DELAWARE VALLEY
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REGIONAL
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JULY 2013

MANAGING ACCESS IN THE DELAWARE VALLEY

Ridge Pike

Lower Providence Township
MONTGOMERY COUNTY

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

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APPENDIX A

Executive Summary

This access management case study addresses an emerging corridor in Lower Providence Township, Montgomery County. The facility studied was Ridge Pike, which serves as both a regional arterial and a main street for the township. Lower Providence Township is in the process of updating its zoning code for the northwest portion of the study corridor. The new zoning would accommodate more dense land uses in the area.

Highway access management techniques were assembled for the study corridor to improve safety and mobility, and to prolong highway serviceability in light of ongoing regional growth and development. The work was performed by DVRPC staff in support of PennDOT's effort to promote wider planning for an application of access management procedures within the commonwealth. The procedures are applicable to both state and local highways, and the strategies are most effectively delivered through municipal ordinances that govern the land development design and review and approval process. The principal guidance for developing the plan was obtained from PennDOT's publication *Access Management Model Ordinances for Pennsylvania Municipalities Handbook*.

Opportunities to correct access management deficiencies are present during land development, redevelopment, and land use changes when the proper enabling ordinances are in place. Appropriately designed access for new development is a simpler task to accomplish, but both developed and developing parcels need to be recognized and addressed in the vision to create comprehensive improvements for the study corridor. Regulations need to be adopted by the municipalities in their zoning and subdivision land use ordinances to ensure that access management strategies advance.

Ultimately, this study sought to accomplish three tasks: educate Lower Providence officials to the benefits of access management; encourage the township to adopt enabling ordinances; and enable the township with tools and recommendations to identify improvements to proactively shape access along Ridge Pike to be safe and efficient.

CHAPTER 1

Introduction

Corridor Planning

DVRPC takes a multimodal approach in identifying practical solutions to corridor issues in the spirit of MAP-21, while working cooperatively with state, county, municipal, and business stakeholders as well as the general public. Several regional corridor planning studies are completed each year based on needs identified in the Long-Range Plan and the Congestion Management Process. DVRPC's corridor studies are targeted analytical studies that address specific needs of a corridor or particular geographic area. They support the initiatives and policies of the New Jersey Department of Transportation and Pennsylvania Department of Transportation, and are responsive to the needs of county and municipal governments.

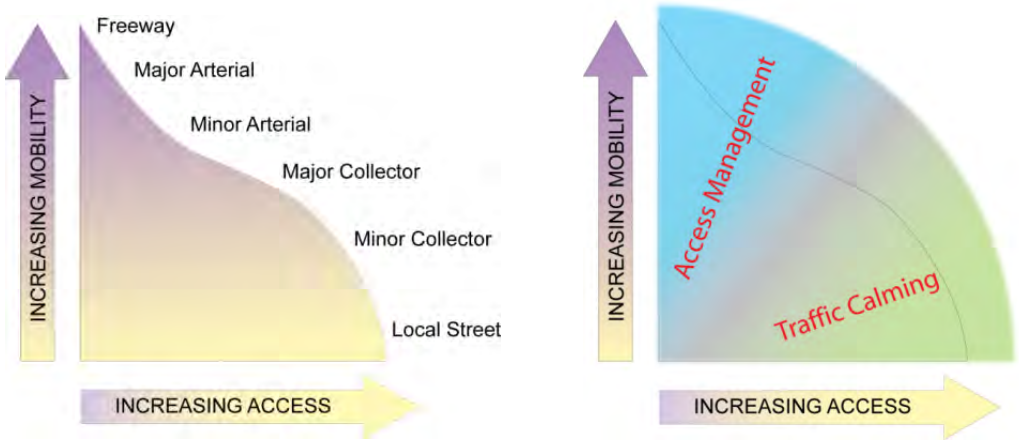
Corridor studies aim to recognize improvements that will increase the accessibility of people and goods. It also identifies effectiveness strategies that promote investments in areas that are either already developed or designated as appropriate for future growth.

Through working with our member governments, we use the best available tools to provide advice and direction based upon evaluations of performance measures, project implementation cost data, and public participation outcomes.

Access Management

Access management involves the proactive management and design of driveways and intersections for the purpose of promoting a complementary relationship between the function of the highway and the accesses along it. The function of the highway ultimately dictates the magnitude of access management that is appropriate. For example, the functions of an expressway and local road are vastly different, and the degree of access management required is reflected. An expressway has the highest degree of access management while a local road has minimal, or no access management. The graphs in **Figure 1** show the relationship between access and highway function, and also the relationship between access management and traffic calming.

Figure 1: Visual Representation of the Access/Mobility Relationship



Source: DVRPC 2008

Access management may be implemented through a variety of methods. Common techniques include minimum driveway spacing requirements, minimum intersection spacing requirements, minimum traffic signal spacing requirements, left and/or right turning lanes, deceleration and acceleration lanes, shared driveways, turn-restricted driveways, and requiring driveways to be located on intersecting streets. These techniques become requirements when codified in municipal zoning and subdivision and land development ordinances. An official map highlighting access requirements is also often beneficial, particularly for multiple parcel access management requirements. When implemented, access management seeks to reduce turbulences affecting highway mobility. They can be applied during construction to minimize the development's impact on highway mobility, or when abutting land is redeveloped or changes use.

There are two primary benefits associated with access management: mobility and traffic safety. Roadway mobility is benefited when turning vehicles are removed from the travel lanes. For mobility, the goal of access management is to allow development to occur along a highway without negatively impacting the flow of traffic. It may also be used to prolong the serviceability of a highway that has already developed abutting lands. Traffic safety is benefitted by access management creating a more predictable driving environment.

PennDOT currently works to implement access management along state-owned roads. Pennsylvania Code, Title 67, Chapter 441 defines the access management regulations employed by PennDOT. Through these regulations, PennDOT encourages the implementation of access management across the state; however, these regulations do not fully consider local context or the desires of any one municipality. The 1997 Commonwealth Court of Pennsylvania decision, Ice v. Cross Roads Borough, set a legal precedent for municipalities to enforce their own access management regulations, so long as they are more stringent than those of PennDOT. PennDOT supports municipalities initiating local access management regulations.

Project Background

DVRPC regularly conducts access management corridor case studies. Potential case study corridors are assessed by their inclusion in the regional Congestion Management Process, in addition to other qualitative factors to determine a study's benefit locally and regionally. In January 2009, an Access Management Task Force meeting was held to discuss potential study corridors. DVRPC's Pennsylvania planning partners chose one corridor per county to be studied in the near future. The Ridge Pike corridor was recommended by the Montgomery County Planning Commission.

During the course of this study, Lower Providence Township worked with planners from the Montgomery County Planning Commission to update the township's zoning code for the western portion of the study corridor. The zoning will likely change from a typical Euclidian model to a more complete-street and mixed-use environment including changes to the building standards, setbacks, and street design to permit a denser built environment. The new zoning may contribute to improvements in the affected area. Conducting this study in parallel with the update was beneficial to address access concerns associated with new development.

Related Work

Planning work conducted by DVRPC and other planning and engineering partners relate to this study. The following is a list and discussion of several related works that guided this study.

- Lower Providence Township Comprehensive Plan, 2002
- Shaping Our Future: A Comprehensive Plan for Montgomery County, 2005
- Lower Providence Township Roadway Sufficiency Analysis and Transportation Capital Improvements Plan, 2007
- Gannett Fleming, Second Bridge Crossing Feasibility Evaluation, 2010
- US 422 Corridor Master Plan, Summary Report, 2010 (DVRPC Publication # 09035)
- DVRPC Congestion Management Process, 2011 (DVRPC Publication # 11042A)
- Enhancing Local Mobility in Collegeville, 2012 (DVRPC Publication # 11020)

Lower Providence Township Comprehensive Plan

The Lower Providence Township comprehensive plan, which was adopted in 2002, outlines goals for the township. One of the land use goals is to create a balance between current land use patterns, new development, and recreational and environmental space. The primary transportation goals consist of finding solutions for congestion and encouraging multimodal transportation. Additionally, the comprehensive plan specifies a highway classification hierarchy system. Several specific goals are listed below. The study team used these goals to direct research and recommendations for this project.

- Focus capacity improvements on arterial roads to ensure traffic moves efficiently and safely and does not cut through residential neighborhoods. Review Ridge Pike for right-of-way recommendations, roadway and streetscape improvements, and pedestrian safety.
- Retain the historic streetscape by installing and incorporating a balanced environment for vehicles and pedestrians, including sidewalks, regulations that support shared parking, common driveways, limitation of curb cuts, and techniques that promote traffic flow and safety by limiting turning movements along roads.
- Only allow cul-de-sacs that take access from internal roads of a subdivision containing at least two access points to external roads.
- Provide regional coordination with neighboring communities, the county, and such regional agencies.

Shaping Our Future: A Comprehensive Plan for Montgomery County

The vision for the comprehensive plan for Montgomery County identifies important projects and policies to improve the efficiency and safety of the current system, while providing additional transportation options. To accomplish the vision of the plan, the county, state, region, local municipalities, developers, businesses, and the public should work cooperatively to improve transportation infrastructure. In addition, local land use decisions must effectively take into account transportation needs.[1] *Shaping Our Future* states that a majority of Montgomery County residents drive to their destination, and this will likely remain the case in 2025, and therefore proposes the following transportation improvements for the county. These recommendations were considered for improvements suggested in this report.

- Complete upgrades and connections that address current problems and future traffic growth.
- Increase the frequency of the current public transit system service and connect service to new areas.
- Provide sidewalks in dense residential, industrial, and commercial complexes. Buildings should be located close to roads and parking should be to the side or rear of the buildings.
- Encourage more bicycle use by installing bike lanes or wide shoulders on arterial and collector roads.

[1] Transportation Plan Summary Shaping Our Future, A Comprehensive Plan for Montgomery County, adopted 2005.

Lower Providence Township Roadway Sufficiency Analysis and Transportation Capital Improvements Plan

This study, completed for the township in 2007 and prepared by McMahon Associates, is a Pennsylvania Act 209 – Transportation Impact Fee study. Analyses of roads within the township were undertaken and improvements were identified to maintain mobility given assumed development occurring with a 2016 horizon. The total cost of needed improvements was divided by assumed new trips with an impact fee assigned to each new trip. Several capital improvements were identified for the Ridge Pike corridor, including: capacity widening at Trooper Road, capacity widening at Park Avenue, a new signal at Sunnyside Avenue, signal modifications at both East Mount Kirk and Eagleville Road/ Parklane Road intersections, and a closed-loop traffic signal system along the corridor. The closed-loop signal system has been implemented with the use of CMAQ funds and in cooperation with West Norriton Township. A few turning lanes have been added at intersections and others are proposed with development applications. The study also recommended that Ridge Pike implement better access management to reduce the number of intersections and driveways.

Second Collegeville Bridge Crossing Feasibility Evaluation

The document assesses the feasibility of a second bridge crossing over the Perkiomen Creek, bisecting Ridge Pike in the western section of the study corridor. The report identifies, analyzes, and evaluates the benefits and costs that could be incurred by an additional bridge crossing within Lower Providence Township. The study team used this document as a reference for conceptual renderings.

The US 422 Corridor Master Plan (pamphlet on Lower Providence Township)

The *US 422 Corridor Master Plan* (DVRPC Publication # 09035) is a long-term plan for sustainable growth and development in the greater US 422 corridor area. Pamphlets highlighting unique strategies were created for many corridor municipalities. The pamphlet for Lower Providence Township highlights the need for mixed-use zoning along Ridge Pike and a complete-streets policy to promote travel by alternative modes. The *US 422 Corridor Master Plan* has been endorsed by the Lower Providence Township Board of Supervisors. Similar goals in the pamphlet are referenced and recommended throughout this report.

DVRPC Congestion Management Process (CMP)

The CMP is a systematic process to manage congestion. It identifies specific multimodal strategies for all locations in the region to minimize congestion and enhance the ability of people and goods to reach their destinations. The CMP advances the goals of the regional Long-Range Plan and strengthens the connection between the Long-Range Plan and the regional Transportation Improvement Program. Ridge Pike in Lower Providence is located within the broader US 422 corridor of the CMP. Congestion management strategies specific for this corridor include: signal improvements, turning-movement enhancements, county and location road connectivity, transit-first policy, walking and bicycling improvements, modifications to existing transit routes or services, and new passenger rail investments. Many similar strategies are stated in the recommendations and improvements sections.

Enhancing Local Mobility in Collegeville

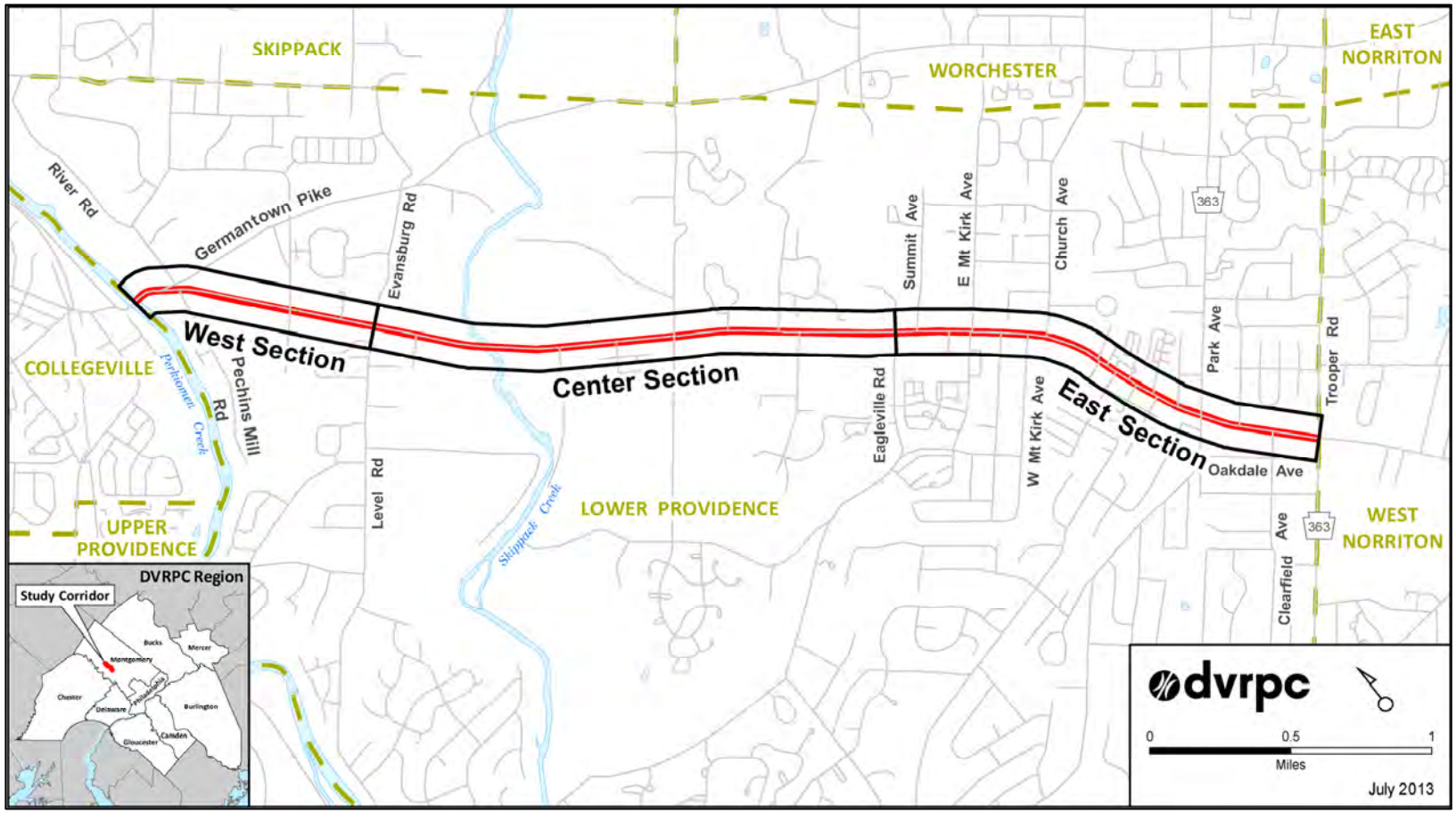
This study was conducted to identify means to improve multimodal mobility in and around Collegeville Borough, including portions of the Ridge Pike corridor in Lower Providence Township. The goals of the study include: closing gaps in sidewalk connectivity, improving the Main Street Perkiomen Trail crossing, establishing Main Street as a bike facility, improving access to the Perkiomen Trail, and working with neighboring municipalities to establish on-road bike facilities with consistent signage. For Lower Providence Township, the study recommends sidewalks between Collegeville and the intersection of Level Road/Evansburg Road, and establishing on-road bike facilities along Ridge Pike and Level Road/Evansburg Road.

