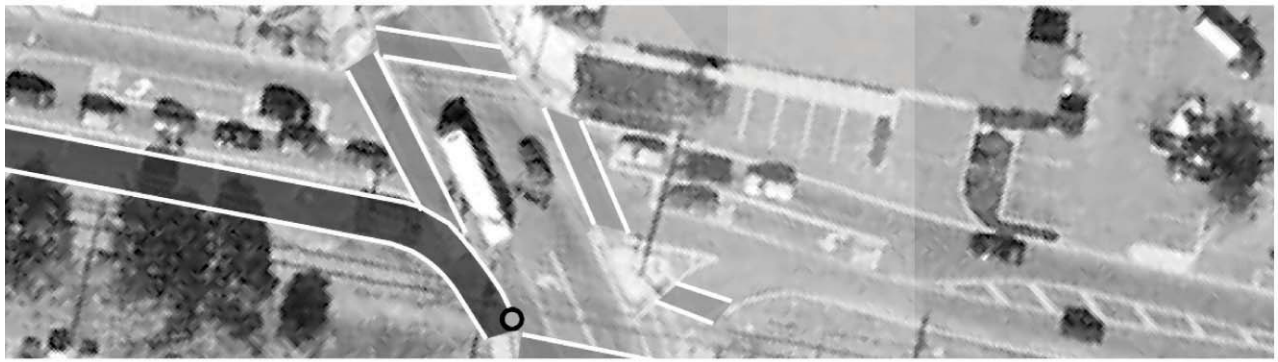
DECEMBER 2008

TAMING TRAFFIC



Context-Sensitive Solutions in the DVRPC Region:

Bethlehem Pike:
Springfield/Whitemarsh Townships, Montgomery County, PA

East Atlantic Avenue:
Audubon/Haddon Heights/Barrington/Lawnside Boroughs
Camden County, NJ

Delaware Valley
Regional Planning
Commission

The Delaware Valley Regional Planning Commission is dedicated to uniting the region's elected officials, planning professionals and the public with a common vision of making a great region even greater. Shaping the way we live, work and play, DVRPC builds consensus on improving transportation, promoting smart growth, protecting the environment and enhancing the economy. We serve a diverse region of nine counties: Bucks, Chester, Delaware, Montgomery and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester and Mercer in New Jersey. DVRPC is the federally designated Metropolitan Planning Organization for the Greater Philadelphia Region – leading the way to a better future.

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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TAMING TRAFFIC

Context-Sensitive Solutions in the DVRPC Region

December 2008

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EXECUTIVE SUMMARY

In recent years, there has been a noticeable emphasis on the importance of place and community within the Delaware Valley Region. The automobile is still the predominant form of transportation in the region for most trips, but there has been a measurable rise in transit ridership, and a renewed interest in biking, and walking. The automobile traffic created by our daily routines can have a negative effect on our neighborhoods, especially sensitive areas like town centers, parks, and areas around schools and other institutions. The good news is that there are planning techniques that can help us to balance the demands of our transportation system, retain our sense of place, and improve our quality of life.

Many of these techniques fall into the category of context-sensitive solutions (CSS). This set of planning methods, which has gained popularity and support in recent years, looks "beyond the pavement" to the way that roads interact with their environment, and seeks to enhance the community and natural features of the setting. CSS recognizes and responds to the fact that in order to have safe and attractive communities, roads should be designed so that drivers behave differently depending on the context. CSS strategies are meant to visually indicate to drivers that they are passing through a special type of area, and need to drive with greater awareness.

In addition, CSS promotes the idea of streets as transportation routes that serve multiple modes of travel, including transit, walking and bicycling. A goal of CSS is to balance the competing needs of all modes to create roadway facilities that complement the local context and are safe for all users — not just those in cars.

Traffic calming is one very important and effective tool of CSS. Speed tables, raised crosswalks, roundabouts, median barriers, textured pavements, and bulbouts are just some of the traffic calming techniques that can be found throughout the Delaware Valley Region. Both the New Jersey and Pennsylvania departments of transportation have developed programs that support traffic calming, and DVRPC has also endorsed traffic calming strategies in its planning studies. In addition, DVRPC's Long Range Plan, *Destination 2030*, describes traffic calming as an effective strategy for advancing the commission's vision for the Delaware Valley as "a place where people of all ages can walk and bicycle safely, on an efficient transportation system that is comprehensive and accommodates all modes."

This document details the findings and recommendations of a study focused on problem locations that will benefit from the implementation of CSS techniques. A diverse group of public officials, local stakeholders, and planning partners worked with the Study Team to identify issues and reasonable improvement strategies in two study locations — one in Pennsylvania and one in New Jersey. The improvement strategies developed by the Study Team create safe facilities that are aligned with the values of each community. This report is divided into two main components: (1) background narrative that describes CSS and traffic calming; and (2) local case studies. A series of detailed plan views and photo simulations are included for each study location.

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

Development within the approximately two-and-one-half-mile study area represents a mixture of uses with a largely auto-dependent design style, including ample surface parking lots, generous setbacks, and minimal bicycle and/or pedestrian accommodations. It is notable that Bethlehem Pike is still lined with a number of historic buildings, constructed up to the street line, maintaining a character of a past age. Many of these structures are active or preserved and create a strong foundation for defining the corridor's character. However, the corridor still lacks a true identity and sense of place.

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

Stakeholders helped the Study Team identify six main issues that could be addressed through context-sensitive solutions, and specific improvements were focused on five locations. Overall, many of the issues addressed during the study involved the need for better pedestrian, bicycle and transit amenities, the abundance of conflict points along the roadway, the potentially dangerous situation presented by the current on-street parking arrangement, and the need to create a stronger identity for the town-center areas along the corridor.

The major corridor-wide recommendation was to install a road diet with shared lane markings, and dedicated parking lanes at various points. When implemented, this improvement should slow traffic while maintaining a similar level of throughput, and increase safety by relegating all turning movements to a two-way-left-turn lane. This recommendation will also improve the environment for cyclists by providing a more prominent "share the road" message and will still allow for the maintenance of on-street parking but under more permanent, defined, and safe conditions. Other improvements included elements to define sense of place, and improve the pedestrian and transit experience.

The second case study location was East Atlantic Avenue in Camden County, NJ, as it traverses approximately two miles through the Boroughs of Audubon, Haddon Heights, Barrington, and Lawnside. The roadway is characterized by dense borough-style development, with important destinations along the corridor including two schools and three downtown shopping districts, with production and shipping facilities at the eastern end of the study area. East Atlantic Avenue is a two-lane facility with dedicated left-turn lanes at higher volume intersections and intermittent shoulders and sidewalks.

East Atlantic Avenue runs parallel to an adjacent CSX freight railway, with a less continuous West Atlantic Avenue on the other side of the railway. Many motorists use this roadway for commuting as an alternative to the White Horse Pike (U.S. 30), which is typically congested during peak periods. East Atlantic Avenue also provides a connection to several other major thoroughfares and is nearby to I-295 and the New Jersey Turnpike. East Atlantic Avenue is a critical local roadway, connecting several town centers.

Through field observations and study advisory committee meetings, the Study Team identified eight issues to be addressed by context sensitive-solutions and traffic calming, as well as six sites in need of specific improvements. One of the greatest concerns for this corridor was the behavior and speed of traffic and the potential for conflicts with pedestrians, especially school students. In limited portions of the corridor there is low-density development that seems to encourage high speeds. In addition, some of the more densely developed segments of the corridor coincide with challenging topography that results in higher speeds and compromised sight distances.

Stakeholders noted the need to increase the profile of pedestrians and provide safe accommodations for cyclists. This was a challenging balance to achieve, considering the narrow width of the roadway and the adjacent swampy ground on one side and railroad bed on the other. The major recommendation to alleviate this issue is the installation of a multi-use path aligned with the CSX rail line that runs parallel to East Atlantic Avenue. This improvement would reflect the best practices of what is known as "Rails with Trails," as studied by the Federal Highway Administration. This is an improvement that has been considered in the past, and the Study Team highly recommends further action toward its implementation.

Other improvements included traffic calming in school zones, consistent striping to cut down on conflicts due to passing vehicles, installation of sidewalks where they are currently missing, installation of curb bump outs to calm traffic patterns at intersections, and the use of enhanced crosswalk treatments to improve the pedestrian experience.

Suggestions for implementation "next steps" are included in this report for each of the study areas. Although these steps are slightly different for each community, a common theme is the importance of coordination and cooperation between local officials and county and state agencies. Considering that in both study areas the roadways analyzed are maintained by a county or state agency, it is increasingly paramount that all parties are involved from the outset, working toward the common goal of creating a unique corridor that is safe and accommodates all users.

SECTION 1:
CONTEXT-SENSITIVE SOLUTIONS

INTRODUCTION

Context-sensitive solutions (CSS) describes an approach to transportation planning that attempts to enhance communities and natural environments, while balancing the competing needs of all modes of travel. While CSS is widely accepted today, the first significant step toward a context-sensitive approach came in 1969 with the National Environmental Policy Act, requiring transportation agencies to consider the impact of projects on the surrounding environment.

Over the next two decades, policy continued to evolve, incorporating an appreciation of context into transportation planning. Another major step forward occurred in 1998, when the Maryland Department of Transportation, in partnership with the American Association of State Highway and Transportation Officials (AASHTO) and the Federal Highway Administration (FHWA), conducted Thinking Beyond the Pavement: National Workshop on Integrating Highway Development with Communities and the Environment While Maintaining Safety and Performance.

FHWA continued to promote the CSS approach in its planning documents and incorporated language about CSS into the current federal transportation program, Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). Today, the FHWA is an advocate for CSS, and it is endorsed by many state departments of transportation, including PennDOT and NJDOT.

An important component of a CSS approach is that it links driving behavior with the perception of the surrounding context. Traffic calming techniques are often implemented as a component of a complete CSS strategy. Traffic calming aims to reduce the speed and volume of traffic to a level appropriate for the type of roadway and the surrounding land use context. Although this approach originated in Europe, it was adopted in the United States starting in the 1940s and 1950s, when the cities of Montclair, New Jersey, and Grand Rapids, Michigan, installed street closures and traffic diverters. In the decades to follow, other US cities began implementing traffic calming into traffic management plans and programs.

This study focuses on a full range of CSS approaches, incorporating traditional traffic calming techniques in some instances. The aim of this comprehensive approach is to change the look and feel of a roadway that is currently out of context with its surroundings. These changes may, in turn, alter driver behavior and make passing motorists more aware of the dynamic atmosphere beyond the edge of pavement. The recommendations in this report show how value can be added to traditional engineering approaches by also including streetscaping elements, such as street vegetation, signage, significant sidewalks, unique textures, and other techniques to create a sense of place along the corridor. Proposed improvements for the corridors studied in this report also emphasize the multi-modal character of roadways, with recommendations for progressive planning techniques such as Shared Lane Markings and rails-with-trails facilities.

This study was conducted through a collaborative process that involved a local study advisory committee representing each community, comprising law enforcement, municipal and county planners, transit and roadway agency staff, and community activists. The identified problems and recommended improvements are unique to each location and have been endorsed by the local advisory committee members. A list of the participants can be found at the end of the report.

WHAT ARE CONTEXT-SENSITIVE SOLUTIONS (CSS)?

As an approach to transportation planning, CSS has spread rapidly since the late 1990s. This planning method looks "beyond the pavement" to the role that streets and roads can play in enhancing communities and natural environments. It is grounded in the principle that many roadways, particularly residential and local streets, do not exist solely to facilitate automotive use, and thus transportation solutions should not focus exclusively on the motorist and the cartway. Most notably, CSS involves a commitment to collaboration with community stakeholders to respond to local needs and values while accommodating the safe movement of motor vehicles.

The primary goal of CSS is to balance the competing needs of all modes of travel with a flexible application of design controls, guidelines, and standards to create roadway facilities that complement the local context, maintain a distinct sense of place, and are safe for all users. As driving behavior is often linked to a motorist's perception of the surrounding context, changes to the environment help to modify driver behavior. As seen in both local and international examples, destinations that exhibit a sense of place and have increased multimodal activity foster slower speeds and heightened caution among drivers, thus reducing the negative impacts of traffic. An effective CSS approach to transportation planning and project development should include the following key elements:

- An evaluation of the "context" of the area
- Interdisciplinary stakeholder involvement throughout the project
- Attention to community values and qualities including environmental, scenic, aesthetic, historic, and natural resources, as well as safety and mobility
- Evaluation of the effects of transportation action on a community
- Objective evaluation of a full range of alternatives, including flexible engineering and policy principles

To implement CSS along a corridor, a variety of techniques can be packaged into a comprehensive improvement strategy. Unlike other approaches to transportation planning, CSS strategies will not only include typical engineering improvements, but may also incorporate less common components to create a highly functioning roadway environment.

Elements of CSS, such as community involvement, flexible engineering techniques, and attention to the surrounding environment are also prominent in other planning methods. Traffic Calming is one such prevalent planning technique that values a comprehensive approach to transportation solutions. The most commonly cited definition of traffic calming comes from the Institute of Transportation Engineers (ITE), which states that it is "the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users." Traditional traffic calming solutions involve both engineering and policy modifications and include an education component.

ITE provides a set of engineering-focused traffic calming techniques that are accepted nationally. However, there are several other techniques that can be used to complement traditional traffic calming measures by building a sense of place and changing the context of the surrounding physical environment. These techniques include streetscaping elements, such as street trees and plantings, street furniture, period lighting, signage, and vibrant textural treatments. Companion improvements, such as widening sidewalks, adding bike lanes, and creating median islands, improve the bicycle and pedestrian environment and are likely to draw more nonmotorized users to the roadway. Like all traffic calming elements, these techniques must be customized to appropriately match the location and function of the roadway. These complementary elements, which effectively change the context of the roadway, contribute to a more comprehensive improvement strategy when implemented in conjunction with conventional calming measures. In this way, traffic calming principles are not only consistent with CSS principles, but also Smart Growth values, which support the creation of walkable communities that provide a range of transportation choices.

