Highway;
- Bleim Road and PA 663;
- Bleim Road and New Hanover Square Road;
- Bleim Road and Pleasantview Road; and
- High Street and Sanatoga Road.

The Armand Hammer Boulevard and Industrial Highway intersection is the fourth location along the High Street and Armand Hammer Boulevard Corridor. This intersection is the first US 422 WB exit within the Pottstown region. The intersection was reconstructed in 2015. The US 422 WB on-ramp was moved to the south leg of the intersection, and a pedestrian sidepath was installed on the SB side. As a result, this intersection provides critical motor vehicular connections to and from US 422. The pedestrian infrastructure could be expanded to connect to the planned Schuylkill River Trail segment, which will connect Montgomery and Chester counties via the US 422 bridge.

BLEIM RD & SANATOGA RD CORRIDOR

The other four study intersections in Lower Pottsgrove Township are part of the Bleim Road and Sanatoga Road Corridor (**Figure 40**). Much of the new development in the Pottstown region is located near PA 663. As traffic volumes increase throughout the region, it is possible that Bleim Road may be used as a cut-through between PA 663 and US 422.

FIGURE 40: BLEIM RD & SANATOGA RD CORRIDOR



Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

10 ARMAND HAMMER BLVD & INDUSTRIAL HWY A

The primary concern at this location is roadway user safety, particularly pedestrian safety. There were two hit pedestrian crashes recorded from 2012 through 2017 (**Figure 41**).

Angle and rear-end crashes were the most common at this intersection. The majority of the angle crashes (8 of 13) involved EB left-turning vehicles colliding with WB through vehicles. Nine of 15 rear-end crashes involved WB vehicles that were slowing or stopping as they approached the center of the intersection.

The SB through volumes are the highest in both the AM and PM peak hours (**Table 19**). Only 7 percent of SB vehicles turn right in the AM; 21 percent turn right in the PM. Intersection volumes are estimated to increase by 8 percent by 2025.

There are PART stops on Industrial Highway but no sidewalks or marked crosswalks to safely access the stops (**Figure 42**). As mentioned previously, a sidepath was constructed at this intersection in 2015.

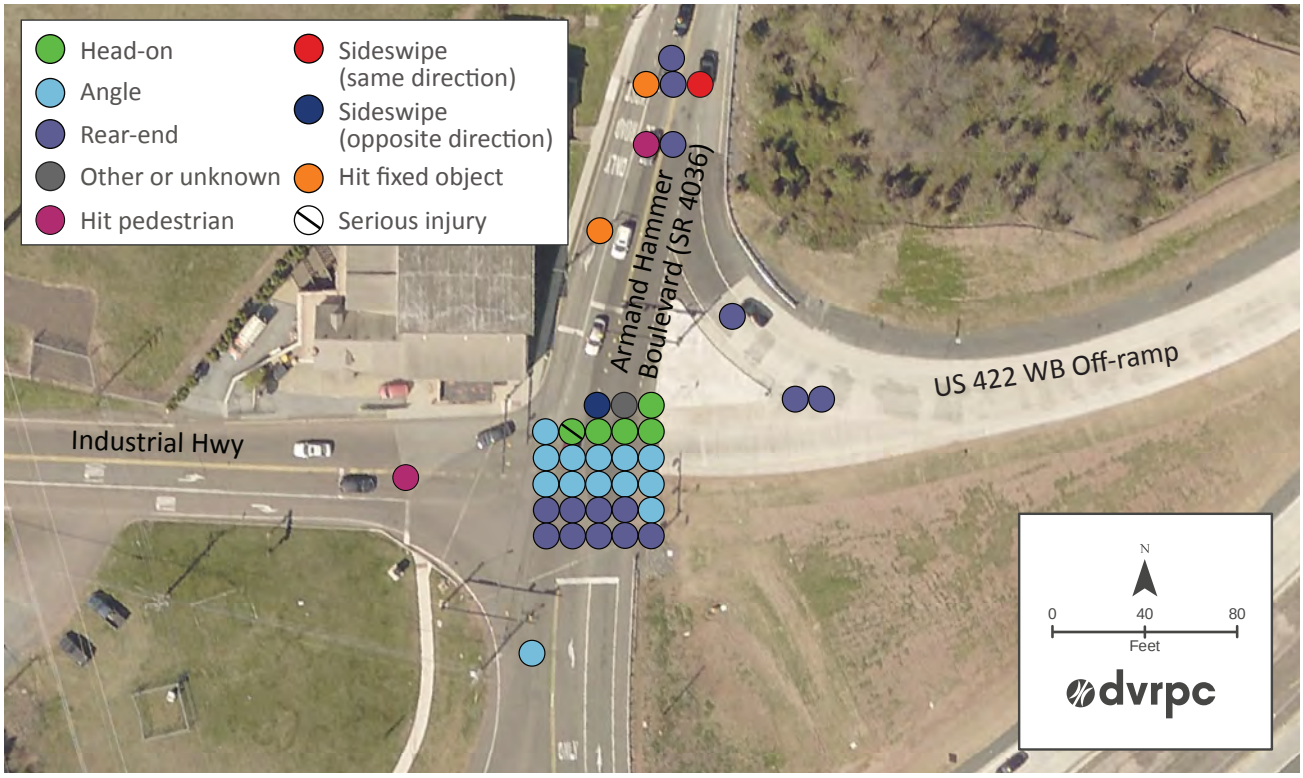
TABLE 19: PEAK HOUR TRAFFIC VOLUMES (2018)

Approach	AM Peak Hour	PM Peak Hour
NB (Armand Hammer)	342 (23L|319T)	313 (44L|269T)
SB (Armand Hammer)	**662** (43R|**619T**)	**715** (152R|**563T**)
EB (Industrial)	322 (114L|208R)	235 (94L|141R)
WB (US 422 Off-ramp)	304 (14L|217R|73T)	596 (4L|217R|217T)

Source: DVRPC, 2018

The sidepath connects south to a sidewalk that continues along the SB side of Armand Hammer Boulevard. If the Schuylkill River Trail segment is constructed on the US 422 bridge, this sidepath could form part of the connection to the trail. The incomplete pedestrian infrastructure should be enhanced to allow greater access to this planned recreational facility from Pottstown Borough. PART stop consolidation should be considered along the corridor given low ridership at this location. The main operational recommendation is to change the SB right-only lane to a SB right and through lane (**Figure 43**).

FIGURE 41: CRASH DATA (2012–2017)



Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

Traffic Analysis

LOS and delay were analyzed to identify and evaluate traffic flow improvements. The traffic analysis results are summarized below.

- The SB approach currently operates at LOS C in the AM peak hour and LOS E in the PM peak hour.
- In both peak hours, the SB right-turn lane operates at LOS A, suggesting that the lane is underutilized. The right-turn lane is blocked by queueing in the through lane.
- Delay does not increase significantly in the Future No Build scenario, despite an 8 percent increase in traffic volumes.

Queueing on SB approach during the PM peak hour. SB through vehicles block the empty right-turn lane. Source: DVRPC, 2018

SCENARIOS TESTED

Existing Conditions (Year 2018): This scenario is based on 2018 traffic volumes and incorporates the SR 4031-PSS traffic signal timing and design upgrades implemented in the base year (2018).

Future No Build (2025): This scenario incorporates the SR 4031-PSS traffic signal timing and design upgrades, and overall intersection volumes were increased by 8 percent. Turning movement volumes were based on 2018 distributions.

Future Build (2025): This scenario includes all elements of the Future No Build scenario. The SB right-only lane was changed to a SB right and through movement; a receiving lane was added to the south leg for this additional through lane. This improvement was tested to improve the performance of the southbound approach.

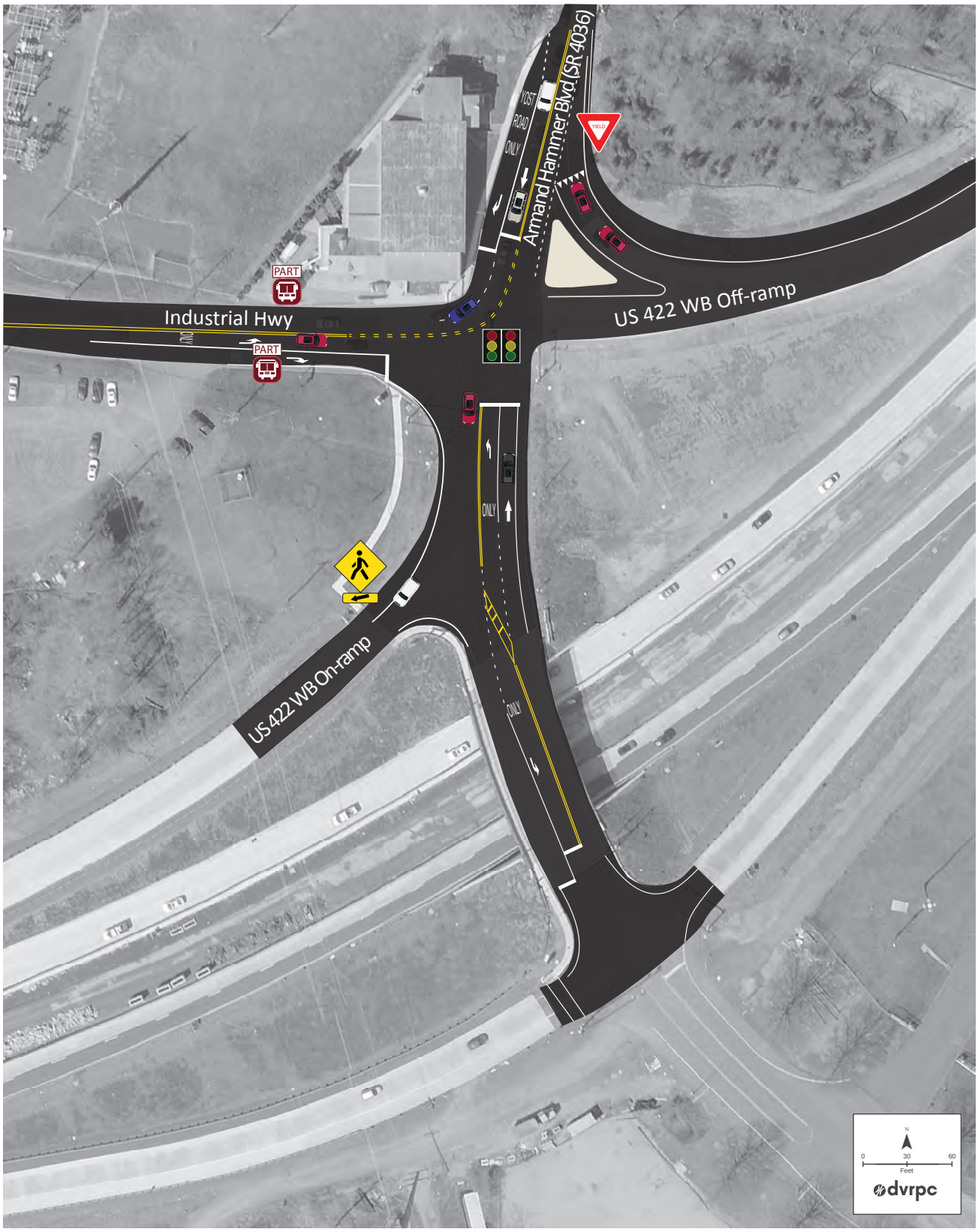
- The split of vehicles taking the US 422 WB on-ramp and those continuing through on Armand Hammer Boulevard to the US 422 EB on-ramp or the industrial site is almost equal in the AM and PM peak hours.
- By changing the SB right-only lane to a SB right and through lane, PM intersection delay decreases by 43 percent in the Future Build scenario, and the LOS improves from a C to a B.

TABLE 20: ARMAND HAMMER BLVD AND INDUSTRIAL HWY LOS SUMMARY

Approach		Existing Conditions (2018)	Future No Build (2025)	Future Build (2025)
NB (Armand Hammer)	AM	A	A	A
	PM	B	B	B
SB (Armand Hammer)	AM	C	C	B
	PM	E	E	C
EB (Industrial)	AM	C	C	C
	PM	B	B	B
WB (US 422 Off-ramp)	AM	B	B	B
	PM	B	B	B
Intersection Delay (seconds)	AM	17.3	17.5	14.9
	PM	28.8	31.3	17.9
Intersection LOS	AM	B	B	B
	PM	C	C	B

Source: DVRPC, 2019

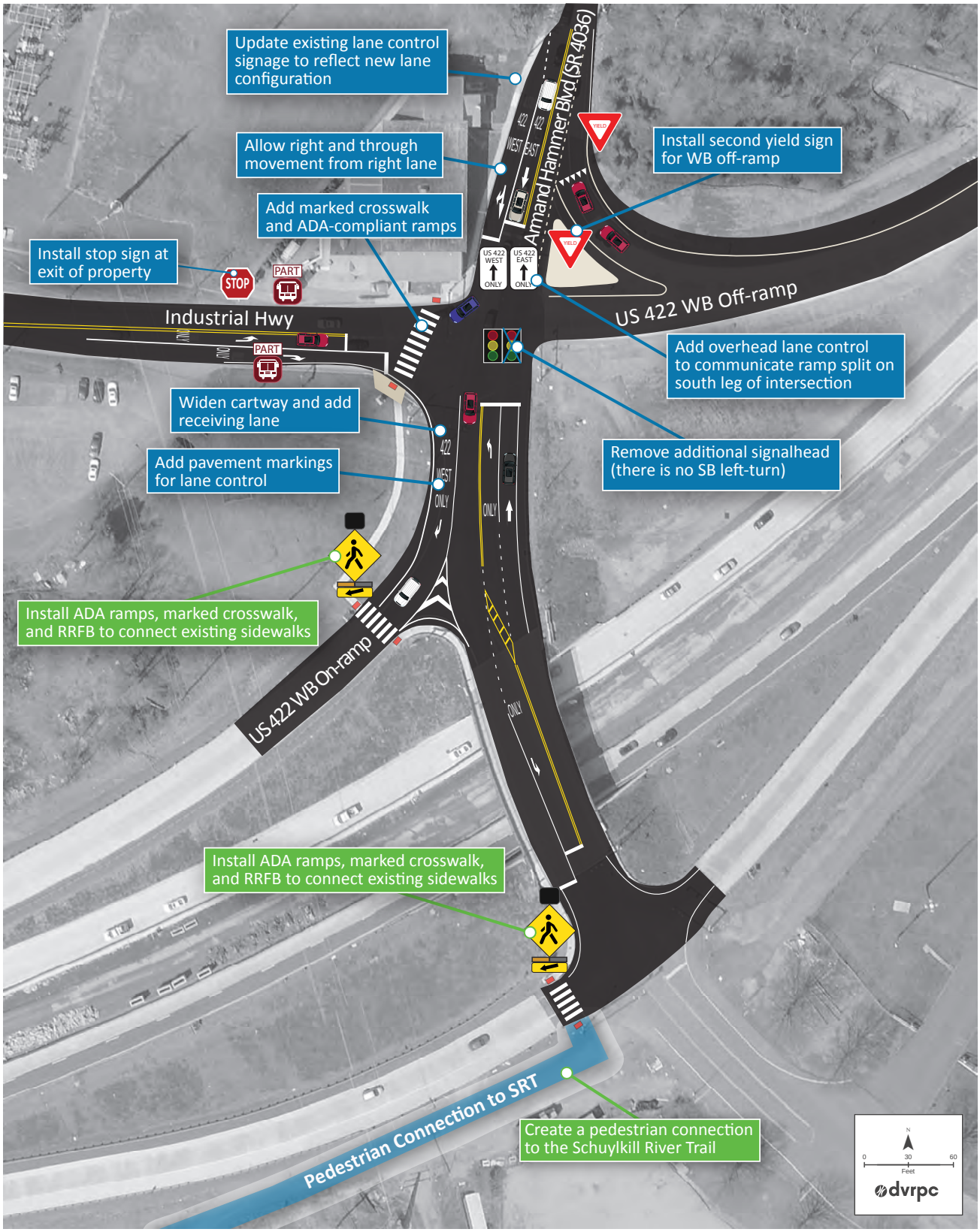
FIGURE 42: EXISTING CONDITIONS



Note: Conceptual graphics are not to scale. Pavement markings and signage are oriented for readability. The orientation is not to be interpreted literally. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 43: RECOMMENDED TRANSPORTATION IMPROVEMENTS

This figure shows **Stage 1** and **Stage 2** recommendations, such as the redesignation of the SB right-only lane to a right or through lane, a second yield sign for the WB off-ramp, overhead lane control, and enhanced pedestrian facilities.



Note: Conceptual graphics are not to scale. Pavement markings and signage are oriented for readability. The orientation is not to be interpreted literally. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

11 BLEIM RD & PA 663

The Bleim Road and PA 663 intersection is on the Bleim Road corridor, and it is located on the boundary between Lower Pottsgrove and Upper Pottsgrove townships. The concern for this intersection is the traffic impact of future development.

Traffic volumes are higher in the PM peak hour than in the AM peak hour; volumes double in the NB and WB directions in the PM. SB traffic volumes are consistent between the two peak periods (**Table 21**). Traffic signal installation is recommended and warranted given existing traffic volumes (**"Appendix A"**). Traffic volumes are estimated to grow by 13 percent by 2025. Thirty-eight percent of crashes involved SB left-turning vehicles (**Figure 44**).

TABLE 21: PEAK HOUR TRAFFIC VOLUMES (2018)

Approach	AM Peak Hour	PM Peak Hour
NB (PA 663)	271 (32R|239T)	443 (60R|383T)
SB (PA 663)	**451** (143L|**308T**)	**486** (96L|**390T**)
WB (Bleim)	102 (32L|70R)	280 (53L|227R)

Source: DVRPC, 2018

EQUITY ANALYSIS

Census Tract where 21 percent of residents are 65 years or older.

Only the Bleim Road approach is stop-controlled (**Figure 45**). Visual perception and reaction times are important considerations at this location because of the high percentage of older residents. A street light and RPMs on the PA 663 approaches should be installed to improve visibility at night and in inclement weather. Reaction times become slower with age so a "Red Signal Ahead" advance warning sign would allow older drivers more time to brake on the downhill NB approach (**Figure 46**). PA 663 is a proposed bicycle route in the county bicycle plan; the speed limit is 40 mph so bicycle lanes are recommended. The roadway would need to be widened in order to implement this treatment. Local officials should coordinate with PennDOT on the installation of multimodal facilities if warranted by future land use changes (**"Appendix A"**). The turning radii at this intersection must be maintained for farming vehicles. A traffic signal and dedicated SB left-turn lane could improve the safety of turns at this location, despite inadequate sight lines (**"Appendix C"**).

FIGURE 44: CRASH DATA (2012–2017)

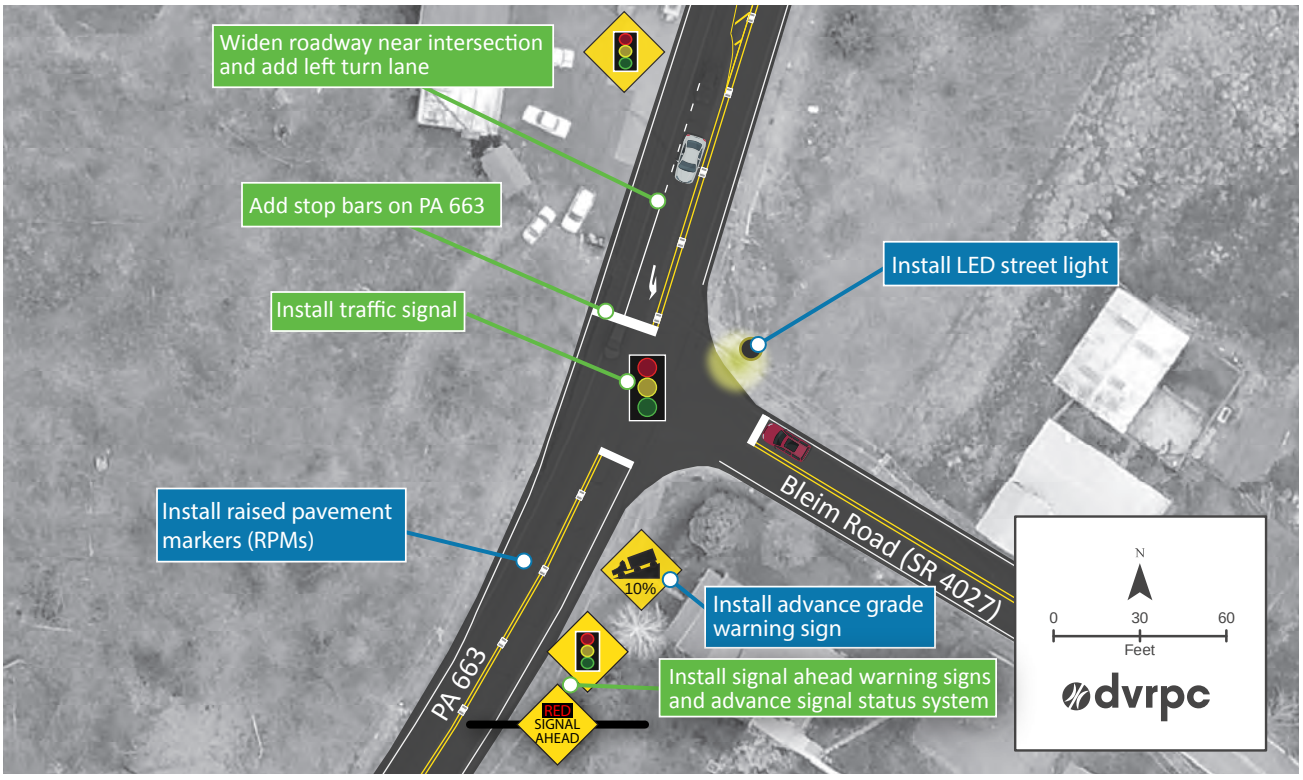
Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 45: EXISTING CONDITIONS

Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 46: RECOMMENDED TRANSPORTATION IMPROVEMENTS

This figure shows **Stage 1** and **Stage 2** recommendations, including RPMs, advance warning signage, roadway widening, and a traffic signal.