Recommendations emanating from this project have considered existing plans.

Overview of the Study Corridor

The corridor for this case study is Ridge Pike (State Routes 0363 and 4031) within Lower Providence Township, Montgomery County in Pennsylvania. Ridge Pike is designated as State Route 363 between Trooper Road and Valley Forge Road and State Route 4031 for the remainder of the study corridor. The western terminus of the study corridor is the border with Collegeville Borough at the Perkiomen Creek. The eastern terminus is the border with West Norriton Township at Trooper Road (S.R. 0363). The corridor is 4.3 miles long and is comprised of an array of differing natural landscapes and abutting land uses. As such, for this study the corridor is divided into three sections, determined by the DVRPC study team based on land use and density, and are discussed independently. Currently, the western section is being considered for a zoning update. The three sections are unique and require different access management strategies. **Figure 2** highlights the study corridor, as well as the three distinctive sections of Ridge Pike.

Figure 2: Study Corridor



East Section - Trooper Road to Eagleville Road/Parklane Drive

This section is defined by dense strip development. From Trooper Road to Eagleville Road/Parklane Drive there is an abundance of access points, both driveways and local streets. The local streets in this area typically provide access to residential neighborhoods. There are sidewalks intermittently located throughout this section, where buildings have recently been developed or redeveloped. A traversable center turn lane or two-way left turn lane exists throughout the eastern section of the study corridor.

Center Section - Eagleville Road to Level Road/Evansburg Road

The eastern portion of the center section is defined by sparse development, while the western portion crosses through Evansburg State Park. At each end there is a signalized intersection, the only two within the section. The speed limit is 45 mph throughout the majority of the Evansburg State Park and many vehicles operate at even higher speeds. A climbing lane exists on Ridge Pike between Eagleville Road and Level Road/ Evansburg Road. Therefore, Ridge Pike is three lanes across Evansburg State Park, which alternate direction from the low point at the Skippack Creek.

West Section - Level Road/Evansburg Road to Collegeville Borough

This section is under consideration for an update to the zoning code. Abutting land uses vary and are typical of an auto-dependent suburban corridor. Near the western terminus, Germantown Pike merges with Ridge Pike. At the intersection of Level Road/Evansburg Road the roadway is four lanes across, two on each side, and the speed limit decreases from 45mph to 40 mph. There are no sidewalks throughout the western section. Due to the unsafe pedestrian environment, there are no permanent bus stops.

Ridge Pike Corridor Demographics

The study corridor has the context of a suburban arterial highway in the Philadelphia metropolitan area. Between Philadelphia and Berks County, Ridge Pike (the name periodically changes across its span) generally parallels the Schuylkill River, I-76, and US 422. Suburban development along the corridor and the greater US 422 corridor has been significant in recent years.

Population and Employment

The population and employment in Lower Providence Township, abutting municipalities, and Montgomery County is forecasted to increase between 2010 and 2040, as is illustrated in **Table 1.** Lower Providence Township population and employment are both forecasted to increase by 12 percent.[2] Similarly, Montgomery County's population and employment are also both forecasted to increase by 12 percent.[3] This growth will shape the future land use patterns within the study area and along the Ridge Pike corridor.

Table 1: Regional Population and Employment Demographics

	Population				Employment			
	2010	2040*	Change in Employment	Percent Change	2010	2040*	Change in Employment	Percent Change
Lower Providence Township	25,436	28,440	3,004	12%	11,926	13,335	1,409	12%
Abutting Municipalities								
Collegeville Borough	5,089	5,376	287	6%	2,423	2,559	136	6%
East Norriton Township	13,590	14,524	934	7%	8,537	10,624	2,087	24%
Skippack Township	13,715	17,587	3,872	28%	4,205	4,955	750	18%
Upper Providence Township	21,219	26,767	5,548	26%	15,963	20,136	4,173	26%
West Norriton Township	15,663	17,193	1,530	10%	8,541	9,375	834	10%
Worcester Township	9,750	12,497	2,747	28%	3,205	3,705	500	16%
Montgomery County	799,874	894,486	94,612	12%	542,264	605,507	63,243	12%

Source: DVRPC 2012

[2] Regional, County, and Municipal Population Forecasts, 2010-2040, DVRPC, 2012
[3] Regional, County, and Municipal Employment Forecasts, 2010-2040, DVRPC, 2013

Environmental Justice

To the degree that federal funding might be involved in aspects of developing or implementing recommendations from this study, it deserves mention that some advance inventorying work was performed in identifying human and natural environments in the study area. As projects are developed, the information may be helpful in engaging selected, targeted residents, helping identify avoidance steps, and preparing for the eventuality of compliance with the requirements of federal mandates.

Federal law Title VI of the Civil Rights Act of 1964 and the 1994 President's Executive Order on Environmental Justice (#12898) states that no person or group shall be excluded from participation in, or denied the benefits of, any program or activity utilizing federal funds. Each federal agency is required to identify any disproportionately high and adverse health or environmental effects of its programs on minority and low-income populations. Metropolitan Planning Organizations (MPOs), as part of the United States Department of Transportation's certification requirements, are charged with evaluating their plans and programs for environmental justice sensitivity, including expanding their outreach efforts to low-income, minority, or other disadvantaged population groups.

DVRPC first developed a method of analysis in 2001, and has since completed several updates. U.S. Census data is used to assess eight degrees of disadvantage (DOD): non-Hispanic minorities, Hispanics, the disabled, carless households, impoverished households, female heads of household with children, and limited English proficiency households. Census tracts with a population that exceeds the Philadelphia metropolitan regional average, or threshold, are considered environmental-justice-sensitive.

DOD was applied to Lower Providence Township study corridor using data from the 2010 Census. The findings indicated that Census tract 206005, which covers the portion of the study corridor between Trooper Road and East Mount Kirk Road, has both elderly and female-head-of-household populations that exceed the respective regional averages. The remaining Census tracts comprising the study corridor all have no disadvantaged population groups exceeding the regional averages. Planning projects requiring federal funding should make special effort to seek input from disadvantaged population groups.

CHAPTER 3

Land Use, Cover, and Management

The relationship between land use and transportation facilities is central to any traffic study. The use of the land, where people live and work, and its intensity is responsible for trip generation. The geographic distribution of uses, and the transportation facilities connecting and serving the uses, are responsible for how trips are made (e.g., by highway, transit, walking, etc.).

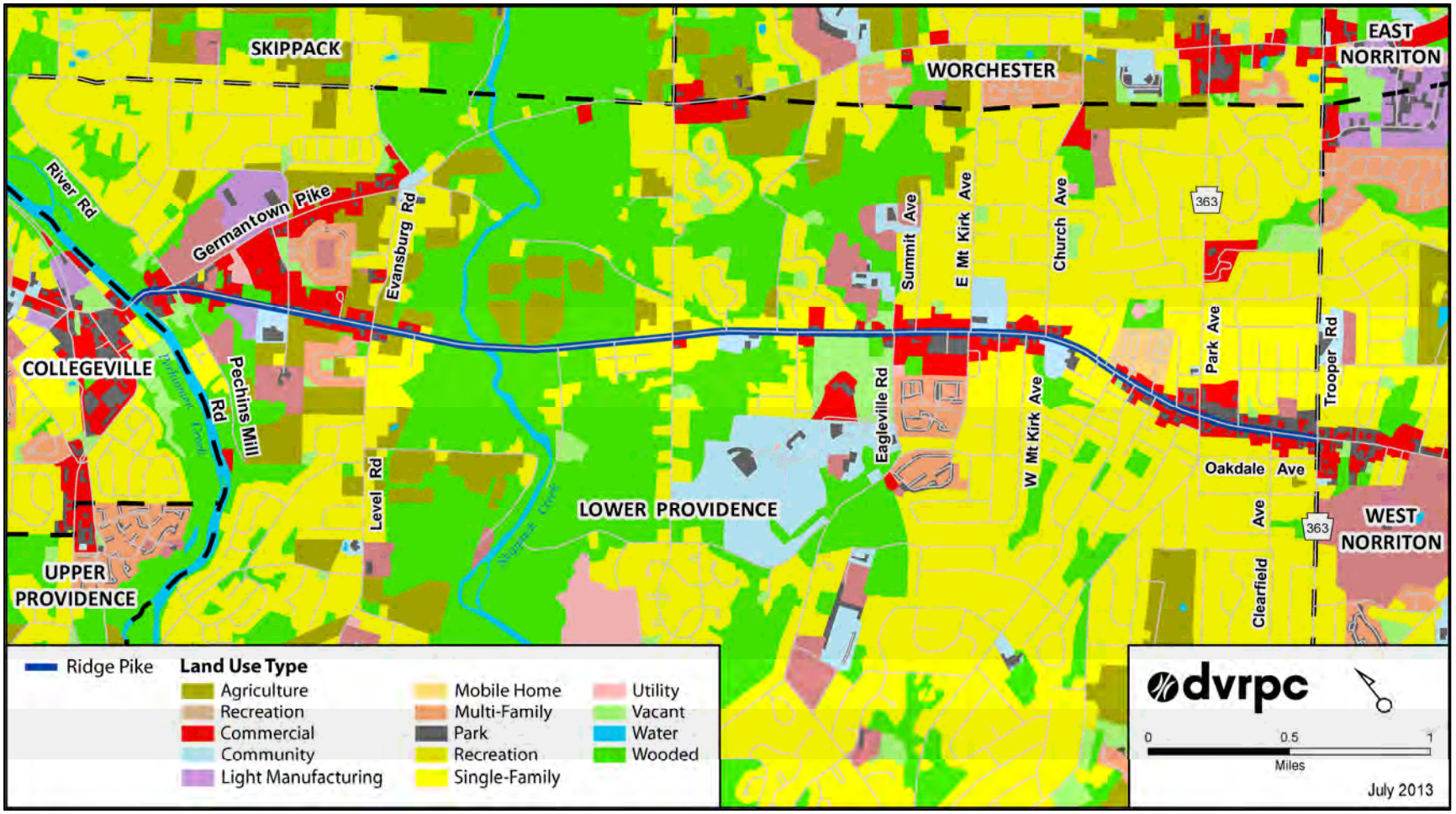
Existing Land Use

Over the past decade, land use in Lower Providence Township has remained relatively unchanged. Single-family detached residential dominated about 50 percent of the total land acreage in 2010. Another significant land use are wooded areas—primarily Evansburg State Park, which accounts for roughly 25 percent of the township. The remaining land uses account for the last 25 percent of the township.

Figure 3 illustrates the land uses along the study corridor and the surrounding area in detail. Abutting Ridge Pike in the eastern section (from Trooper Road to Eagleville Drive/Parklane Road) are typical highway commercial uses, such as car dealerships, banks, gas stations, shopping centers, and restaurants. In the center section, between Eagleville Road/Parklane Drive and Level Road/Evansburg Road, the land is less densely developed. Some commercial developments are adjacent to the eastern portion of the center section, as well as many single-family residential units. The western portion of the center section is mainly Evansburg State Park and is largely undeveloped. Presently, the land use in the western section of the corridor is medium-density highway commercial (Level Road/Evansburg Road to Collegeville Borough). Adjacent to the Ridge Pike are parking lots, strip commercial, and undeveloped land.

Land uses in the study corridor not abutting Ridge Pike primarily consist of residential developments.

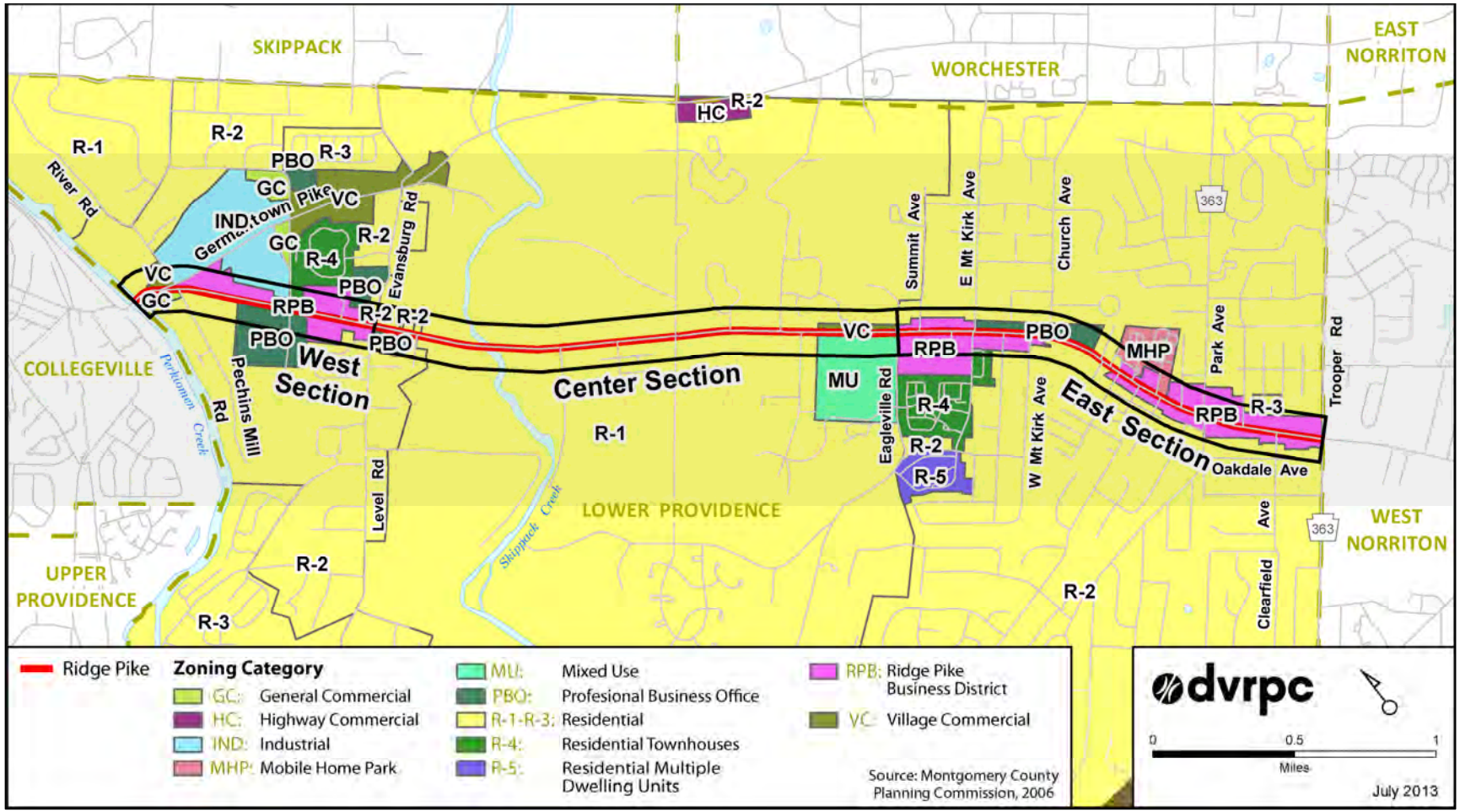
Figure 3: Land Use Map



Zoning

Figure 4 displays the current zoning of Lower Providence Township. Land use and zoning in the township generally reflect each other. Along the Ridge Pike study corridor, there are various types of commercial zoning districts. In the eastern section, there is a combination of professional business office, mixed use, and village commercial. Throughout the center section of the corridor, there is some village commercial and residential. In the western section of the corridor, there is a mix of residential, residential townhouses, and professional business offices. This map does not include zoning overlays.