REGIONAL PERSPECTIVE

CSS and traffic calming strategies are common internationally and are becoming increasingly widespread throughout the Delaware Valley region. Although many examples of traffic calming can be found throughout the region, few have been implemented as the result of a comprehensive study.

During the winter of 2004-2005, Haddonfield Borough in Camden County, New Jersey, conducted a comprehensive traffic calming study. Led by a state-funded consultant, the study examined qualitative and quantitative data from five areas in the municipality that could benefit from traffic calming, and offered "initial improvement concepts" for each. The first area where improvements were implemented, Lincoln Avenue, was given priority due to high levels of cut-through traffic and proximity to a school. Measures thus far consist of raised intersections and curb extensions. An active citizens' committee called the Borough of Haddonfield Transportation and Pedestrian Safety Committee (TAPS) identified the five target areas and was the driving force in getting local political support for the traffic calming study and securing state funds. TAPS also participated in a walkable places audit and organized a Drive25 campaign that has become an annual event in Haddonfield. The Haddonfield study was successful because it had support from municipal, county, and state governments, as well as from residents.

At a regional level, DVRPC promotes traffic calming in *Destination 2030*, its long-range plan for the Delaware Valley region. Listed under the title "Design Streets and Highways For All Users," the policy states: "DVRPC promotes the implementation of traffic calming techniques in a context-sensitive approach." This policy also supports the plan's bicycle and pedestrian goals of doubling the percentage of trips by foot and bicycle by 2030, while reducing the number of injuries and fatalities suffered by bicyclists and pedestrians.

In January 2001, the Pennsylvania Department of Transportation (PennDOT) published Pennsylvania's *Traffic Calming Handbook*. The handbook provides guidance for PennDOT when considering the use of traffic calming measures on state roadways in Pennsylvania. It is also provides municipalities with information that can help them establish a traffic calming program for roadways within their jurisdiction. Several years ago, PennDOT began re-evaluating road projects using an approach known as "right-sizing." Right-sizing seeks to meet transportation needs while considering social and environmental considerations, such as community and regional goals and objectives, quality-of-life concerns, economic development initiatives, and fiscal constraints. Right-sizing is context sensitive, as it considers a much wider range of factors than just traditional mobility issues.

The New Jersey Department of Transportation (NJDOT) has updated its roadway design manual to include traffic calming techniques. NJDOT has also embraced traffic calming, planning, and implementation by funding projects through its Local Technical Assistance Program (LTAP). Additionally, NJDOT has launched an effort known as NJFIT: Future in Transportation. NJFIT is a partnership between NJDOT, the Office of Smart Growth, and other state agencies to tackle the root causes of congestion by fostering strengthened connections between transportation and land use. For example, in the Borough of Flemington, instead of building a bypass, a new parkway boulevard with extensive connectivity to the local grid is being designed. This Smart Growth alternative is context-sensitive, as it will increase the number of travel choices and support existing settlement patterns at one-third the cost of a limited access freeway.

NJDOT and PennDOT, in conjunction with DVRPC, released a joint publication in spring 2008 titled *Smart Transportation Solutions Guidebook*. It identifies roadway and roadside design values appropriate for different types of roadways in a variety of land use contexts, recommends a process for implementing context-sensitive design projects, and provides guidelines for improving the transportation system in accordance with context-sensitive and Smart Growth principles.

CSS STRATEGIES

Placemaking Elements

Features, such as decorative lighting, landscaping, and public art, give a roadway a distinct character. CSS encourages these features to be created with materials that reflect the architectural style and urban fabric of the surrounding community. These elements may be placed along the sides of the roadway or introduced in the cartway by way of engineering techniques like bulb-outs or center medians/islands.

Consistent placement and appearance of necessary directional signage along a corridor contributes to the sense of place. It also reduces confusion associated with visual clutter and leads to more predictable travel movements.

Collingswood, New Jersey utilized decorative lighting, plantings, patterned crosswalks, banners, and other placemaking elements to give Haddon Avenue its distinctive character. Source: DVRPC

Pedestrian/Bicycle/Transit Amenities

Sidewalks, visually bold and texturally distinct crosswalks, median islands, and pedestrian signal heads and push buttons create a safe environment for pedestrians and raise the profile of crossing points.

Designated bike lanes, commonly within the cartway, provide a safe riding area for cyclists and serve to heighten driver awareness and encourage sharing of the road. Roadside shelters, benches, and lighting all provide convenient and safe accommodations for transit users and create a more transit-friendly environment. CSS encourages transit facilities to be carefully designed to contribute to the character of the roadway and its surroundings.

This image shows bicycle lanes and a bicycle rack by the University of Pennsylvania, in Philadelphia.
Source: DVRPC

Traffic Calming

The most commonly cited definition of traffic calming comes from the Institute of Transportation Engineers (ITE), which states that it is "the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for nonmotorized street users."

Traditional traffic calming solutions involve both engineering and policy modifications, as well as an education component. The most effective and long-term traffic calming techniques are engineering measures that actually alter the form of the roadway and impact driver behavior. Traffic calming measures can be combined with placemaking elements to create a distinct roadway character and heightened driver perception. See pages 12 and 13 for some engineering traffic calming techniques.

Jenkintown Borough in Montgomery County, PA installed curb bumpouts as a traffic calming measure, forcing traffic to slow down. In addition to the calming benefits, the bumpouts shorten the pedestrian crossings and create contained streetside parking. Source: DVRPC

Smart Growth Development Pattern

Much of a roadway's character, configuration, and driver behavior are determined by the pattern of development along the corridor. Uses such as big-box stores, large parking lots, suburban-style housing developments, and warehouses may convey the image of a sprawling, high-speed corridor, where drivers do not need to be concerned about pedestrians.

In contrast, focusing development around concentrated main streets and mixed-use communities may create a different type of roadway character. Smart growth is the term often used to describe this type of development pattern, promoting development that mirrors elements found in traditional small towns. These elements include mixed-use development, main streets and town centers, diversity of housing types, a focus on human-scale and street-level uses, and an overall emphasis on walking and mass transit. Even traditional uses, such as big-box stores, can be adapted to portray more of a town-center type of character, thereby influencing the way drivers use and perceive the adjacent roadway.

Main Street at Exton, in West Whiteland Township, PA is a smart growth development, including several retailers typically found in "big box" stores. The smart growth development pattern changes the character of the shopping corridor and the configuration of the roadway. Source: DVRPC

RAILS-WITH-TRAILS

There are two concepts recommended later in this report that require some additional discussion as part of this overview of CSS. The first of these concepts is "rails-with-trails," recommended later as an application for East Atlantic Avenue.

What Is Rails-with-Trails?

Rails-with-trails describes multi-use trails designed directly adjacent to an active rail line. This concept stands in contrast to rails-to-trails, in which abandoned rail line corridors are converted into trails for non-motorized recreation.

Rails-with-trails may or may not be separated from the rail line by a hard barrier (i.e., a fence, wall, or vertical buffer). Currently there are rails-with-trails in 20 US states, and Pennsylvania has more than any other state (nine). A survey of 35 rails-with-trails projects reported 8.2 million visits a year. Data shows that trail usage is increasing, as is the number of trails under construction, and the overall length of trails.

What Are the Benefits of Rails-with-Trails?

Building trails in active rail corridors provides many benefits. Many communities interested in improving their trail infrastructure are hampered by limited land availability, and also the legal and logistical difficulty of linking together numerous parcels into a working trail network. Just like a rails-to-trails project, a rail corridor is a logical solution: it provides an existing, contiguous, and generally straight and level corridor perfect for accommodating travel and recreation.

The inherent design of a rail corridor provides many benefits for use as a trail. Rail corridors are designed as direct links between communities, making rail rights-of-way perfect for off-road commuting by foot or bicycle.

Are Rails-with-Trails Safe?

A 2000 study by the Rails-to-Trails Conservancy with the Department of Transportation (DOT) and the Institute of Transportation Engineers show that rails-with-trails projects do not pose significant safety concerns. Rails-with-trails have been shown to provide safer conditions than roadways equipped with amenities for pedestrians and cyclists (e.g., bicycle lanes, crosswalks, and adequate sidewalks).

According to the report that assesses design, management, and operating characteristics of 61 trails along active rail lines, the most important design features in rails-with-trails projects are:

- Providing adequate distance between track and trail;
- Providing safe fencing, barriers or grade separation between track and trail where necessary (barriers can include vegetation, grade separation, fences, ditches, and cement walls);
- Designing safe rail crossings;
- Installing adequate trail-user warning signs.

Other Sources

Communities interested in rails-with-trails projects should review the reports referenced below for more details on trail design, construction, safety, insurance, working with railroads, and for case study examples of successful projects.

Morris, Hugh. *Rails-with-Trails: Design, Management and Operating Characteristics of 61 Trails Along Active Railroads*. Washington, DC: Rails-to-Trails Conservancy, November 2000.

Birk, Mia L., Andrea Ferster, Esq., Michael G. Jones, Philip K. Miller, and George M. Hudson. *Rails-with-Trails: Lessons Learned*. Washington, DC: US Department of Transportation, Federal Highway Administration, August 2002, http://www.fhwa.dot.gov/environment/rectrails/rwt/documentation.htm.

The image shows the Metrobikelink trail in St. Clair County, Illinois. The trail was built in 2001. It operates for 4 miles alongside a commuter transit line. Trains run as often as every ten minutes, at speeds up to 55 miles per hour. At some points the trail is less than 12 feet from the rail line, without a hard barrier.

Source: www.silverspringtrails.org

ROAD DIETS

A "road diet" is a strategy for calming and improving roadway safety, while minimally affecting roadway operation. Typically a road diet refers to the conversion of a four-lane roadway with two through lanes in each direction, to a three-lane roadway with one through lane in each direction and a center two-way-left-turn lane.

It may seem counterintuitive that eliminating a travel lane would have no impact or low impact on roadway capacity. However, on roadways with many turning opportunities, significant delay may be caused by drivers stacked behind turning traffic, or drivers merging into the adjacent lane to avoid a turning vehicle ahead. The center two-way-left-turn-lane in a road diet scenario accommodates all left turns in the center turn lane rather than in the through lanes, allowing traffic in the through lanes to flow uninterrupted.

Numerous studies have tested the effects of a road diet, finding that while road diets typically slow down vehicle speeds, they often have little or no effect on level of service when average daily traffic (ADT) is 20,000 vehicles per day or lower (though road diets can work on roadways with over 20,000 ADT).

In some cases, business owners have been concerned that a road diet would make a given roadway undesirable and cause drivers to seek alternate routes, thereby reducing the number of vehicles that pass their businesses. However, analysis shows that this fear is unfounded. Vehicle counts on roadways in Seattle and Philadelphia before and after a road diet installation actually showed a higher number of vehicles on the roadway after the road diet was installed.[1] In addition, lower-speed vehicles may more readily notice businesses along the roadside.

One of the greatest benefits of road diets is the impact on safety. The center two-way-left-turn lane removes turning vehicles from through lanes, provides a safe refuge for traffic turning onto the roadway from adjacent driveways, and reduces the total number of lanes – all contributing to a decrease in the number of conflict points. Road diets also typically slow speeds which results in fewer and less severe incidents. A study of 30 roadways in Iowa (15 with road diets compared to 15 control sites) showed a 25% reduction in crash frequency per mile, 19% reduction in crash rate, and 34% reduction in injury crashes, on the roadways with the road diets.[2]

Road diets also offer great benefits for bicyclists and pedestrians. Overall, slower travel speeds usually associated with a road diet create a more favorable environment for pedestrians and cyclists alike. More specifically, road diets reduce the number of lanes that pedestrians need to cross over, and result in fewer conflict points between vehicles and pedestrians. Furthermore, excess roadway space available after a road diet conversion may create room for bicycling lanes or sidewalks.

For more information on road diets, please download DVRPC's Municipal Implementation Tool #16: Road Diets (November 2008) from DVRPC's Online Publications Database.

[1] Source for Seattle: Dan Burden and Peter Lagerwey, "Road Diets:Fixing the Big Roads," *Walkable Communities*, March 1999; Source for Philadelphia: City of Philadelphia, DVRPC traffic count data.

[2] Thomas Stout, et. al., "Safety Impacts of 'Road Diets' in Iowa,"*ITE Journal*, December 2006.

The image above shows York Road (PA Rte. 263) as it passes through Hatboro Borough, in Montgomery County, PA. Hatboro has a traditional main-street environment, and the road diet allows for on-street parking, while reducing vehicle speeds and calming driver behavior.

The image at the top right shows Hurffville-Crosskeys Road in Washington Township, Gloucester County, NJ. The area is abutted by numerous retail uses, as well as a school and a hospital, creating a significant number of turning points. The road diet here removes turning traffic from the through lanes, allowing the through lanes to function more smoothly.

The image at the bottom right shows Vanderbilt Avenue in Brooklyn, New York. This roadway previously contained four lanes, prior to its road-diet conversion. Today it contains one lane in each direction, with bike lanes, on-street parking, and a center two-way-left-turn lane, with dedicated left-turn lanes at intersections. The result is a calm, pedestrian and bicycle friendly context.