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

12 BLEIM RD & NEW HANOVER SQUARE RD

The Bleim Road and New Hanover Square Road intersection is in Lower Pottsgrove Township. The concern for this intersection is the traffic impact of future development. A new 19-unit residential development, Farm View Acres, was approved with access to New Hanover Square Road north of this intersection. Other residential subdivisions have been constructed along this road in recent years, but drivers favor parallel north-south routes, such as PA 663, and volumes on the New Hanover Square Road approach at this intersection are very low (**Table 22**). Traffic volumes are estimated to increase by 21 percent (67 vehicles in the AM peak hour and 100 vehicles in the PM peak hour) by 2025.

TABLE 22: PEAK HOUR TRAFFIC VOLUMES (2018)

Approach	AM Peak Hour	PM Peak Hour
NB (Bleim)	67 (3R|64T)	**305** (8R|**297T**)
SB (Bleim)	**218** (19L|**199T**)	133 (20L|113T)
WB (New Hanover Sq)	27 (6L|21R)	31 (6L|25R)

Source: DVRPC, 2018

EQUITY ANALYSIS

Census Tract where 21 percent of residents are 65 years or older and 17 percent of residents have one or more disabilities.

Only two crash types were recorded in the six-year period: angle and hit fixed object crashes (**Figure 47**). This study location is surrounded predominantly by undeveloped forest. As a result, there are no multimodal connections or mobility options beyond driving (**Figure 48**).

Street lighting and new advance warning signage is recommended for this intersection because of the steep grade (9 percent) of Bleim Road and the high percentage of senior citizen residents (**Figure 49**). If vacant parcels are developed in the future, they should include complete, ADA-accessible pedestrian infrastructure to increase mobility options. This intersection does not meet any warrants for traffic signal installation (**"Appendix A"**).

FIGURE 47: CRASH DATA (2012–2017)

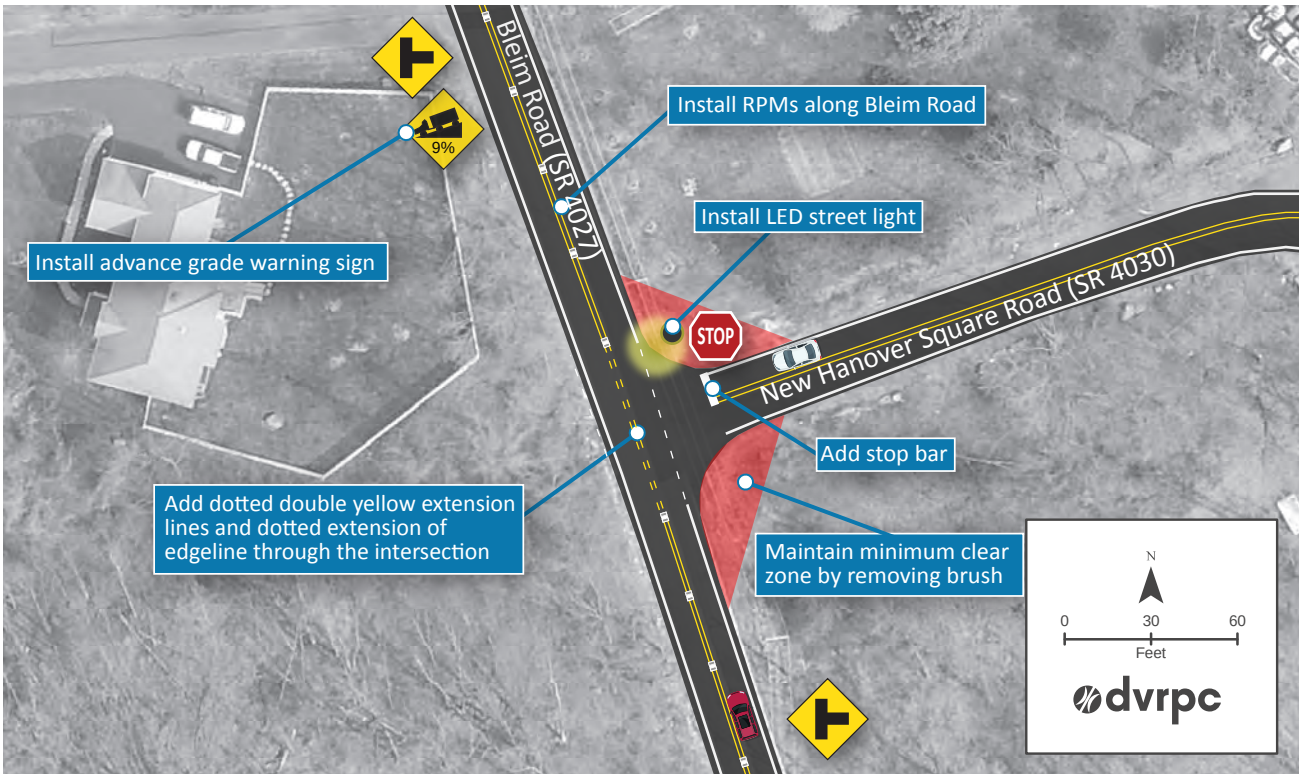
Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 48: EXISTING CONDITIONS

Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 49: RECOMMENDED TRANSPORTATION IMPROVEMENTS

This figure shows **Stage 1** recommendations: RPMs, advance warning signage, a street light, a stop bar, and dotted double yellow and edgeline extensions on Bleim Road.



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

13 BLEIM RD & PLEASANTVIEW RD

This intersection is in Lower Pottsgrove Township. Pruss Hill Road provides a connection to the US 422 interchange at Rupert Road, and Pleasantview Road intersects with High Street. The parcel on the southwest corner is being developed with 178 single-family detached units (Spring Valley Farms), which will contribute to an increase in traffic volumes at this critical intersection. The local concern at this location is the traffic impact of future development. EB traffic volumes are the highest in the AM peak hour, while NB traffic volumes are the highest in the PM peak hour (**Table 23**). Traffic volumes are estimated to increase by 21 percent (AM peak hour: 119 vehicles; PM peak hour: 171 vehicles) by 2025.

TABLE 23: PEAK HOUR TRAFFIC VOLUMES (2018)

Approach	AM Peak Hour	PM Peak Hour
NB (Pleasantview)	145 (38L|33R|74T)	**299** (**159L**|24R|116T)
SB (Pleasantview)	160 (37L|5R|118T)	136 (7L|8R|121T)
EB (Bleim)	**203** (5L|87R|**111T**)	132 (6L|79R|47T)
WB (Pruss Hill)	49 (23L|5R|21T)	231 (34L|50R|147T)

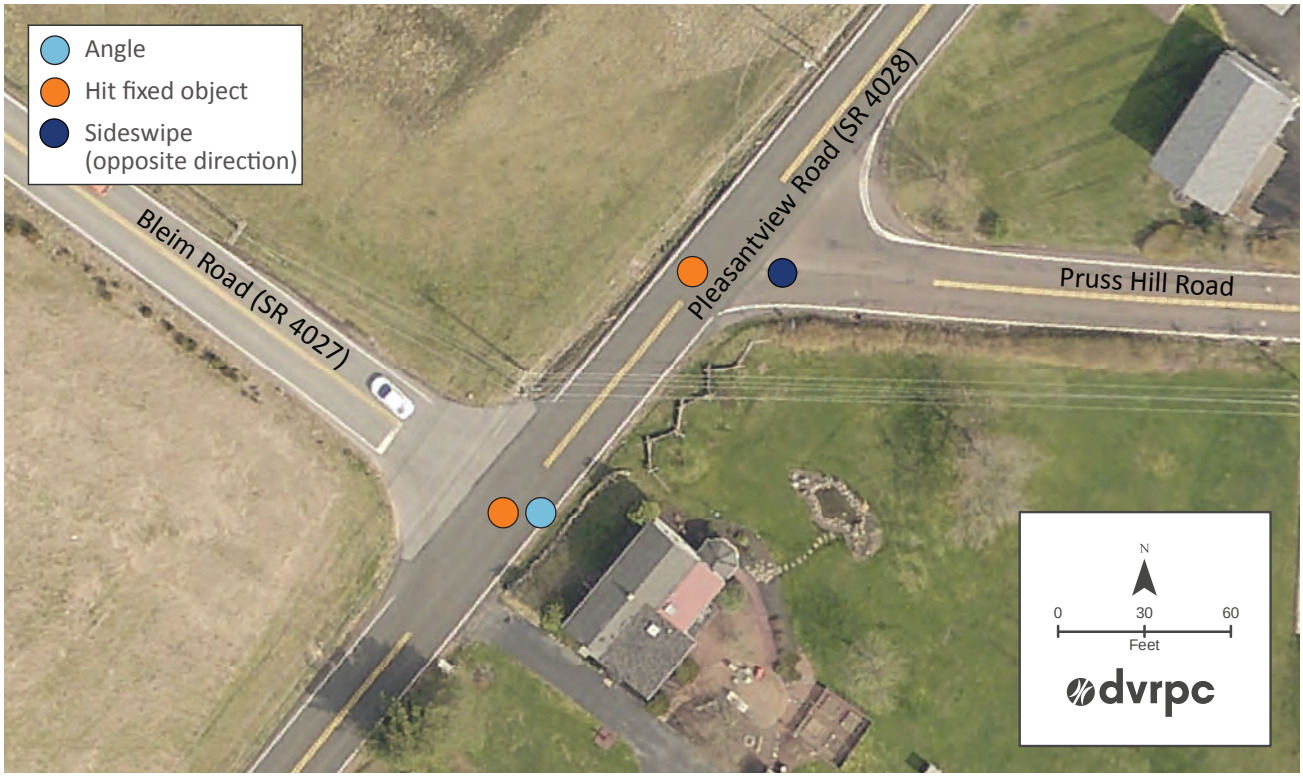
Source: DVRPC, 2018

EQUITY ANALYSIS

Census Tract where 21 percent of residents are 65 years or older and 17 percent of residents have one or more disabilities.

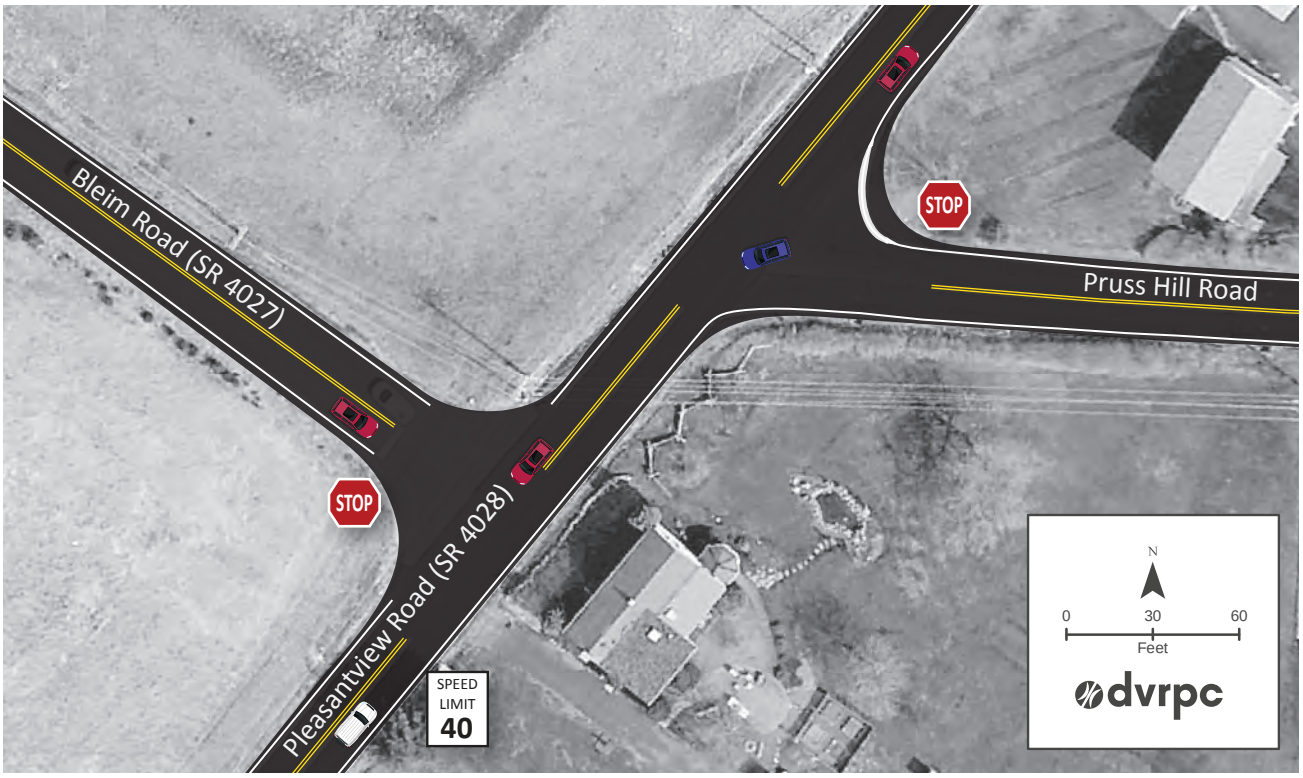
The Bleim Road and Pruss Hill Road approaches are stop-controlled but misaligned (**Figure 51**). Recommendations for a new street light and intersection realignment are sensitive to the older population (**Figure 52**). The northwest quadrant is owned by Lower Pottsgrove Township so public right-of-way should be maintained for the redesign. Pleasantview Road is a proposed bicycle route in the county bicycle plan; the speed limit is 40 mph so bicycle lanes are recommended. The roadway would need to be widened in order to implement this treatment. Local officials should coordinate with PennDOT on the installation of multimodal facilities if warranted by future land use changes. Traffic signal installation is recommended and warranted under future traffic conditions, and room for future pedestrian infrastructure should be maintained (**"Appendix A"**). NB and SB left-turn lanes are recommended to increase capacity and reduce potential delays caused by the heavy NB left-turn movement in the PM peak hour.

FIGURE 50: CRASH DATA (2012–2017)



Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

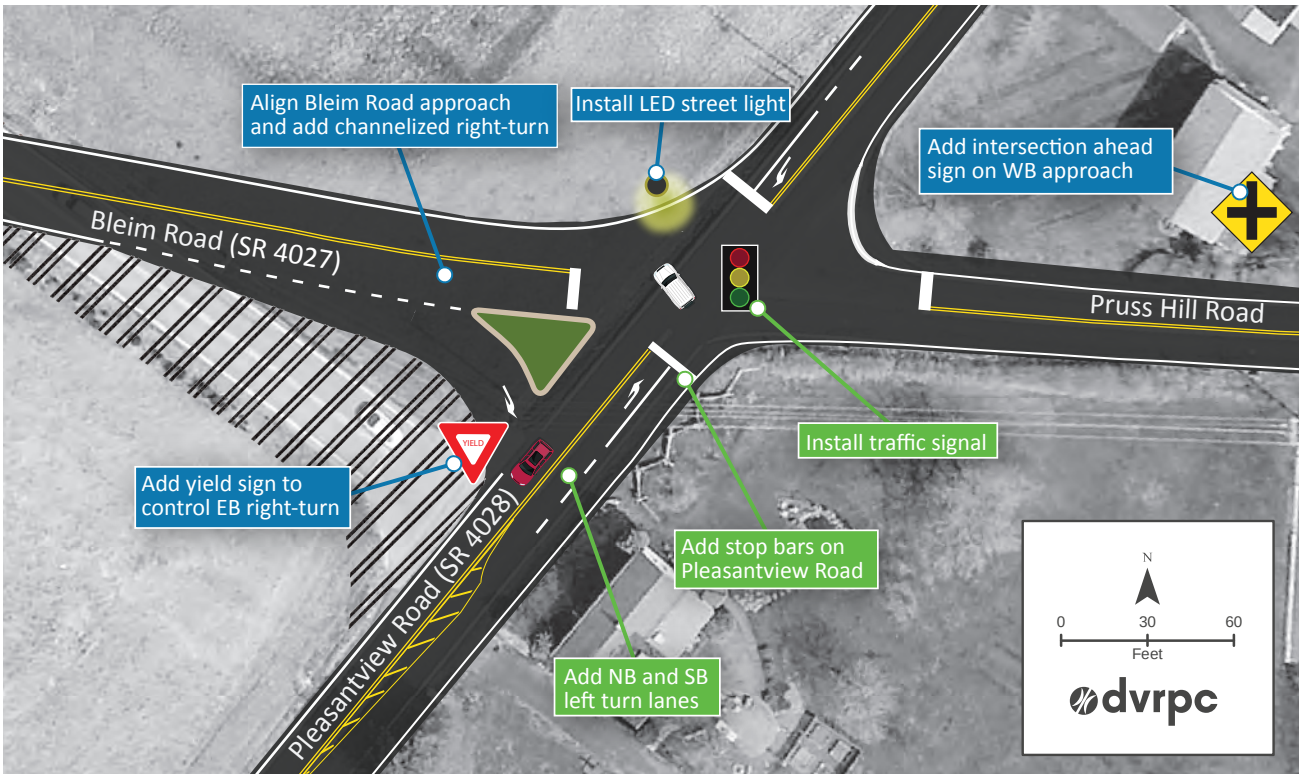
FIGURE 51: EXISTING CONDITIONS



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 52: RECOMMENDED TRANSPORTATION IMPROVEMENTS

This figure shows **Stage 1** and **Stage 2** recommendations: a street light, advance warning signage, intersection realignment, a channelized right-turn with a yield sign, NB and SB turn lanes, and a traffic signal.



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

14 HIGH ST & SANATOGA RD

This study intersection is the final location along the Bleim Road and Sanatoga Road Corridor. Sanatoga Road provides direct access to High Street from Pleasantview Road. The concern for this intersection is the traffic impact of future development.

The EB movement is the heaviest in the AM peak hour, and the WB movement is the heaviest in the PM peak hour (**Table 24**). Traffic volumes on Sanatoga Road are very low. As a result, a traffic signal is not warranted under existing or future conditions (**"Appendix A"**). Consistent with most of the High Street corridor, traffic volumes are estimated to increase by 8 percent by 2025.

TABLE 24: PEAK HOUR TRAFFIC VOLUMES (2018)

Approach	AM Peak Hour	PM Peak Hour
NB (Sanatoga)	14 (3L|7R|4T)	35 (8L|14R|13T)
SB (Sanatoga)	40 (28L|4R|8T)	31 (22L|4R|5T)
EB (High)	**750** (1L|17R|**732T**)	598 (10L|20R|568T)
WB (High)	418 (8L|8R|402T)	**927** (9L|140R|**778T**)

Source: DVRPC, 2018

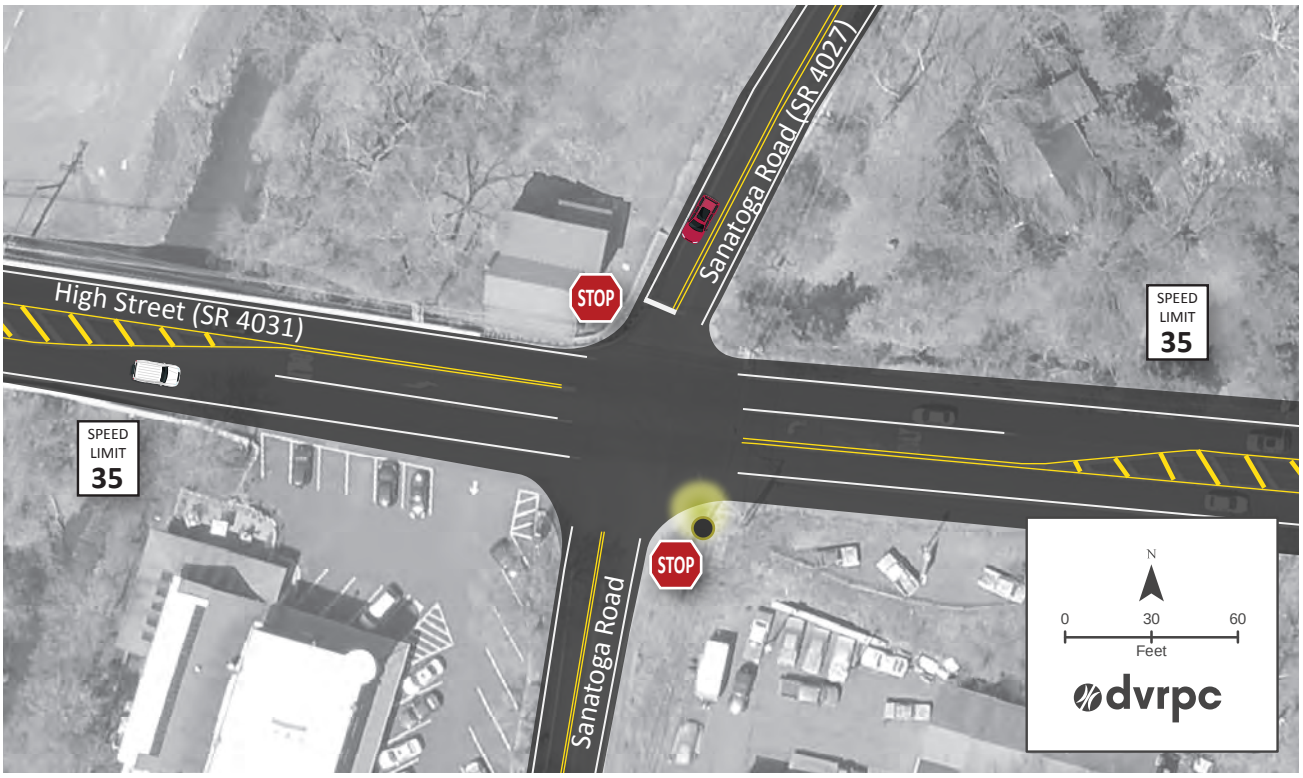
Six of the nine crashes that occurred at this location involved a vehicle traveling SB on Sanatoga Road (**Figure 53**). The sight distance from the stop sign on this approach is inadequate due to vegetation and a fence on the northeast corner (**"Appendix C"**). The stop bar should be moved closer to the intersection so that drivers on the SB approach can see and be seen by vehicles traveling WB on High Street.