Figure 4: Lower Providence Township Zoning



Concurrent with this study, the Lower Providence Planning Commission, working with the Montgomery County Planning Commission, is considering zoning changes for the western section of the study corridor due to public water recently becoming available in the area. There is a desire to allow for mixed uses and denser development. The current zoning districts for the western section are not supportive of these ideas.

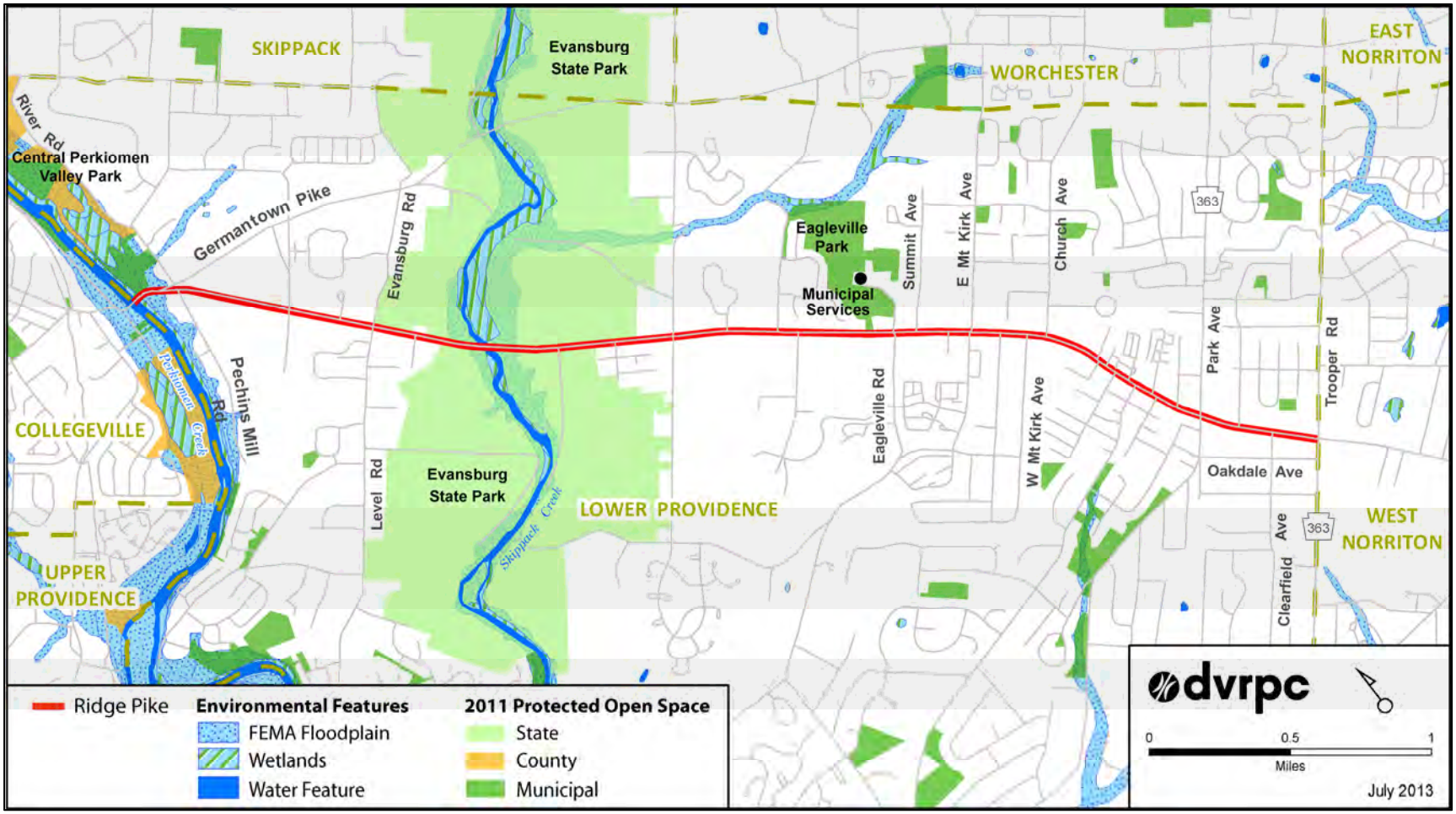
Topographic and Hydrologic Characteristics

The presence of natural features and protected lands can influence development patterns. Development often creates more impervious surfaces, which can lead to accelerated runoff and flooding. In addition, water quality and the natural habitat can be impaired. Natural features in the study corridor are illustrated in **Figure 5** and include protected open space, floodplains, and wetlands.

There are various types of protected areas within a mile of and along the Ridge Pike corridor, including municipal (highlighted in dark green), county (in orange), and state (in light green). **Figure 5** shows Eagleville Park, used for recreation, located close to the municipal services buildings. Central Perkiomen Valley Park, which is a protected county area, is highlighted in orange. Evansburg State Park extends through 10 municipalities, including Lower Providence Township and Collegeville Borough, and to the west connects to the Perkiomen Trail (discussed further in Chapter 5). Evansburg State Park is centrally located along the study corridor, provides recreational opportunities for nearby residents, and attracts visitors to the Ridge Pike corridor.

Throughout the study corridor, there are numerous streams and small ponds. The Perkiomen Creek runs along the border of Lower Providence Township, just west of River Road/Pechins Mill Road and east of First Avenue in Collegeville Borough. The Skippack Creek meanders through Evansburg State Park and converges with the Perkiomen Creek just west of US 422. Adjacent to both of these creeks are floodplain and wetland areas.

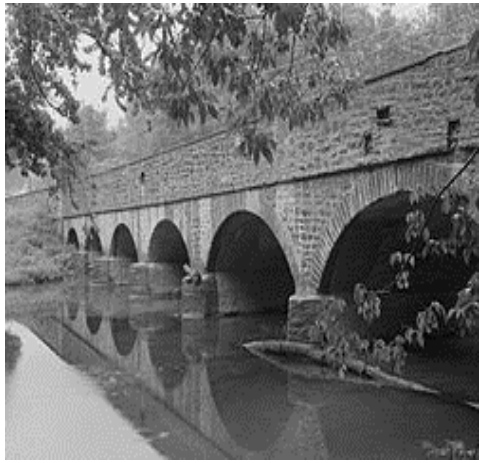
Figure 5: Natural Features



Cultural and Historical Features

There are many cultural sites located within the study area. Cultural landmarks in the study corridor include private and public schools, colleges and universities, municipal service buildings, parks, and police and fire locations. There is also a public swim and golf facility located just east of the study corridor along Egypt Road.

There are several historic sites that are on the National Register for Historical Places in Montgomery County due to their historical architecture: Perkiomen Bridge Hotel (Collegeville), Perkiomen Bridge (border of Collegeville and Lower Providence), and Skippack Bridge (Lower Providence). Special consideration may need to be given to transportation and land use projects that impact these locations.



Photos showing the historical Perkiomen (top) and Skippack Bridges (bottom), retrieved from Wikipedia.org 2013

Transportation Network

Ridge Pike Characteristics

Ridge Pike in Lower Providence is functionally classified as a principal arterial highway. Traffic levels range from an annual average daily volume of approximately 13,700 (2012) vehicles in the eastern corridor to roughly 11,065 (2010) vehicles per day near the western terminus—while west of where Ridge Pike and Germantown Pike merge there are about 22,300 (2010) vehicles. **Figure 6** shows volume counts collected along the study corridor from 2010 to 2012. There is a significantly higher count of 22,513 (2012) vehicles west of Trooper Road approaching Park Avenue. This may be a result of vehicles using the PA 363 corridor to commute from US 422. The study corridor has varying characteristics that were noted by the DVRPC study team during observation and inventory, and are listed below and illustrated in **Figure 7**.

- Along the corridor there are sparse sidewalks.
- Curbs exist along Ridge Pike for the majority of the corridor, except through Evansburg State Park.
- There is a shoulder present along roughly two-thirds of the corridor.
- Ridge Pike has climbing lanes through Evansburg State Park.
- There is a traversable, often two-way left-turn lane center median present along much of the corridor.

Photos illustrating Ridge Pike existing road conditions

Figure 6: Study Corridor AADTs

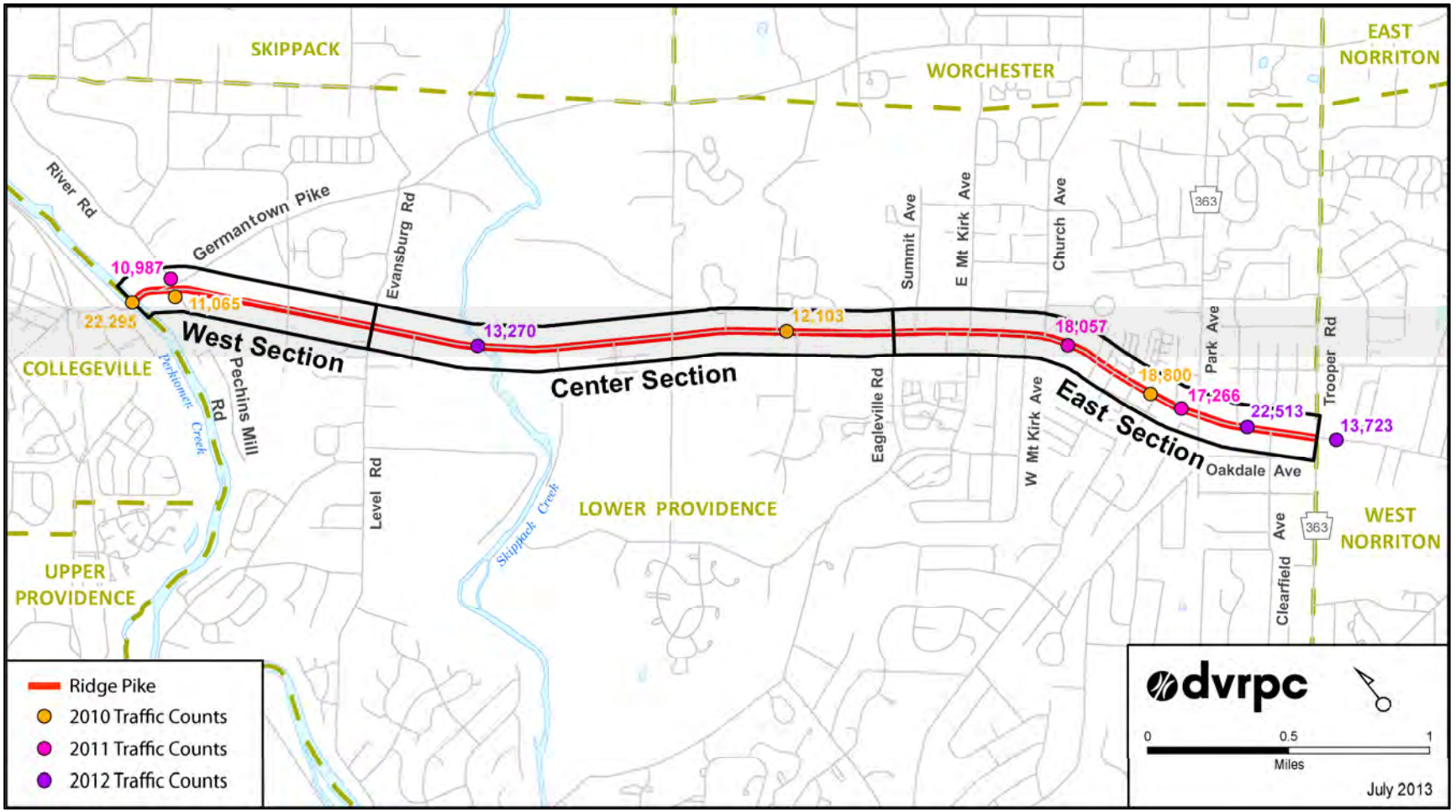
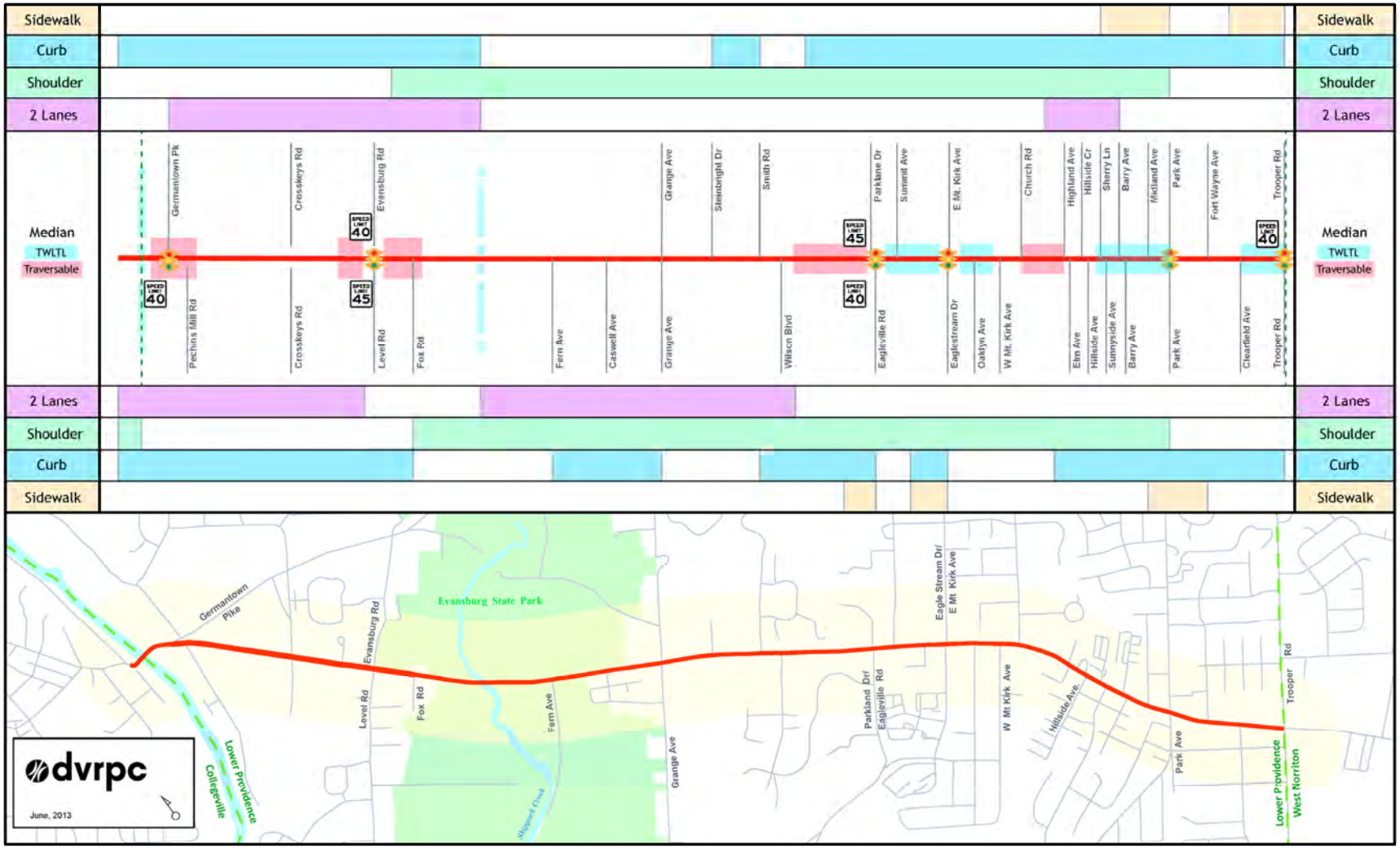


Figure 7: Ridge Pike Straight Line Diagram



Locally Significant Routes

Major Parallel Routes

- Germantown Pike (and Avenue) extends between Philadelphia and Lower Providence Township, paralleling Ridge Pike. Its functional classification is principal arterial highway in Lower Providence Township. Germantown Pike merges with Ridge Pike near the western terminus of the study area.
- US 422 parallels Ridge Pike throughout the study area to the south. It is a limited-access freeway extending between Upper Merion Township and Pottstown Borough. North of Pottstown Borough, US 422 continues as principal arterial highway. During the course of this study, stakeholders noted that when incidents occur on US 422 traffic is often diverted onto Ridge Pike.