Source: DVRPC

TRAFFIC CALMING GOALS AND TECHNIQUES

In the most basic terms, traffic calming seeks to modify the behavior of traffic to match its surrounding context. Many of the traffic calming techniques provide solutions to alleviate potentially dangerous conditions, and to improve safety for drivers, pedestrians, and cyclists. The Institute of Transportation Engineers identifies the following goals and objectives.

Traffic Calming Goals:

- Increasing the quality of life
- Incorporating the preferences and requirements of the people using the area (e.g., working, playing, residing) along the street(s), or at intersection(s)
- Creating safe and attractive streets or helping to reduce the negative effects of motor vehicles on the environment (e.g., pollution, sprawl)
- Promoting pedestrian, cycle, and transit use

Traffic Calming Objectives:

- Achieving slow speeds for motor vehicles
- Reducing collision frequency and severity
- Increasing the safety and the perception of safety for nonmotorized users of the street(s)
- Reducing the need for police enforcement
- Enhancing the street environment (e.g., streetscaping)
- Increasing access for all modes of transportation
- Reducing cut-through motor vehicle traffic

Traffic calming techniques are an attempt to enhance traffic and pedestrian safety and preserve neighborhood character and liveability. The primary effects produced by these techniques are speed reduction, traffic volume reduction, increased driver awareness, and increased safety.

There are a variety of ways to organize or categorize traffic calming techniques. For the purposes of this study, the techniques have been organized into four categories: education, engineering, enforcement, and policy. Although a technique from any one of these categories may produce some level of benefit, these techniques work best when used in conjunction with one another.

Education

Education-based traffic calming measures include "programs implemented on a day-to-day basis to regulate, warn, guide, inform, enforce, and educate motorists, bicyclists, and pedestrians," as described in the *Traffic Calming Toolkit* published by the City of San Jose, California. Many of these techniques can be implemented quickly and at a low cost, providing immediate benefit, whereas engineering techniques may require more extensive planning and design, and, in some cases, right-of-way acquisition, which can be costly and time consuming.

Neighborhood Traffic Safety Campaigns: This education program appeals to local residents to comply with traffic laws. This usually consists of personalized letters or other materials distributed to all residents of a town or neighborhood typically citing local, state, or national statistics on speeding.

Drive 25 Campaign: This program informs motorists of the benefits of driving at the speed limit and encourages them to be conscious of their speed. The effectiveness of this program can be bolstered by increased police presence and enforcement of the speed limit. The temporary nature of the campaign, and the cost of increased law enforcement, is a downside of the program.

Haddonfield, New Jersey's Drive 25 Campaign is an educational effort using media coverage and promotional materials, such as this window sticker.

Safe Routes to School (SRTS): This federally funded program is designed to make physical improvements that promote safe walking and biking passages to our schools. PennDOT and NJDOT each have their own program that they administer with federal funds. In addition, DVRPC administers the SRTS program that is part of the Transportation Enhancements Program.

Engineering

The most definitive resource on traffic calming is the Institute of Transportation Engineers (ITE) report, *Traffic Calming: State of the Practice*, published in August of 1999. Since that time, the ITE has created an extensive traffic calming website at www.ite.org/traffic providing information and research regarding all aspects of traffic calming. The following descriptions of engineering techniques were taken from the aforementioned document. Although most traffic calming measures that involve changes to the physical environment have some effect on both volume and speed, they can be classified according to their dominant effect: volume control or speed control.

Not included in this list are regulatory measures, such as modifications to traffic signal timings or the implementation of new stop signs. As stated in *Traffic Calming: State of the Practice*, "regulatory measures are generally perceived as less effective at calming traffic than are physical measures that by their nature are self-enforcing." Stop signs and lane markings are considered to be more effective as complementary techniques than as stand-alone techniques. See pages 12 and 13 for examples of engineering techniques.

Enforcement

Police enforcement of traffic laws is an effective way of raising awareness at select locations. Unfortunately, it is cost prohibitive to target multiple traffic calming locations simultaneously by using enforcement. In addition, the effect of enforcement on driver behavior is temporary. Such constraints make this approach less successful and unsustainable in a practical sense when compared to self-policing engineering techniques. Enforcement is, however, a practical complimentary strategy when used in companion with Neighborhood Traffic Safety Campaigns.

Another enforcement-based program is the Radar Speed Trailer unit that displays motorists' speed as they approach the device. Speed trailers serve to draw drivers' attention to the fact that they may be traveling above the speed limit, thus encouraging them to slow down. The Neighborhood Speed Watch program empowers residents by allowing them to record speeds of motorists passing their homes, record license plate and vehicle information, and submit the information to local law enforcement.

Policy

The policy approach to traffic calming is much more proactive when compared to the techniques described in the education, engineering, and enforcement categories, which are reactive. The policy approach seeks to set standards or performance measures (pedestrians, bicyclists, and motorists) for the transportation system and its users that maintain mobility, create connectivity, and ensure safety. The policy approach covers two areas: retrofits of existing problem areas and standards for new construction. For retrofits, a framework to rank projects based on roadway characteristics and factors, such as vehicle speed, crashes, and proximity to schools, could be established. Opportunities to add traffic calming measures when resurfacing roadways should also be analyzed. Ideally, a retrofitting policy would be integrated into the transportation component of the local comprehensive plan.

The most comprehensive approach is to alter subdivision and land development ordinances to include traffic calming measures in new construction projects. Engineering specifications can be tailored to ensure that roadway designs that complement the surrounding land use are created at the outset; thus conflicts requiring corrective traffic calming measures are less likely to occur in the future. For instance, requiring narrow lane widths in residential areas may lead to drivers exercising additional care and engaging in behavior more appropriate for a residential setting. The policy approach to traffic calming shares the proactive Smart Growth planning approach by setting standards that maintain mobility, create connectivity, and promote safety. If the goals of traffic calming can be incorporated at the policy level, a municipality can prevent the negative impacts of traffic in a comprehensive manner.

Some tools that may be utilized in a policy approach are the municipal Comprehensive Plan or Master Plan, including an Official Map delineating road rights-of-way, bicycle and pedestrian routes, and multi-purpose shared facilities.

ENGINEERING TRAFFIC CALMING TECHNIQUES

Volume Control Measures

The primary purpose of these techniques is to discourage or eliminate through-traffic.

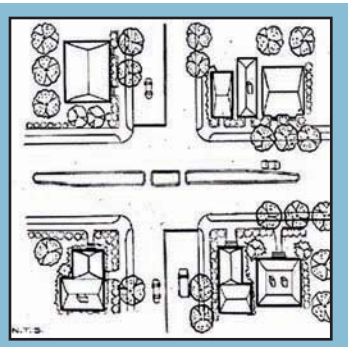
Full Street Closures: Barriers placed across a street to close the street completely to through-traffic, usually leaving only sidewalks or bicycle paths open. The barriers may consist of landscaped islands, walls, gates, side-by-side bollards, or any other obstructions that leave an opening smaller than the width of a passenger car.

Half Street Closures: Barriers that block travel in one direction for a short distance on otherwise two-way streets. When two half closures are placed across from one another at an intersection, the result is a semi-diverter. Half closures are often used in sets to make travel through neighborhoods with grid streets circuitous rather than direct.

Diagonal Diverters: Barriers placed diagonally across an intersection, blocking through-movement. Like half closures, diagonal diverters are usually staggered to create circuitous routes through neighborhoods.

Forced Turn Islands: Raised islands that block certain movements on approaches to an intersection.

Median Barriers: Raised islands located along the centerline of a street and continuing through an intersection so as to block through-movement at a cross street.



Source: Pennsylvania's Traffic Calming Handbook, PennDOT

Speed Control Measures

The primary purpose of these techniques is to slow traffic. Speed control measures are classified as vertical, horizontal, or narrowings, with vertical and horizontal devices being most effective at reducing speeds.

Vertical Speed Control Measures
Achieve speed reductions by forcing motorists over vertical curves or over road surfaces that have a texture different from the main line.

Speed Humps
Rounded raised areas placed across the road. The Watts profile hump, developed and tested by Britain's Transport Research Laboratory, is the most common speed control measure in the United States.

Speed Tables
Flat-topped speed humps often constructed with brick or other textured materials on the flat section. Their long flat fields, plus ramps that are sometimes more gently sloped than speed humps, give speed tables higher design speeds than humps.

Reno, NV

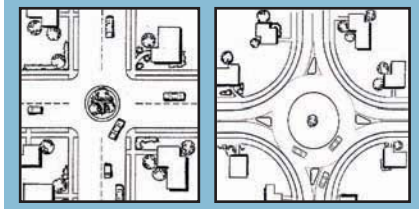
Raised Intersections: Flat raised areas covering entire intersections, with ramps on all approaches and often with brick or other textured materials on the flat section. They make entire intersections-crosswalks and all-pedestrian territory.

Textured Pavements: Roadway surfaces paved with brick, concrete pavers, stamped asphalt, or other surface materials that produce constant small changes in vertical alignment. A noted limitation to textured pavements, such as cobblestone, is that they may present difficulties for pedestrians and bicyclists, particularly in wet conditions.

Collingswood, NJ

Horizontal Speed Control Measures
Achieve speed reductions by forcing drivers around horizontal curves and by blocking long views of the road ahead.

Roundabouts
Raised islands, placed in intersections, around which traffic circulates. Roundabouts are defined by yield control of all entering traffic, channelized approaches, and appropriate geometric curvature to ensure that travel speeds are less than 30 MPH. Roundabouts should not be confused with the older traffic circles that give priority to entering vehicles and are prone to a high rate of crashes and congestion.



Traffic circle (left) and roundabout (right)

Chicanes
Curb extensions that alternate from one side of the street to the other, forming S-shaped curves. A chicane-like effect can be achieved, at a fraction of the cost, by alternating on-street parking from one side of the street to the other.

Lateral Shifts
Curb extensions on otherwise straight streets that cause travel lanes to bend one way and then bend back the other way toward the original direction of travel. Lateral shifts are one of the few measures that have been used on roadways where high traffic volumes and high posted speeds preclude more abrupt measures.

Realigned Intersections
Changes in alignment that convert T-intersections with straight approaches into curving streets that meet at right angles.

Narrowings Speed Control Measures
Use roadway narrowing to achieve speed reductions. The addition of on-street parking and/or striped bicycle lanes is another method of narrowing lanes for speed reduction.

Neckdowns/Bulbouts
Curb extensions at intersections that reduce roadway width from curb to curb. Neckdowns are the most common type of street narrowing. Their primary purpose is to “pedestrianize” intersections by shortening crossing distances for pedestrians and drawing attention to pedestrians via raised peninsulas.

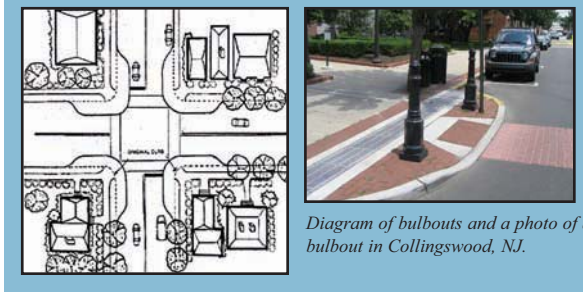


Diagram of bulbouts and a photo of a bulbout in Collingswood, NJ.

Center Islands
Raised islands located along the centerline of a street that narrow the travel lanes at that location. When placed at the entrance to a neighborhood, they are called gateways.

Examples of gateway islands.

Chokers
Curb extensions at midblock that narrow a street by widening the sidewalk or planting strip.

TRAFFIC CALMING ISSUES

Though traffic calming measures may create more predictable and safe motorist behavior, there are also concerns that these engineering techniques may negatively impact other roadway functions, including emergency service vehicles, drainage, and the Americans with Disabilities Act (ADA) requirements.

Funding

The expense of implementing a comprehensive traffic calming program is a concern for communities. Though rarely significant in cost, without dedicated funding, most local governments must find flexible ways to finance these efforts from their capital or general funds. In Pennsylvania, Liquid Fuels funds may be used for traffic calming measures if a "Traffic Calming Study and Approval Process" has been completed. The appendix of this study also lists several funding sources to help communities implement the recommendations herein.

Problems for Emergency Vehicles and Heavy Service Vehicles

Many communities are hesitant to install traffic calming techniques, as some can cause delay and other problems for emergency vehicles and heavy service vehicles (buses, garbage trucks, and snowplows). According to Pennsylvania's *Traffic Calming Handbook*, a speed hump causes delays from 0-9 seconds, while roundabouts cause 1 to 11 seconds of delay. Though it is important to identify and weigh this response time increase, the incremental risk to residents from fire truck delays is typically much smaller than the benefit of increased road safety from accident reductions resulting from the installation of traffic calming techniques.

Many of the emergency vehicle concerns with respect to speed humps and roundabouts also apply to transit vehicles. Additionally, bulb-outs at intersections may make it difficult for buses to pick up and drop off passengers. Coordination with transit agencies is essential to ensure that accessibility and convenience are not hampered. Impact on snow removal is a common concern, but when the locations of traffic calming treatments are clearly identified, municipalities have found the impact to be minimal. With any traffic calming program, it is vital that emergency responders and road crews be consulted during design and implementation.

These problems can be minimized if they are considered in project planning. Some street closures include short-cuts for emergency and service vehicles, while medians, roundabouts, and other driving obstructions may be outfitted with mountable curbing for use by oversized vehicles or in emergency situations. If accommodations for these vehicles cannot be determined, communities may also purchase smaller fire and garbage trucks for use in traffic calmed areas or elect not to install such treatments on roadways that are major emergency response routes.

Drainage and Landscaping Concerns

As the installation of traffic calming treatments may change the drainage pattern of the roadways on which they are located, it is very important to review drainage characteristics when determining the appropriateness of certain measures. Poorly-sited bulb-outs and chicanes, for example, may lead to the accumulation of ice/water on the roadway or pedestrian walkways. However, when properly designed, these features can serve as filtering strips that improve stormwater management.