The absence of a traffic signal at this intersection and change in the surrounding area character–from denser, urbanized area in the west to less dense, rural area in the east–may encourage speeding (**Figure 54**). The posted speed limit on High Street is 35 mph along this segment; however, vehicles were observed traveling at an average free flow speed of 48 mph in the EB direction and 40 mph in the WB direction. A temporary radar feedback trailer is recommended to remind drivers to slow down (**Figure 55**). Advance warning signs and edgeline markings may also increase driver awareness as they approach the intersection and lead to a reduction in vehicular speeds. Finally, wayfinding signage is encouraged for the surrounding area, as Sanatoga park is located 0.3-miles south of this location.

FIGURE 53: CRASH DATA (2012–2017)

Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

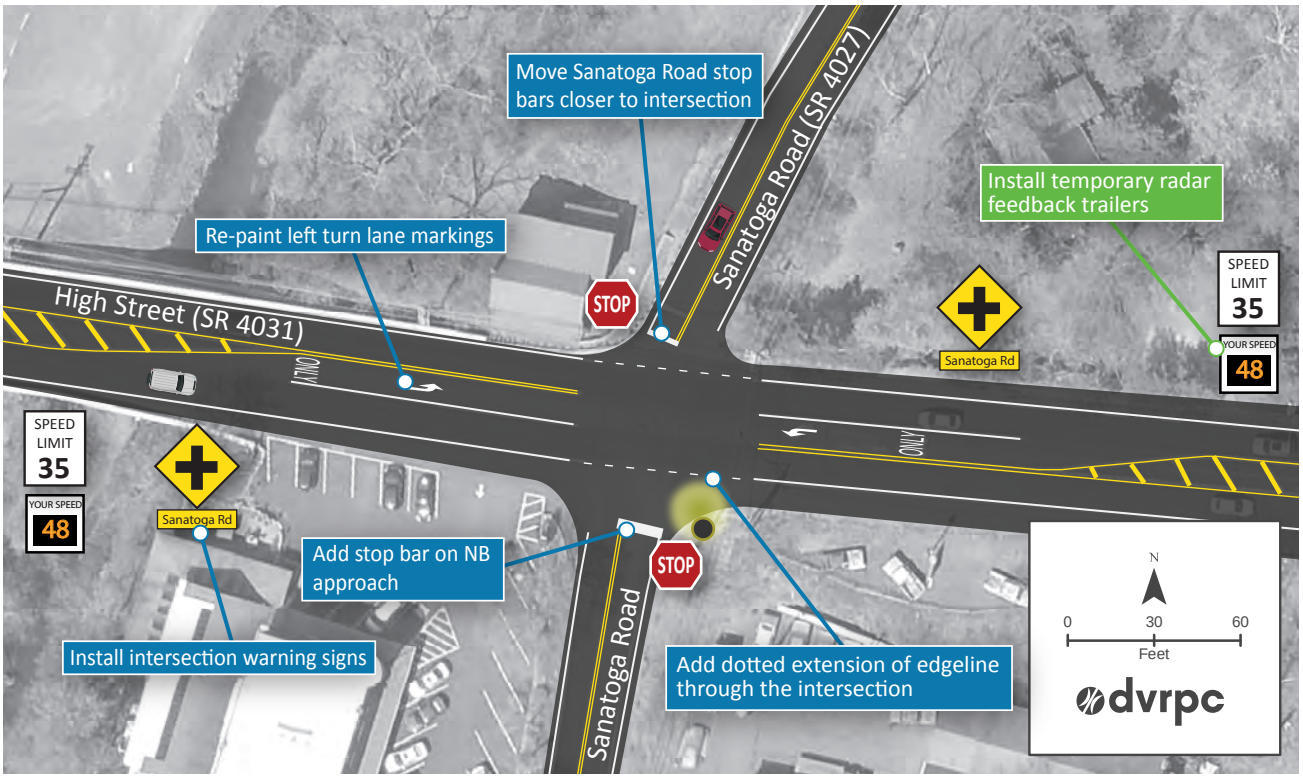
FIGURE 54: EXISTING CONDITIONS



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 55: RECOMMENDED TRANSPORTATION IMPROVEMENTS

This figure shows **Stage 1** and **Stage 2** recommendations: pavement marking maintenance, edgeline extensions on High Street, intersection warning signs, and a temporary radar feedback trailer.



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

CHAPTER 7
NORTH COVENTRY & EAST COVENTRY

dvrpc

Vehicle making a left-turn onto PA 100 from EB Hoffecker Rd. Source: DVRPC, 2018

Advance warning sign 250 feet from PA 724 on NB Vaughn Rd. Source: DVRPC, 2018

Existing conditions on SB approach of Wells Rd. Source: DVRPC, 2018

WB approach of Bethel Church Rd and PA 23 intersection. Source: DVRPC, 2018

CHAPTER 7
NORTH COVENTRY & EAST COVENTRY

This chapter presents analyses and recommendations for the four study locations in North Coventry and East Coventry townships:

- Hoffecker Road and PA 100;
- Vaughn Road and PA 724;
- Wells Road and PA 724; and
- Bethel Church Road and PA 23.

As mentioned previously, PA 100 is one of five Pennsylvania Traffic Routes and four Principal Arterials in the region. PA 100 connects south to US 202 in Chester County and north to US 222 in Lehigh County.

PA 724 (Minor Arterial) is an important east-west route in the Pottstown area. It connects to PA 23 in Chester County, providing access to Phoenixville Borough. PA 23 is another Minor Arterial; only a 1.3-mile segment runs through East Coventry Township.

North Coventry and East Coventry have the highest percentages of agricultural, wooded, or vacant land–61 and 58 percent, respectively–of all the municipalities in the Pottstown region. The study locations in these two municipalities are predominantly surrounded by these uses. While the arterials may have high traffic volumes, the minor roads that intersect them do not. As a result, none of these four intersections are currently signalized, and most recommendations include signage and pavement marking enhancements to improve safety.

PA 724 has numerous driveways and intersecting roads, and many intersections are stop-controlled. Source: DVRPC, 2018

15 HOFFECKER RD & PA 100 A

This study intersection is located in North Coventry Township, Chester County. The concern at this location is roadway user safety. Specifically, local officials noted that it is difficult for traffic on Hoffecker Road to cross PA 100 safely. Through and left-turns are prohibited from the eastbound approach, but vehicles make these movements during peak and off-peak hours.

The SB movement is the heaviest in the AM peak hour, and the NB movement is the heaviest in the PM peak hour (**Table 25**). Traffic volumes are estimated to increase by 11 percent by 2025.

TABLE 25: PEAK HOUR TRAFFIC VOLUMES (2018)

Approach	AM Peak Hour	PM Peak Hour
NB (PA 100)	549 (13L|6R|530T)	**1124** (53L|6R|**1065T**)
SB (PA 100)	**1017** (82L|2R|**933T**)	735 (53L|6R|676T)
EB (Hoffecker)	28 (25R|3T)	25 (25R)
WB (Hoffecker)	59 (3L|54R|2T)	71 (2L|64R|5T)

Source: DVRPC, 2018

The majority of crashes at this location were angle crashes–one of which resulted in a major injury. Two of these angle crashes involved an eastbound vehicle traveling straight or making a left-turn (**Figure 56**).

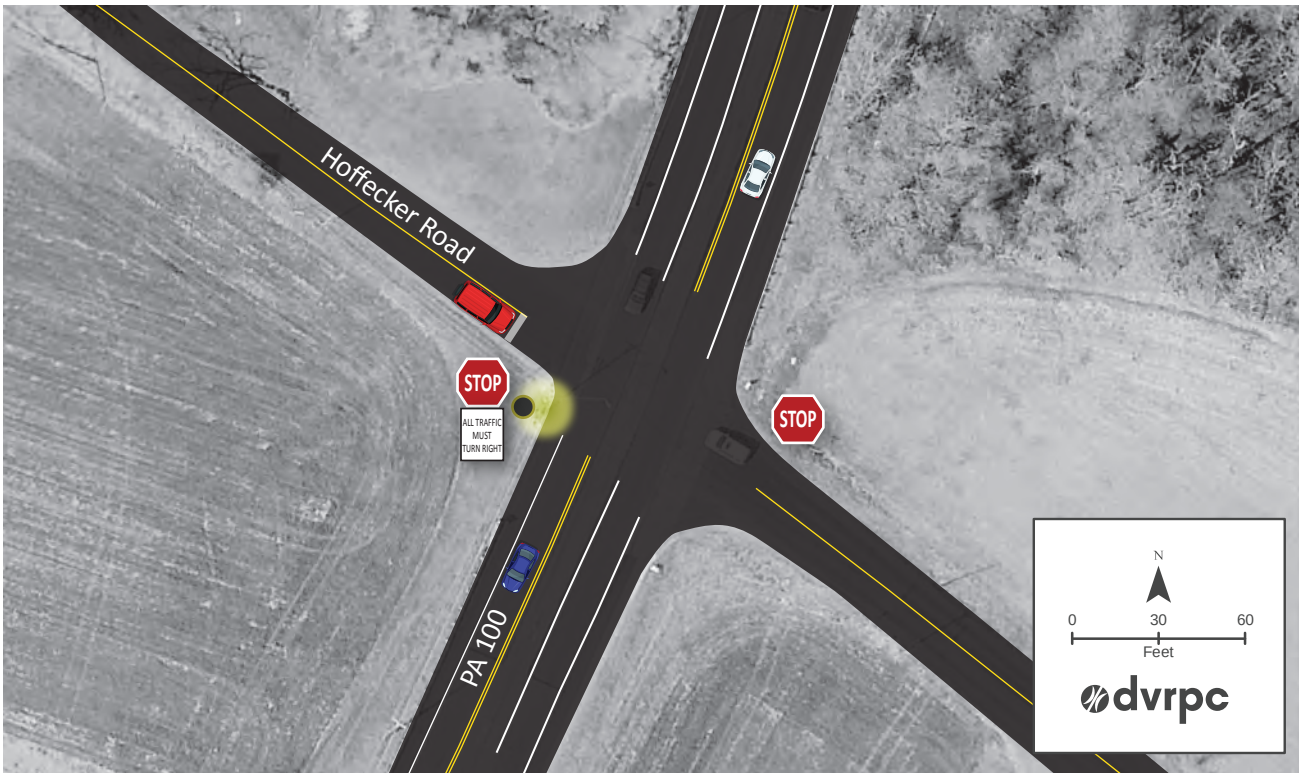
In the short-term, adherence to the stop signs and restricted movements should be more strictly enforced (**Figure 57**). A traffic signal is warranted given future traffic volumes (**"Appendix A"**). So in the long-term, traffic signal installation is recommended (**Figure 58**) because it would allow all movements to be made safely from the EB and WB approaches. This intersection is more than 2,000 feet south of the nearest traffic signal, which is sufficient for traffic signal coordination.

Sixty-one percent of land in North Coventry is wooded, vacant, or agricultural. There are no multimodal mobility options. If residential uses are introduced to the area, multimodal connections should be constructed to connect this location to the Suburbia Shopping Center at PA 100 and Glocker Way (north). Room for future pedestrian infrastructure should be maintained upon traffic signal installation (**"Appendix A"**).

FIGURE 56: CRASH DATA (2012–2017)

Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

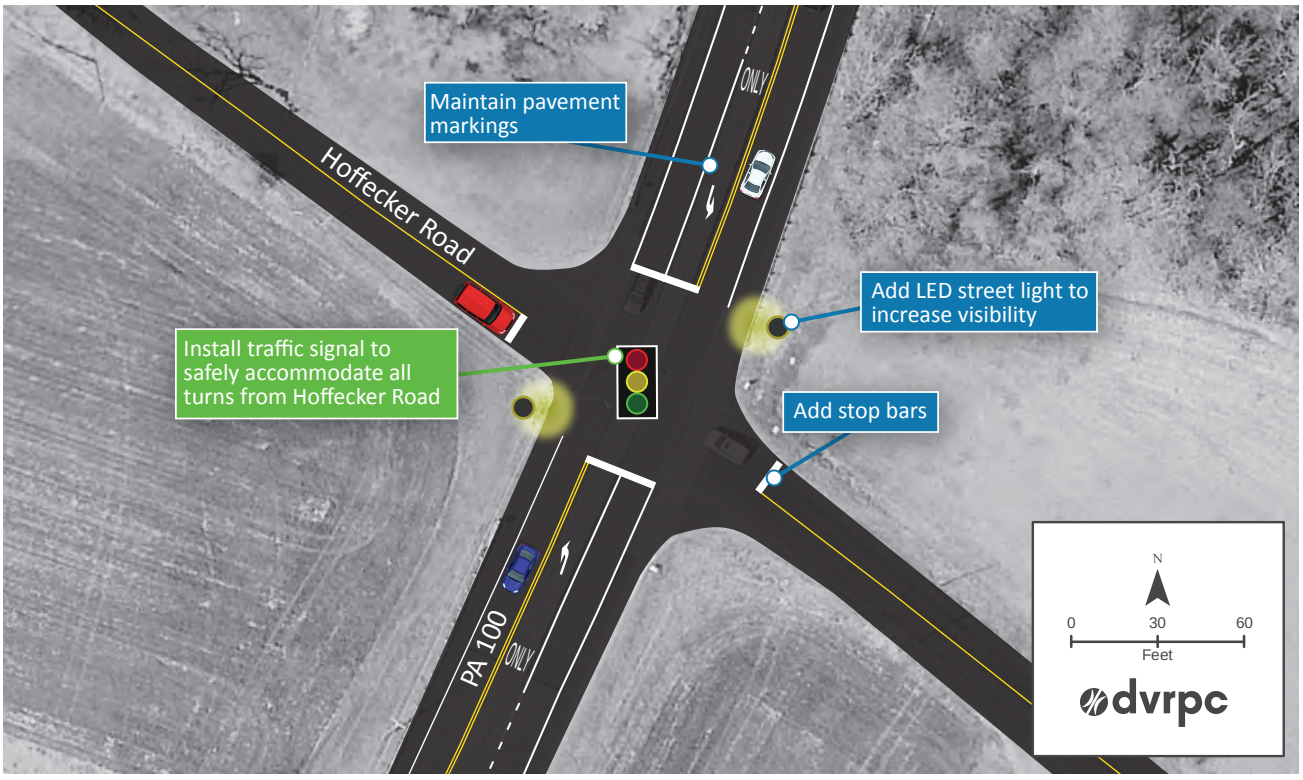
FIGURE 57: EXISTING CONDITIONS



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 58: RECOMMENDED TRANSPORTATION IMPROVEMENTS

This figure shows **Stage 1** and **Stage 2** recommendations: pavement marking maintenance, a street light, stop bars, and a traffic signal.



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

16 VAUGHN RD & PA 724 A

This study intersection is located on the boundary between North Coventry and East Coventry townships. The concern at this location is roadway user safety because of unclear striping.

The north leg of the intersection is a service road for the North Coventry Wastewater Treatment Plant so SB volumes are very low. The EB movement is the heaviest in the AM peak hour, and the WB movement is the heaviest in the PM peak hour (**Table 26**). The travel flow and estimated future growth rate of 8 percent are consistent with other east-west corridors in the Pottstown region.

TABLE 26: PEAK HOUR TRAFFIC VOLUMES (2018)

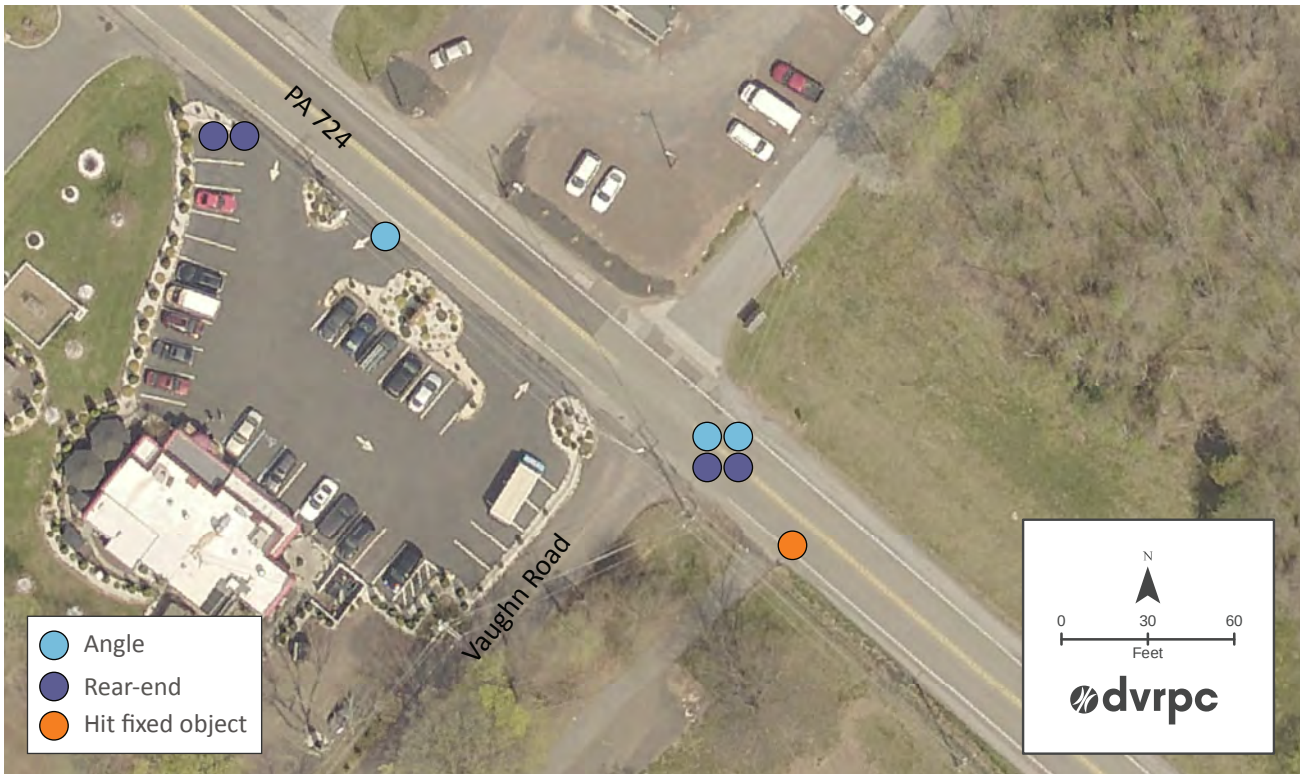
Approach	AM Peak Hour	PM Peak Hour
NB (Vaughn)	54 (22L|32R|0T)	30 (19L|11R|0T)
SB (Vaughn)	1 (0L|1R|0T)	1 (1L|0R|0T)
EB (PA 724)	**951** (0L|10R|**941T**)	715 (0L|38R|677T)
WB (PA 724)	571 (2L|1R|568T)	**993** (12L|0R|**981T**)

Source: DVRPC, 2018

A traffic signal is not warranted because minor road (Vaughn Road) approach volumes are low (**"Appendix A"**). Vehicles were recorded traveling within 5 mph of the posted speed limit of 45 mph on PA 724 in free flow conditions. While speeding is not an issue at this location, it is important that drivers be aware of turning vehicles to avoid fatal crashes at this high speed. Three crashes in the six-year study period occurred near business driveways (**Figure 59**).