Major Perpendicular Routes

- PA 363 approaches the study corridor from the southeast as Trooper Road. It shares the Ridge Pike alignment west to North Park Avenue, where it continues north. The shared alignment covers approximately four-tenths of a mile. The entire length of PA 363 stretches between US 422 and Lansdale Borough.

The top photograph shows the intersection where Ridge Pike and Germantown Pike converge. The bottom photograph illustrates existing road conditions on Germantown Pike.

Traffic Mobility

Balancing traffic mobility and access is an important task to efficiently manage the flow of traffic along the study corridor. Recently, DVRPC, along with PennDOT, Montgomery County, Lower Providence Township, and neighboring municipalities, conducted a study to determine the value of closed-loop traffic signals in the area. In the end, closed-loop traffic signals were determined to be appropriate for the corridor and were subsequently implemented. Along Ridge Pike in Lower Providence Township, two closed-loop systems operate. The first extends from West Norriton Township into Lower Providence as far as Eagleville Road. The second system is primarily in Collegeville Borough, extending one intersection (Germantown Pike) into Lower Providence Township. The Level Road/Evansburg Road intersection traffic signal is the only one along the corridor not tied to a closed-loop system. The system allows township police staff to monitor traffic, and change between signal timing schemes that favor a particular direction, or account for an incident on US 422.

To gauge the effectiveness of the closed-loop traffic signal system, the study team measured travel times across the corridor before and after implementation. The results, shown in **Table 2** for Ridge Pike between Trooper Road and Wilson Boulevard, indicate that the Ridge Pike corridor has benefited from the closed-loop traffic signal system. Travel-times for the western closed-loop traffic signal system are not relevant due to the lack of a complete roadway segment being in Lower Providence Township.

Table 2: Closed-loop Traffic Signal System Travel Time Results (Trooper Road to Wilson Boulevard)

	Travel Time (seconds)		
WESTBOUND	**Before**	**After**	**% Improvement**
AM Peak	305	258	15%
Midday	371	300	19%
PM Peak	725	680	6%
EASTBOUND			
AM Peak	582	374	36%
Midday	230	172	25%
PM Peak	223	181	19%

Source: DVRPC 2013

For many intersections across the study corridor, manual turning-movement traffic counts were conducted. Using the Synchro traffic simulation files from the closed-loop project with updated traffic volumes, vehicular level of service was calculated. The results are shown in **Table 3**. Level of service is a grade that corresponds with delay at an intersection. An 'A' would be assigned to free-flow conditions, while an 'F' signifies a breakdown in traffic flow. The level of service shown in **Table 3** is based on the average vehicular delay on all approaches. Individual approaches may operate better or worse than the overall intersection. Many intersections along major arterials operate as 'E' or 'F' during peak periods.

Table 3: Signalized Intersection Level of Service Summary

Intersection with Ridge Pike	Level of Service	
	AM Peak	PM Peak
Trooper Road	D	E
Park Avenue	D	F
Eaglestream Drive	E	F
Eagleville Road	D	D
Evansburg Road	C	C
Germantown Pike	B	F

Source: DVRPC 2013

In summary, to improve mobility, the township implemented two closed-loop traffic signal systems that have reduced travel time across the eastern portion of the study corridor. Some congestion exists along the study corridor during peak travel periods, particularly during the afternoon peak. However, it is no more significant than what might be expected for most arterial highways in the Delaware Valley region.

Traffic Volume and Heavy Vehicle Analysis

Heavy vehicles, typically short school buses and trucks are a common sight along the study corridor. Climbing lanes are present through the Evansburg State Park valley to accommodate heavy vehicles on the roughly 5.8 percent gradient. As part of the data collection effort for this study, DVRPC conducted vehicle classification counts to provide a basis for the degree to which heavy vehicles must be considered in the planning process. **Table 4** summarizes the results of the vehicle classification counts, collected in August 2012, in morning and afternoon peak periods as well as an all-day total.

Table 4: Ridge Pike Vehicle Classification Count Summary

	Ridge Pike - Eastbound			
Time of Day	**Total**	**# of Cars***	**# of Trucks****	**% Trucks****
6 - 9 am	5,542	5,192	351	6%
3 - 6pm	6,379	6,115	264	4%
All day	24,496	23,184	1,316	5%
	Ridge Pike - Westbound			
6 - 9 am	3,649	3,350	300	8%
3 - 6pm	4,123	3,913	210	5%
All day	14,440	13,452	988	7%

*Cars are defined as motorcycle, car, and pickup.

Source: DVRPC, 2013

**Trucks are defined as Bus, 2-axle light truck, 3-axle single unit, 4-axle single unit, 3-axle single trailer, and 4-axle single trailer.

The following conclusions can be assumed from the classification count data.

- The ratio of heavy vehicles is typical of a suburban corridor in the Delaware Valley region. [4]
- In all time periods, the eastbound direction experiences a heavier volume of heavy vehicles.

An analysis of heavy vehicle speed versus car speed was conducted along Ridge Pike for eastbound traffic near Grange Avenue. The grade was measured at 5.8 percent, and the speed limit is 45 miles per hour. The analysis found that heavy vehicles traveled on average 24 percent slower than cars on this grade (48 and 37 miles per hour, respectively).

[4] VISSIM Standards Project, DVRPC, 2013.

Public Transit Service

Public transit plays an important role in mobility along the study corridor. Two Southeastern Pennsylvania Transportation Authority (SEPTA) bus routes operate on or across Ridge Pike in the study area. There are few bus shelters along Ridge Pike, although the ridership is significant for suburban routes. The Norristown Regional Rail Line has its western terminus approximately four miles east of the study corridor. License plate surveys conducted by DVRPC in 2011 and 2012, found a total of 65 Lower Providence Township resident's vehicles (on typical weekdays) using the parking facilities at Norristown Transportation Center, Main Street, or Elm Street regional rail stations. There are two model bus types that operate along this corridor; the New Flyer Hybrid and Nova Hybrid bus, which are both are 40 feet long. The New Flyer Hybrid can accommodate 39 seated passengers and 27 standees while the Nova Hybrid bus can seat 40 passengers and hold 28 standees. The following are the two SEPTA bus routes that operate along the study corridor in Lower Providence Township.

- **Route 91** operates on Ridge Pike and provides three round trips on Saturdays between Norristown Transportation Center and Graterford State Prison in Graterford.
- **Route 93** operates along Ridge Pike and provides service between Norristown and Pottstown and is the primary route that operates in the study corridor. **Table 5** illustrates daily ridership counts (boards and alights) in Lower Providence Township in 2012 along this bus route. On weekdays, headways are 30 minutes during peak periods and one-hour during off-peak hours. On Saturdays headways are about an hour, and on Sundays are between one and two hours.

Top and bottom photos show bus stop conditions on Ridge Pike within the study corridor.

Table 5: SEPTA Bus Route 93 Stop Level Boards and Alights (2012)

Stop Location	Eastbound	Westbound	Total
Trooper Road and Ridge Pike	24	21	45
Clearfield Avenue and Ridge Pike	16	15	30
Park Avenue and Ridge Pike	21	29	51
Eagle Stream Drive/E. Mount Kirk Avenue and Ridge Pike	30	26	56
Parklane Drive/Eagleville Road and Ridge Pike	48	19	67
Wilson Boulevard and Ridge Pike (Evansburg State Park)	8	4	7
Level Road/Evansburg Road and Ridge Pike	12	N/A	12
3rd Avenue and Main Street (Collegeville Borough)	43	28	71

Source: DVRPC and SEPTA, 2012

Table 5 illustrates that ridership is distributed throughout the study corridor. The boards and alights increase at the stops west of Trooper Road. However, there are more daily riders traveling eastbound, a total of 196, compared to 143 riders going westbound. The peak stop location within Lower Providence Township is at Parklane Drive/Eagleville Road and Ridge Pike, where there are municipal services and recreational fields. Boards and alights dip within the segment in the vicinity of Evansburg State Park. Currently, there are no permanent bus stops from the Level Road/Evansburg Road and Ridge Pike intersection.

Where there are no bus stop signs posted between Level Road/Evansburg Road and the Perkiomen Creek, operators are permitted to make "flag stops" where they can identify a safe location. Generally these take place at or near the intersections of Cross Keys Road or Germantown Pike. The difficulty with operator discretion is that it can vary from one operator to another, based on real time conditions and their own interpretation of safety. Formalizing stops is preferable and SEPTA would like to do that in these areas, but the roadway design does not support it at this time.

For much of the study corridor, travel by public transit is not convenient. Residential areas are often separated from Ridge Pike and a connected sidewalk network is lacking. Planning for pedestrian mobility (mixed land uses and connectivity) may provide the added benefit of increased transit ridership, and thereby a reduction in single-occupant vehicle trips. DVRPC published the *SEPTA Bus Stop Guidelines* (#12125) report in October 2012, which provides municipalities, developers, and other partners with a reliable set of guidelines for redesigning surface transit stops. There are 21 bus stops along Ridge Pike in Lower Providence which could use passenger improvements. The report suggests three curbside essentials for passenger facilities.

Photos of passengers waiting at bus stops at West Mount Kirk (top) and Clearfield Avenue (bottom) on Ridge Pike.

- First, provide a loading area with ample space for boarding and alighting passengers. At a minimum, the loading areas should be five feet wide along the curb by eight feet deep, as is the ADA standard. The majority of bus stops along Ridge Pike do not have well defined loading areas, as illustrated in the top photo of the bus stop at West Mount Kirk Avenue and Ridge Pike.
- Second, install an adjacent waiting area that is wide enough at the curbline to provide a safe place for passengers waiting outside of the loading area. Distinct waiting and loading areas speed up passenger movements, reducing dwell time at bus stops. Commonly along Ridge Pike, the area is small between the bus stop and the adjacent development, shown in the bottom photo at Clearfield Avenue and Ridge Pike.
- Third, at a minimum, a four-foot wide connecting pedestrian path should be provided to passengers from the bus stop/waiting area to the surrounding development. A majority of the bus stops along Ridge Pike do have a pedestrian pathway close by the bus stop, but fail to have the link between this pathway and the bus stop.

Transit facilities that have amenities, including benches, signage and information systems, shelters, bike racks, publication racks, and lighting, provide passengers with comfort and access to information at bus stops. **Table 6** provides a summary of the Ridge Pike study corridor bus stops. There are a total of 21 bus stops in the study corridor with only three shelters, three benches, and eight curb cuts. Guidelines highlighted in the *SEPTA Bus Stop Guidelines* could be used to improve bus stops along Ridge Pike and possibly encourage more public transportation use.

Table 6: Summary of Corridor Bus Stops

Bus Stop Location	Bus Routes Served	Direction Served	Shelter Present		Bench		Curb Cut	
			EB	WB	EB	WB	EB	WB
Trooper Road	91/93	EB/WB	No	No	No	No	No	No
Clearfield Avenue	91/93	EB/WB	No	No	No	No	Yes	No
Park Avenue	91/93	EB/WB	No	No	No	No	Yes	Yes
Barry Avenue	91/93	EB	No	No	No	No	Yes	No
Church Road	91/93	EB	No	No	No	No	No	No
W. Mt. Kirk Avenue	91/93	EB/WB	No	No	No	No	No	No
Eaglestream Drive/E. Mt. Kirk Avenue	91/93	EB/WB	Yes	No	Yes	No	Yes	No
Eagleville Road/Parklane Drive	91/93	EB/WB	No	No	No	No	No	No
Wilson Boulevard	91/93	EB/WB	No	No	No	No	No	Yes
Montgomery County Correction Facility (Eagleville Road)	93	EB/WB	Yes	Yes	No	Yes	Yes	Yes
Level Road/Evansburg Road	91/93	EB	No	No	No	No	No	No
Crosskeys Road	91/93	EB	No	No	No	No	No	No
Germantown Pike	91/93	EB	No	No	No	No	No	No
Totals	**2 routes served**	**21 stops**	**2**	**1**	**2**	**1**	**5**	**3**

Source: SEPTA 2010, DVRPC 2012

Pedestrian and Bicycle Facilities

There are few nonmotorized facilities along Ridge Pike in the study corridor. Installing sidewalks, bike lanes, and connecting trails along the corridor would provide missing access links from various land uses, such as from one commercial use to another or from a commercial use to a residential use.

The Montgomery County Bicycle Mobility Program is supported by Lower Providence Township, and suggests designing and constructing on-road bike lanes along Ridge Pike in the study corridor. Ridge Pike and Trooper Road are both proposed as primary routes for bike lane installation. In addition, the Lower Providence Township Planning Commission suggests that it will consider designating certain road segments as sidewalk-priority areas, where sidewalk implementation is most important. This includes Ridge Pike in its entirety.

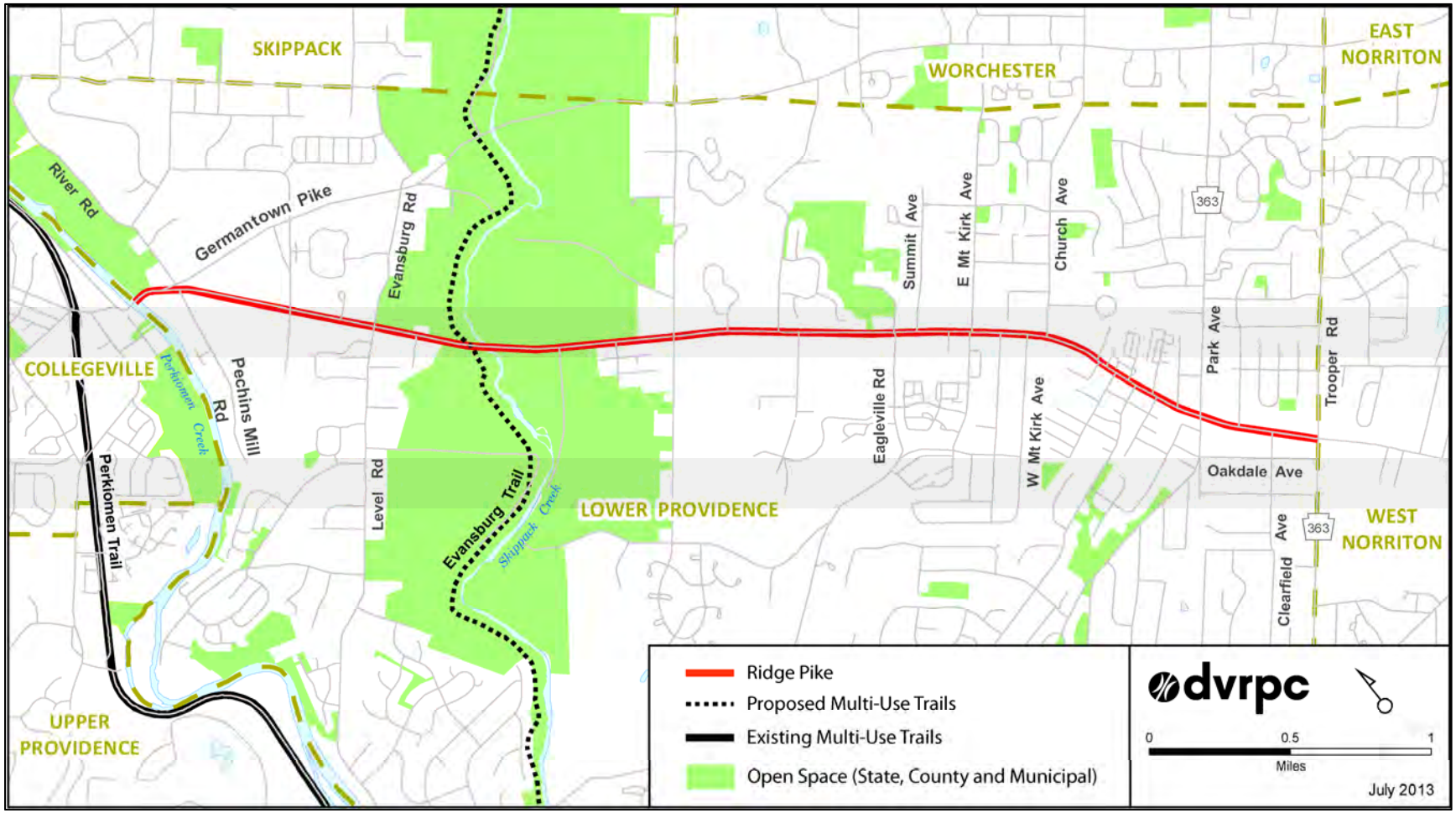
DVRPC published the report *Enhancing Local Mobility in Collegeville* (DVRPC Publication # 11020), which proposes ways to improve the bicycle and pedestrian environment in Collegeville and the surrounding area, including Lower Providence along Ridge Pike.