Choosing the correct landscaping elements is also an important consideration to include in any traffic calming program. To reduce maintenance efforts, some local governments recruit neighborhood residents for routine landscape maintenance or opt for a low-maintenance landscape plan. Along with maintenance concerns, one must consider safety issues that could arise if the wrong types of plantings are used, resulting in decreased sight distance or the creation of obstacles for bicyclists and pedestrians. For this reason, any traffic calming program suggesting landscaping elements should consider plant type, growth, and location.

ADA Requirements

Finally, traffic calming must accommodate all people in the community. Measures that impact pedestrian travel must be designed to meet the requirements set forth in the Americans with Disabilities Act (ADA).

Liability Claims

Current experience indicates that traffic calming projects do not cause significant liability claims. A 1997 survey by ITE found that out of more than 1,500 total lawsuits brought against traffic engineers in 68 jurisdictions, only six involved traffic calming devices, and only two were successful. Vehicle damage during construction and inadequately signed speed humps appear to be the most common cause of claims. Monetary awards tend to be relatively small. As designers and motorists become more familiar with traffic calming, and as specific strategies become widely accepted practices, the risk of claims is likely to decline. Liability can be minimized by using standard strategies and designs published by organizations such as ITE and by using appropriate signage to warn drivers.

Temporary Traffic Calming Applications

Traffic calming measures may not always work, or may be a hard sell to neighbors, municipal governments, or state DOTs. For this reason, many municipalities implement temporary traffic calming applications prior to installing permanent treatments. These temporary applications simulate the more permanent treatments, but with materials that are cheap and easy to install or remove.

While not always terribly attractive, temporary traffic calming installations allow for a trial run, to see if the treatment impacts driver behavior. Traffic calming treatments often take time for drivers to become acclimated to them. For this reason, temporary applications, made of rubber, low pavers, or pavement striping, are minimally destructive if involved in a collision. Sometimes temporary applications are used simply to help drivers acclimate to the new roadway configuration before installing a hardscape treatment.

The images to the right show temporary traffic calming treatments, simulating a curb bump out (top), and a median island (bottom).
Source: Top — www.flickr.com/photos/drdul/180850619/
Bottom — Chris Knigge, Princeton Borough

TAMING TRAFFIC METHODOLOGY

This report, *Taming Traffic*, is the product of the fourth round of DVRPC's annual context-sensitive solutions study.

Site Selection

At the project start, DVRPC distributed surveys to solicit CSS case-study candidate locations from its member county governments, as well as from the cities of Camden, Chester, Philadelphia, and Trenton. After receiving the completed surveys, DVRPC collected consistent key data and arrayed the locations into a spreadsheet matrix for analysis.

Relevant data sets included:

- area type (urban, suburban, village, rural)
- posted speed limit
- annual average daily traffic (AADT)
- crashes (including breakdown of fatalities, bicycle, and pedestrian)
- roadway functional class (arterial, major collector, etc.)
- community facilities
- concurrent projects
- public input
- previous studies

The DVRPC project team carried out a comparison and selection process to determine the final case study locations, based on a set of established criteria:

- one higher-density and one lower-density location
- one site in Pennsylvania and one in New Jersey
- areas for which a local comprehensive plan or study recommended CSS or traffic calming measures were given higher priority
- locations that were recently the subject of a traffic calming or transportation planning study were given lower priority
- locations lacking public support for their improvement were given lower priority

Priority was given to areas:

- where potentially hazardous conditions may be eased through context-sensitive solutions and traffic calming
- where CSS and traffic calming are deemed an appropriate and potentially effective improvement strategy
- where travel speeds are reported to be inappropriate for the surrounding context
- where roadways are unnecessarily wide or confusing
- where there is recent change in existing conditions, including an increase in pedestrian activity
- where the infrastructure supports intermodality
- where there is close proximity to schools, recreation, residential, shopping, or transit-oriented destinations
- where other improvement options (signalization, striping, enforcement) have already been considered
- where CSS and traffic calming have a moderate-to-high probability of leading to additional future improvements

DVRPC project team members made site visits to the highest ranking candidate locations and collected photographs of noteworthy conditions that may warrant CSS. The DVRPC project team and senior staff then made final selections. Selections were announced to participating member governments.

Data Collection and Report Production

For each selected site, the study research included at least two site visits at which DVRPC staff took roadway measurements and surveyed existing conditions. Staff collected additional site data, as needed.

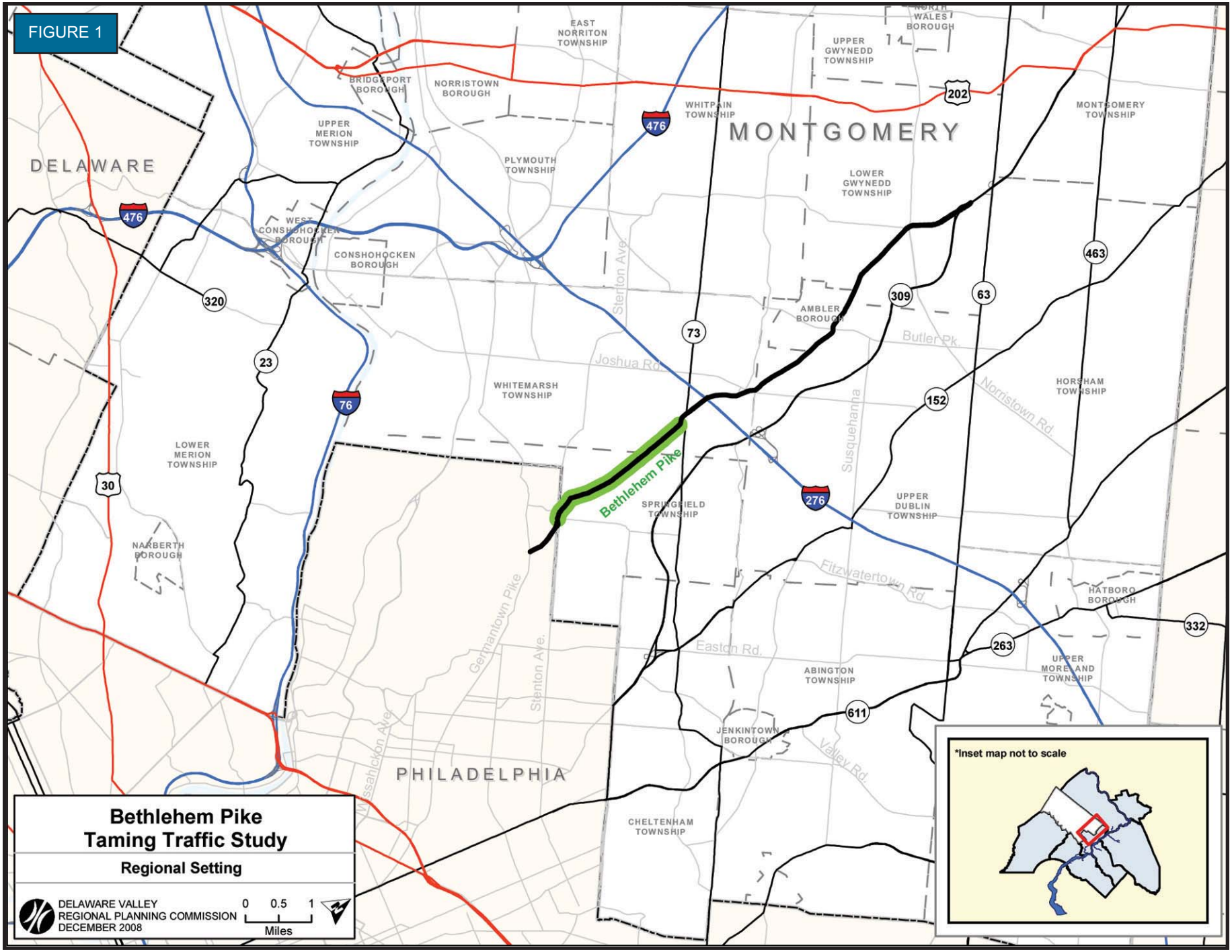
For each site, DVRPC staff held two meetings with the study advisory committee (SAC), comprising stakeholder representatives from municipal and county governments, law enforcement, parks and recreation, departments of transportation, and transit agencies. The initial meeting was held to introduce the project and gather input from the stakeholders to help the Study Team identify the highest priority concerns that could be improved with traffic calming and/or CSS solutions.

During the course of data collection and research, DVRPC staff held several internal meetings to produce a problem identification document and recommendation plans. DVRPC staff submitted the problem identification to the study advisory committee for approval, and at the second meeting with each committee, presented a set of conceptual recommendation plans and solicited changes and amendments.

Concluding the site selection, data collection, site visits, steering committee meetings, research, internal meetings, problem identification, and plan production phases, DVRPC staff combined its own recommendations with the collected local input to produce this final report.

SECTION 2:
BETHLEHEM PIKE STUDY SITE
SPRINGFIELD/WHITEMARSH TOWNSHIPS
MONTGOMERY COUNTY, PA

FIGURE 1



Bethlehem Pike
Taming Traffic Study

Regional Setting

DELAWARE VALLEY
REGIONAL PLANNING COMMISSION
DECEMBER 2008

0 0.5 1
Miles

BETHLEHEM PIKE: EXISTING CONDITIONS

Street Name: Bethlehem Pike
Functional Class: Urban Minor Arterial
Posted Speed Limit: 35 MPH
AADT: 17,000-23,000

Location

The study area is a section of Bethlehem Pike, approximately 2.5 miles long, running through Springfield and Whitemarsh Townships, in Montgomery County. The study area extends along Bethlehem Pike from the intersection of Paper Mill Road and Stenton Avenue, north to the intersection of Skippack Pike. The southern end of the study area is adjacent to the City of Philadelphia border. Bethlehem Pike is used as a commuter corridor, and is also critical for local traffic to access shopping and recreation destinations. It intersects with Church Road, Stenton Avenue, Skippack Pike, and Germantown Avenue — all major commuter roadways.

Highway Access

The study area is within close proximity to the Route 309 Expressway, and approximately two miles from the Fort Washington interchange of the Pennsylvania Turnpike. PA State Route 73 intersects Bethlehem Pike and at the northern terminus of the study corridor.

Transit Access

The study corridor is proximate to rail transit, with the southern end of the corridor less than half a mile from the Chestnut Hill East SEPTA Regional Rail station on the R7 Line. The study corridor is served by SEPTA's 94, 134 and L Bus routes. The Routes 94 and 134 both traverse the corridor on Bethlehem Pike, originating in Chestnut Hill and terminating at the Montgomery Mall — though their routes deviate past Ft. Washington. The Route L Bus only travels briefly on Bethlehem Pike, making a loop around Paper Mill Road, Montgomery Avenue, and Bethlehem Pike, before returning to its primary route along Stenton Avenue and Germantown Pike, between the Olney Transportation Center and the Plymouth Meeting Mall.

Roadway Characteristics

Within the study area limits Bethlehem Pike is a state road that varies in width from approximately 38 to 48 feet. Between the intersection of Paper Mill Road/Stenton Avenue and the Whitemarsh Township municipal line (at the northern end of the Genuardi's shopping center) the roadway is configured as two travel lanes in each direction. From the Whitemarsh border to a point about 200 feet south of Church Road, the roadway has a three-lane configuration, also known as a "road diet," with one travel lane in each direction and a center two-way left turn lane. The northern end of the study area includes two through lanes for southbound traffic, and one through lane and a left-turn only lane for northbound traffic.

Bethlehem Pike is used as a commuter corridor, and is also critical for local traffic to access shopping and recreation destinations. It contains a number of historic buildings and businesses.
Source: DVRPC

Neighboring Amenities

The study area is lined with a number of street-edge businesses and contains two major strip shopping centers. The southern end of the study area is close to Germantown Avenue in Chestnut Hill — a popular shopping destination. Several historic structures, such as the Black Horse Inn and the Wheel Pump Inn are also found along this portion of Bethlehem Pike. Several country clubs and Fort Washington State Park, a local park with ball fields on Bysher Avenue, provide nearby recreation opportunities. Two private schools are situated directly on the corridor with several other public and private schools nearby. The study area is also close to Chestnut Hill College and the Morris Arboretum.

Historic Character

Present day Springfield Township was initially a gift from William Penn to his wife, and was first designated on a map in 1681. One of the oldest roadways in Pennsylvania, Bethlehem Pike was originally a Native-American trail. Completed as a modern roadway in 1734, it was traversed by both Colonial and British troops during the Revolutionary War. As noted earlier, a number of historic buildings still line the study corridor, including the Black Horse Inn (1744) and the Wheelpump Inn (1725).

Shown here is the historic Wheel Pump Inn building and historic homes in Springfield Township, along Bethlehem Pike.
Source: DVRPC

Crash Summary

A cursory crash analysis of reportable crashes was performed in an effort to identify crash safety problems and areas of crash concentrations related to traffic operations along the Bethlehem Pike study corridor. The area of concern is between the Paper Mill Road intersection in Springfield Township to just south of the intersection of Bethlehem Pike and PA 73 in Whitemarsh Township; an approximate length of 2.3 miles. Crash data for years 2003-2007 from the Pennsylvania Department of Transportation's CDART crash database was utilized. This analysis considered five years of crash data in an effort to remain consistent with PennDOT's analysis criteria. A reportable crash involves at minimum an injury, or damage to a vehicle which requires that it be towed from the scene.