The NB Vaughn Road approach is stop-controlled, and there is a stop ahead advance warning sign on that approach (**Figure 60**). Short-term, low-cost improvements such as advance warning signs, dotted double yellow extension lines, and dotted edgeline extensions can improve safety (**Figure 61**). In addition, three of eight crashes occurred in dark conditions; an additional street light at the intersection on the EB approach would improve the visibility of the intersection.

FIGURE 59: CRASH DATA (2012–2017)



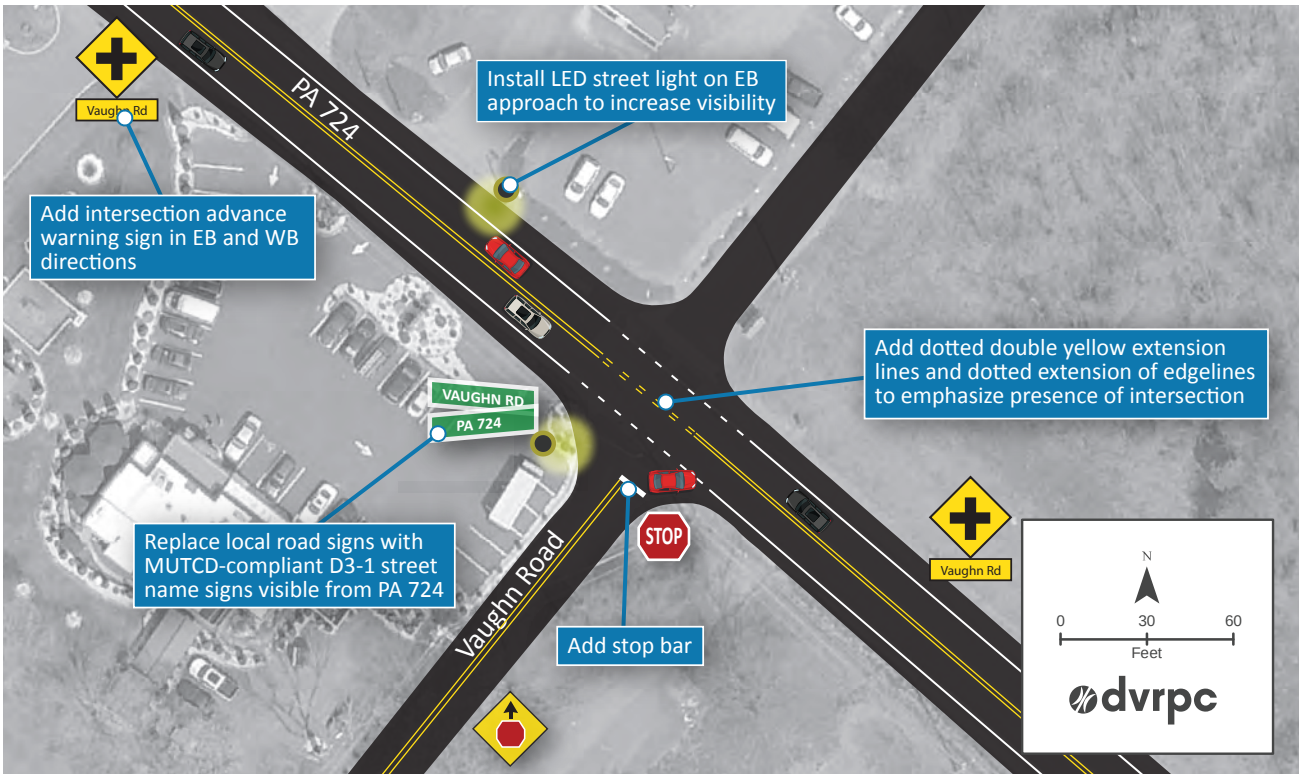
Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 60: EXISTING CONDITIONS

Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 61: RECOMMENDED TRANSPORTATION IMPROVEMENTS

This figure shows **Stage 1** recommendations: a street light on the EB approach, advance warning signage, a stop bar, dotted double yellow and edgeline extensions on PA 724, and MUTCD-compliant street signs.



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

17 WELLS RD & PA 724 A

This study intersection is located in East Coventry Township, Chester County. The concern at this location is roadway user safety because the Schuylkill River Trail is planned for the railbed owned by Norfolk Southern north of this intersection.

The EB movement is the heaviest in the AM peak hour, and the WB movement is the heaviest in the PM peak hour (**Table 27**). This traffic flow is consistent with other east-west corridors in the Pottstown region. Traffic volumes are estimated to increase by 6 percent by 2025. Traffic signal installation is warranted under existing conditions (**"Appendix A"**), and it is identified in the East Coventry Township 2011 Capital Improvement Plan (CIP). The rear-end crashes on PA 724 resulted from vehicles colliding with slowing or stopped vehicles traveling in the same direction and making a left-turn (**Figure 62**). Currently, the Wells Road approaches are stop-controlled, and traffic on PA 724 has free movement (**Figure 63**). EB and WB dedicated left-turn lanes on PA 724 are recommended as part of signal installation to improve safety and increase capacity to accommodate future volumes (**Figure 64**).

The Schuylkill River Trail will run parallel to PA 724 from Linfield Road in the east to Fricks Lock Road in the west. Wayfinding signage, an enhanced trail crossing, and sharrows are short-term, low-cost improvements that can improve multimodal safety by enhancing the visibility of this facility. In the long-term, a traffic signal with a pedestrian countdown signal and new sidewalk will make it possible for local residents to walk to the trail.

TABLE 27: PEAK HOUR TRAFFIC VOLUMES (2018)

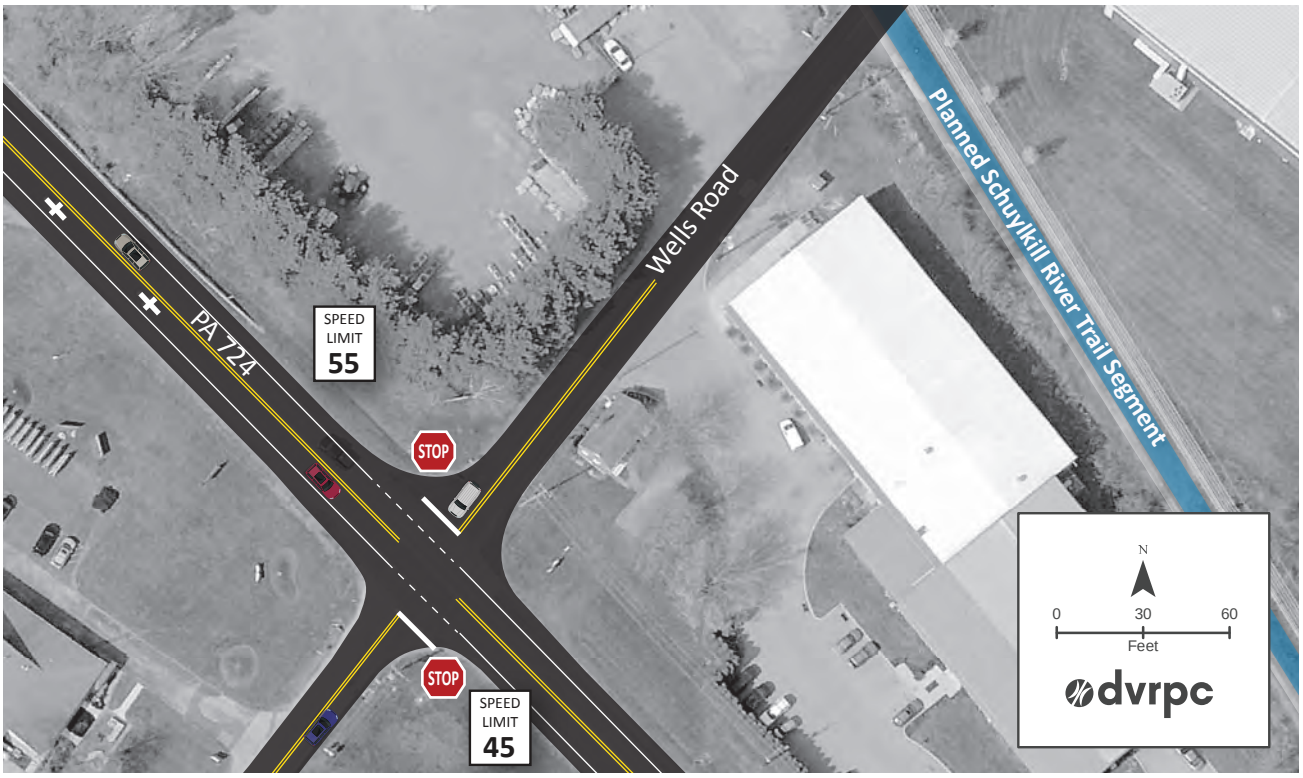
Approach	AM Peak Hour	PM Peak Hour
NB (Wells)	55 (2L|38R|15T)	58 (7L|27R|24T)
SB (Wells)	66 (1L|60R|5T)	191 (3L|163R|25T)
EB (PA 724)	**994** (206L|12R|**776T**)	563 (119L|11R|433T)
WB (PA 724)	412 (2L|2R|408T)	**739** (2L|12R|**725T**)

Source: DVRPC, 2018

FIGURE 62: CRASH DATA (2012–2017)

Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 63: EXISTING CONDITIONS



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 64: RECOMMENDED TRANSPORTATION IMPROVEMENTS

This figure shows **Stage 1** and **Stage 2** recommendations, including sharrows on Wells Road, a street light, wayfinding signage, trail crossing pavement markings, a new signal, and EB and WB left-turn lanes.

Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

18 BETHEL CHURCH RD & PA 23 A

This study intersection is located in East Coventry Township, Chester County along PA 23, which connects the Pottstown region to Phoenixville Borough. The concern at this location is roadway user safety because Bethel Church Road is used as a cut-through route between PA 724 to the north and PA 23.

The EB movement is the heaviest in the AM peak hour, and the WB movement is the heaviest in the PM peak hour (**Table 28**). Traffic volumes are estimated to increase by 13 percent by 2025, which represents an increase of about 100 vehicles during both peak hours.

TABLE 28: PEAK HOUR TRAFFIC VOLUMES (2018)

Approach	AM Peak Hour	PM Peak Hour
NB (Bethel Church)	9 (1L|2R|6T)	28 (12L|1R|15T)
SB (Bethel Church)	112 (15L|91R|6T)	118 (5L|105R|8T)
EB (PA 23)	**503** (98L|8R|**397T**)	369 (118L|246T|5R)
WB (PA 23)	174 (1L|7R|166T)	**375** (3L|9R|**363T**)

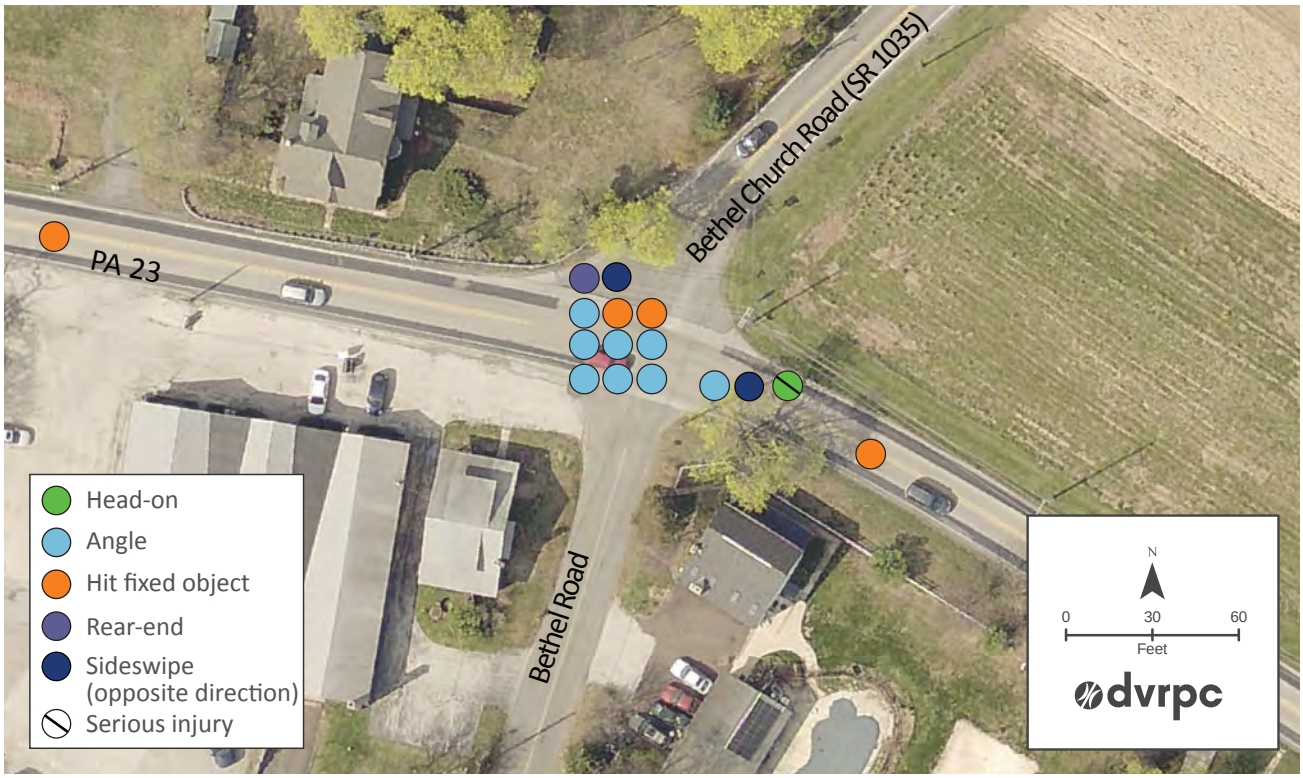
Source: DVRPC, 2018

A traffic signal is not warranted at this location due to low approach volumes (**"Appendix A"**). The sideswipe, hit fixed object, and head-on crashes at the intersection are the result of vehicles attempting to negotiate the curve. Of the 16 crashes that occurred during the six-year study period, one occurred at dusk and five occurred at night (**Figure 65**).

There is existing advance warning signage to warn drivers of the curve in the road. The Bethel Church Road approaches are stop-controlled, but they do not have stop bar pavement markings (**Figure 66**). Short-term, low-cost improvements, such as a street light and RPMs on the approaches, would increase the visibility of the curve in dark conditions (**Figure 67**).

Visibility of both signage and PA 23 traffic from the stop signs is obstructed by foliage (**"Appendix C"**). SB right-turning vehicles stop beyond the stop sign (or do not stop) to reduce turn time and gain visibility of PA 23 traffic. By reducing the curb radius, drivers will be forced to slow down and more likely to stop at this stop sign. The properties on the northwest and southeast corners are residential, and property owners should be encouraged to maintain a clear zone sight distance for drivers.

FIGURE 65: CRASH DATA (2012–2017)



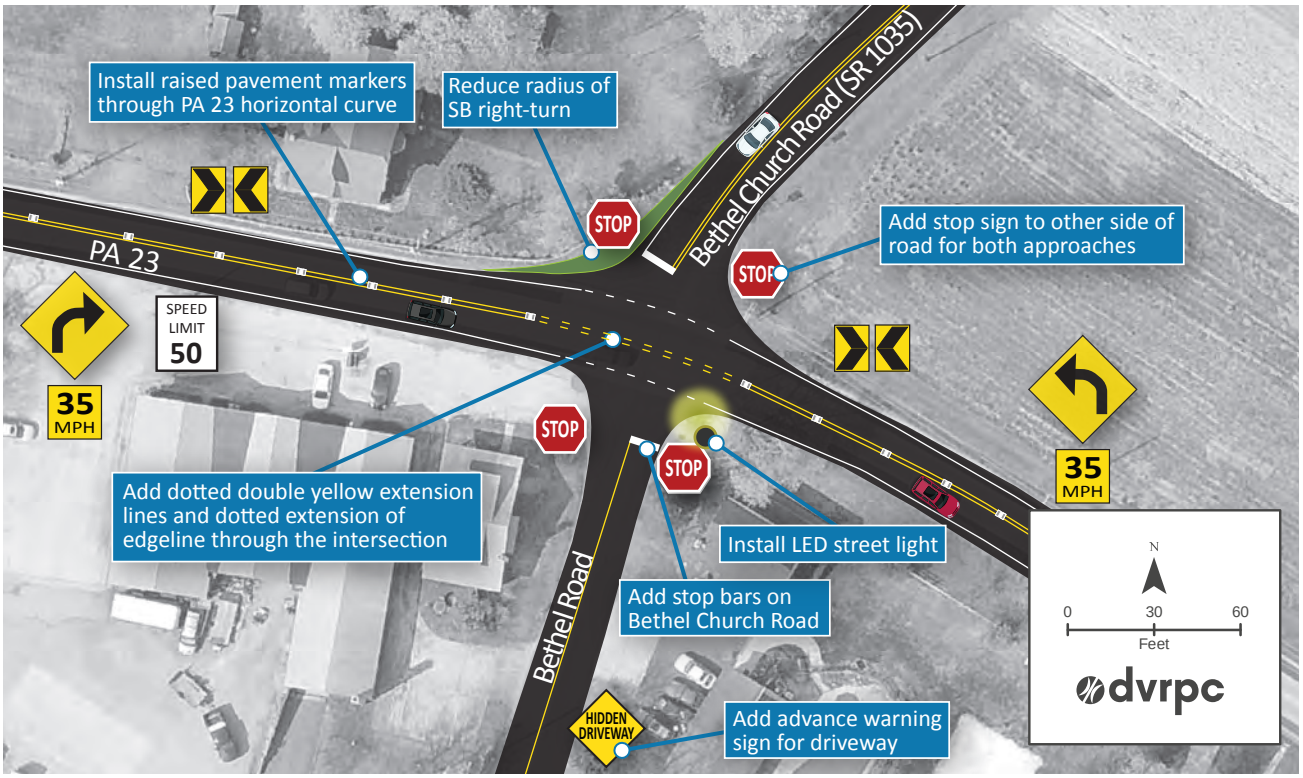
Sources: PennDOT, 2017; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 66: EXISTING CONDITIONS

Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE 67: RECOMMENDED TRANSPORTATION IMPROVEMENTS

This figure shows **Stage 1** recommendations: dotted double yellow and edgeline extensions on PA 23, additional stop signs on stop-controlled approaches, RPMs, stop bars, an advance warning sign, and a tighter SB right turning radius.



Note: Conceptual graphics are not to scale. Sources: DVRPC, 2019; Southeastern PA Regional Task Force, 2017 (Aerial)

CHAPTER 8
COST ESTIMATES AND CRASH REDUCTION FACTORS

ESTIMATION OF PROJECT COSTS

Cost estimates for all recommended improvements are parametrically estimated—the unit cost was multiplied by the unit volume to estimate a cost per line item. These estimates are informed by item price history from PennDOT's Engineering and Construction Management System (ECMS), PennDOT Publications 287 and 408, and the 2013 report *Costs for Pedestrian and Bicyclist Infrastructure Improvements* (UNC Highway Safety Research Center). Academic publications, external cost databases, completed project cost reports, and product retailer websites were used to supplement this data.

The planning-level cost estimates on the following page are designed to give local officials an idea of the projected material and installation cost of specified improvements. Maintenance costs, including pavement markings, will be an ongoing expense for the municipalities. Detailed engineering analyses that are necessary before construction, such as hydrogeological surveying and pavement evaluation, were not performed as part of this assessment. As a result, assumptions were made about soil conditions, roadway drainage, and existing pavement cross-section. Project engineering design, construction inspection, right-of-way allowance, and utility allowance costs were not included. Therefore, these estimates will not equal the exact future bid prices for an infrastructure project at the respective location. DVRPC recommends an engineering study be performed at each intersection that will provide an adequate level of detail of the study area to deliver a well-informed project bid.

Cost Estimation Methodology

The recommendations for each intersection were developed by the DVRPC Office of Corridor Planning and quantified using various methods and assumptions (**Table 29**). Each improvement was developed in accordance with MUTCD, AASHTO Roadside Design Guide, PennDOT, ADA, and FHWA standards. Improvements that are not specifically governed by a publication, such as sidewalk and pavement cross-section, were assumed to be consistent between intersections. Centerline, edgeline, crosswalk, stop bar, cross hatch, and dashed line material and size were also assumed to be consistent. All costs include the furnishing and installation of the respective material. The costs of recommended improvements were organized by intersection and then divided into stages. Each stage represents a level of cost and constructability such that the set of improvements could be made together. All costs were scaled up by 20 percent and rounded to the next thousand to account for cost contingencies. Cost estimates exclude improvements being implemented as part of the PennDOT signal upgrade project.

Crash Reduction Factor (CRF)

The CRF and crash type is listed for improvements, where applicable (**Table 30**). The CRF represents the anticipated percent reduction in crashes of the listed crash type if the improvement were installed. CRF data was obtained from the 2008 FHWA *Desktop Reference for Crash Reduction Factors*. In some cases, specific crash types are not available for each improvement, meaning that the CRF percentage is for all crashes and not just a certain type. CRF percentages were not available for all improvements, indicating that a before-and-after study was not performed for the safety countermeasure.