- On-road bicycle facilities improvements
  - The Perkiomen Trail is a nonmotorized facility with a trail entrance just outside of the study area; however, the lack of on-road bicycle facilities and accompanying signage prevents trail users from exploring areas beyond the trail. To determine the correct type of on-road facility, the referenced report recommends further analysis of the road geometry, traffic volumes, and other factors. In addition, the study proposes adding connectors, or smaller, more bicycle-friendly accommodations along roads, which would connect designated facilities or attractions where appropriate signage is recommended to guide cyclists to destinations.
- Sidewalk network improvements
  - During outreach via the DVRPC website, respondees stated that there were missing links in the sidewalk network. The study found that these significant sidewalk gaps exist and should be considered priorities. The sidewalk gaps identified in Lower Providence along Ridge Pike are between the Perkiomen Creek and Level Road/ Evansburg Road. Although the Perkiomen Bridge has an existing pedestrian path, there is no connection between this area and the rest of Ridge Pike in Lower Providence Township.

Photo of the Perkiomen Trail entrance in Collegeville, PA

Figure 8 highlights the existing and proposed multiuse trails in the study corridor, which can be used for both commuting and recreational use. The existing Perkiomen Trail (19 miles long) begins at the junction near Schuylkill River Trail in the Valley Forge National Historic Park in King of Prussia and runs along the Perkiomen River northwest until it reaches Green Lane Park. The proposed Evansburg Trail would begin south of the study corridor on the Perkiomen Trail running through Evansburg State Park, connecting with the Perkiomen Trail in Morris, PA. Additional feasibility analysis needs to be completed prior to the Evansburg Trail being a viable multiuse facility.

Figure 8: Multiuse Trails



CHAPTER 5

Traffic Safety

Background

Nationally, at least 21 percent of all fatalities, 52 percent of injuries, and 45 percent of property-damage crashes occur at or near intersections. For this study, DVRPC staff quantified and analyzed crash data along the study corridor to identify problematic intersections. Reportable crash data was obtained from a PennDOT database. A reportable crash is one resulting in injury or property damage, or requiring vehicle towing services. In the four-year period between 2008 and 2011, there were a total of 174 crashes along Ridge Pike within the study corridor. Analysis revealed that 100 of these crashes, or 57 percent, occurred at intersections. **Figure 9** displays the spatial distribution of crashes across the study area. The map includes the ratio of identified crashes at each functional intersection. The ratios display the majority of either angle or rear-end crashes over the one that is the minority of these two crash types. The functional intersection, or crashes included, is the area that extends both upstream and downstream from the physical intersection area (which includes auxiliary lanes and their associated channelization).

Figure 9: Corridor Crash Summary (2008 – 2011)

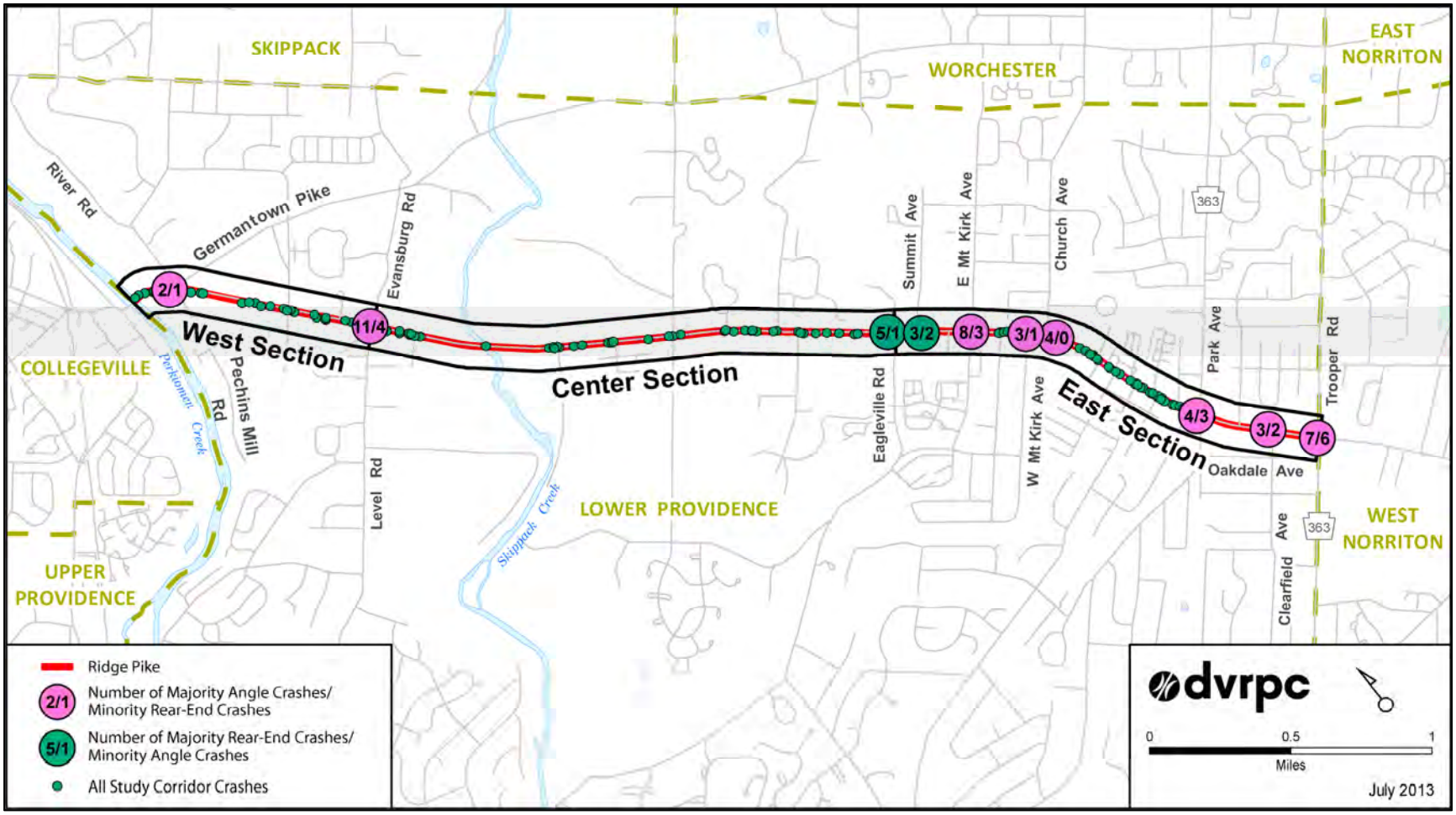


Table 7 summarizes the corridor's crashes, and includes a closer look at the rear-end crashes and angle crashes, which make up 73 percent of the total crashes in the four-year analysis. This is consistent with the rest of the Delaware Valley region, where rear-end and angle crashes from 2008 to 2011 were the most frequent crash types. The most crashes at a single intersection during the period was 18 crashes at Trooper Road. Angle crashes were most frequent, at a total of 39 percent throughout the corridor; with rear-end crashes at 33 percent. The most crashes of one type at an intersection was 11 angle crashes at the Level Road/Evansburg Road intersection. This is likely due to a lack of protected left-turning phases. Redevelopment of the area may provide an opportunity to install turning lanes at the intersection and introduce protected signal phases. The largest concern in regards to traffic safety is vehicle and pedestrian crashes. Along the corridor, there were six such crashes over the four-year analysis period. There was one crash at each of the following six intersections with Ridge Pike: Trooper Road, Clearfield Avenue, Park Avenue, East Mount Kirk Avenue, Summit Avenue, and Parklane Drive. Throughout the study corridor, crosswalks are in place at all signalized intersections. Crosswalks at unsignalized intersections should be striped for crossing the intersecting street and along Ridge Pike to complete the sidewalk network as a benefit for pedestrian safety.

The crash data used in this report was provided by PennDOT for DVRPC's traffic-safety-related transportation planning and programming purposes only. The raw data remains the property of PennDOT and its release to third parties is expressly prohibited without the written consent of the department. Since there is always room for improvement in regards to safety, several recommendations are offered for intersections within the corridor with higher crash rates.

Table 7: Corridor Crash Summary (2008-2011)

Intersection along Ridge Pike	Total Crashes by Intersection	Rear-end Crashes by Intersection	% Rear-end Crashes	Angle Crashes by Intersection	% Angle Crashes
Trooper Road	18	6	33%	7	39%
Clearfield Avenue	10	2	20%	3	30%
Park Avenue	12	3	25%	4	33%
Church Road	6	0	0%	4	67%
W. Mount Kirk Avenue	5	1	20%	3	60%
Eaglestream Drive/ E. Mount Kirk Avenue	13	3	23%	8	62%
Summit Avenue	8	3	38%	2	25%
Eagleville Road/ Parklane Drive	8	5	63%	1	13%
Level Road/ Evansburg Road	16	4	25%	11	69%
Germantown Pike	4	1	25%	2	50%
Total	**100**	**28**	**28%**	**45**	**45%**

Source: DVRPC 2011

Observations and Recommendations

East Section – Dense commercial development

Trooper Road Intersection (signalized)

There is a Burger King on the northeast corner of Trooper Road and Ridge Pike. There are gas stations that are either in use, in construction, or proposed on the other three corners. The southeast corner gas station is being redeveloped, the southwest corner gas station is vacant and for sale, and on the northwest corner is a Sunoco station. A left turn onto Ridge Pike out of the Sunoco gas station into eastbound traffic creates a conflict at this intersection.

Potential Improvement Strategies

- Change access at the Sunoco station by implementing a right-in and right-out driveway.
- Improve lighting and pavement markings to increase driver roadway awareness.
- Reduce sign clutter to decrease motorist confusion.

Clearfield Avenue Intersection (unsignalized)

The Clearfield Avenue and Ridge Pike intersection is approximately 1,000 feet west of Trooper Road. During the morning peak, the study team observed traffic queues eastbound along Ridge Pike beyond the Clearfield Avenue intersection. Drivers use the shoulder on Ridge Pike to turn right onto Clearfield to bypass the intersection at Trooper Road and Ridge Pike to access South Trooper Road. Vehicles speed along Clearfield Avenue, turn left onto Oakdale Avenue, and approach South Trooper Road, where there is inadequate sight distance for drivers turning either direction.

Potential Improvement Strategies

- Increase peak-hour traffic law enforcement.
- Consider the use of traffic-calming devices on Clearfield Avenue to reduce cut-through traffic.

Photos at Trooper Road and Ridge Pike heading northwest, heading east on Trooper Road, and looking west on Ridge Pike showing the queuing traffic on Ridge Pike back to Clearfield Avenue.

- Use pavement striping to define travel lanes on Clearfield Avenue in the vicinity of the intersection.
- Use signage and pavement markings to keep the intersection 'box' clear.
- Improve sight distance by removing vegetation at the intersection.

Park Avenue (signalized)

At Park Avenue, all four approaches have auxiliary right and left-turn lanes and sidewalks that connect to shopping areas. From observation, this intersection operates well, and there are aesthetically distinctive crosswalks. The Shell gas station on the southwest corner has an exit with little room to merge before the stop bar at the signal.

Potential Improvement Strategies

- Close the service station exit on Ridge Pike in the southwest quadrant.

Church Road (unsignalized)

At the intersection of Church Road and Ridge Pike, the arterial roadway begins to slope slightly; drivers turning onto Ridge Pike likely have difficulty seeing past the incline. The top and middle photographs show the driver's view at the stop-line of the intersection. In addition, there is no pedestrian access from the intersection to the existing sidewalk that connects to the commercial land use on the southeast corner. In the afternoon there is a long queue of westbound traffic on Ridge Pike.

Potential Improvement Strategies

- Install advance warning signage due to sight distance concerns.
- Complete sidewalk network at this intersection.

The top two photos are at the intersection of Church Road and Ridge Pike and the third photo is at the West Mount Kirk Avenue and Ridge Pike intersection.

West Mount Kirk Avenue (unsignalized)

At this intersection, the decline in topography continues from the Church Road intersection. Vehicles that are moving toward Ridge Pike on West Mount Kirk Avenue likely have difficulty seeing approaching vehicles when turning in either direction. Vehicles turning right onto Ridge Pike and heading up the incline cannot get up to speed quickly enough. This speed difference is a safety issue.

Potential Improvement Strategies

- Install advance warning signage due to sight distance concerns.
- Enforce vegetation maintenance and sign placement regulations to ensure adequate sight distance for turning vehicles.

Summit Avenue (unsignalized)

Various types of commercial development abut Ridge Pike where this small residential street intersects the roadway. Directly across from Summit Avenue on Ridge Pike is the retail store Eagle Pool and Spa, which has a parking lot with back-out parking in front and does not have curb definitions. The speed limit at this location is 40 miles per hour. Additional parking is available in the rear of the building for customers. There are no crosswalks or sidewalks at this intersection.

Potential Improvement Strategies

- Stripe pedestrian crosswalk on Summit Avenue.
- Seek to eliminate back-out parking on the east side of the intersection in front of the retail store.
- Improve driveway definition in the vicinity of the intersection.

The two photos show the intersection of Summit Avenue and Ridge Pike, illustrating the unlimited access parking spaces on Ridge Pike.

Center Section

Eagleville Road/Parklane Drive (signalized)

This is an offset intersection. There is a protected and permitted signal for left turns on the westbound approach on Ridge Pike. The sidewalks at the intersection seem to begin and end without leading to destinations.

Potential Improvement Strategies

- In the long term, correct the intersection offset by realigning the northern leg of Parklane Drive opposite Eagleville Road (shown in Figure 11 page 42).
- Enforce vegetation maintenance and sign placement regulations to ensure adequate sight distance.
- Seek to create sidewalk continuation and connection from commercial buildings and residential communities to the roadway.

West Section

Level Road/Evansburg Road (signalized)

There are no protected signal phases at this intersection. Traffic queues at this intersection on the minor streets.

Potential Improvement Strategies

- Install north and southbound left-turn lanes and signal phases on the minor legs when redevelopment occurs.
- Investigate protected and permitted phasing for the westbound and eastbound left-turns onto Level Road from Ridge Pike.

The top photo is at Eagleville Road/Parklane Drive and Ridge Pike, and the center and bottom photos are at Level Road/ Evansburg Road and Ridge Pike.

Germantown Pike (signalized)

Ridge Pike and Germantown Pike converge at this intersection. Approximately 300 feet east of this crossing, River Road intersects with Germantown Pike and Pechins Mill Road intersects with Ridge Pike. Additionally, there are several access points present at this juncture that create conflict points.

Potential Improvement Strategies

- Seek to close driveways where feasible in close proximity to the intersection.
- Install pedestrian crossing amenities.
- Long-term work to redesign the intersection by creating a new connection from Germantown Pike to Ridge Pike.

Top photo is the merge of Germantown Pike and Ridge Pike heading westbound, while the bottom photo is the same intersection heading eastbound.

Corridor-wide Safety Recommendations

- Complete the pedestrian network, including sidewalks and uniform pedestrian crossings and signal controls at all signalized intersections. Sections of Ridge Pike with greater than a half a mile between signalized intersections should be considered for well-lit and signed pedestrian crossings.
- All parking lots allowing back-out maneuvers onto Ridge Pike should be placed in a nonconforming status. These lots should be required to be brought into conforming status when the property changes use or is redeveloped.
- Work to remove driveways within the functional area of any intersection (i.e., where left- and/or right-turning lanes are present).
- To the extent possible, new driveways should be located directly across from existing driveways.
- New driveways connecting to Ridge Pike should have adequate throat length to ensure that parking lot congestion does not spill onto the roadway.