The data analyzed in this report involves crashes coded to Bethlehem Pike (SR 2018) proper. An analysis of the crash situation at the PA 73 and Bethlehem Pike intersection is beyond the scope of this study and may require a more in-depth evaluation.

Corridor Crash Statistics

During the five-year period (2003-2007) 138 crashes were recorded on Bethlehem Pike within the corridor study limits. Crashes by year varied between 26% in 2003 on the high end, and 16% in 2006 on the low end, with an average of 27 crashes per year.

Angle crashes were the most frequent collision type accounting for 46% (64 crashes), followed by rear-end crashes accounting for 23% (32 crashes). Angle crashes involve vehicles turning from and to Bethlehem Pike as they access side streets and businesses. Six pedestrian crashes occurred within the study area accounting for four percent of the collision type total. Pedestrian crashes, which tend to occur in low volumes in a suburban context such as the Bethlehem Pike study area, are considered an indication of pedestrian activity. Even at only four percent this is still noteworthy. There were two fatal crashes, four major injury crashes, 18 moderate injury crashes, and 26 minor injury crashes. The largest percentage was property-damage-only crashes (no injury) at 39% (54 crashes).

The recommended improvements for the Bethlehem Pike corridor will address the angle crash problem. Specifically, the number of conflict points is reduced by the three-lane configuration which removes turning traffic from the inner or passing lane by providing a dedicated center turning lane. Currently when a motorist seeks to turn left from Bethlehem Pike onto a side street or into a business they must cross two lanes of oncoming traffic. These left-turning vehicles are also subject to the erratic lane weaving which is indicative of a four-lane cross-section. This situation will be nearly eliminated under the three-lane configuration.

Crash Concentrations

For the purposes of this study a crash concentration is considered any intersection or narrowly defined corridor segment where more than 10 crashes were identified during the five-year study period. This criterion — which is not a standard — is a relatively low threshold and is intended to identify areas for further investigation. Utilizing these criteria, five concentrations were identified.

1. Intersection of Paper Mill Road and Bethlehem Pike

This location experienced 29 crashes. Regarding collision type, the highest percentage were angle crashes at 41%, and the second highest were rear-end crashes at 27%. Crashes here may be related to intersection turning volume and any issues related to the intersection's alignment on a significant grade. No pedestrian crashes were recorded. This location marks the beginning of the corridor on the southern end and is the first signalized intersection along the corridor.

2. Intersection of Hillcrest Road and Bethlehem Pike

Twelve crashes were recorded at this intersection. The vast majority of the crashes (75%) were angle collisions suggesting possible turning problems between Hill Crest Road and Bethlehem Pike. No pedestrian crashes were recorded.

3. From the intersection of Gordon Road to the intersection of Brookside Road

Fourteen crashes occurred in this area. Although seven different collision types were recorded, angle crashes accounted for the highest percentage (35%) with hit fixed object crashes logging the second highest number of incidents (28%). One pedestrian crash occurred along this stretch. This area is where the roadway transitions from a significant grade to a more level alignment. The study committee reported that northbound motorists have difficulty staying in their lanes which may contribute to the hit-fixed-object crashes.

4. Intersection of Wissahickon Avenue and Bethlehem Pike

Angle crashes were the most common collision type at this location, representing 50% of the total. Like Paper Mill Road, Wissahickon Avenue is an important feeder facility to Bethlehem Pike which may contribute to the elevated frequency of angle crashes.

5. From the intersection of Weiss Avenue to the intersection of Mill Road

This corridor segment experienced 29 crashes between 2003 and 2007. The most predominant collision type was angle crashes accounting for 58% of the total. Equally as significant are the four pedestrian crashes, accounting for 13% of all crashes at this location. This is the highest pedestrian crash concentration along the corridor. This area is characterized by a high level of pedestrian activity as well bus transfers, primarily due to a concentration of retail in what is the corridor's main shopping area.

Existing Plans and Studies

Bethlehem Pike has been the subject of several recent plans and studies. The *Taming Traffic* study seeks to add value to this work, not to duplicate it.

In 2003, Springfield Township was awarded a $190,900 grant from PennDOT's Transportation Enhancements (TE) program, administered by DVRPC, for the construction of three community gateways. The Township hired consultant Gilmore and Associates to design these gateways for

Bethlehem Pike at Valley Green Road, Bethlehem Pike at the entrance to Cisco Park, and the intersection of East Mill and Penn Oak Roads. As of the publication of this report, the gateways were still moving towards readiness to advertise for their construction. Meanwhile, they have also been incorporated into other plans and studies.

In January 2004, a consultant team comprising Carter van Dyke Associates, Urban Partners, Carroll Engineering, and Runyan & Associates Architects developed the *Flourtown Erdenheim Vision Plan* for the Flourtown-Erdenheim Enhancement Association (FEEA), paid for with a combination of public and private funding. The plan divided a segment of Bethlehem Pike stretching between Bells Mill Road on the south and Valley Green Road on the north into five distinct sections — Valley Green Gateway, Highway Shopping Corridor, Flourtown Village, Mixed-Use Corridor, and Erdenheim Village. It proposed strategies for economic development, transportation improvements, streetscape enhancements, and architectural enhancements.

Among other recommendations, this plan proposed four roadway configurations, all of which involve a road-diet conversion to a three-lane cross-section. Additionally, the plan proposed traffic calming, realignment of Gordon Lane, expansion of on-street and shared parking opportunities, access management, and enhanced pedestrian amenities. The Vision Plan also contained recommended components of a streetscaping theme, general architectural design guidelines, and recommendations for "special study areas" along the corridor. It concluded with an outline of a ten-year implementation strategy including a phasing strategy and suggestions for public-sector/private-sector cooperation, zoning, historic preservation, and tenant recruitment.

Just over a year later, in February 2005, Carroll Engineering Corporation produced the *Bethlehem Pike Corridor Study* for Springfield Township, drawing on some of the recommendations of the Vision Plan. This study dealt primarily with the operation and flow of Bethlehem Pike, rather than land use and economic development.

The Corridor Study also recommended the conversion of Bethlehem Pike to a road-diet, three-lane cross-section, along with several access management related improvements and the enhancement of pedestrian amenities. The study also specifically focused on the Bysher/College Avenue intersection, recommending the installation of opposing left turns side-by-side at this point. Carroll also carried out a Synchro® capacity analysis for the three-lane cross-section and proposed left-turn phases. The result was, briefly, "Altering the lane geometry of Bethlehem Pike…will allow for more efficient signal coordination along Bethlehem Pike, reduce accidents and allow for an increase in on-street parking."

While the Township was interested in pursuing many of the ideas presented in the Carroll Engineering study, PennDOT District 6-0 staff outlined several areas where revised engineering analysis was required.

In addition to these studies, a Village Center Zoning District was introduced in the Township Commission, and referred to the Planning Commission, with the most recent revision occurring in September 2008. If enacted, this district would contain a number of provisions to "Encourage economic development through the establishment of flexible standards that create a human scaled main street environment and unique community identity." Characteristics of this district include "street-wall" development, with minimal setbacks and parking set back from the street line, with bonuses for historic preservation, shared parking, transit amenities, and reduced curb cuts, as well as the provision of design standards.

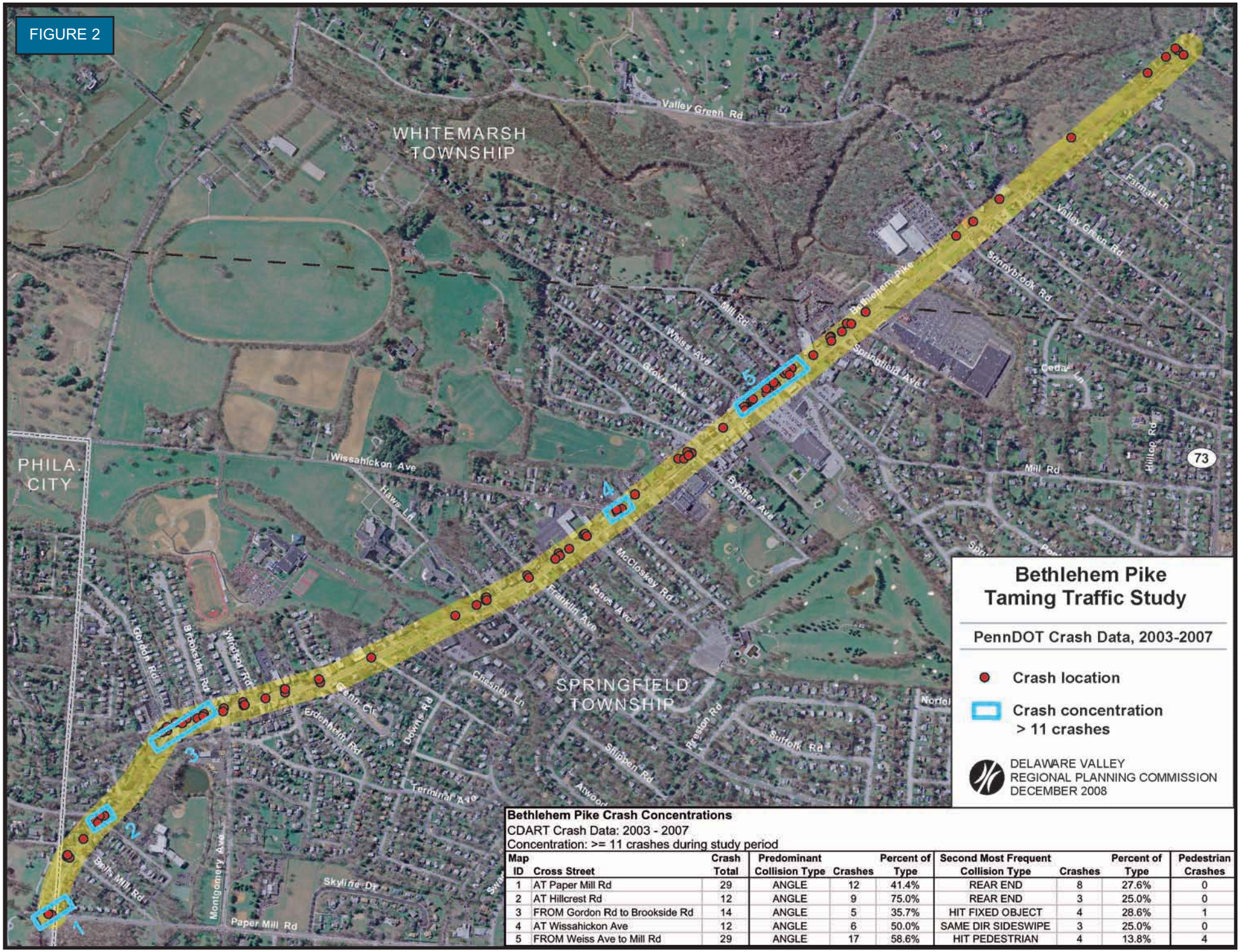
Finally, through $800,000 of federal earmark funding, Springfield Township recently engaged Michael Baker Corporation and Carter van Dyke Associates to develop the Bethlehem Pike Streetscaping Project. The intent of the project is to "help create a pedestrian oriented 'main street' atmosphere, improve pedestrian safety, and enhance commercial activities." Improvements will be designed for Flourtown and Erdenheim village center areas, and construction is anticipated to begin in summer of 2009. Planned improvements will include enhanced crosswalks, sidewalk reconstruction, pedestrian-oriented street lighting, ornamental signal poles, and street trees.

Case for Study

Bethlehem Pike, within the study area, has the potential to become a vibrant and prosperous corridor. It already has the types of mixed-use, street-edge, historic buildings and thriving commercial infrastructure that make places like neighboring Chestnut Hill and Ambler attractive to locals and visitors. However, corridor improvements are needed.

The DVRPC Study Team recognizes the opportunity to contribute a complementary element to the Streetscape Plan (which does not look at the cartway) through the *Taming Traffic* study, recommending strategies for altering the roadway to match its emerging new context as a pedestrian-friendly, vibrant commercial corridor. This study may also add value to DVRPC's capital investment completed through the TE grant project.

FIGURE 2



Bethlehem Pike Taming Traffic Study

PennDOT Crash Data, 2003-2007

- Crash location
- Crash concentration > 11 crashes

DELAWARE VALLEY REGIONAL PLANNING COMMISSION
DECEMBER 2008

Bethlehem Pike Crash Concentrations
CDART Crash Data: 2003 - 2007
Concentration: >= 11 crashes during study period

Map ID	Cross Street	Crash Total	Predominant Collision Type	Crashes	Percent of Type	Second Most Frequent Collision Type	Crashes	Percent of Type	Pedestrian Crashes
1	AT Paper Mill Rd	29	ANGLE	12	41.4%	REAR END	8	27.6%	0
2	AT Hillcrest Rd	12	ANGLE	9	75.0%	REAR END	3	25.0%	0
3	FROM Gordon Rd to Brookside Rd	14	ANGLE	5	35.7%	HIT FIXED OBJECT	4	28.6%	1
4	AT Wissahickon Ave	12	ANGLE	6	50.0%	SAME DIR SIDESWIPE	3	25.0%	0
5	FROM Weiss Ave to Mill Rd	29	ANGLE	17	58.6%	HIT PEDESTRIAN	4	13.8%	4


FIGURE 3
WHITEMARSH TOWNSHIP
SPRINGFIELD TOWNSHIP
PHILA. CITY
Valley Green Rd
Bethlehem Pike
Wissahickon Ave
Mill Rd
Springfield Ave
Sunnybrook Rd
Fahnar Ln
Cedar Ln
Hilltop Rd
73
Bysher Ave
McCloskey Rd
Franklin Ave
Jones Ave
Spruce Rd
Poplar Rd
Cherry Ln
Haws Ln
Greenbrook Rd
Brookside Rd
Wrenford Rd
Glenn Cir
Erdenheim Rd
Dolores Rd
Chesney Ln
Preston Rd
Suffolk Rd
Shippen Rd
Terminal Ave
Atwood Rd
Longfield Rd
Hereford Ln
Swede Rd
Arden Ln
Skyline Dr
Dells Mill Rd
Montgomery Ave
Paper Mill Rd
Bethlehem Pike
Taming Traffic Study
Transit Network
= SEPTA Routes 94 & 134
= SEPTA Route L
0
500
1,000
Feet
DELAWARE VALLEY
REGIONAL PLANNING COMMISSION
DECEMBER 2008

PROBLEM IDENTIFICATION

The following are major problems in the study area, as identified by members of the Study Advisory Committee (SAC) and through field observations, which may be addressed through context-sensitive solutions.