TRAFFIC SIGNAL INSTALLATION

In Pennsylvania, local authorities are responsible for the construction, maintenance, and operation of traffic signals (PennDOT Publication 191). A signed Application for Traffic Signal Approval (TE-160) must be submitted by the municipality in conformance with the instructions provided by PennDOT, and a Traffic Signal Permit must be issued, before any work can begin. Statewide, PennDOT-administered competitive funding programs, such as ARLE and Green Light-Go, provide financial assistance to municipalities for signal installation and improvements.

TABLE 29: SUMMARY OF COST ESTIMATES

Intersection	Improvement Description	Base Cost	Total Cost (base plus 20 percent)
Middle Creek Road and Congo Road		**$20,641.00**	**$25,000.00**
Stage 1	All-way stop installation, street light	$20,641.00	$25,000.00
PA 73 and Middle Creek Road		**$336,806.50**	**$405,000.00**
Stage 1	Sharrows, close Short Road, signage, street light	$31,054.50	$38,000.00
Stage 2	Signalization, bike lanes	$305,752.00	$367,000.00
State Road and Farmington Avenue		**$90,015.00**	**$109,000.00**
Stage 1	Adjust roadway geometry to form T intersection, widen and add SBL turn lane	$90,015.00	$109,000.00
Manatawny Street and Grosstown Road		**$245,721.00**	**$296,000.00**
Stage 1	Signs, pavement markings, ADA ramps	$19,461.00	$24,000.00
Stage 2	Sidewalk and curb additions	$226,260.00	$272,000.00
Manatawny Street and Sell Road		**$58,041.00**	**$70,000.00**
Stage 1	Signs, pavement markings, RPMs, street light	$28,041.00	$34,000.00
Stage 2	RRFB system	$30,000.00	$36,000.00
Manatawny Street and Glasgow Street		**$101,772.50**	**$123,000.00**
Stage 1	Signs, ADA ramps, street light	$13,722.50	$17,000.00
Stage 2	Curb bumpout, sidewalk, on-street parking and bus stop markings	$88,050.00	$106,000.00
High Street and Moser Road		**$31,005.25**	**$38,000.00**
Stage 1	Sidewalk, crosswalk, ADA ramps	$4,125.25	$5,000.00
Stage 2	Sidewalk and sharrows on Moser Road to Industrial Highway	$26,880.00	$33,000.00
High Street and Armand Hammer Boulevard		**$24,906.00**	**$31,000.00**
Stage 1	Signal retiming, pavement markings, crosswalks	$4,531.00	$6,000.00
Stage 2	Shoulder widening for bus bay	$20,375.00	$25,000.00
Armand Hammer Boulevard and Medical Drive		**$270,634.00**	**$325,000.00**
Stage 1	Sidewalk/curb repair, ADA ramps, crosswalks, street light	$34,095.00	$41,000.00
Stage 2	Widen and add NBR lane	$236,539.00	$284,000.00

Intersection	Improvement Description	Base Cost	Total Cost (base plus 20 percent)
Armand Hammer Boulevard and Industrial Highway		**$272,914.00**	**$329,000.00**
Stage 1	Re-designate SBR to SBR/T and add receiving lane, signage, crosswalk	$50,209.00	$61,000.00
Stage 2	SRT multimodal connections	$222,705.00	$268,000.00
PA 663 and Bleim Road		**$189,646.00**	**$229,000.00**
Stage 1	RPM, signage, street light	$10,850.00	$14,000.00
Stage 2	Signalization, signal ahead warning system	$178,796.00	$215,000.00
Bleim Road and New Hanover Square Road		**$12,122.50**	**$15,000.00**
Stage 1	Signage, street light, pavement markings, brush clearing	$12,122.50	$15,000.00
Bleim Road/Pruss Hill Road and Pleasantview Road		**$337,015.00**	**$405,000.00**
Stage 1	Signage, align intersection approach, street lights	$152,461.00	$183,000.00
Stage 2	Signalization	$184,554.00	$222,000.00
High Street and Sanatoga Road		**$12,069.00**	**$15,000.00**
Stage 1	Signs, pavement markings	$2,069.00	$3,000.00
Stage 2	Dynamic speed feedback signs	$10,000.00	$12,000.00
PA 100 and Hoffecker Road		**$145,601.00**	**$175,000.00**
Stage 1	Pavement markings, street light	$11,484.00	$14,000.00
Stage 2	Signalization	$134,117.00	$161,000.00
PA 724 and Vaughn Road		**$15,178.00**	**$19,000.00**
Stage 1	Pavement markings, signage	$15,178.00	$19,000.00
Wells Road & PA 724		**$319,791.00**	**$385,000.00**
Stage 1	Trail crossing, signage, street lights, sharrows	$43,059.00	$52,000.00
Stage 2	Signalization, sidewalk, crosswalk, ADA ramps	$276,732.00	$333,000.00
Bethel Church Road and PA 23		**$13,070.75**	**$16,000.00**
Stage 1	Signage, pavement markings, RPM, turn radius adjustment	$13,070.75	$16,000.00

Sourcea: PennDOT ECMS; PennDOT Pub. 287; PennDOT Pub. 408; UNC Highway Safety Research Center, Costs for Pedestrian and Bicyclist Infrastructure Improvments; DVRPC, 2019

TABLE 30: CRASH REDUCTION FACTORS (CRF)

Improvement	CRF	Crash Types Addressed
Stop Bar	19%	Angle
Street Light	38%	Angle, Head-on, and Rear-end (related to visibility)
R1-3p Plaque (All-Way)	47%	All crash types
Flexible Delineator Post	11%	All crash types
Buffered Bicycle Lane	36%	Hit cyclist
Centerline Pavement Marking	30-36%	All crash types
W3-3 Sign (Signal Ahead)	22%	All crash types
Sidewalk	74%	Hit pedestrian
Continental Crosswalk Markings	25%	Hit pedestrian
Traffic Signal	36%	Angle, Rear-end
Pedestrian Signal Heads	20%	All crash types
Edgeline	20%	All crash types
Intersection Realignment	29%	All crash types
Left-turn lane	44%	All crash types
W13-1P Plaque (Advisory Speed)	20-29%	All crash types
W1-8R Sign (Chevron Alignment)	20-50%	All crash types
W2-3 Sign (Intersection Ahead)	40%	Angle
W11-2 Sign (Advanced Pedestrian Crossing)	15%	Hit pedestrian
W16-7P Plaque (Diagonal Downward Arrow)	15%	Hit pedestrian
Yield Line	18%	All crash types
Raised Pavement Markers	24%	Roadway departure in wet/dark conditions
W16-9P Plaque (Ahead)	15%	Hit pedestrian
RRFB	53%	Hit pedestrian
W11 Sign (Yield to Pedestrians Ahead)	15%	Hit pedestrian
Signal Retiming, Leading Pedestrian Interval	5%	Hit pedestrian
Overhead Lane Control Sign	51%	Rear-end, Sideswipe
W2-2 Sign (Intersection Ahead)	35%	All crash types
Dynamic Speed Feedback Sign	46%	All crash types
Signal Ahead Warning System	40%	Rear-end
Clearing and Grubbing (Clear Zone)	9%	All crash types
Approach Realignment	16%	All crash types
“TRAIL XING” Pavement Markings	6%	All crash types
R1-1 Sign (Stop)	11%	Angle
W11-19A Sign (Hidden Driveway)	40%	Angle

Sources: FHWA *Desktop Reference for Crash Reduction Factors*, 2008; DVRPC, 2019

CHAPTER 9
REGIONAL VISION

NEXT STEPS

This traffic analysis is intended as a tool to identify local transportation project opportunities in the Pottstown region. Further engineering study is required prior to the implementation of the recommended improvements. Municipal officials and engineers must obtain the appropriate agreements and permits, and coordination with PennDOT or SEPTA on these efforts is key.

As a regional planning entity, the PMRPC has the unique opportunity to establish–and achieve–multi-municipal goals to improve the regional transportation network. Some such actions include:

- submitting multi-municipal grant applications, which enhance project competitiveness by emphasizing local support and the broader positive impacts of a project;
- pooling resources to provide shared transportation services and implement small-scale improvement projects as bundles;
- adopting regional policies that encourage and support roadway user safety and multimodal planning, such as Vision Zero and Complete Streets;
- encouraging and providing guidance on the adoption of municipal sidewalk ordinances so that pedestrian connections are available across municipal boundaries;
- creating regional guidelines for the review of land development applications to improve access management; and
- identifying regional placemaking opportunities that can improve transportation and quality of life for all residents in the region, such as the revitalization of the High Street Corridor.

FUNDING PROGRAMS

Securing funding is a crucial step toward project implementation. There are a number of competitive grant programs available in the DVRPC region to help municipalities cover the cost of the transportation improvements described in this report. Municipalities can coordinate with other municipalities, school districts, the county, and PennDOT to prepare and submit grant applications. Possible funding sources for the improvements identified in this study are detailed below.

Transportation and Community Development Initiative (TCDI)

The TCDI is an opportunity for DVRPC to support growth in individual municipalities of the Delaware Valley through planning initiatives that implement the region's long-range plan. TCDI grants support early stage planning, design, and feasibility studies. Eligible projects reinforce and implement improvements in designated centers and improve the overall character and quality of life within the region. Among the eligible activities are wayfinding plans and mobility elements of master plans.

Act 89 Multimodal Transportation Fund (MTF)

The design recommendations in this report are multimodal in nature, making these improvements eligible for the Act 89 MTF program. The MTF provides grants to encourage economic development and ensure that a safe and reliable system of transportation is available to the residents of the commonwealth. The program is administered by PennDOT and the Department of Community and Economic Development (DCED) under the direction of the Commonwealth Financing Authority (CFA).

MTF–PennDOT

Eligible projects for PennDOT's MTF program include projects related to streetscape, bicycle and pedestrian facilities, improved signage, and improvements to an integrated transportation corridor in order to improve the productivity, efficiency, and security of goods movement to and from PA ports.

MTF–DCED/CFA

On behalf of the CFA, the DCED accepts applications every year between March 1 and July 31 for multimodal projects. Project eligibility for this funding source is similar to the PennDOT MTF.

CMAQ

The DVRPC Competitive CMAQ Program funds transportation projects that will improve air quality and reduce traffic congestion in the DVRPC region. CMAQ-eligible projects demonstrably reduce air pollution emissions and help the region meet the federal health-based air quality standards. Congestion reduction and traffic flow improvement projects are eligible for CMAQ funding.

DCED Municipal Assistance Program (MAP)

The DCED MAP provides funding to assist local governments to plan for and efficiently implement a variety of services and improvements. Shared service activities and community planning are eligible for MAP funding. Community planning projects that could be funded through MAP include parts of comprehensive plans and land use ordinances.

Transportation Alternatives Set-Aside Program (TA)

TA is administered by PennDOT. TA provides federal funds for community based "non-traditional" surface transportation projects designed to strengthen the cultural, aesthetic, and environmental aspects of the nation's intermodal system. Projects must be directly related to surface transportation and be accessible to the public. TA funds are provided on a reimbursement basis. Eligible projects include design and construction of on-road and off-road trail facilities for pedestrians, bicyclists, and other non-motorized forms of transportation. Projects must be authorized for construction within two years of the grant notification, and they must have formal community support.

Automated Red Light Enforcement (ARLE)

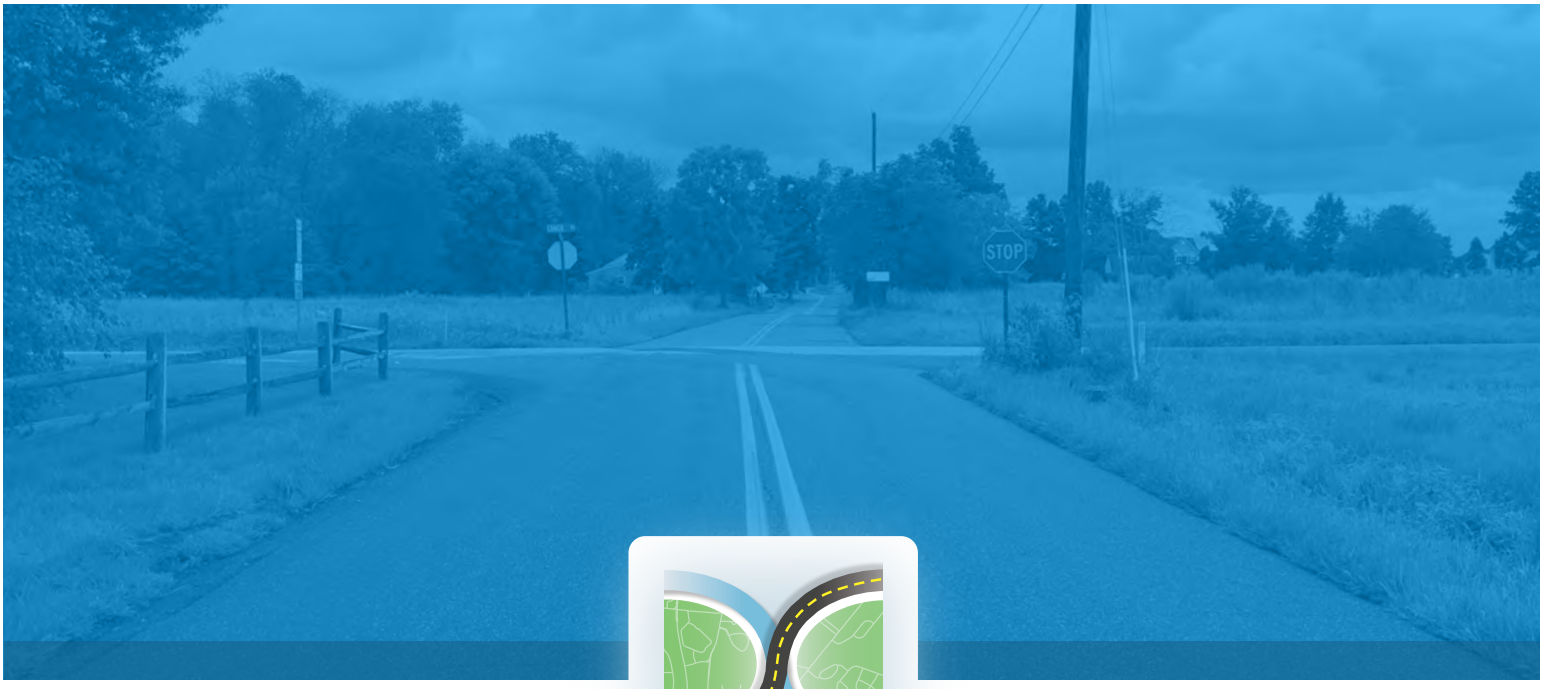
The ARLE program is a state-funded, PennDOT-administered competitive grant program established in 2010. The intent of the program is to improve intersection safety by reducing vehicle crashes and injuries due to red-light-running. The program funds the installation of the ARLE system, which is a vehicle sensor that works in conjunction with a traffic control signal and automatically produces images of a vehicle at the time the vehicle is running a red light. The system helps to enforce traffic laws and improve safety. Eligible projects include the installation of a traffic control signal system, improvements to traffic control signals, and roadway capacity upgrades such as auxiliary turning lanes.

Green Light-Go

Green Light-Go, Pennsylvania's Municipal Signal Partnership Program, provides state funds for the operation and maintenance of traffic signals along critical and designated corridors on state highways. It is a reimbursement grant program, and applications are required to provide a minimum 20 percent match. Eligible projects include the replacement of existing incandescent or LED bulbs with new LED bulbs for vehicular and/or pedestrian signal indications, traffic signal retiming, and modernization upgrades.

Regional Streetlight Procurement Program (RSLPP)

DVRPC's RSLPP assembles the resources needed to design, procure, and finance the transition to light-emitting-diode street lighting at the municipal level. The RSLPP is designed to help municipalities overcome the barriers of implementing an LED conversion project, such as navigating the conversion process, identifying the best solutions, finding trusted project partners, and paying for the upfront cost of the project. The RSLPP is organized in four phases: 1) Feasibility, 2) Project Development, 3) Construction, and 4) Post Construction Operations and Maintenance. Municipalities are responsible for the project implementation and maintenance costs. However, they benefit from cost savings in all four steps due to the pooling of municipal resources. In addition, DVRPC manages the program and guides municipalities through each step of the process. Please note that the RSLPP has assisted municipalities in installing new LED street lights in certain cases.



APPENDICES

A: Traffic Control Signal Needs Studies

B: Itemized Cost Estimates

C: Sight Distance Evaluation

D: Glossary

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APPENDIX A
TRAFFIC CONTROL SIGNAL NEEDS STUDIES

This traffic analysis provides preliminary recommendations for the installation of new traffic signals, and the need for pedestrian infrastructure was evaluated based on surrounding land uses. Prior to the installation of a traffic signal, an engineering study shall be conducted to determine the need for pedestrian accommodation at signalized intersections and the related design and operational features. There are several tools available to analyze pedestrian needs. It is recommended to leave room for future pedestrian facilities at the time of signal installation, if there could be a need for such facilities in the future. This is the primary recommendation cited in this study for locations where traffic signal installation is warranted. When pedestrian accommodations will not be provided, proper justification must be documented and appropriate signage should be installed to indicate that there is no pedestrian crossing.

TOOLS TO ANALYZE PEDESTRIAN NEEDS

Pedestrian Study Determination (PennDOT Design Manual 2, Chapter 6)

Bike/Pedestrian Checklist (PennDOT Publication 10X)

Pedestrian Accommodation at Intersections Checklist (TE-672)

Local and Regional Planning Documents

TABLE A-1: TRAFFIC SIGNAL WARRANT ANALYSIS SUMMARY

Intersection	Signal Warrant Met	Signal Warrant Years Met	Factors Met
Bleim Road and Pleasantview Road	2 (Four-Hour Volume)	2025	4 hours met in 2025
PA 724 and Wells Road	2 (Four-Hour Volume)	2018, 2025	6 hours met in 2018 and 2025
PA 100 and Hoffecker Road	2 (Four-Hour Volume)	2025	6 hours met in 2025
PA 73 and Middle Creek Road	2 (Four-Hour Volume)	2018, 2025	5 hours met in 2018, 6 hours met in 2025
PA 663 and Bleim Road	2 (Four-Hour Volume)	2018, 2025	5 hours met in 2018 and 2025
PA 23 and Bethel Church Road	2 (Four-Hour Volume)	2018, 2025	4 hours met in 2018, 5 hours met in 2025

Note: The traffic counts used as the basis for this signal warrant analysis are available for download from the DVRPC Traffic Counts Web Map: https://www.dvrpc.org/webmaps/TrafficCounts/. Sources: DVRPC, 2018; Manual on Uniform Traffic Control Devices (MUTCD), 2009

TABLE A-2: MUTCD TRAFFIC SIGNAL WARRANT ANALYSIS FACTORS

Traffic Signal Warrants	MUTCD Description
Warrant 1, Eight-Hour Vehicular Volume	1) The vehicles per hour given in both of the 100 percent columns of the appropriate condition in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.
Warrant 2, Four-Hour Vehicular Volume	1) The need for a traffic control signal shall be considered if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) all fall above the applicable curve in Figure 4C-1 for the existing combination of approach lanes. On the minor street, the higher volume shall not be required to be on the same approach during each of these 4 hours.
Warrant 3, Peak Hour	1) The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.
Warrant 4, Pedestrian Volume	1) For each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) all fall above the curve in Figure 4C-5; or 2) For 1 hour (any four consecutive 15-minute periods) of an average day, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) falls above the curve in Figure 4C-7.
Warrant 5, School Crossing	1) The number of adequate gaps in the traffic stream during the period when the schoolchildren are using the crossing is less than the number of minutes in the same period AND there are a minimum of 20 schoolchildren during the highest crossing hour.
Warrant 6, Coordinated Signal System	1) On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning. 2) On a two-way street, adjacent traffic control signals do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation.
Warrant 7, Crash Experience	1) Five or more crashes have occurred in a 12 month period, that are correctable by the introduction of a traffic signal.
Warrant 8, Roadway Network	1) Intersection has immediate entering volume over 1000 vehicles per hour. 2) Five-year projected volumes satisfy any of the Warrant 1, 2, or 3 requirements. 3) Intersection of two major routes (routes that enter/traverse a city, appear as a major route on a plan, or part of a principal system for through traffic flow).
Warrant 9, Intersection Near a Grade Crossing	1) An at-grade railroad intersection is nearby and existing signage and a traffic signal would enhance the safety of crossing vehicles.

Source: Manual on Uniform Traffic Control Devices (MUTCD), 2009

APPENDIX B
ITEMIZED COST ESTIMATES

As explained in **"Chapter 8,"** cost estimates for all recommended improvements are parametrically estimated. In other words, the unit cost was multiplied by the projected unit volume to estimate a cost for that line item. They are informed by item price history from PennDOT's Engineering and Construction Management System (ECMS), PennDOT Publications 287 and 408, and the 2013 report *Costs for Pedestrian and Bicyclist Infrastructure Improvements* developed by the UNC Highway Safety Research Center. Academic publications, external cost databases, completed project cost reports, and product retailer websites were also used to supplement this data.