Applications for new developments and the associated driveways should be thoroughly analyzed for safety-related concerns and should require strategies to mitigate safety concerns.

Conceptual Plans

For this study, the corridor was divided into three sections, each representing unique context conditions. Conceptual ideas for each section are discussed independently.

East Section

The east section extends between Trooper Road and Eagleville Road/Parklane Drive. The context along this sub-section consists of moderately dense strip development. Many gas stations, restaurants, and shopping centers abut the highway. Additionally, there are several vacant structures and areas of undeveloped land. Developing and redeveloping these properties will allow for near- to mid-term implementation of access management. Ridge Pike consists of one travel lane per direction with a two-way-left-turn lane (TWLTL). At intersections, the TWLTL functions as a left-turn lane.

Appropriate access management strategies along the east subsection include:

- Right-in, right-out driveways in the functional areas of intersections (between the intersection and the beginning of any taper for an auxiliary turning lane);
- Defined throats for driveways, thus removing uncontrolled, open accesses;
- Full access driveways located along cross streets;
- Shared driveways;
- Completed sidewalk network;
- Wide shoulders at bus stops;
- High standards for new traffic signals in this subcorridor;
- Permit only a single driveway connecting to Ridge Pike for each parcel; and
- Minimum standards for driveway throat length to avoid queuing on Ridge Pike.

Figure 10 highlights the conceptual implementation of several access management techniques in the northwest quadrant of the Ridge Pike and Trooper Road intersection. The site was previously an automobile dealership and is currently vacant. The figure presents what a redevelopment of the site may look like if access management plays a major role in the design process. To make traffic along Ridge Pike operate more smoothly, access to the property is provided along both Trooper Road and Ridge Pike, thereby reducing demand at the intersection. To a degree, traffic calming techniques (speed humps or bumps) may be employed to reduce cut-through traffic. Additionally, buildings abut the roadways and the parking in the rear, with barriers of sidewalk, curbs, and trees to make the environment along Ridge Pike more aesthetically pleasing.

Figure 10 also exhibits shared access between multiple land uses, which reduces curb cuts while benefiting traffic safety and mobility. Since queuing already exists heading southbound on Trooper Road toward Ridge Pike, and adding a connection between Ridge Pike and Trooper Road may result in higher traffic volumes, this new configuration may necessitate signalization. A traffic analysis study would need to be completed to determine the potential impacts of this new arrangement.

Figure 10: Trooper Road Redevelopment Scenario

Also to note, as part of the township's Act 209 study (see p.7), a right-turn lane was recently added along eastbound Ridge Pike approaching Trooper Road. Additional improvements, including a northbound right-turn lane along Trooper Road, are planned.

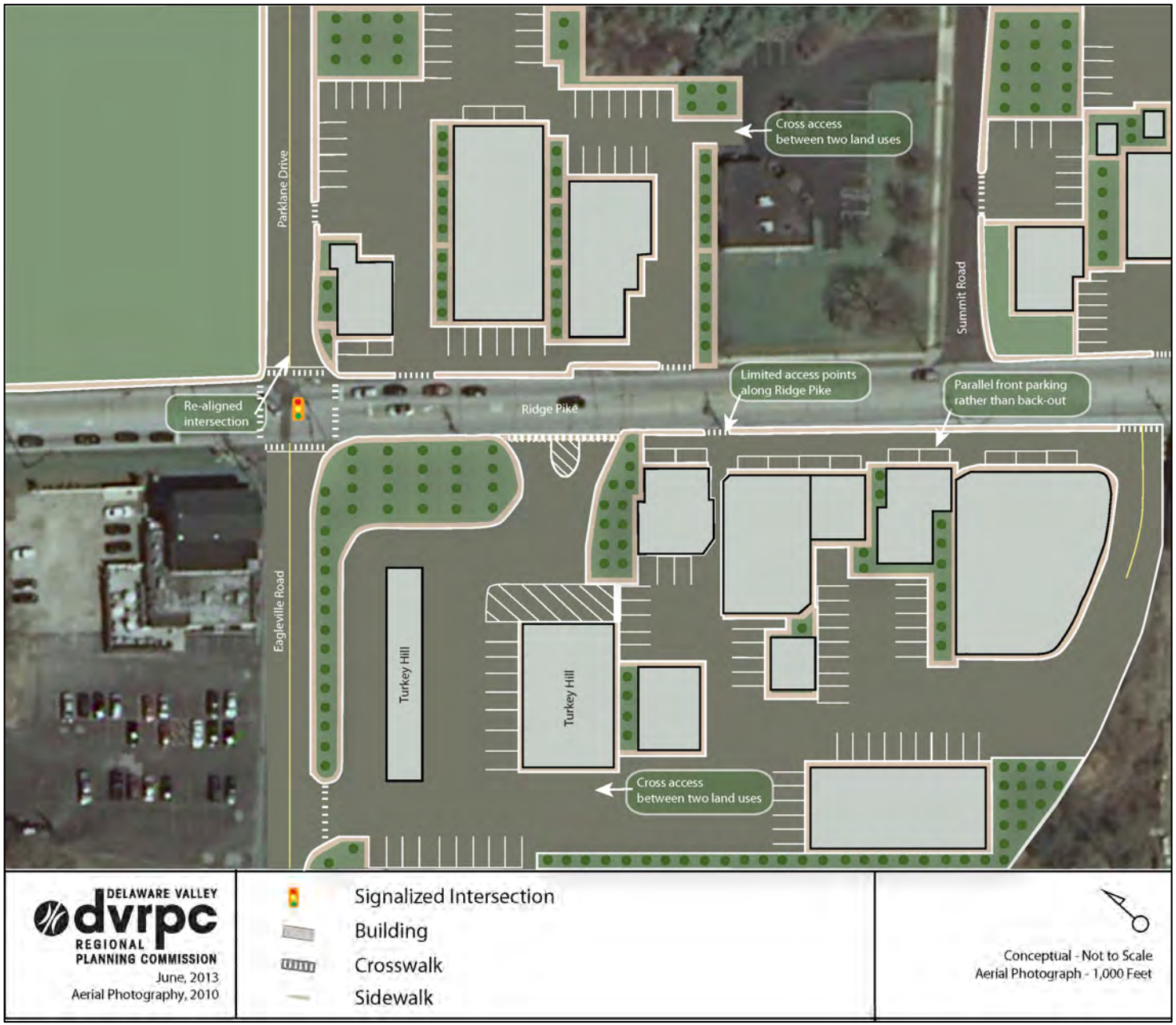
Center Section

This section extends between Eagleville Road/Parklane Drive and Level Road/Evansburg Road and is characterized by low-density development, primarily single-family residences, and Evansburg State Park. The lane configuration along the roadway consists of three travel lanes. West of Skippack Creek, the westbound direction has two travel lanes. East of the creek, the eastbound direction has two travel lanes. The second travel lane serves as a climbing lane due to the nearly six percent grade east and west of the creek. Along Ridge Pike, appropriate access management strategies for this section include:

- No additional single-family residential driveways;
- Acceleration and deceleration lanes at high volume intersections and driveways; and
- New roads should align opposite existing roads, or satisfy minimum spacing requirements (600 feet).

Figure 11 conceptually shows the area between Summit Avenue and Eagleville Road/Parklane Avenue and incorporates access management improvements, which could make the roadway and surrounding area safer for both pedestrians and vehicles. The figure illustrates limiting access along the corridor by consolidating driveways, defining curb cuts, and prohibiting back-up parking onto the arterial.

Figure 11: Center Section Access Management Redevelopment Scenario



West Section

This section extends between Level Road/Evansburg Road and Collegeville Borough. New zoning is being considered for the abutting land uses. The zoning code will likely allow for higher density development, focused in a 400-foot radius around the three intersections. The implementation of an updated zoning code for the area may act as a catalyst for redevelopment, which in turn would allow for significant access management improvements. Appropriate access management strategies for this section include:

- Providing a unique redevelopment opportunity to have full access from minor roads, or new service roads;
- Building a grid network;
- Accommodating bicyclists and pedestrians;
- Developing an official map (see p. 54) to show a new road between Evansburg Road and Crosskeys Road, west of Ridge Pike; and
- Limiting any new traffic signals to the Crosskeys Road intersection, with an exception if a second bridge is constructed.

Figure 12 provides an overview of the entire western section, identifying access management strategies such as protected signal phasing and reverse frontage roads**.** A reverse frontage road is preferred in this location because it could potentially remove local traffic from the arterial and create more of a grid network in this area.

A second bridge crossing the Perkiomen Creek has long been conceptualized, and the idea has been endorsed by the Lower Providence Township Board of Supervisors. This is discussed in the *Second Bridge Crossing Feasibility Study* by Gannett Fleming which also identifies additional road connections to be further evaluated. The current preferred alignment would create a new intersection west of Crosskeys Road shown in **Figure 12** in light orange. Westbound congestion approaching Collegeville Borough would be eliminated or reduced with a second bridge located to the south of the existing bridge. Additionally, any congestion resulting from the Ridge and Germantown Pikes' merge should be substantially reduced.

Figure 13 provides a conceptual overview of the area between Level Road and Crosskeys Road. The figure illustrates denser development, which may occur with new zoning and shared parking, right-in and right-out access, minimal building setbacks, rear parking, preserved open space, and new bus stops. The same figure highlights the use of roundabouts rather than stop signs or traffic signals. The major advantage to roundabouts is that they slow cars, but do not force a complete stop. This creates a safer environment for pedestrians while the traffic operates at a steady speed.

Figure 12: West Section Conceptual Plan

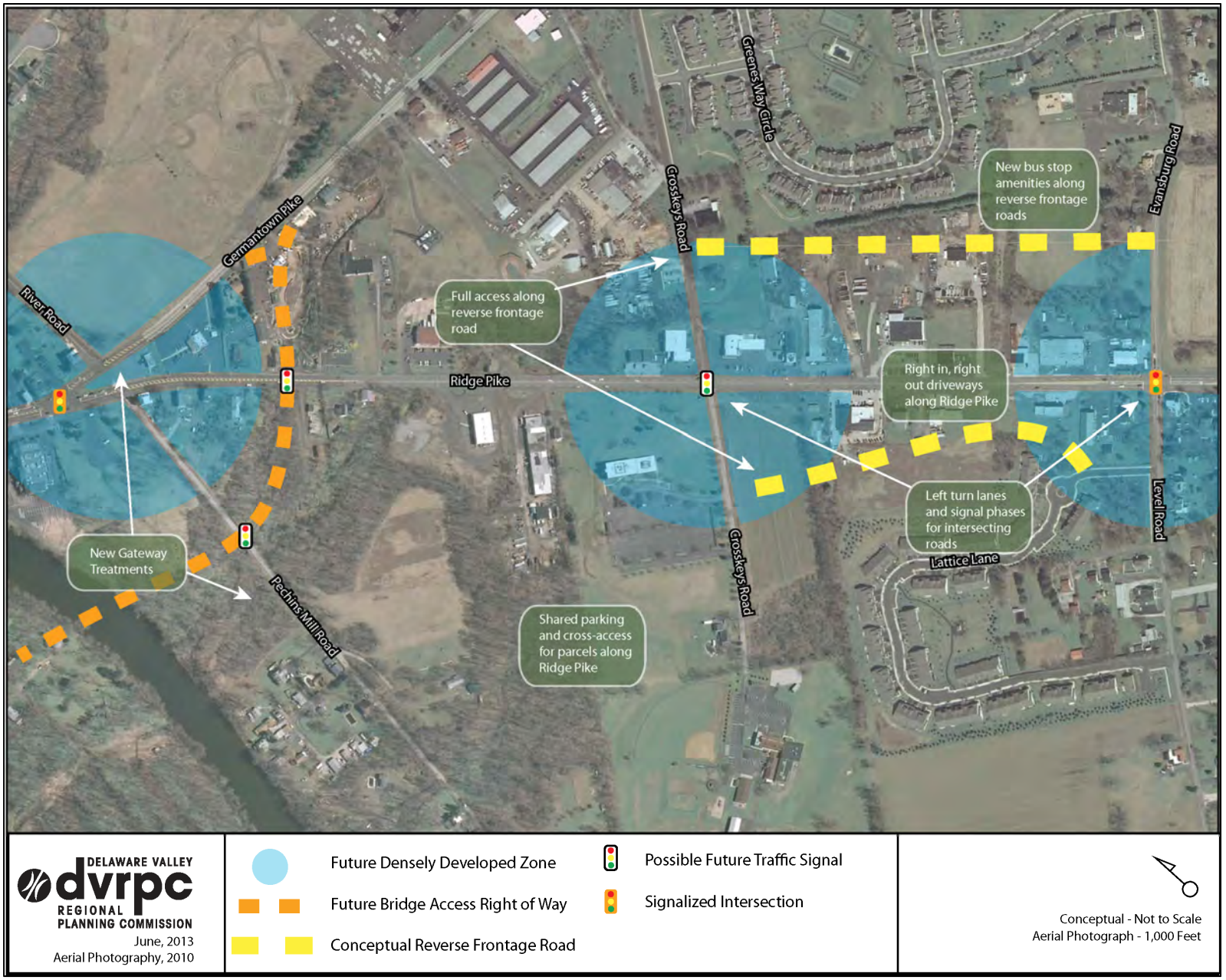


Figure 13: Western Section Access Management Redevelopment Scenario

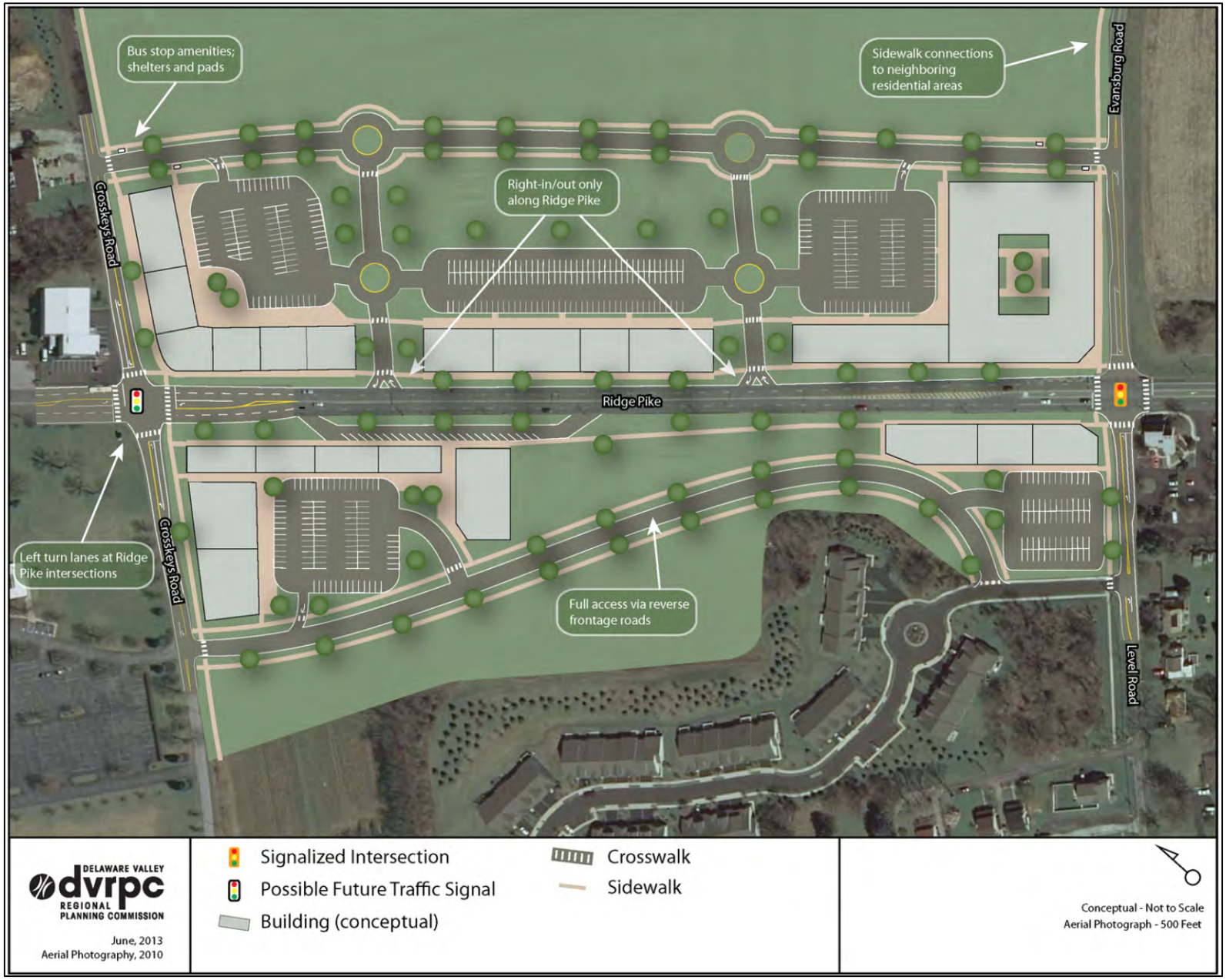


Figure 14: Lower Providence Gateway Concept

The top photograph in **Figure 14** illustrates the current environment at the intersection of Germantown Pike and Ridge Pike. The bottom image in **Figure 14** highlights various streetscape improvements such as sidewalks, street trees, and crosswalks that could be installed to make the intersection more aesthetically pleasing. Creating the landscape buffer between the illustrated sidewalk and the roadway creates a safety barrier for pedestrians. In addition the rendering shows how a gateway could be constructed to create a sense of community and place, which all traffic entering on and exiting on either Ridge Pike or Germantown Pike will be able to view the sign.