1. Excessive vehicle speeds northbound due to steep grade between Stenton Avenue and Gordon Lane

The high-volume intersection of Stenton Avenue, Paper Mill Road, and Bethlehem Pike is located at the southern end of the study corridor. Vehicles proceeding north along the corridor encounter a steep grade and a sharp curve and at the northern end of the incline. As identified by the advisory committee, a significant number of drivers increase their speed on the grade, maneuver the curve at dangerous speeds, and accelerate again when the roadway geometry opens up into a straightaway. Moreover, this portion of the corridor is lined with street-edge businesses and residential streets, where high-speed traffic is inappropriate and presents safety concerns.

The straightaway past the curve at Gordon Lane (northbound) results in drivers accelerating just as they are entering a traditional business district where high speeds are inappropriate.
Source: DVRPC

2. Potentially dangerous conditions created by Bethlehem Pike's inconsistent parking scheme

At several points along the corridor Bethlehem Pike is lined with traditional, street-edge businesses, some of which are served by on-street parking. Because a designated parking lane does not exist along Bethlehem Pike, this on-street parking is permitted in the travel lanes in certain sections of the corridor and during certain times of day (not during AM and PM peak periods). This presents a potentially hazardous situation as motorists traveling through the corridor encounter parked cars in the travel lane, and are forced to stop suddenly and merge into the adjacent free-flowing travel lane. One location of particular note is the section of Bethlehem Pike near Montgomery Avenue. There is a significant volume of southbound left-turning traffic at this location. However, vehicles are permitted to park in the right-hand travel lane. The combination of parked vehicles in the right lane and turning vehicles in the left lane creates a situation where traffic stacks in both lanes and seriously limits the capacity of Bethlehem Pike.

The need for on-street parking and the lack of dedicated parking lanes results in this unusual allowance of on-street parking in an active travel lane — a potentially dangerous condition.
Source: DVRPC

3. Retail hub in the vicinity of Bysher Avenue experiences high volume of traffic and pedestrians, and has a demonstrated crash history

The advisory committee and the Study Team have observed dangerous conditions for both motorists and pedestrians at the intersection of Bysher Avenue and Bethlehem Pike. This offset intersection has several elements that create potential conflicts with through traffic, turning vehicles, and/or pedestrians. The main issue centers around the access point for the shopping plaza, located directly between the two legs of the offset intersection. This uncontrolled access point adds to an already confusing situation with through traffic moving at different signal phases, and compromised site distance for turning traffic. Opposing left turns obscure visibility of through traffic, making left turns potentially dangerous.

The offset intersection coupled with the Starbucks access point creates a confusing intersection with poor sight lines, and a demonstrated crash history. Source: DVRPC

4. Town center area lacks a distinctive sense of place

Between Bysher Avenue and Mill Road the study corridor contains a significant density of businesses, including many street-edge businesses with frontage along Bethlehem Pike. This section also contains several key historic structures. This development pattern creates a foundation for a town-center, main-street type character. However, this business corridor lacks complementary components that accent that character and convey to drivers that the area they are passing through is a special environment requiring caution and slower speeds. In other communities throughout the region this "sense of place" has been shown to be important for calming traffic, attracting shoppers, and providing a safe and friendly environment for pedestrians.

A segment of the study area has historic buildings, a critical mass of businesses, and good walkability, but lacks the sense of place that makes other town centers easily identifiable. Source: DVRPC

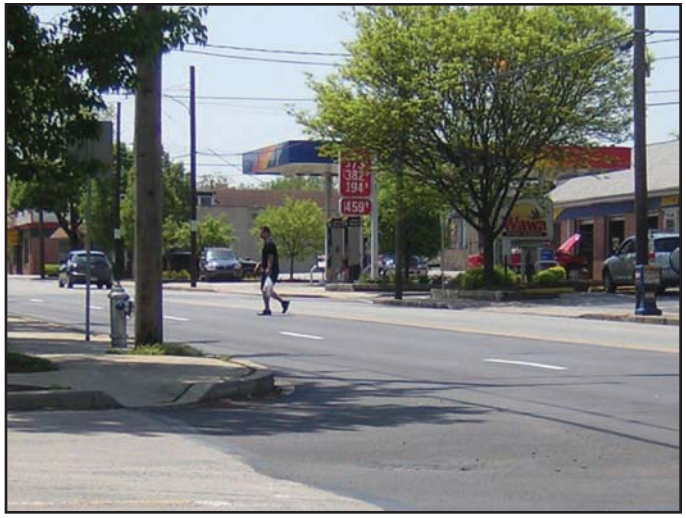
5. Conflicts with turning and through traffic at major destinations

At several points along the corridor, such as the aforementioned shopping plaza at College Avenue, there are conflicts between turning and through traffic resulting in potentially dangerous and difficult driving and pedestrian conditions. Another significant location is the corridor section between Mill Road and Weiss Avenue, where there are driveways for the Wawa, Halligan's Pub, and the Acme shopping center. Because these access points are all in close proximity, but are staggered on both sides of the roadway, there is a significant amount of turning traffic from several directions, conflicting with both northbound and southbound through traffic.

The collection of several, staggered access points by the Acme shopping center creates conflicts between turning and through traffic. Source: DVRPC

6. Shortage of safe and highly visible pedestrian crossings, especially in the vicinity of heavily used bus stops

There are numerous marked crosswalks along the corridor. However, with the exception of the continental-style crosswalks at the Haws Lane intersection, the pedestrian crossings do not have high-visibility treatments. In addition, there are no mid-block crossing points along the corridor, despite the fact that a significant number of pedestrians have been observed crossing Bethlehem Pike to access the SEPTA bus stop across from the Wawa. Throughout the corridor there are other points with high pedestrian activity that lack visible crosswalks, such as the southern entrance to the Genuardi's shopping center, by the Dunkin' Donuts. The lack of pedestrian crossing amenities not only decreases pedestrian safety, but also creates a perceived danger among potential pedestrians that may keep them from choosing to walk along Bethlehem Pike.



Significant pedestrian activity exists in the area by the Wawa and Acme shopping center, yet no crosswalks are provided for safe pedestrian crossings. Source: DVRPC

7. Corridor lacks adequate bicycle amenities

As per PennDOT's regulations, bicycles are permitted in the travel lanes of Bethlehem Pike. However, this road is not very bicycle friendly. The Montgomery County trail system is currently being expanded and will include a trail head and possibly a trail connection at Bethlehem Pike, just north of Mill Road. Due to the densely developed residential communities surrounding the corridor and the forthcoming bicycle traffic due to the trails, it is increasingly important to plan for multi-modal roadway usage, and for this facility to accommodate bicyclists.

The corridor lacks sufficient bicycle amenities, such as "share the road" signs, bike lanes, and storage racks. Source: DVRPC

8. Lack of accommodations and safety considerations for transit users/minimal presence of transit amenities along the corridor

The corridor is served by SEPTA's Route L bus. However, most SEPTA stops along the corridor lack basic amenities for transit riders such as shelters and benches. Some stops are poorly marked and others lack sidewalks or any kind of safe area at which riders can wait. Transit amenities are important for supporting and encouraging the users of alternative modes of travel. Drivers tend to proceed more slowly when they share the roadway with other modes of travel, including cyclists, pedestrians, and transit users.

Some areas of the corridor, like this segment just south of Church Road, contain transit stops, but no shelters or safe places to wait. At some points, like the area shown, there are no sidewalks leading to the stops (bus stops are circled in yellow). Source: DVRPC

CORRIDOR-WIDE IMPROVEMENTS

1. Road Diet

Improvement: Install a road diet throughout the Springfield Township segment of the corridor. A road diet is the conversion of a four-lane roadway cross-section to a three-lane cross-section, including a center two-way-left-turn lane.

Explanation: Several past planning documents commissioned by Springfield Township have recommended a road diet for Bethlehem Pike. Road diets have been shown in many cases to serve the dual role of improving both safety and traffic flow by removing turning traffic from the through lanes (for a primer on the road diet concept, see page 12 of this document).

A road diet was recently installed on Bethlehem Pike in the Whitemarsh Township section of the study corridor. Based partly on the success of this roadway configuration in the northern portion of the study area, the SAC supports extending the road diet treatment through Springfield Township as well.

Past studies recommended cross-sections improvements that were not physically feasible or did not meet PennDOT's specifications. The SAC believes that the cross-section proposed here is physically feasible, meets the base criteria for accommodating a road diet, and has been accepted in concept by the PennDOT representatives on the study advisory committee. (Note: Additional engineering analysis to demonstrate feasibility may be required by PennDOT if Springfield Township wishes to pursue the road diet concept.)

Currently Bethlehem Pike is consistently about 44 feet in width throughout the corridor, with two outer 10.5-foot travel lanes, and two 10-foot inner travel lanes. The proposed cross-section will have two 11-foot travel lanes with "shared lane markings" (also known as "sharrows"), a center two-way-left-turn lane, and one 8-foot dedicated parking lane (see more on shared lane markings on page 39 and more on parking following). At signalized intersections the two-way-left-turn lane will become a dedicated left-turn lane. Although past studies have recommended several different cross-sections, DVRPC considers this consistent configuration the most feasible approach to meeting the needs of the community and roadway users without incurring significant and likely unnecessary road widening costs.

2. Dedicated On-Street Parking

Improvement: Install an 8-foot, dedicated on-street parking lane along one side of the roadway through areas of the corridor with a higher density of commercial activity. The parking lane may switch sides of the roadway with a minimum 300-foot transition area to safely accommodate the lane shift.

Explanation: The study corridor contains an unusual and potentially dangerous parking configuration — utilizing travel lanes for on-street parking during non-peak times of the day. The SAC agrees with the assessment made in past studies that it is desirable to maintain on-street parking both for traffic calming purposes and to enable the traditional, town-center-type businesses to remain competitive.

As noted above, the proposed cross-section contains an 8-foot dedicated parking lane. Based on PennDOT's specifications, it is not physically feasible to accommodate on-street parking on both sides of Bethlehem Pike. The SAC therefore recommends installing a dedicated parking lane on one side of the roadway that would alternate sides, periodically, to accommodate the needs of adjacent businesses. In the conceptual application of this lane switch, the proposed drawings show a transition zone of at least 300 feet, to meet minimum standards for a lane shift.

The proposed configuration will have a reduced number of parking spaces compared to the number currently available. However, the new spaces will be accessible any time of day, as opposed to the current configuration in which parking is only allowed during non-peak periods. In addition, the availability of a designated parking lane will be much safer and more intuitive for out-of-town visitors.

See the graphic at right for a schematic diagram of the current and proposed parking configurations.

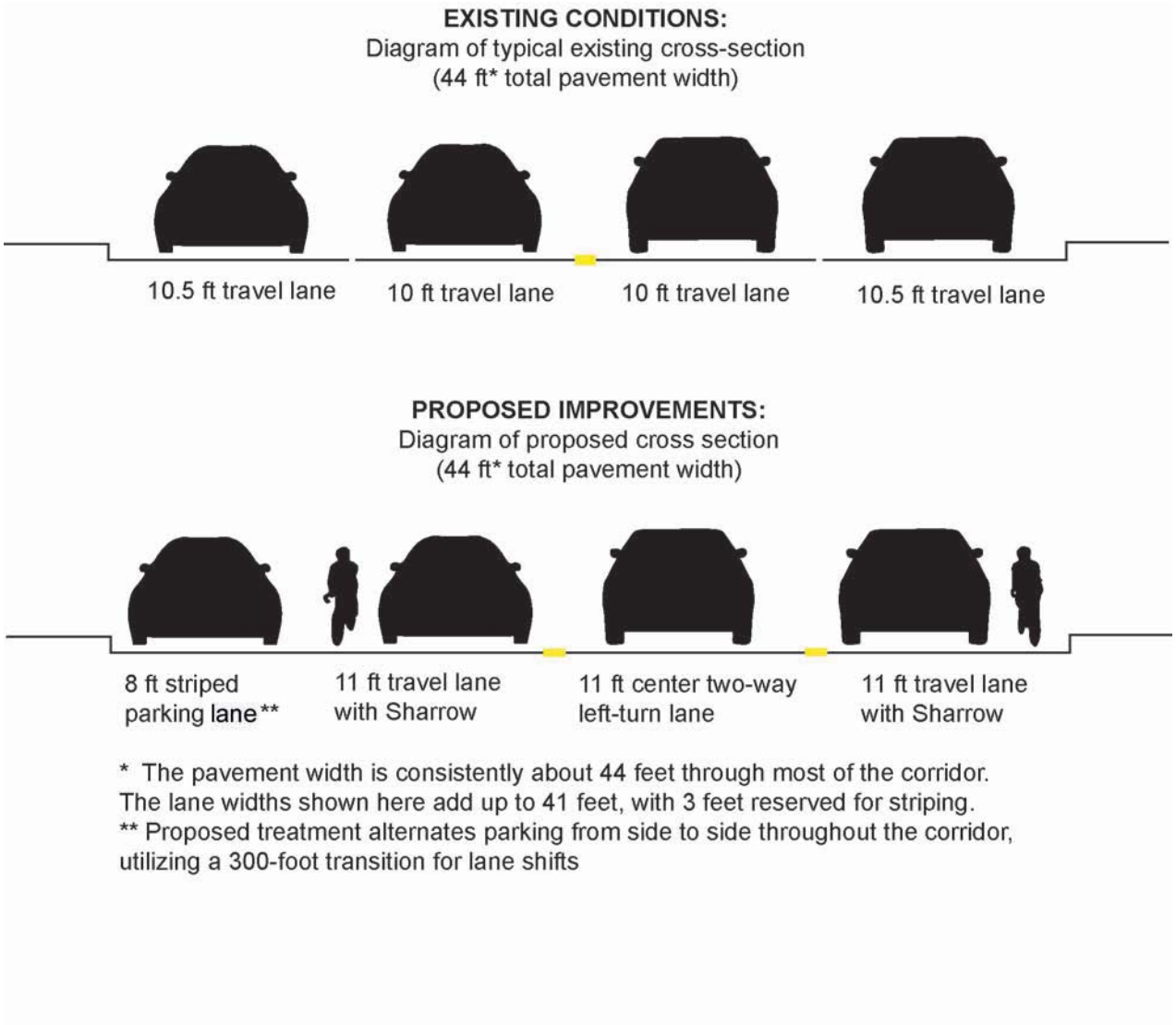


FIGURE 4: Bethlehem Pike – Existing and Proposed Cross-Sections. *The illustrations above show the configuration of the current cross-section and proposed "road diet" cross-section for Bethlehem Pike, through Springfield Township. The segment of the study corridor in Whitemarsh Township already contains a three-lane cross-section. Source: DVRPC*