The recommendations for each intersection were developed by the DVRPC Office of Corridor Planning. Each improvement was developed in accordance with MUTCD, AASHTO Roadside Design Guide, PennDOT, ADA, and FHWA standards. Improvements that are not specifically governed by a publication, such as sidewalk and pavement cross-section, were assumed to be consistent between intersections. Centerline, edgeline, crosswalk, stop bar, cross hatch, and dashed line material and size were also assumed to be consistent.

All costs include the furnishing and installation of the respective material. The costs of recommended improvements were organized by intersection and then divided into stages. Each stage represents a level of cost and constructability such that the set of improvements could be made together. All costs were scaled up by 20 percent and rounded to the next thousand to account for cost contingencies. Maintenance costs, including pavement markings, will be an ongoing expense for the municipalities.

Some of the improvements highlighted for the four signalized intersections—High Street and Moser Road, High Street and Armand Hammer Boulevard, Armand Hammer Boulevard and Medical Drive, and Armand Hammer Boulevard and Industrial Highway—are already funded and being implemented as part of the PennDOT signal upgrade project SR 4031-PSS. Therefore, these items are not included in **Table B-1**.

UNIT ABBREVIATIONS

CY: Cubic Yard
EA: Each
LF: Linear Foot
LS: Lump Sum
SF: Square Foot
SY: Square Yard

TABLE B-1: ITEMIZED INTERSECTION IMPROVEMENT COST ESTIMATES

Stage	Item Description	Quantity	Unit	Unit Price	Estimated Cost
	Middle Creek Road and Congo Road				
1	Stop Bar (4)	48	LF	$13.00	$624.00
1	Pavement Marking, Edgeline	4500	LF	$2.00	$9,000.00
1	Street Light	1	EA	$10,000.00	$10,000.00
1	W16-8P Plaque (Street Name) (2)	3.34	SF	$50.00	$167.00
1	R1-1 Sign (Stop) (2)	14	SF	$50.00	$700.00
1	R1-3p Sign (All-Way) (4)	3	SF	$50.00	$150.00
				TOTAL- Stage 1	**$20,641.00**
	PA 73 and Middle Creek Road				
1	Flexible Delineator Post	6	EA	$75.00	$450.00
1	Middle Creek Road Stop Bar (2)	24	LF	$13.00	$312.00
1	Street Light	1	EA	$10,000.00	$10,000.00
1	Pavement Marking, Middle Creek Rd Centerline	3000	LF	$2.50	$7,500.00
1	Pavement Marking, Middle Creek Rd Edgeline	3000	LF	$2.00	$6,000.00
1	Pavement Marking, Sharrows	36	EA	$180.00	$6,480.00
1	R5-1 Sign (Do Not Enter) (1)	6.25	SF	$50.00	$312.50
2	Buffered Bike Lanes	1	LS		$42,200.00
	Pavement Marking, Sharrows	*40*	*EA*	*$180.00*	*$7,200.00*
	Bike lane/ PA 73 Separator Lines	*10000*	*LF*	*$2.00*	*$20,000.00*
	Hatched Marks Between Separator Lines	*7500*	*LF*	*$2.00*	*$15,000.00*
2	PA 73 Stop Bar (6)	48	LF	$13.00	$624.00
2	Pavement Marking, Left-Turn	2	EA	$200.00	$400.00
2	Pavement Marking, PA 73 Lane Guides	75	LF	$2.00	$150.00
2	W3-3 Sign (Signal Ahead) (2)	12.5	SF	$50.00	$625.00

Stage	Item Description	Quantity	Unit	Unit Price	Estimated Cost
2	Traffic Signal	1	LS		$136,075.00
	Traffic Signal Support, 30' Mast Arm	*2*	*EA*	*$14,000.00*	*$28,000.00*
	Traffic Signal Support, 35' Mast Arm	*2*	*EA*	*$16,000.00*	*$32,000.00*
	NEMA TS-2; Type 1 Controller Assembly	*1*	*EA*	*$37,000.00*	*$37,000.00*
	2" Conduit	*100*	*LF*	*$3.25*	*$325.00*
	Trench and Backfill, Type 1	*200*	*LF*	*$18.00*	*$3,600.00*
	Signal Cable, 14 AWG, 3 Conductor	*1000*	*LF*	*$3.25*	*$3,250.00*
	Junction Box, JB-27	*4*	*EA*	*$650.00*	*$2,600.00*
	Electrical Service, Type C	*1*	*EA*	*$2,200.00*	*$2,200.00*
	Uninterrupted Power Supply	*1*	*EA*	*$5,750.00*	*$5,750.00*
	Signal Head, Three 12" Sections	*4*	*EA*	*$900.00*	*$3,600.00*
	Signal Head, Five 12" Sections	*4*	*EA*	*$1,500.00*	*$6,000.00*
	Emergency Preemption System	*1*	*EA*	*$9,000.00*	*$9,000.00*
	Traffic Signal Timing	*1*	*EA*	*$350.00*	*$350.00*
2	Widen Roadway, Smooth NE/SW Corners near Intersection	1	LS		$97,562.00
	Sitework, Clearing, Grubbing	*1*	*LS*	*$8,000.00*	*$8,000.00*
	Excavation (Class 1) and Backfill	*387*	*CY*	*$40.00*	*$15,480.00*
	Subbase	*544*	*SY*	*$30.00*	*$16,320.00*
	Base Course	*544*	*SY*	*$60.00*	*$32,640.00*
	Binder Course	*544*	*SY*	*$15.50*	*$8,432.00*
	Wearing Course	*544*	*SY*	*$10.00*	*$5,440.00*

Stage	Item Description	Quantity	Unit	Unit Price	Estimated Cost
	Joint and Transition Sealing	*510*	*LF*	*$5.00*	*$2,550.00*
	Remove Edgeline and Centerline	*1400*	*LF*	*$1.50*	*$2,100.00*
	Re-Paint Centerline	*1000*	*LF*	*$5.00*	*$5,000.00*
	Re-Paint Edgeline	*800*	*LF*	*$2.00*	*$1,600.00*
2	6' Shoulder Width, PA 73 East Leg	1	LS		$37,516.00
	Sitework, Clearing, Grubbing	1	LS	$2,500.00	$2,500.00
	Base Course	292	SY	$60.00	$17,520.00
	Binder Course	292	SY	$15.50	$4,526.00
	Wearing Course	292	SY	$10.00	$2,920.00
	Joint and Transition Sealing	450	LF	$5.00	$2,250.00
	Re-Paint Edgeline	400	LF	$2.00	$800.00
				TOTAL- Stage 1	**$31,054.50**
				TOTAL- Stage 2	**$305,752.00**
	State Road and Farmington Avenue				
1	Align NB Farmington Avenue Approach	1	LS		$58,865.00
	Sitework, Clearing, Grubbing	*1*	*LS*	*$8,000.00*	*$8,000.00*
	Milling/Sitework of Old Road Footprint	*550*	*SY*	*$5.00*	*$2,750.00*
	Excavation (Class 1) and Backfill	*267*	*CY*	*$40.00*	*$10,680.00*
	Subbase	*320*	*SY*	*$30.00*	*$9,600.00*
	Base Course	*320*	*SY*	*$60.00*	*$19,200.00*
	Binder Course	*320*	*SY*	*$15.50*	*$4,960.00*
	Wearing Course	*320*	*SY*	*$10.00*	*$3,200.00*
	Joint and Transition Sealing	*95*	*LF*	*$5.00*	*$475.00*
1	Expand SB Farmington Avenue Approach, add SBL Turn Lane	1	LS		$11,576.50
	Sitework, Clearing, Grubbing	*1*	*LS*	*$3,000.00*	*$3,000.00*

Stage	Item Description	Quantity	Unit	Unit Price	Estimated Cost
	Excavation (Class 1) and Backfill	*39.2*	*CY*	*$40.00*	*$1,568.00*
	Subbase	*47*	*SY*	*$30.00*	*$1,410.00*
	Base Course	*47*	*SY*	*$60.00*	*$2,820.00*
	Binder Course	*47*	*SY*	*$15.50*	*$728.50*
	Wearing Course	*47*	*SY*	*$10.00*	*$470.00*
	Joint and Transition Sealing	*230*	*LF*	*$5.00*	*$1,150.00*
	Pavement Marking, Left-Turn	*1*	*EA*	*$200.00*	*$200.00*
	Pavement Marking, "ONLY"	*1*	*EA*	*$230.00*	*$230.00*
1	Pavement Marking, Centerline	450	LF	$2.50	$1,125.00
1	Pavement Marking, Edgeline	485	LF	$2.00	$970.00
1	Removal of Existing Centerline/ Edgeline	440	LF	$1.50	$660.00
	Lane Separator Curb, North Edgeline of Southeast Leg	170	LF	$30.00	$5,100.00
1	Street Light	1	EA	$10,000.00	$10,000.00
1	Stop Bar (1)	12	LF	$13.00	$156.00
1	W1-1L Sign (Horizontal Alignment) (1)	6.25	SF	$50.00	$312.50
1	W13-1P Plaque (Advisory Speed) (1)	2.25	SF	$50.00	$112.50
1	W3-1 Sign (Stop Ahead) (1)	6.25	SF	$50.00	$312.50
1	W2-3 Sign (Intersection Ahead) (2)	12.5	SF	$50.00	$625.00
1	Move Stop Sign (1)	1	EA	$200.00	$200.00
				TOTAL- Stage 1	**$90,015.00**
	Manatawny Street and Grosstown Road				
1	Stop Bar (1)	12	LF	$13.00	$156.00
1	ADA Curb Ramp	2	EA	$5,000.00	$10,000.00
1	3' x 2' ADA Pad (2)	12	SF	$40.00	$480.00

Stage	Item Description	Quantity	Unit	Unit Price	Estimated Cost
1	Continental Crosswalk Markings	40	LF	$8.50	$340.00
1	Pavement Marking, Sharrows	37	EA	$180.00	$6,660.00
1	W11-2 Sign (Adv Ped Crossing) (2)	18	SF	$50.00	$900.00
1	W11-1 Sign (Bicycle) (2)	12.5	SF	$50.00	$625.00
1	W16-1P Plaque (Share the Road) (2)	6	SF	$50.00	$300.00
2	Construct Sidewalk	1165	SY	$120.00	$139,800.00
2	Construct Curb	1572	LF	$55.00	$86,460.00
				TOTAL- Stage 1	**$19,461.00**
				TOTAL- Stage 2	**$226,260.00**
		Manatawny Street and Sell Road			
1	Stop Bar (1)	12	LF	$13.00	$156.00
1	Street Light	1	EA	$10,000.00	$10,000.00
1	W11-2 Sign (Pedestrian) (2)	18	SF	$50.00	$900.00
1	W16-7P Plaque (Diagonal Downward Arrow) (2)	4	SF	$50.00	$200.00
1	Yield Line	30	LF	$20.00	$600.00
1	Continental Crosswalk Markings	30	LF	$8.50	$255.00
1	ADA Curb Ramp	2	EA	$5,000.00	$10,000.00
1	3' x 2' ADA Pad (2)	12	SF	$40.00	$480.00
1	Snowplowable RPMs	145	EA	$20.00	$2,900.00
1	R1-5 Sign (Yield Here to Pedestrians) (2)	18	SF	$50.00	$900.00
1	W11-2 Sign (Pedestrian) (3)	27	SF	$50.00	$1,350.00
1	W16-9P Plaque (Ahead) (1)	2	SF	$50.00	$100.00
1	W16-7P Plaque (Diagonal Downward Arrow) (2)	4	SF	$50.00	$200.00

Stage	Item Description	Quantity	Unit	Unit Price	Estimated Cost
2	RRFB System	2	EA	$15,000.00	$30,000.00
				TOTAL- Stage 1	**$28,041.00**
				TOTAL- Stage 2	**$30,000.00**
		Manatawny Street and Glasgow Street			
1	3' x 2' ADA Pad (4)	24	SF	$40.00	$960.00
1	Street Light	1	EA	$10,000.00	$10,000.00
1	Continental Crosswalk Markings	100	LF	$8.50	$850.00
1	Move Advance Warning Sign	1	EA	$200.00	$200.00
1	W11-2 Sign (Pedestrian) (2)	18	SF	$50.00	$900.00
1	W16-9P Plaque (Ahead) (2)	4	SF	$50.00	$200.00
1	R1-6 Sign (In-Street Ped Crossing) (1)	*1*	*EA*	$300.00	$300.00
1	W11 Sign (Yield to Pedestrians Ahead) (1)	*6.25*	*SF*	$50.00	$312.50
2	Parking/Bus Stop Pavement Markings	1	LS	$800.00	$800.00
2	Extend Curb	*1*	*LS*	$15,000.00	$15,000.00
2	Construct Sidewalk	**275**	**SY**	$120.00	$33,000.00
2	Construct Curb	**350**	**LF**	$55.00	$19,250.00
2	ADA Curb Ramp	4	EA	$5,000.00	$20,000.00
				TOTAL- Stage 1	**$13,722.50**
				TOTAL- Stage 2	**$88,050.00**
		High Street and Moser Road			
1	Remove Grass Strip	1.67	CY	$75.00	$125.25
1	Construct Sidewalk	10	SY	$120.00	$1,200.00
1	Continental Crosswalk Markings	200	LF	$8.50	$1,700.00
1	Signal Retiming: Lead Pedestrian Interval	1	EA	$350.00	$350.00

Stage	Item Description	Quantity	Unit	Unit Price	Estimated Cost
1	Remove Existing Crosswalk Markings	200	LF	$1.50	$300.00
1	W4-2R Sign (Lane Ends) (1)	9	SF	$50.00	$450.00
2	Moser Road Pavement Marking, Sharrows	14	EA	$180.00	$2,520.00
2	Construct Moser Road/SRT Sidewalk	78	SY	$120.00	$9,360.00
2	Install At-Grade Pedestrian Railroad Crossing Safety Devices	1	LS	$15,000.00	$15,000.00
				TOTAL- Stage 1	**$4,125.25**
				TOTAL- Stage 2	**$26,880.00**
	High Street and Armand Hammer Boulevard				
1	Stop Bar (1)	12	LF	$13.00	$156.00
1	Continental Crosswalk Markings	350	LF	$8.50	$2,975.00
1	Remove Existing Crosswalk Markings	700	LF	$1.50	$1,050.00
1	Traffic Signal Timing	1	EA	$350.00	$350.00
2	Widen Shoulder				$20,375.00
	Remove Existing Surface Course	*100*	*CY*	*$10.00*	*$1,000.00*
	Base Course	*120*	*SY*	*$60.00*	*$7,200.00*
	Binder Course	*100*	*SY*	*$15.50*	*$1,550.00*
	Wearing Course	*100*	*SY*	*$10.00*	*$1,000.00*
	Joint and Transition Sealing	*165*	*LF*	*$5.00*	*$825.00*
	Construct Curb	*160*	*LF*	*$55.00*	*$8,800.00*
				TOTAL- Stage 1	**$4,531.00**
				TOTAL- Stage 2	**$20,375.00**

Stage	Item Description	Quantity	Unit	Unit Price	Estimated Cost
	Armand Hammer Boulevard and Medical Drive				
1	Construct Sidewalk	52	SY	$120.00	$6,240.00
1	Repair/Reconstruct Curb	50	LF	$55.00	$2,750.00
1	Reset Guide Rail	300	LF	$14.00	$4,200.00
1	Continental Crosswalk Markings	50	LF	$8.50	$425.00
1	ADA Curb Ramp	2	EA	$5,000.00	$10,000.00
1	3' x 2' ADA Pad (2)	12	SF	$40.00	$480.00
1	Street Light	1	EA	$10,000.00	$10,000.00
2	Pavement Markings, Right-Turn	1	EA	$190.00	$190.00
2	Pavement Markings, "ONLY"	1	EA	$230.00	$230.00
2	Widen Roadway for NB Right-Turn Lane	1	LS		$236,119.00
	Sitework, Clearing, Grubbing	*1*	*LS*	*$1,000.00*	*$1,000.00*
	Roadway Embankment Stabilization/ Retaining wall	*3360*	*SF*	*$60.00*	*$201,600.00*
	Remove Existing Edgeline	*280*	*LF*	*$1.50*	*$420.00*
	Excavation (Class 1) and Backfill	*182*	*CY*	*$30.00*	*$5,460.00*
	Subbase	*218*	*SY*	*$30.00*	*$6,540.00*
	Base Course	*218*	*SY*	*$60.00*	*$13,080.00*
	Binder Course	*218*	*SY*	*$15.50*	*$3,379.00*
	Wearing Course	*218*	*SY*	*$10.00*	*$2,180.00*
	Joint and Transition Sealing	*300*	*LF*	*$5.00*	*$1,500.00*
	Pavement Markings, Turn Channel Line	*200*	*LF*	*$2.00*	*$400.00*
	Re-Painting of Edgeline	*280*	*LF*	*$2.00*	*$560.00*
				TOTAL- Stage 1	**$34,095.00**
				TOTAL- Stage 2	**$236,539.00**

Stage	Item Description	Quantity	Unit	Unit Price	Estimated Cost
Armand Hammer Boulevard and Industrial Highway					
1	Widen South Leg/422 WB On-Ramp	1	LS		$20,507.50
	Sitework, Clearing, Grubbing	*1*	*LS*	*$1,000.00*	*$1,000.00*
	Remove Existing Edgeline	*180*	*LF*	*$1.50*	*$270.00*
	Excavation (Class 1) and Backfill	*125*	*CY*	*$30.00*	*$3,750.00*
	Subbase	*150*	*SY*	*$30.00*	*$4,500.00*
	Base Course	*115*	*SY*	*$60.00*	*$6,900.00*
	Binder Course	*115*	*SY*	*$15.50*	*$1,782.50*
	Wearing Course	*115*	*SY*	*$10.00*	*$1,150.00*
	Joint and Transition Sealing	*165*	*LF*	*$5.00*	*$825.00*
	Re-Painting of Edgeline	*165*	*LF*	*$2.00*	*$330.00*
1	Remove SBL Signal Head	1	LS	$3,000.00	$3,000.00
1	Shift Signal Head	2	EA	$4,500.00	$9,000.00
1	ADA Curb Ramp	2	EA	$5,000.00	$10,000.00
1	3' x 2' ADA Pad (2)	12	SF	$40.00	$480.00
1	Continental Crosswalk Markings	80	LF	$8.50	$680.00
1	Pavement Markings, Yield	15	LF	$21.00	$315.00
1	Pavement Marking, "ONLY"	2	EA	$230.00	$460.00
1	Pavement Marking, "422 WEST/ EAST"	1	EA	$990.00	$990.00
1	Pavement Marking, Right/Through	1	EA	$360.00	$360.00
1	Pavement Marking, Centerline	400	LF	$2.50	$1,000.00
1	Pavement Marking, Chevron	35	LF	$10.00	$350.00
1	Pavement Marking, Left-Turn	2	EA	$200.00	$400.00
1	Pavement Marking, Right-Turn	1	EA	$190.00	$190.00
1	Pavement Marking Removal	1	EA	$130.00	$130.00
1	Traffic Signal Timing	1	EA	$350.00	$350.00
1	Overhead Lane Control Sign (2)	20	SF	$65.00	$1,300.00

Stage	Item Description	Quantity	Unit	Unit Price	Estimated Cost
1	R1-1 Sign (Stop) (1)	7	SF	$50.00	$350.00
1	R1-2 Sign (Yield) (1)	6.93	SF	$50.00	$346.50
2	Construct Armand Hammer Boulevard/ SRT Sidewalk	556	SY	$120.00	$66,720.00
2	Construct Curb	1250	LF	$55.00	$68,750.00
2	Armand Hammer Boulevard/SRT RRFB	4	EA	$15,000.00	$60,000.00
2	Armand Hammer Boulevard/SRT Crosswalk Markings	70	LF	$8.50	$595.00
2	ADA Curb Ramp	4	EA	$5,000.00	$20,000.00
2	3' x 2' ADA Pad (6)	36	SF	$40.00	$1440.00
2	Yield Line	60	LF	$20.00	$1200.00
2	R1-5 Sign (Yield Here to Pedestrians) (2)	36	SF	$50.00	$1800.00
2	W11-2 Sign (Pedestrian) (2)	36	SF	$50.00	$1800.00
2	W16-7P Plaque (Diagonal Downward Arrow) (2)	8	SF	$50.00	$400.00
				TOTAL- Stage 1	**$50,209.00**
				TOTAL- Stage 2	**$222,705.00**
	High Street and Sanatoga Road				
1	Pavement Marking, Left-Turn	2	EA	$200.00	$400.00
1	Stop Bar Removal	2	EA	$130.00	$260.00
1	Stop Bar (2)	24	EA	$13.00	$312.00
1	Pavement Marking, Centerline	46	LF	$2.50	$115.00
1	Pavement Marking, Edgeline	95	LF	$2.00	$190.00
1	W2-2 Sign (Intersection Ahead) (2)	12.5	SF	$50.00	$625.00
1	W16-8P Plaque (Street Name) (2)	3.34	SF	$50.00	$167.00
2	Dynamic Speed Feedback Sign	2	EA	$5,000.00	$10,000.00
				TOTAL- Stage 1	**$2,069.00**
				TOTAL- Stage 2	**$10,000.00**