Source: DVRPC 2013

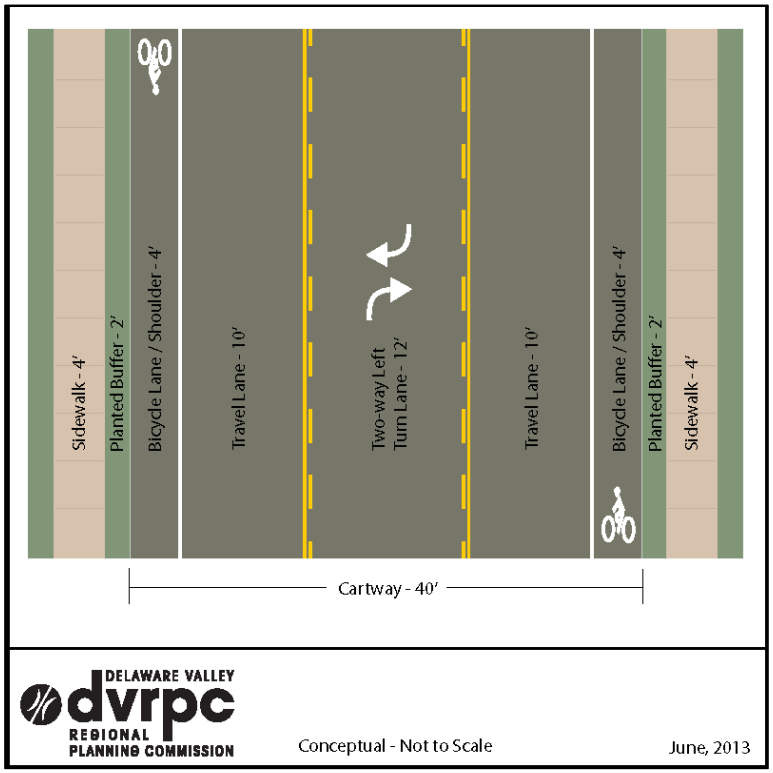
Corridor-Wide Recommendations

Several recommendations are appropriate across the corridor.

- Do not permit any driveway that requires back-in or back-out maneuvers.
- Ensure that the zoning ordinance includes a clause for nonconforming driveways.
- Enforce vegetation control for sight distance at intersections.
- Do not permit new single-family residential driveways along Ridge Pike.

The study team developed a conceptual Ridge Pike cross section shown in **Figure 15**. The concept is a sample section of the roadway, where the cartway width is the most constrained at 40 feet in the eastern section of the corridor. The graphic represents the minimum ideal cross section. Where additional space is available, throughout the park and further west, travel lanes and bicycle lanes can be wider than shown. The cross section highlights the ideas illustrated in **Figures 13 and 14** in the western portion of the study corridor, such as changes to the density through zoning to create a "village" atmosphere. **Figure 15** displays traffic calming techniques, such as connecting shoulders throughout the corridor and "complete streets" ideas, like installing bike lanes and sidewalks. The center two-way left-turn lane should be reconfigured as a left-turn lane at signalized intersections. In areas with heavy pedestrian activity, a wider sidewalk would be preferred.

Figure 15: Conceptual Ridge Pike Cross Section



Conceptual Plan Summary

Several conceptual renderings were completed to highlight the potential for implementation of access management along the corridor. Broad access management regulations were also identified for each of the study corridor's three sections. While township officials will ultimately determine the appropriate degree of access management regulation and practice within the township, the information contained in this chapter is offered as suggestions and examples.

CHAPTER 7

Access Management Regulation

Access management is a set of traffic mobility and safety strategies that are implemented over time. In order to implement access management, municipal regulation needs to be supportive. This chapter presents the findings of an analysis that was comprised of existing municipal regulation, and then provides recommendations where the existing regulation is lacking. Successful implementation of access management requires support in the comprehensive plan, regulation in the zoning and subdivision and land development ordinances, and the use of an official map where applicable.

Existing Regulation

This first section summarizes the existing regulations in the comprehensive plan, zoning ordinance, and subdivision and land ordinances.

Comprehensive Plan

The existing comprehensive plan, titled *Lower Providence Township Comprehensive Plan*, dates from 2002. The comprehensive plan provides support for:

- Limiting the number of driveways;
- Prohibiting cul-de-sacs with access only to a major road;
- Increasing pedestrian amenities;
- Improving bus passenger amenities; and
- Improving options of bicyclists.

While access management is supported, the comprehensive plan does not make specific reference to the term access management. As the Township undergoes the next comprehensive plan update, township officials should ensure that clear and concise support for access management is included. Such language should include a description of access management, the benefits provided by access management for safety and mobility, and a list of the strategies that the township desires to have implemented. This document can be used as a reference in the comprehensive plan update.

Zoning Ordinance

Nine unique zoning districts abut Ridge Pike in Lower Providence Township, with one zoning overlay district representing Evansburg State Park. The Ridge Pike Business (RPB) and Professional Business Office (PBO) districts occupy much of the Ridge Pike frontage, and to properly manage access along Ridge Pike, these two districts should be a priority. The RPB district is solely located along Ridge Pike frontage, and the PBO is almost entirely along Ridge Pike frontage, therefore indirectly affecting other corridors is not problematic. What is of concern is the township's plan to change zoning in the western portion of the study corridor. Changes there should include access management regulations.

While most of the corridor is covered by two distinct zoning districts, two residential districts (R-1 and R-2) also have frontage along Ridge Pike. The regulations for these districts should prohibit residential (single-family) driveways from connecting to arterial highways, such as Ridge Pike.

General Existing Regulation

- §143-71, A. "…parking spaces and access driveways shall be laid out in a safe and efficient method that takes into account the location of access to the property, loading areas, pedestrian circulation and any drive-through facilities."
- §143-157, A (5). The township does not specifically require township-oriented permits for access to state-owned highways. In lieu, the township relies on PennDOT's Highway Occupancy Permit to regulate such driveways.

Ridge Pike Business District Existing Regulation (Article XXXIII)

- §143-257. The legislative intent states goals, such as: provide incentives that require shared access points, cross-access easements, shared parking increased pedestrian connections and a walkable streetscape.
- §143-262, E. An impervious coverage bonus of 20 percent is offered to satisfy three of the following five stipulations:
    - Pedestrian and vehicle connectivity with adjacent properties;
    - The consolidation of two or more properties;
    - Tree planting;
    - Façade renovation; or
    - Bringing façade wall and sidewalk into conformity with the subdivision and land development ordinance.
- §143-263, A. "A maximum of one curb cut of 30 feet is allowed per street frontage."

Professional Business Office District Existing Regulation (Article XVII)

- §143-122, A. Driveways should meet the requirements set forth in the subdivision and land development ordinance.
- §143-122, B. “Spacing of access drives should be 200 feet.”

Zoning Ordinance Summary

Municipalities may regulate access by zoning district, or more generally in the subdivision and land development ordinance (SALDO). Lower Providence Township has selected the SALDO route, as there are few access regulations in the township’s zoning ordinance. While this is an acceptable option, a statement of nonconformance for driveways, if desired by the township, should be located in the zoning ordinance. All other regulations may be found in the SALDO. A unique concern for the township is the proposal to rezone the western section of the study corridor. If completed, this event provides an excellent opportunity to implement a high degree of access management and may be best regulated in the updated zoning ordinance.

Subdivision and Land Development Ordinance (SALDO)

The SALDO is Chapter 123 of the Lower Providence Township ordinance. As the name suggests, the SALDO provides regulation for all aspects of the subdivision and/or (re)development of land. Existing access-management-related regulations are summarized below.

- §123-39, B (2). “Semicontrolled access highways [Ridge Pike] restrict direct access from adjacent properties as much as is reasonably possible and encourages the use of other streets intersecting the highway or the use of marginal access streets to provide access. Grade level intersections will be spaced at large enough intervals to facilitate the safe and convenient flow of traffic.”
- §123-30, B. The township may require a marginal access street (i.e., frontage road) along primary arterials (i.e., Ridge Pike) as necessary to prevent congestion or reduce safety concerns.
- §123-34, Street Intersections. This section provides numerous access-related regulations, including the following:
    - No more than four legs to an intersection;
    - Ninety degree approaches whenever feasible;
    - A 600-foot minimum distance between intersections;
    - One hundred twenty-five-foot sight triangles at intersections;
    - A minimum of a 40-foot arc radii for intersections; and
    - Intersection sight distance must be a minimum of 500 feet.

- §123-36, Driveway Access. This section defers regulation to Pennsylvania Code, Title 67, Chapter 441, which is the regulation that PennDOT uses for the highway occupancy permitting process. Regulations specified include;
    - A minimum spacing of 200 feet between driveways;
    - Driveways must be a minimum of 50 feet from the nearest intersection;
    - The number of driveways is limited to one for properties with 100 feet or less of frontage and for larger properties, no more than two driveways per frontage are permitted;
    - Driveways shall favor the lesser classified street; and
    - Clear sight triangles for driveways must be consistent with those for intersecting streets.

Subdivision and Land Development Ordinance Summary

Lower Providence Township currently does not regulate access beyond the state's minimum requirements.

Recommended Changes

There is opportunity for improvement in the way that Lower Providence Township currently regulates access. Following, by subcategory, are several recommendations for improvement. Over the long term, traffic mobility and safety will benefit from implementing access management strategies. **Appendix A** contains sample ordinance language.

Comprehensive Plan

As was previously mentioned, access management needs to be supported in a municipal comprehensive plan in order for any related regulations to be legally sound. At a minimum, the following statement, or something similar, should be included in the next comprehensive plan update. The township may desire to work with its planning consultant to create a more robust access management section in the comprehensive plan update.

Access management is employed in the Township to provide for efficient circulation within the limits of the existing transportation system. Access management improves public safety and allows for the utilization of the full capacity of roads within the Township. Ultimately, access management creates a more predictable driving environment. Methods for employing access management include: controlling the number and placement of driveways; the sharing of driveways through joint and access to outparcels; ensuring the proper design of driveways; and installing auxiliary turning lanes where necessary. The Township's subdivision and land development ordinance (SALDO) contains access management regulations. In situations where an aspect of access management is not covered in the SALDO, the Township relies on the PennDOT Highway Occupancy Permit process to manage access on state-owned roads.

Zoning Ordinance Recommendations

Aspects of the zoning ordinance are recommended to be improved.

- Create a nonconforming clause for driveways. This is the best means to correct existing poor accesses. Legal, nonconforming driveways would need to be brought into conformance when the property's use changes or intensifies, or the property is redeveloped. Relief may be offered in unique circumstances.
- Specify access restrictions for the western section's updated zoning. This should include the desire for reverse frontage and frontage roads, and right-in/right-out access only along Ridge Pike and shared accessways.
- Minimize building set-back requirements for properties fronting Ridge Pike, thereby promoting rear parking facilities.
- Prohibit new single-family residences that take access from Ridge Pike.

Subdivision and Land Development Ordinance Recommendations

Several recommendations to improve the SALDO are offered.

- Include a statement that defers regulation to Pennsylvania Code, Title 67, Chapter 441 for any aspect of access that is not specifically covered in the SALDO.
- Limit the number of driveways to one and restrict primary access, when possible, to the lesser classified roadway. Driveways along arterial highways should be right-in/right-out whenever possible. For corner parcels, if the intersecting street is signalized, primary access must be taken from the secondary road.
- Whenever possible, prohibit driveways within the functional area of an intersection—where auxiliary turning lanes are present. If not possible, driveways should be turn restricted.
- Incentivize shared driveways, cross access, and shared parking facilities.
- Regulate driveway design for throat length and width. These prevent internal parcel circulation from spilling onto the access street.
- Provide that new driveways along Ridge Pike have deceleration lanes, acceleration lanes when possible, and channelization for turn-restricted driveways.
- Increase the recommended driveway separation to 600 feet and require attempts to secure cross access when not possible.
- Recommend a 1,000-foot separation between existing traffic signals and new ones along Ridge Pike.

- Require the development of properties along Ridge Pike, where an existing bus stop is located, or when the demand associated with the new development may be cause for a new bus stop, to provide sufficient bus stop amenities, including a wide highway shoulder or bus turnout bay, as well as pedestrian accommodations for loading, unloading, and waiting.
- Require any new developments in the township to provide through connectivity with existing streets.
- Require re-use of existing properties along Ridge Pike to produce permits for existing driveways. If a permit cannot be produced, a Highway Occupancy Permit must be obtained and the driveway brought into contemporary conformance.
- Require a floating cross-access easement when properties are redeveloped if cross-access to an abutting property may be appropriate in the future.

Official Map

The Pennsylvania Municipalities Planning Code states that an official map "may show appropriate elements or portions of elements of the comprehensive plan…" (Section 401). If the comprehensive plan thoroughly covers access management, an official map is a useful implementation tool. Lower Providence Township currently does not have an official map that supports the comprehensive plan.

The official map may be used for the long-term access management practices. For this study corridor, an official map would be useful for identifying locations where roads associated with new developments will intersect with existing roads—particularly in the west section. It could also be used to illustrate the township's desire to correct offset intersections.

An official map need not cover an entire municipality. It may cover a single corridor, or a combination of corridors.

Access Management Regulation Summary

Access management, employed at the municipal level, is typically regulated through a combination of means: the comprehensive plan, zoning ordinance, subdivision and land development ordinance, and official maps. Lower Providence Township defers to the state for access management regulation for state-owned roads. For locally owned roads, little regulation is in place. The township should begin with a comprehensive plan update, followed by updates to the zoning and subdivision and land development ordinances. An official map may also be adopted for all or portions of the study corridor. Finally, development and redevelopment of parcels is certain to occur along the study corridor and access can be improved during such events, if the appropriate regulations are in place.

CHAPTER 8

Conclusion and Next Steps

Conclusion

This study was conducted by DVRPC on behalf of Lower Providence Township and Montgomery County in support of PennDOT's ongoing efforts to encourage the practice of municipal-level access management. Lower Providence Township is working with the Montgomery County Planning Commission and is currently considering zoning changes to the western portion of the study corridor. The zoning changes are in response to municipal services (sewer and water) recently becoming available in the area. The new utilities may serve as a catalyst for redevelopment. Although access management implementation is typically long-term, changes in the western portion of the study corridor may expedite this process.

The following is a summary of the work completed for this project.

Chapter 1 provides an overview of access management and the work that DVRPC does to support it at the municipal scale. Existing plans and studies relevant to the study area are reviewed and discussed. Chapter 1 also provides a broad overview of the Ridge Pike study corridor and discusses dividing the corridor into three subcorridors.