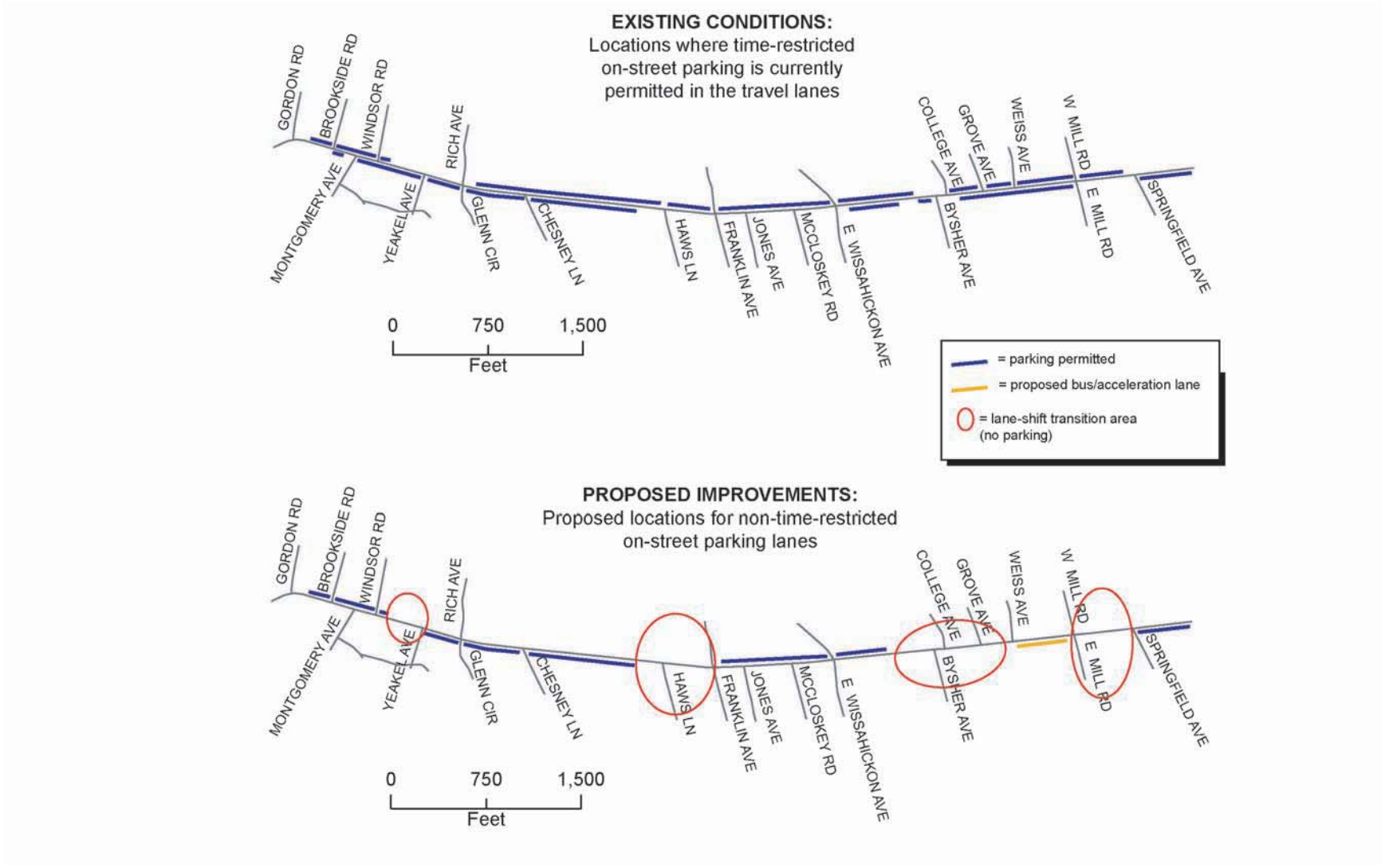


FIGURE 5: Bethlehem Pike – Existing and Proposed Parking Configurations. *The top illustration shows areas where on-street parking is currently permitted in the travel lanes, during off-peak times. The data was gathered from existing on-street signage. The bottom image shows the proposed areas for dedicated on-street parking lanes. In the proposed configuration, no parking will be allowed in travel lanes. The proposed parking lanes alternate sides of the roadway. Due to the 35-mile-per-hour speed limit, a minimum 300-foot transition area is necessary to accommodate this lane shift. Source: DVRPC*

3. Shared Lane Markings ("Sharrows")

Improvement: Install shared lane markings (also known as sharrows) throughout the corridor, to improve safety for bicyclists and motorists.

Explanation: Bicycle activity was observed on the corridor during three separate site visits. With the construction of new trail facilities through the Montgomery County Trail network, and a future trail head located at Mill Road, there will likely be an increase in bicycle usage on Bethlehem Pike. The proposed cross-section cannot accommodate bicycle lanes; however, it can and should accommodate shared lane markings to increase priority for bicyclists and create a more bicycle friendly environment.

Shared lane markings are pavement markings in the travel lanes denoting bicycle usage. These markings play the same role as share-the-road signage, but are more visible to motorists. A 2004 study prepared for the San Francisco Department of Parking and Traffic is the most thorough evaluation of the effectiveness of shared lane markings known to the Study Team. This study determined that "Overall, the stencil markings significantly improved both motorists' and cyclists' positions in the roadway…"

Shared lane marking or "sharrow." Source: www.livablestreets.com

The study found that both cyclists and motorists rode farther from parked cars, with the pavement markings present, and passing vehicles provided more space between themselves and cyclists when the markings were present. In addition, the *Federal Register* by the U.S. Department of Transportation states "The purpose of this proposed new marking is to reduce the number and severity of bicycle-vehicular crashes, particularly crashes involving bicycles colliding with suddenly opened doors of parked vehicles."

Shared lane markings are included in the *Federal Register* (Vol. 73:1, January 2008, #494) for inclusion in the next version of the Federal Highway Administration's *Manual of Unified Traffic Control Devices* (MUTCD). These markings have been utilized in numerous areas around the country. Doylestown Borough in Bucks County will soon be the first municipality in the DVRPC region to implement this application.

Doylestown is adopting the standards recommended in the San Francisco study, with an additional two feet added to the distance from the parking lane (the San Francisco study recommends 11 feet between the pavement marking and the curb, and Doylestown will utilize 13 feet from the marking to the curb). The San Francisco study recommends two stencil markings: one showing a cyclist inside an arrow ("bike in house"), and another showing a larger bicycle with "V" markings above ("bike-and-chevron").

The "bike-in-chevron" markings shown in the photo simulations are based roughly on the San Francisco report's recommended dimensions of 7'9" in height and 3'3" in width. If Springfield and Whitemarsh Townships wish to implement this recommendation they should refer to any adopted standards by the MUTCD, work closely with PennDOT, and evaluate the designs and dimensions that are most appropriate for their application.

4. Placemaking Elements

Improvement: Install a program of placemaking elements, including streetscaping, high-visibility crosswalks, pedestrian lighting, and curb bumpouts.

Explanation: Placemaking elements involve a range of components that together contribute to the establishment of a unique visual identity and sense of place. Placemaking may involve "streetscaping" elements, such as banners, pedestrian-oriented street lamps, trees, brick pavers, and benches. Placemaking may also include adoption of consistent colors, materials and textures for sidewalks, crosswalks, and wayfinding signage.

Some placemaking elements also provide safety benefits including more visible crosswalks and street lighting. In some cases, placemaking elements have also been shown to have a traffic calming effect. The impact is perhaps psychological, giving drivers the visual perception that they are in a destination (e.g., a town center or park) where it is necessary to drive more slowly and increase awareness and caution. Areas may have a significant level of pedestrian activity or a density of businesses, but if they do not convey this fact through their visual treatment and roadside context, drivers may pass through without taking notice.

The SAC supports installation of placemaking elements. Springfield Township is already working with consultant firm Carter Van Dyke Associates (CVDA), to design a set of placemaking elements for implementation along Bethlehem Pike. CVDA's recommendations are reflected in the diagrams and photo simulations in this document.

This image shows a conceptual streetscaping scheme for Bethlehem Pike, developed by Carter van Dyke Associates. The image portrays the intersection of Bethlehem Pike and Mill Road. Source: CVDA

The following section contains a series of two-page spreads describing and illustrating the site-specific recommendations for Bethlehem Pike.

SITE-SPECIFIC IMPROVEMENTS

The DVRPC project staff has prescribed a set of improvements specific to five sites along the study corridor. These sites are identified on the attached full-corridor view, and the improvements are shown overlaid on aerial images in the attached site plan documents.

Site A: Vicinity of Paper Mill Road and Bells Mill Road

The high volume intersection of Stenton Avenue, Paper Mill Road, and Bethlehem Pike is located at the southern end of the study corridor. In addition to high volume, vehicles proceeding north along this roadway encounter a steep grade followed by a sharp curve. As identified by the steering committee, a significant number of drivers increase their speed on the grade and maneuver the curve at dangerous speeds.

The improvements for this site are intended to calm traffic and encourage drivers to operate more cautiously on the down-grade and around the sharp curve at Gordon Road, while preparing northbound drivers for entrance into a dense mixed-use area of Bethlehem Pike. Placement of gateway signage and other placemaking elements in the existing grass median (and repeated consistently through dense sections of the corridor) will alert drivers to the changing character of the roadway.

More prominent crosswalks as well as curb extensions will raise the profile of crossing pedestrians and shorten the crossing distance which provides a safety benefit by reducing a pedestrian's exposure to traffic. Bump-outs also provide a traffic calming benefit as they narrow the cartway.

The Study Team recommends beginning the three-lane "road diet" cross-section just after the planted median, for northbound traffic. With this improvement, drivers will navigate the downhill curve between Paper Mill Road and Gordon Road in one single stream of traffic. It is expected that the implementation of a single lane of northbound travel will result in slower travel speeds and increased safety for drivers, pedestrians, and cyclists.

In order to make the transition to the road diet smooth and safe, the Study Team recommends converting one of the northbound through lanes into a right-only lane for turns onto Paper Mill Road. In this way, all merges will occur prior to entering the intersection with Stenton and Paper Mill Roads, and all traffic continuing northbound onto Bethlehem Pike will be in a single-file queue.

Site A Improvements:

1. Convert the existing northbound Bethlehem Pike through/right-turn lane into a right-turn-only lane.
2. Assess the need for increase in the left-turn stacking lane, headed northbound on Stenton Avenue, approaching the study corridor.
3. Remove one travel lane north of Paper Mill Road, and replace it with striped gore area and shoulder, while transitioning to the road diet, three-lane configuration.
4. Begin three-lane cross-section with one through lane in each direction and a center two-way-left-turn lane, after the existing median island, north of Paper Mill Road.

Corridor-Wide Improvements:

1. Streetscaping and placemaking elements
2. Crosswalk Improvements

The advisory committee identified potential congestion issues for northbound traffic approaching the intersection with Stenton and Paper Mill Road. These issues may be able to be mediated by increasing the left-turn stacking lane for traffic turning onto Stenton Avenue, and/or adjusting the signal timing.

Note: More information on road diets can be found earlier in this report. In short, a typical road diet consists of one through lane in each direction and a center two-way-left-turn lane to provide turning opportunities to drivers traveling in either direction.