Stage	Item Description	Quantity	Unit	Unit Price	Estimated Cost
	PA 663 and Bleim Road				
1	Street Light	1	EA	$10,000.00	$10,000.00
1	W7-1a Sign (% Grade) (1)	9	SF	$50.00	$450.00
1	Snowplowable RPMs	20	EA	$20.00	$400.00
2	Pavement Marking, Left-Turn	2	EA	$200.00	$400.00
2	Pavement Marking, PA 663 Lane Guide	45	LF	$2.00	$90.00
2	Pavement Marking, Centerline	350	LF	$2.50	$875.00
2	PA 663 Stop Bars (3)	36	LF	$13.00	$468.00
2	Move Speed Limit Signs	1	EA	$200.00	$200.00
2	Remove Signage	3	EA	$65.00	$195.00
2	W3-3 Sign (Signal Ahead) (2)	12.5	SF	$50.00	$625.00
2	Signal Ahead Warning System	1	LS		$22,462.50
	Signal Support- 20' Mast Arm	*1*	*EA*	*$12,000.00*	*$12,000.00*
	2" Conduit	*50*	*LF*	*$3.25*	*$162.50*
	Conduit Connection to Signal	*1*	*EA*	*$800.00*	*$800.00*
	Wireless Communication System	*1*	*LS*	*$2,500.00*	*$2,500.00*
	Dynamic "Signal Ahead" Sign	*1*	*EA*	*$7,000.00*	*$7,000.00*
2	Widen Roadway Through Intersection	1	LS		$40,105.50
	Sitework, Clearing, Grubbing on West Side of Roadway	*1*	*LS*	*$7,500.00*	*$7,500.00*
	Excavation (Class 1) and Backfill	*267*	*CY*	*$40.00*	*$10,680.00*
	Subbase	*171*	*SY*	*$30.00*	*$5,130.00*
	Base Course	*171*	*SY*	*$60.00*	*$10,260.00*
	Binder Course	*171*	*SY*	*$15.50*	*$2,650.50*
	Wearing Course	*171*	*SY*	*$10.00*	*$1,710.00*

Stage	Item Description	Quantity	Unit	Unit Price	Estimated Cost
	Joint and Transition Sealing	*150*	*LF*	*$5.00*	*$750.00*
	Pavement Marking, Turn Lane Taper Hatched Area	*150*	*LF*	*$2.50*	*$375.00*
	Remove Edgeline	*300*	*LF*	*$1.50*	*$450.00*
	Re-Paint Edgelines	*300*	*LF*	*$2.00*	*$600.00*
2	Traffic Signal	1	LS		$113,375.00
	Traffic Signal Support, 30' Mast Arm	*1*	*EA*	*$14,000.00*	*$14,000.00*
	Traffic Signal Support, 35' Mast Arm	*2*	*EA*	*$16,000.00*	*$32,000.00*
	NEMA TS-2; Type 1 Controller Assembly	*1*	*EA*	*$37,000.00*	*$37,000.00*
	2" Conduit	*100*	*LF*	*$3.25*	*$325.00*
	Trench and Backfill, Type 1	*200*	*LF*	*$18.00*	*$3,600.00*
	Signal Cable, 14 AWG, 3 Conductor	*1000*	*LF*	*$3.25*	*$3,250.00*
	Junction Box, JB-27	*4*	*EA*	*$650.00*	*$2,600.00*
	Electrical Service, Type C	*1*	*EA*	*$2,200.00*	*$2,200.00*
	Uninterrupted Power Supply	*1*	*EA*	*$5,750.00*	*$5,750.00*
	Signal Head, Three 12" Sections	*2*	*EA*	*$900.00*	*$1,800.00*
	Signal Head, Five 12" Sections	*1*	*EA*	*$1,500.00*	*$1,500.00*
	Emergency Preemption System	*1*	*EA*	*$9,000.00*	*$9,000.00*
	Traffic Signal Timing	*1*	*EA*	*$350.00*	*$350.00*
				TOTAL- Stage 1	**$10,850.00**
				TOTAL- Stage 2	**$178,796.00**
	Bleim Road and New Hanover Square Road				
1	Street Light	1	EA	$10,000.00	$10,000.00
	Pavement Marking, Dotted Center-line Extension Line	25	LF	$2.50	$62.50
1	Pavement Marking, Edgeline Lane Guide	27	LF	$2.00	$54.00
1	Stop Bar (1)	12	LF	$13.00	$156.00

Stage	Item Description	Quantity	Unit	Unit Price	Estimated Cost
1	Snowplowable RPMs	20	EA	$20.00	$400.00
1	Clearing and Grubbing	1	LS	$1,000.00	$1,000.00
1	W7-1a Sign (% Grade) (1)	9	SF	$50.00	$450.00
				TOTAL- Stage 1	**$12,122.50**
	Bleim Road/Pruss Hill Road and Pleasantview Road				
1	Construct Aligned EB Approach	1	LS		$123,000.00
	Sitework, Clearing, Grubbing	*1*	*LS*	*$8,000.00*	*$8,000.00*
	Milling/Sitework of Old Road Footprint	*550*	*SY*	*$5.00*	*$2,750.00*
	Sodding/Planting of Old Road Footprint	*550*	*LS*	*$10.00*	*$20,000.00*
	Excavation (Class 1) and Backfill	*500*	*CY*	*$40.00*	*$20,000.00*
	Subbase	*600*	*SY*	*$30.00*	*$18,000.00*
	Base Course	*600*	*SY*	*$60.00*	*$36,000.00*
	Binder Course	*600*	*SY*	*$15.50*	*$9,300.00*
	Wearing Course	*600*	*SY*	*$10.00*	*$6,000.00*
	Joint and Transition Sealing	*125*	*LF*	*$5.00*	*$625.00*
	Removal of Old Centerlines and Edgelines	*150*	*LF*	*$1.50*	*$225.00*
	Pavement Marking, Centerline	*460*	*LF*	*$2.50*	*$1,150.00*
	Pavement Marking, Edgeline	*475*	*LF*	*$2.00*	*$950.00*
1	Traffic Island Curb	150	LF	$55.00	$8,250.00
1	Street Light	2	EA	$10,000.00	$20,000.00
1	Yield Line	12	LF	$20.00	$240.00
1	Bleim Road/Pruss Hill Road Stop Bar (2)	24	LF	$13.00	$312.00
1	W2-1 Sign (Intersection Ahead) (1)	6.25	SF	$50.00	$312.50
1	R1-2 Sign (Yield) (1)	6.93	SF	$50.00	$346.50

Stage	Item Description	Quantity	Unit	Unit Price	Estimated Cost
2	Remove Stop Sign	2	EA	$65.00	$130.00
2	Pavement Marking, Left-Turn	2	EA	$200.00	$400.00
2	Pavement Marking, Turn Lane Markers	60	LF	$2.50	$150.00
2	Pavement Marking, Centerline	450	LF	$2.50	$1,125.00
2	Pleasantview Road/Left-Turn Lane Stop Bar (4)	48	LF	$13.00	$624.00
2	Expand Pleasantview Road Footprint	1	LS		$48,450.00
	Sitework, Clearing, Grubbing	*1*	*LS*	*$2,000.00*	*$2,000.00*
	Excavation (Class 1) and Backfill	*250*	*CY*	*$40.00*	*$10,000.00*
	Subbase	*300*	*SY*	*$30.00*	*$9,000.00*
	Base Course	*300*	*SY*	*$60.00*	*$18,000.00*
	Binder Course	*300*	*SY*	*$15.50*	*$4,650.00*
	Wearing Course	*300*	*SY*	*$10.00*	*$3,000.00*
	Joint and Transition Sealing	*240*	*LF*	*$5.00*	*$1,200.00*
	Pavement Marking, Edgeline	*300*	*LF*	*$2.00*	*$600.00*
2	Traffic Signal	1	LS		$133,675.00
	Traffic Signal Support, 30' Mast Arm	*2*	*EA*	*$14,000.00*	*$28,000.00*
	Traffic Signal Support, 35' Mast Arm	*2*	*EA*	*$16,000.00*	*$32,000.00*
	NEMA TS-2; Type 1 Controller Assembly	*1*	*EA*	*$37,000.00*	*$37,000.00*
	2" Conduit	*100*	*LF*	*$3.25*	*$325.00*
	Trench and Backfill, Type 1	*200*	*LF*	*$18.00*	*$3,600.00*
	Signal Cable, 14 AWG, 3 Conductor	*1000*	*LF*	*$3.25*	*$3,250.00*
	Junction Box, JB-27	*4*	*EA*	*$650.00*	*$2,600.00*
	Electrical Service, Type C	*1*	*EA*	*$2,200.00*	*$2,200.00*

Stage	Item Description	Quantity	Unit	Unit Price	Estimated Cost
	Uninterrupted Power Supply	*1*	*EA*	*$5,750.00*	*$5,750.00*
	Signal Head, Three 12" Sections	*4*	*EA*	*$900.00*	*$3,600.00*
	Signal Head, Five 12" Sections	*4*	*EA*	*$1,500.00*	*$6,000.00*
	Emergency Preemption System	*1*	*EA*	*$9,000.00*	*$9,000.00*
	Traffic Signal Timing	*1*	*EA*	*$350.00*	*$350.00*
				TOTAL- Stage 1	**$152,461.00**
				TOTAL- Stage 2	**$184,554.00**
		PA 100 and Hoffecker Road			
1	Hoffecker Road/ PA 100 Left-Turn Lane Stop Bar (4)	48	LF	$13.00	$624.00
1	Pavement Marking, Left-Turn	2	EA	$200.00	$400.00
1	Pavement Marking, "ONLY"	2	EA	$230.00	$460.00
1	Street Light	1	EA	$10,000.00	$10,000.00
2	Remove Stop Sign	2	EA	$65.00	$130.00
2	PA 100 Stop Bar (2)	24	LF	$13.00	$312.00
2	Traffic Signal	1	LS		$133,675.00
	Traffic Signal Support, 30' Mast Arm	*2*	*EA*	*$14,000.00*	*$28,000.00*
	Traffic Signal Support, 35' Mast Arm	*2*	*EA*	*$16,000.00*	*$32,000.00*
	NEMA TS-2; Type 1 Controller Assembly	*1*	*EA*	*$37,000.00*	*$37,000.00*
	2" Conduit	*100*	*LF*	*$3.25*	*$325.00*
	Trench and Backfill, Type 1	*200*	*LF*	*$18.00*	*$3,600.00*
	Signal Cable, 14 AWG, 3 Conductor	*1000*	*LF*	*$3.25*	*$3,250.00*
	Junction Box, JB-27	*4*	*EA*	*$650.00*	*$2,600.00*
	Electrical Service, Type C	*1*	*EA*	*$2,200.00*	*$2,200.00*
	Uninterrupted Power Supply	*1*	*EA*	*$5,750.00*	*$5,750.00*
	Signal Head, Three 12" Sections	*4*	*EA*	*$900.00*	*$3,600.00*

Stage	Item Description	Quantity	Unit	Unit Price	Estimated Cost
	Signal Head, Five 12" Sections	*4*	*EA*	*$1,500.00*	*$6,000.00*
	Emergency Preemption System	*1*	*EA*	*$9,000.00*	*$9,000.00*
	Traffic Signal Timing	*1*	*EA*	*$350.00*	*$350.00*
				TOTAL- Stage 1	**$11,484.00**
				TOTAL- Stage 2	**$134,117.00**
	PA 724 and Vaughn Road				
1	Pavement Marking, Dotted Centerline Extension Line	20	LF	$2.50	$50.00
	Pavement Marking, Edgeline Lane Guide	20	LF	$2.00	$40.00
	Remove Edgeline	42	LF	$1.50	$63.00
1	Street Light	1	EA	$10,000.00	$10,000.00
1	Stop Bar (1)	12	LF	$300.00	$3,600.00
1	Remove Signage	2	EA	$50.00	$100.00
1	D3-1 Sign (Street Name) (2)	10	SF	$50.00	$500.00
1	W2-2 Sign (Intersection Ahead) (2)	12.5	SF	$50.00	$625.00
1	W16-8P Plaque (Street Name) (2)	4	SF	$50.00	$200.00
				TOTAL- Stage 1	**$15,178.00**
	Wells Road and PA 724				
1	Street Light	2	EA	$10,000.00	$20,000.00
1	Pavement Marking, Sharrows	12	EA	$180.00	$2,160.00
1	Wells Road/PA 724 Left-Turn Lanes Stop Bar (4)	48	LF	$13.00	$624.00
1	Pavement Marking, Left-Turn	2	EA	$200.00	$400.00
1	Pavement Marking, "ONLY"	2	EA	$230.00	$460.00
1	Pavement Marking, Centerline	750	LF	$2.50	$1,875.00
1	Pavement Marking, Lane Line	120	LF	$2.00	$240.00
1	Pavement Marking, Edgeline	1000	LF	$2.00	$2,000.00
1	Remove Pavement Markings	6	EA	$120.00	$720.00
1	Mid-Block Trail Crossing	1	LS		$13,792.50

Stage	Item Description	Quantity	Unit	Unit Price	Estimated Cost
	Pavement Marking, "TRAIL"	*2*	*EA*	*$450.00*	*$900.00*
	Pavement Marking, "XING"	*2*	*EA*	*$400.00*	*$800.00*
	Continental Crosswalk Markings	*25*	*LF*	*$8.50*	*$212.50*
	ADA Curb Ramp	*2*	*EA*	*$5,000.00*	*$10,000.00*
	3' x 2' ADA Pad (2)	*12*	*SF*	*$40.00*	*$480.00*
	R1-6 Sign (In-Street Ped Crossing) (1)	*1*	*EA*	*$300.00*	*$300.00*
	W11-2 Sign (Pedestrian) (2)	*18*	*SF*	*$50.00*	*$900.00*
	W16-7P Plaque (Diagonal Downward Arrow) (2)	*4*	*SF*	*$50.00*	*$200.00*
1	D11-1 Sign (Bicycle Route) (4)	12	SF	$50.00	$600.00
1	M7-1 Sign (L or R Arrow Auxilliary, Bicycle) (2)	1.5	SF	$50.00	$75.00
1	M7-2 Sign (Straight Arrow Auxilliary, Bicycle) (1)	0.75	SF	$50.00	$37.50
1	M7-5 Sign (Double Arrow Auxilliary, Bicycle) (1)	1.5	SF	$50.00	$75.00
2	Continental Crosswalk Markings	120	LF	$8.50	$1,020.00
2	PA 724 Stop Bar (2)	24	LF	$13.00	$312.00
2	Traffic Signal	1	LS		$133,675.00
	Traffic Signal Support, 30' Mast Arm	*2*	*EA*	*$14,000.00*	*$28,000.00*
	Traffic Signal Support, 35' Mast Arm	*2*	*EA*	*$16,000.00*	*$32,000.00*
	NEMA TS-2; Type 1 Controller Assembly	*1*	*EA*	*$37,000.00*	*$37,000.00*
	2" Conduit	*100*	*LF*	*$3.25*	*$325.00*
	Trench and Backfill, Type 1	*200*	*LF*	*$18.00*	*$3,600.00*
	Signal Cable, 14 AWG, 3 Conductor	*1000*	*LF*	*$3.25*	*$3,250.00*
	Junction Box, JB-27	*4*	*EA*	*$650.00*	*$2,600.00*
	Electrical Service, Type C	*1*	*EA*	*$2,200.00*	*$2,200.00*

Stage	Item Description	Quantity	Unit	Unit Price	Estimated Cost
	Uninterrupted Power Supply	*1*	*EA*	*$5,750.00*	*$5,750.00*
	Signal Head, Three 12" Sections	*4*	*EA*	*$900.00*	*$3,600.00*
	Signal Head, Five 12" Sections	*4*	*EA*	*$1,500.00*	*$6,000.00*
	Emergency Preemption System	*1*	*EA*	*$9,000.00*	*$9,000.00*
	Traffic Signal Timing	*1*	*EA*	*$350.00*	*$350.00*
2	W3-3 Sign (Signal Ahead) (2)	12.5	SF	$50.00	$625.00
2	Remove Signage	4	EA	$65.00	$260.00
2	Move Speed Limit Signs	2	EA	$200.00	$400.00
2	Construct Sidewalk	533	SY	$120.00	$63,960.00
2	Construct Curb	1200	LF	$55.00	$66,000.00
2	ADA Curb Ramp	2	EA	$5,000.00	$10,000.00
2	3' x 2' ADA Pad (2)	12	SF	$40.00	$480.00
				TOTAL- Stage 1	**$43,059.00**
				TOTAL- Stage 2	**$276,732.00**
	Bethel Church Road and PA 23				
1	Remove Edgeline	20	LF	$1.50	$30.00
1	Pavement Marking, Dotted Centerline Extension Line	32.5	LF	$2.50	$81.25
	Pavement Marking, Edgeline Lane Guide	65	LF	$2.00	$130.00
	Pavement Marking, Edgeline	15	LF	$2.00	$30.00
1	Shift Guardrail	50	LF	$15.50	$775.00
1	Street Light	1	EA	$10,000.00	$10,000.00
1	Snowplowable RPMs	35	EA	$20.00	$700.00
1	Stop Bar (2)	24	LF	$13.00	$312.00
1	R1-1 Sign (Stop) (2)	14	SF	$50.00	$700.00
1	W11-19A Sign (Hidden Driveway) (1)	6.25	SF	$50.00	$312.50
				TOTAL- Stage 1	**$13,070.75**

Sources: PennDOT Publication 287; PennDOT ECMS Historical Bid Data; *Costs for Pedestrian and Bicyclist Infrastructure Improvements*, UNC Highway Safety Research Center; *Trail Costs Appendix*, Northwestern Indiana Regional Planning Commission (NIRPC); Historical Design-Build Costs; Third-Party Retailers; National Association of City Transportation Officials (NACTO)

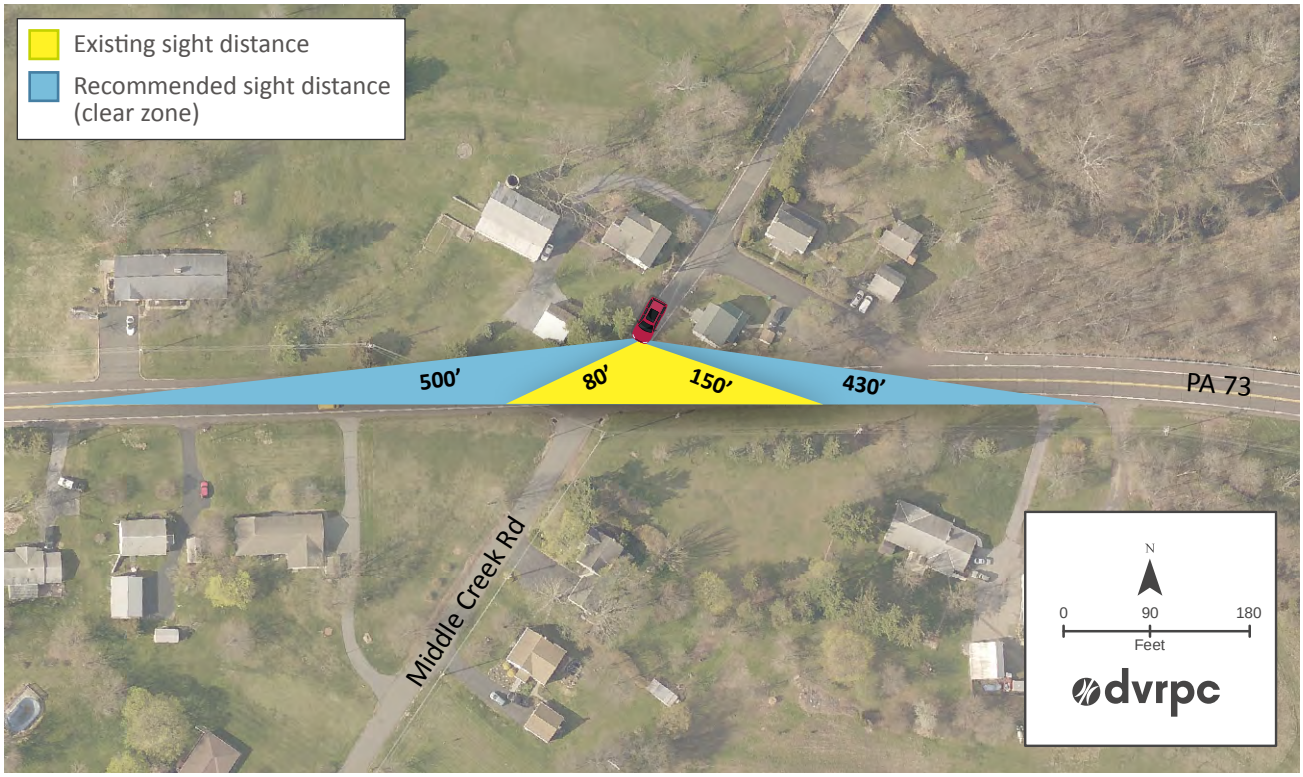
APPENDIX C
SIGHT DISTANCE EVALUATION

The intersection sight distance, a driver's view approaching or departing an intersection, was assessed for all 18 study locations. **Figure C-1** through **Figure C-9** on the following pages show the existing and recommended departure sight distances at study locations where they were determined to be inadequate. Departure sight distance is the driver's view from a stopped vehicle position on a minor roadway. Because all of the study intersections had traffic control devices, the departure sight distance was used to evaluate appropriate sight triangles. These were determined following the design standards outlined in *A Policy on Geometric Design of Highways and Streets* (AASHTO, 2011), or the *Green Book*. The variables that are assessed in sight distance determination include speed (posted speed limit) and number of lanes.