Chapter 2 is a brief chapter that presents demographics (population, employment, and environmental justice) for the study area.

Chapter 3 provides an overview of the study area characteristics, including: land uses, zoning, environmental concerns, and cultural and historical features.

Chapter 4 presents existing conditions of transportation in the study area. A straight line diagram for the study corridor is provided that summarizes an inventory of the highway's characteristics. Key modes of travel are included in Chapter 4, including heavy vehicle, public transportation, pedestrian, and bicycle. Travel-time and level-of-service data is also provided.

Chapter 5 explores traffic safety. For the traffic safety analysis, a review of reportable crash data, as well as field visits was completed. Ultimately, a series of potential mitigation strategies were developed for the most crash-prone intersections in the study corridor including: Trooper Road, Clearfield Avenue, Park Avenue, Church Road, West Mount Kirk Avenue, Summit Avenue, Eagleville Road/Parklane Drive, and Level Road/Evansburg Road.

Chapter 6 presents and discusses several conceptual plans for portions of the study corridor focusing on access management in the center section, a future redevelopment parcel for the eastern section of the corridor. For the western section there are concepts for reconfiguration and redevelopment that includes an idea of what the cross section could look like in the most constrained portions of the corridor. Beyond providing the conceptual plans, access management strategies were identified by section and corridor wide.

Chapter 7 summarizes the existing access management regulations employed by Lower Providence Township. The comprehensive plan, zoning ordinance, and subdivision and land development ordinance were all reviewed. Recommendations for each were provided to ensure that appropriate levels of access management are achievable.

Next Steps

Implementing the recommendations of this study is a gradual process, and requires the efforts of Lower Providence Township officials. In regards to the traffic safety recommendations for several intersections (Chapter 5), implementation can be accomplished as opportunities arise, such as during roadway resurfacing or redevelopment in the affected areas.

To implement the access management recommendations emanating from this study the following should be considered.

- Assemble an access management subcommittee or task force represented by township officials, the township traffic engineer, the township engineer, and other interested parties.
- Determine the ideal levels of appropriate access management regulation.
- Work with the township's solicitor or planning consultant to draft zoning, SALDO amendments, and an official map if desired.
- Work to adopt amendments to the comprehensive plan, zoning ordinance, SALDO, and the official map.
- Create a township access permitting process that complements PennDOT's highway occupancy permitting.
- Implement the practice of access management as new development and redevelopment occurs.

Should Lower Providence Township officials desire to move forward with implementing the access management recommendations discussed in this publication, funding assistance is organized on the DVRPC website at www.dvrpc.org/Funding, and at the Pennsylvania Department of Community and Economic Development website http://www.newpa.com/find-and-apply-for-funding/. An additional resource is the pamphlet published by DVRPC called Funding Transportation Safety Improvements that can be accessed at http://www.dvrpc.org/reports/10018.pdf. Lower Providence Township officials can also access the Municipal Resource Guide at http://www.dvrpc.org/asp/MCDResource/ which is a navigation tool to help municipalities locate grants that are applicable to their needs. The Montgomery County Planning Commission may also prove a valuable resource for identifying funding opportunities or in offering technical assistance.

Summarized below are funding opportunities that the municipality could apply for specific recommendations in this report.

- In Chapters 5 and 6, both safety and mobility recommendations are suggested to improve access management throughout the study corridor. Funding resources for both are described below.
  - There are safety improvements recommended by the DVRPC study team such as signage and striping that could be funded by state transportation programs. PennDOT *Appropriation 916* provides funding for preservation, restoration, and maintenance of the roadway system.
  - Another option for similar safety precautions is the *Low-Cost Safety Improvement Program*, where state funding can be used to implement low-cost roadway enhancements.
  - In addition, the state platform Automated Red Light Enforcement Program distributes revenue generated from automated red light enforcement systems for low-cost road safety or mobility projects.
- Lower Providence Township is interested in providing a network of “complete streets” including pedestrian improvements along the Ridge Pike Corridor. The Planning Commission has started rezoning plans for the western portion of the study corridor and will eventually implement them for the entire study corridor. Below are funding resources for the municipality to consider for planning and installing such improvements.
  - The Transportation and Community Development Initiative (TCDI) is a mechanism for municipalities to undertake locally-directed actions to improve their communities, which in turn implements their local and county comprehensive plans and supports the goals and vision of the long-range land use and transportation plan. Projects will lead to more residential, employment, or retail opportunities, improve character and quality of life, attract and retain business and residents, or reduce congestion and improve the efficiency of the region's transportation network. The next TCDI grant round is pending approval by the DVRPC Board. If awarded, the next grant solicitation will take place in Fiscal Year 2015.
  - *Transportation Alternatives (TA)* are Federal highway and transit funds set aside under the Surface Transportation Program (STP) for community-based "non-traditional" projects designed to strengthen the cultural, aesthetic, and environmental aspects of the nation's intermodal transportation system. This resource historically funded many pedestrian and bicycle supportive projects including streetscape improvements which are recommended in Chapter 6 in various renderings.

- Once sidewalks and crosswalks have been installed throughout the study corridor, there will be a need for pedestrian signalization. The PennDOT program *Deployment of Yield-to-Pedestrian Channelizing Devices* offers free devices to municipalities to enhance pedestrian safety at intersections.

- The existing Perkiomen Trail within the corridor is appreciated, and by observation and from stakeholder knowledge, well-used. **Figure 8** (on page 30) illustrates a planned trail through Evansburg State Park which if feasible could be connected to the Perkiomen Trail creating a network. The Regional Trails Program aims to capitalize upon opportunities for trail development providing funding and technical assistance to municipalities for priority trail design, construction, and the planning of trail projects to make a connected trail network throughout the region.

CHAPTER 9

Acknowledgments and References

Acknowledgments

This study benefitted from the assisance of the following individuals:

- Mr. Mike Comroe – Lower Providence Township
- Ms. Randee Elton – Lower Providence Township
- Mr. Rich Gestrich – Lower Providence Township
- Mr. Bud Carroll – Lower Providence Township Police
- Mr. Casey Moore – McMahon Associates, Inc.
- Mr. Leo Bagely – Montgomery County Planning Commission
- Mr. Wes Ratko – Montgomery County Planning Commission
- Mr. Sean Metrick – Montgomery County Planning Commission
- Ms. Susan LaPenta – PennDOT Engineering District 6.0
- Mr. Sean M'Granahan – PennDOT Engineering District 6.0

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APPENDIX A

Sample Ordinance Language

Additional ordinance language is available in the *Access Management Model Ordinances for Pennsylvania Municipalities Handbook* (PennDOT, 2006). Not all recommendations have associated sample ordinance language.

I. Purpose

This ordinance is intended to promote safe and efficient travel within Lower Providence Township by limiting the number of conflict points, providing safe spacing standards between driveways, encouraging shared access between abutting properties, and ensuring safe access by emergency vehicles.

II. Applicability

This ordinance shall pertain to all applications for subdivision and land development approval, or building permits, for lots with frontage along roadways within Lower Providence Township.

III. Nonconforming Driveways

Driveways that do not conform to the access management regulations in this ordinance, or in the SALDO Section X.X, and were constructed before the adoption of this ordinance or the SALDO, shall be considered legal nonconforming driveways. However, nonconforming driveway(s) shall be reconstructed to comply with this ordinance, and SALDO Section X.X under all of the following conditions:

- New driveway permits are requested;
- Modifications to an existing driveway permit are requested;
- The property owner or applicant applies for a change in property use and will generate more vehicle trips than the existing use; or
- An expansion of the existing use will result in an increase in trip generation.

IV. Relationship to PennDOT Highway Occupancy Permit

Issuance of a PennDOT Highway Occupancy Permit (HOP) does not guarantee site plan approval by Lower Providence Township, nor does it deem the plan in conformance with this ordinance. The HOP submittal to PennDOT should not occur before approval to do so by Lower Providence Township. However, upon request of the applicant or request of Lower Providence Township, PennDOT may be brought into the review process to reconcile site design and access issues.

V. Number of Driveways

The functional area of an intersection includes all areas where auxiliary lanes, such as right- and left-turn lanes, exist. Ideally, driveways should not be located within the functional intersection. Access should only be permitted outside the functional area of an intersection.

- If a mixed or single land use abuts two or more intersecting roadways, access should be given to the lower classification.
- Only one access shall be permitted per property. Additional access(es) shall be allowed if the applicant can demonstrate that traffic accessing the site can be achieved safely.
- The municipality shall restrict access to right-turn-only ingress and egress to a state-maintained or local road if safe and efficient movements cannot be accommodated.
- Require a minimum offset distance between driveways or intersections on opposite sides of undivided roadways if they are not directly opposite each other.
- The following driveway spacing standards are desirable for major roadways.

    i. Principal arterial: 600 feet.
    ii. Minor arterial: 400 feet.
    iii. Major collector: 200 feet.

- If the above driveway standards are not met, a system of joint or cross access driveways, frontage roads, or service roads may be required.

VI. Driveway Alignment

Access driveway approaches used for two-way operation shall be positioned at right angles (90 degrees) to the roadway or as near thereto as site conditions permit.

When two access driveways are constructed on the same property frontage and are used for one-way operation, each of these driveways may be placed at an angle less than a right angle, but not less than 45 degrees to the roadway.

VIII. Corner Clearance

Standardizing corner clearance minimizes driveway-intersection conflicts and provides a greater distance for vehicles to merge into through traffic. Corner clearance, at a minimum, should be equal to or greater than driveway spacing standards. On high volume roadways, a longer corner clearance may be necessary to avoid conflicts.

- Access shall be provided to the roadway where corner clearance requirements can be achieved.
- Corner clearance shall meet the following driveway spacing standards that are desirable for arterial and major collector roads:

    i. Principal arterial: 600 feet.
    ii. Minor arterial: 400 feet.
    iii. Major collector: 200 feet.

- If the minimum driveway spacing standards cannot be achieved due to constraints, the following shall apply in all cases.

    i. There shall be a minimum 10-foot tangent distance between the end of the intersecting roadway radius and the beginning radius of a permitted driveway.
    ii. The distance from the nearest edge of the cartway of an intersecting roadway to the beginning radius of a permitted driveway shall be a minimum of 30 feet.
    iii. Access shall be taken from the intersecting roadway with the lesser functional classification.

- If no other reasonable access to the property is available, the driveway shall be located the farthest possible distance from the intersecting roadway. In such cases, directional connections (i.e., right in/right out only, right in only or right out only) may be required.
- The municipality shall require restrictions at the driveway if the municipal engineer determines that the location of the driveway and particular ingress or egress movements will create safety or operation problems.

IIX. Joint and Cross Access

Collectors and local streets provide for short trips within a community. When large areas of business (including multiple parcels and multiple ownerships) are grouped together, joint and cross access easements and joint parking circulation effectively serve as collectors and local streets. These private roadway systems, although not public streets in the traditional sense, operationally serve the same purpose of keeping short local trips off the higher-volume and higher-speed arterials.

Joint and cross access driveways decrease the number of driveways entering and exiting the roadways, thus reducing the number of conflict areas along the roadway. They provide a safer environment to drivers who want to get from one land use to another without having to merge into traffic. In addition, these types of driveways allow desired driveway spacing standards.

- Adjacent nonresidential properties shall provide joint or cross access driveways to allow circulation between sites and land uses.
- The municipality may require a joint driveway in order to achieve the following driveway spacing standards that are desirable for arterial and major collector roads:

    i. Principal arterial: 600 feet.
    ii. Minor arterial: 400 feet.
    iii. Major collector: 200 feet.

- Adjacent nonresidential properties shall provide a joint or cross access driveway to allow circulation between sites wherever feasible along roadways classified as major collectors or arterials in accordance with the functional classification contained in the municipal comprehensive plan. The following shall apply to joint and cross access driveways.

    i. The driveway shall have a design speed of 10 mph and have sufficient width to accommodate two-way traffic, including the largest vehicle expected to frequently access the properties.
    ii. A circulation plan that may include coordinated or shared parking shall be required.
    iii. Elements should be included within the design making visually obvious where abutting properties will be connected to provide cross access.

- The property owners along a joint or cross access driveway shall complete the following.

    i. Record an easement with the deed allowing cross access to and from other properties served by the driveway.
    ii. Compose an agreement with the municipality so that future access rights along the driveway shall be granted at the discretion of the municipality and the design shall be approved by the municipal engineer.
    iii. Create a joint agreement with the deed defining the maintenance responsibilities of each of the property owners located along the driveway.

IX. Internal Access to Outparcels

For commercial and office developments comprised of more than one building site and under the same ownership at the time of application and consolidated for the purposes of development, (Lower Providence Township) shall require that the development, including all outparcels, be served by an internal drive that is separated from the main roadway. Outparcel access shall demonstrate safe, efficient ingress and egress and avoid queuing across other driveways and parking aisles.

XI. Auxiliary Lanes

A vehicle turning into a driveway is most likely decelerating a considerable distance upstream from where the driveway entry is to be made. Therefore, there is a difference in speed between a vehicle slowing to make a turn and one that is not. Auxiliary left-turn and right-turn lanes (or bays) are the most effective means removing vehicles from the through travel lanes and reducing speed differential conflicts.

- At an unsignalized intersection, a right-turn lane shall be considered when any one or a combination of the following conditions exist: 40 or more right turns during the peak hour, speed in excess of 40 mph, or high average daily traffic on the through road (5,000 vehicles per day or more).
- At an unsignalized intersection, a left-turn lane shall be required if the visibility to the rear of a vehicle stopped to turn left into the proposed access does not meet minimum sight distance requirements and no alternative is available.
- At an intersection, a right-turn or left-turn lane should be installed when the operation of the intersection can be improved by installing a turning lane.
- It is important for turn bays on roadways of high functional classification to be of sufficient length to store all arriving vehicles during typical operations. Auxiliary lanes also reduce the potential for rear-end crashes.

XI. Signalized Intersection Spacing

As a general rule, spacing requirements apply to new development and redevelopment. They do not have to be consistent with existing access characteristics.

Closely spaced or inconsistently spaced traffic signals on arterial roadways result in frequent stops, unnecessary delay, increase fuel consumption, excessive vehicular emissions, and higher crash rates. Uniform spacing allows timing plans that can efficiently accommodate varying traffic conditions during peak and off-peak periods and traffic changes that occur over time. Each additional traffic signal per mile reduces speed two to three mph.

- New development should coordinate with those signals that are already installed and in use along Ridge Pike.

XII. Public Transportation Accommodation

Public transportation service is beneficial for connecting people with employment opportunities and reducing the number of single-occupant vehicles. However, frequent bus stops along Ridge Pike adversely affect traffic flow. To better accommodate public transportation service along Ridge Pike, Lower Providence Township requires the following.

- New development or redevelopment of existing parcels along Ridge Pike at locations of existing bus stops shall provide and maintain bus stop shelters. Additionally, a sidewalk connection to the edge of the Ridge Pike cartway is required to accommodate the boarding and alighting of bus passengers.
- Should the township engineer determine that a bus stop location, due to the frequency of stops and/or the number of boarding and alighting passengers, is detrimental to traffic flow, the township may require the construction of a bus turnout bay.

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Abstract: The evaluations summarized in this report were performed in support of PennDOT's statewide effort to promote the establishment of formal access management ordinances for state and local highways. A case study of Ridge Pike in Lower Providence, Montgomery County was conducted and concept plans prepared for the study corridor as a tangible illustration of benefits of planning and implementing access management strategies. In addition, improvement strategies were suggested as a means of mitigating congestion and improving traffic safety.

Staff Contact:

Amy Bernknopf
Transportation Planner
☏ (215) 238-2845
abernknopf@dvrpc.org

Delaware Valley Regional Planning Commission
190 N. Independence Mall West, 8th Floor
Philadelphia PA 19106
Phone: (215) 592-1800
Fax: (215) 592-9125
Internet: www.dvrpc.org

DELAWARE VALLEY
dvrpc
REGIONAL
PLANNING COMMISSION

190 N INDEPENDENCE MALL WEST

8TH FLOOR

PHILADELPHIA, PA 19106

215-592-1800

www.dvrpc.org