The recommended sight triangles provide adequate sight distance for a stopped driver on a minor roadway to turn onto or cross a major roadway. A sight triangle is obstructed if an object impedes the driver's ability to see for that distance at the driver's eye height. Therefore, sight triangles help identify the area that should be maintained unobstructed–the clear zone.

The departure sight distances and sight triangles are shown only for the problematic movements. For example, in **Figure C-8** the recommended sight triangle for the right-turn is obstructed; therefore, the existing and recommended sight distance is shown only for that movement.

FIGURE C-1: MIDDLE CREEK RD & PA 73 SIGHT DISTANCE DIAGRAM



Sources: DVRPC, 2019; *A Policy on Geometric Design of Highways and Streets*, AASHTO, 2011; Southeastern PA Regional Task Force, 2017 (Aerial)

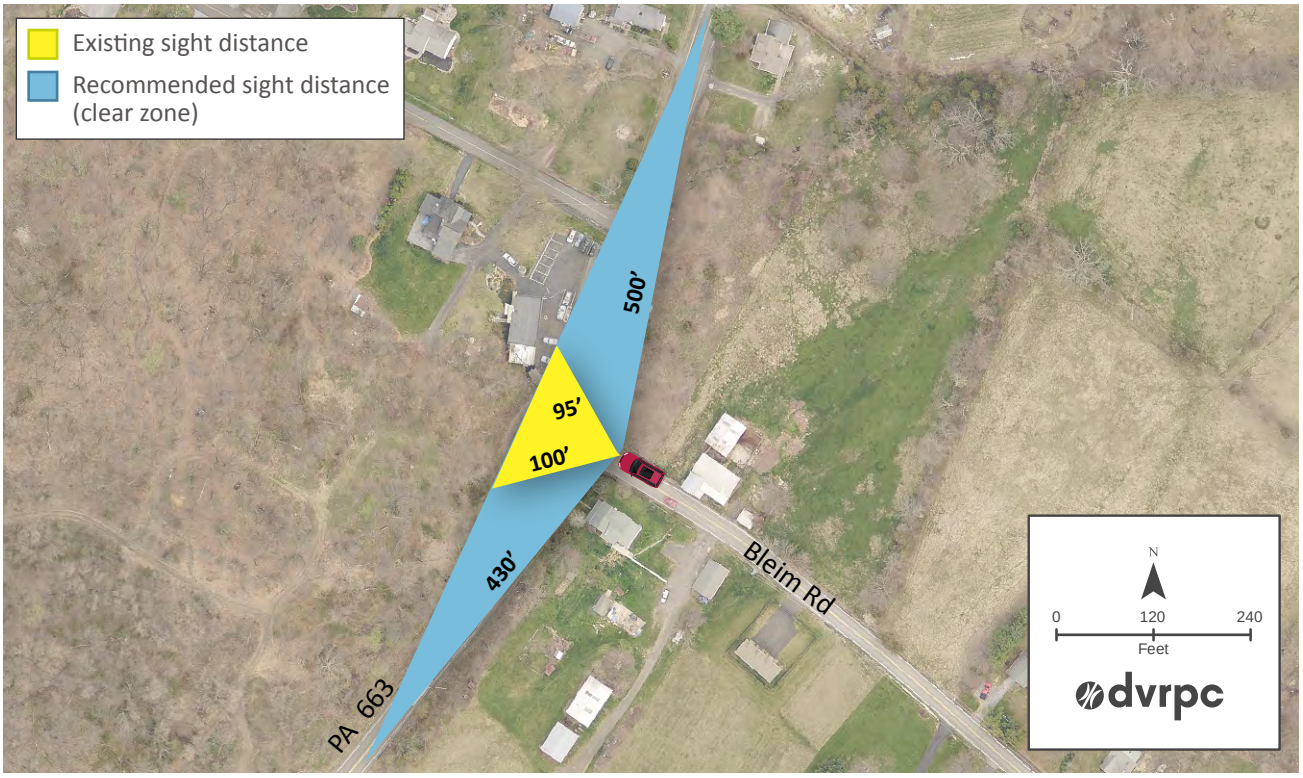
FIGURE C-2: GROSSTOWN RD & MANATAWNY ST SIGHT DISTANCE DIAGRAM

Sources: DVRPC, 2019; *A Policy on Geometric Design of Highways and Streets*, AASHTO, 2011; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE C-3: GLASGOW ST & MANATAWNY ST SIGHT DISTANCE DIAGRAM

Sources: DVRPC, 2019; *A Policy on Geometric Design of Highways and Streets*, AASHTO, 2011; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE C-4: BLEIM RD & PA 663 SIGHT DISTANCE DIAGRAM

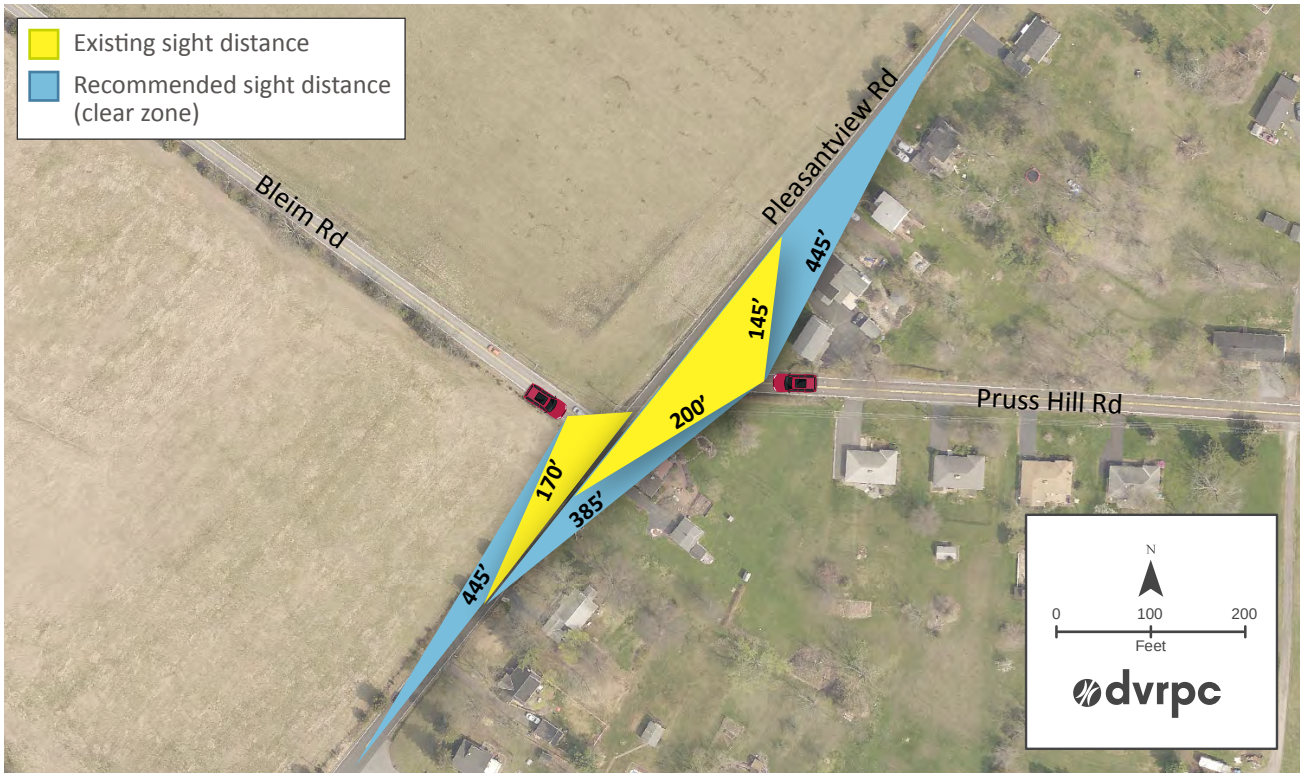


Sources: DVRPC, 2019; *A Policy on Geometric Design of Highways and Streets*, AASHTO, 2011; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE C-5: BLEIM RD & NEW HANOVER SQUARE RD SIGHT DISTANCE DIAGRAM

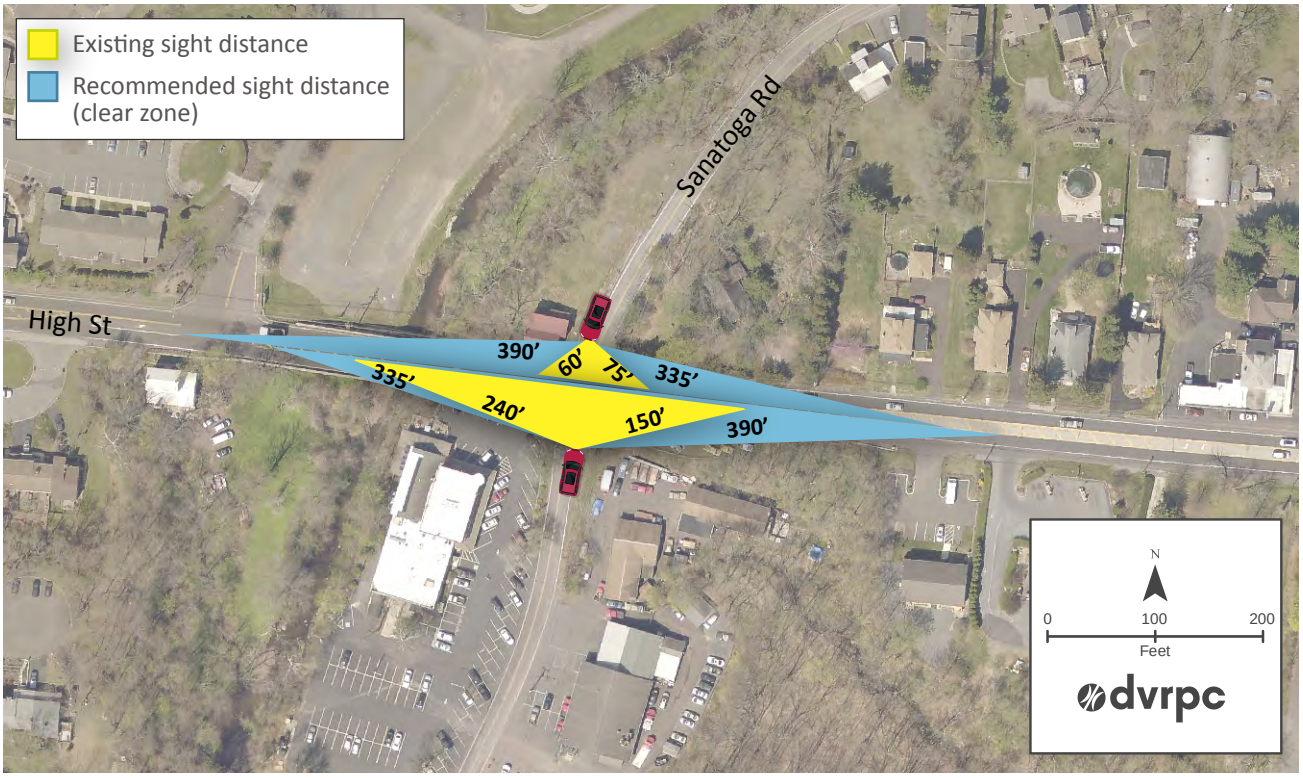
Sources: DVRPC, 2019; *A Policy on Geometric Design of Highways and Streets*, AASHTO, 2011; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE C-6: BLEIM RD & PLEASANTVIEW RD SIGHT DISTANCE DIAGRAM



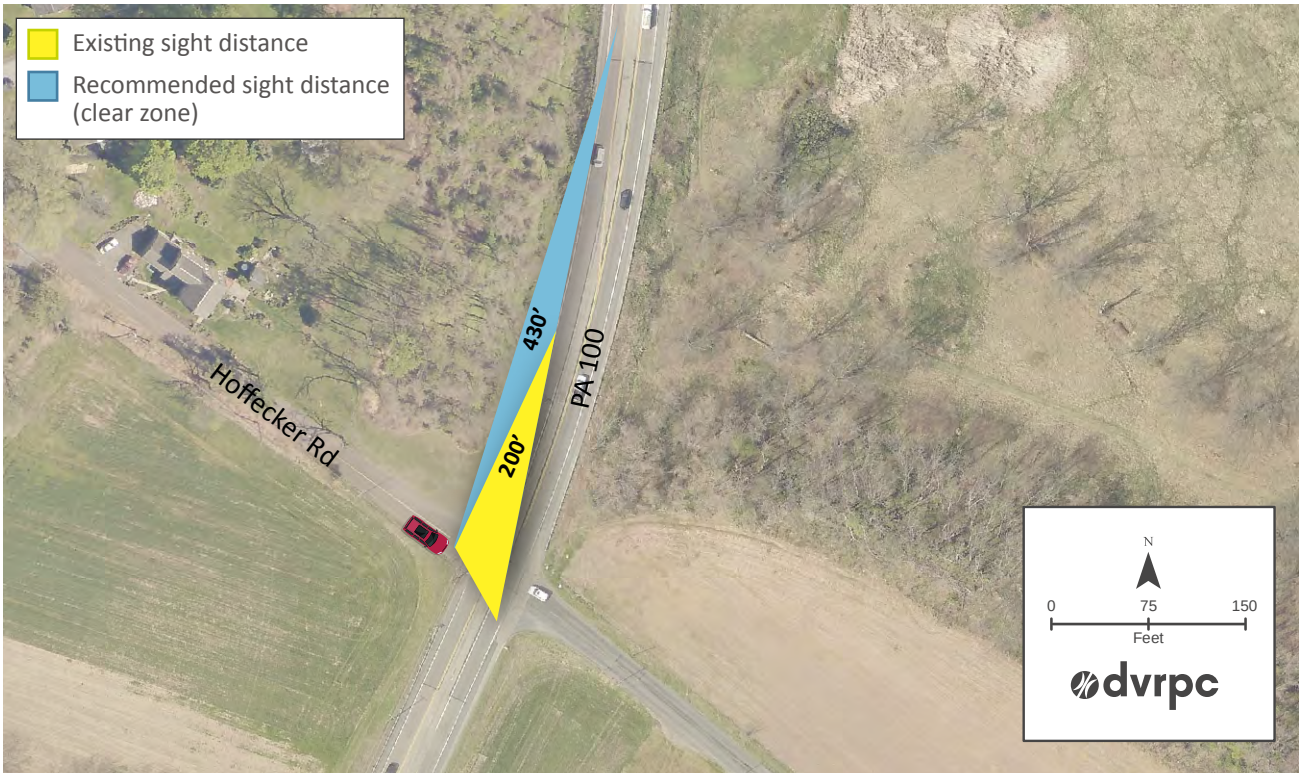
Sources: DVRPC, 2019; *A Policy on Geometric Design of Highways and Streets*, AASHTO, 2011; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE C-7: HIGH ST & SANATOGA RD SIGHT DISTANCE DIAGRAM



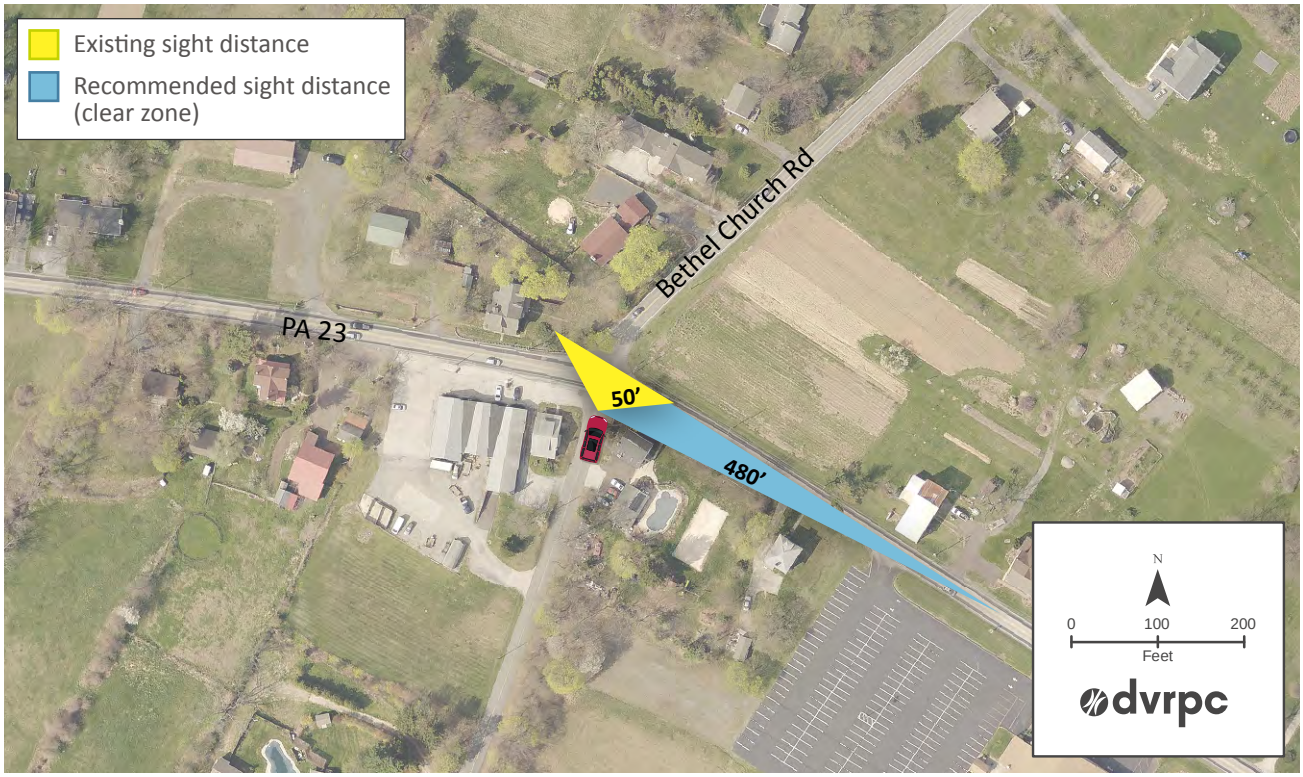
Sources: DVRPC, 2019; *A Policy on Geometric Design of Highways and Streets*, AASHTO, 2011; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE C-8: HOFFECKER RD & PA 100 SIGHT DISTANCE DIAGRAM



Sources: DVRPC, 2019; *A Policy on Geometric Design of Highways and Streets*, AASHTO, 2011; Southeastern PA Regional Task Force, 2017 (Aerial)

FIGURE C-9: BETHEL CHURCH RD & PA 23 SIGHT DISTANCE DIAGRAM



Sources: DVRPC, 2019; *A Policy on Geometric Design of Highways and Streets*, AASHTO, 2011; Southeastern PA Regional Task Force, 2017 (Aerial)

APPENDIX D
GLOSSARY

Actuated: a signal that is activated by motion, typically sensed by a detector.

Bumpout (or curb extension): a traffic calming measure used to extend the sidewalk at an intersection to shorten crossing distances.

LPI: *Leading Pedestrian Interval* - a signal timing adjustment that gives pedestrians a head start when crossing a roadway.

NBR: northbound right

RPM: *Raised Pavement Marker* - a device installed to delineate centerline or edgeline pavement markings so that they are more visible in dark conditions.

RRFB: *Rectangular Rapid Flashing Beacon* - a user-actuated amber LED that supplements warning signs at unsignalized intersections or mid-block crosswalks. They can be activated by pedestrians manually by a push button or passively by a pedestrian detection system.

SBR: southbound right

SBL: southbound left

SBL/T: southbound left/through

Sharrows: a road marking in the form of two inverted V-shapes above a bicycle, indicating which part of a road should be used by cyclists when the roadway is shared with motor vehicles.

Sight distance: the length of a roadway visible to a driver.

Visual acuity: the sharpness of vision, measured by the ability to discern letters or numbers at a given distance according to a fixed standard.

Visual perception: the process of giving meaning to visual information; visual perception affects one's reaction time in response to a visual cue.

PUBLICATION TITLE:
POTTSTOWN REGION TRAFFIC ANALYSIS

Publication Number:
19016

Date Published:
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Geographic Area Covered:
Eighteen intersections in the Pottstown urbanized area in Montgomery and Chester counties: Douglass Township, New Hanover Township, West Pottsgrove Township, Pottstown Borough, Upper Pottsgrove Township, Lower Pottsgrove Township, North Coventry Township, and East Coventry Township.

Key Words:
Traffic Analysis, Traffic Signals, Intersections, Design, Safety, Multimodal, Bicycle, Pedestrian

Abstract:
This traffic analysis focuses on the traffic impacts of the new developments planned for the Pottstown area. The analysis aims to identify roadway improvements that support safety and future traffic growth with a focus on 18 study locations selected by the PMRPC. The study estimates short-term (future year 2025) increases in traffic volumes and identifies multimodal improvements.

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