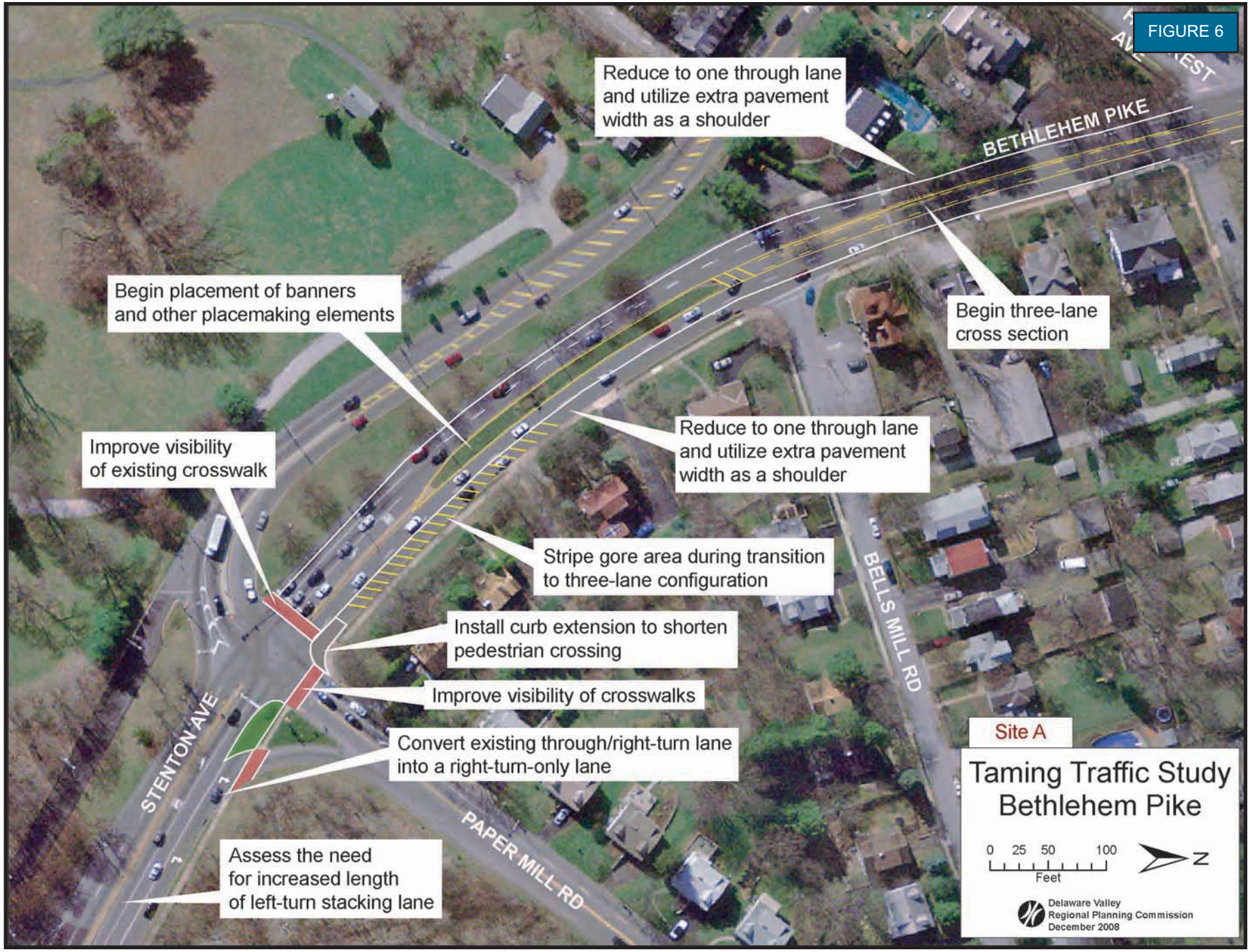


FIGURE 6
Reduce to one through lane and utilize extra pavement width as a shoulder
BETHLEHEM PIKE
Begin placement of banners and other placemaking elements
Begin three-lane cross section
Improve visibility of existing crosswalk
Reduce to one through lane and utilize extra pavement width as a shoulder
Stripe gore area during transition to three-lane configuration
BELLS MILL RD
Install curb extension to shorten pedestrian crossing
Improve visibility of crosswalks
STENTON AVE
Convert existing through/right-turn lane into a right-turn-only lane
PAPER MILL RD
Assess the need for increased length of left-turn stacking lane
Site A
Taming Traffic Study
Bethlehem Pike
0 25 50 100
Feet
N
Delaware Valley Regional Planning Commission
December 2008

Site B: Montgomery Avenue Area

In the area of Montgomery Avenue there is a significant volume of southbound left-turning traffic. On-street parking is also permitted in the travel lanes of Bethlehem Pike during non-peak periods. The combination of parked vehicles in the right lane and turning vehicles in the left lane causes southbound traffic to stack in both lanes, limiting the capacity of Bethlehem Pike. Therefore, the primary goal of improvement recommendations for this section is to safely improve the flow of traffic while maintaining parking for businesses adjacent to the street edge.

Although it may seem counter intuitive, a road diet, that reduces the number of through lanes from two to one in each direction, often increases capacity and steadies traffic flow. Currently parked cars and turning traffic impede drivers' progress and force the roadway to essentially operate as a one-through-lane configuration. By designating permanent areas for both parking and turning activities, the through lane is used solely by through traffic. Separating turning traffic from through traffic improves flow and also increases safety for left turning traffic by reducing the number of conflict points from two to one. This configuration also nearly eliminates lane weaving, which is common in a four-lane configuration such as Bethlehem Pike.

The three-lane cross-section proposed for the majority of the study area is a more condensed configuration than currently exists and will result in extra pavement width being available for a permanent parking lane on one side of the roadway. In this portion of the study area, parking is proposed for the west side (southbound) of Bethlehem Pike due to the higher frequency of street-edge businesses without ample parking on this side of the Pike. On-street parking, in addition to being advantageous for adjacent businesses, is a proven tool for traffic calming, typically resulting in drivers operating at slower speeds, with heightened awareness to their surroundings.

Paired with curb extensions and high-visibility crosswalks, the three-lane roadway configuration contributes to a safer pedestrian environment by reducing the number of lanes that pedestrians must cross and encouraging a slower, less erratic driving pattern.

Site B Improvements:

1. Use extra pavement width for a shoulder around the curve by Gordon Lane and consider adjusting the geometry of the roadway around the curve.
2. Add a permanent on-street parking lane on the west side (southbound) of Bethlehem Pike.
3. Add transit shelter and amenities at existing SEPTA bus stop by Montgomery Avenue.
4. Add curb extension in the parking lane, by Montgomery Avenue, to reduce pedestrian crossing distance.

Corridor-Wide Improvements:

1. Road diet with shared lane markings ("sharrows")
2. Streetscaping and placemaking elements
3. Crosswalk Improvements

At signalized intersections the road diet should include a dedicated left-turn lane, rather than the standard two-way-left-turn lane. In addition, the recommended improvements for this site include addition of a bus shelter for transit riders, and a potential reconfiguration of the geometry around the Gordon Lane curve.


FIGURE 7
Use extra pavement width as a shoulder around the curve
Install three-lane cross section with two-way-left-turn lane
Add permanent on-street parking lane only on west side of the road
Install curb extensions at signalized intersection
Consider adjusting roadway geometry around curve
Add transit refuge area and/or shelter
Improve visibility of crosswalks
Utilize placemaking elements and add improvements for safe cycling, including share-the-road signage, sharrows, and bike racks
GORDON RD
BROOKSIDE RD
WINDSOR RD
BETHLEHEM PIKE
MONTGOMERY AVE
Site B
Taming Traffic Study
Bethlehem Pike
0 25 50 100
Feet
N
Delaware Valley
Regional Planning Commission
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FIGURE 8: Vicinity of Montgomery Avenue – Existing Conditions. *This image is a photograph of existing conditions on Bethlehem Pike, looking north toward the intersection with Montgomery Avenue. Source: DVRPC*

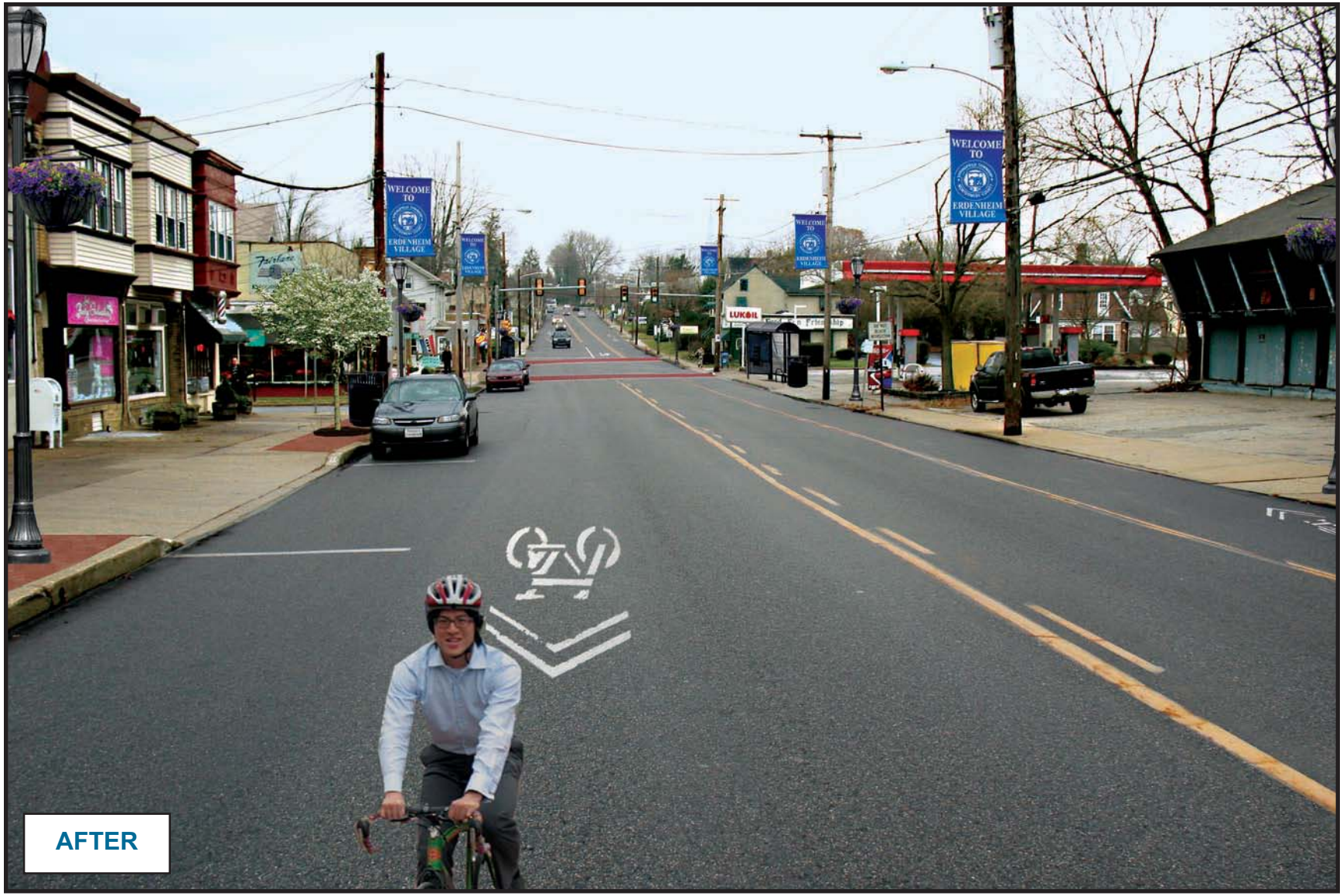

FIGURE 9: Vicinity of Montgomery Avenue – Simulation. *This image is a photo-simulation of the recommended improvements for the location shown on the left. Major improvements include the three-lane cross-section, sharrows, dedicated parking lane, enhanced crosswalks, streetscaping, and improved transit amenities. Source: DVRPC*

Site C: Vicinity of Bysher and College Avenues

This segment of the study corridor exhibits many of the issues along Bethlehem Pike identified by the DVRPC Study Team and the study advisory committee members. The primary issue is the uncontrolled access point for the shopping plaza located directly between the two legs of this offset intersection. Split-signal phasing and compromised sight distance make left turns at this intersection potentially unsafe and generally problematic. Another main concern for this stretch of the study area is pedestrian safety.

This area includes multiple destinations and access points on both sides of the roadway resulting in turning traffic from several directions, and few opportunities for pedestrians to safely cross the street. The development pattern in the vicinity of Bysher Avenue reflects a main-street type character with street-edge businesses and key historic structures but little "sense of place" to provide a unique identity. Improvements suggested for this area aim to address both vehicular and pedestrian safety while improving the community character.

The Study Team recommends the addition of dedicated opposing left-turn lanes at College and Bysher Avenues (see the next two-page spread for an alternative configuration). As in other segments of the corridor, the three-lane roadway configuration and on-street parking combine to allow a larger throughput of traffic than the current off-peak configuration, and increased safety for all roadway users. The narrower cartway also encourages motorists to drive more slowly and carefully.

The Study Team also recommends the conversion of the shopping plaza access point from "entrance only" to right-in and right-out movements, with full access for left-turning motorists available via the signalized intersection at College Avenue. The right-out movement will provide a concession to the retail tenants, while eliminating the most dangerous turning movement — the left-in. The elimination of left-turn movements at this uncontrolled access point will decrease conflicts between motorists as well and pedestrians while still providing ample access to this business property.

The installation of curb extensions and more prominent crosswalks at signalized intersections also improves the pedestrian environment and provides a safe and predictable crossing over Bethlehem Pike. Finally, the utilization of placemaking elements along this portion of Bethlehem Pike not only transforms this foundation into a true downtown, but also provides a complementary traffic calming benefit reminding drivers that this corridor is multi-modal and dynamic, requiring heightened caution.

Site C Improvements:

1. Add a permanent on-street parking lane on the west side (southbound) of Bethlehem Pike and transition this parking lane to the east side (northbound) north of Bysher Avenue.
2. Convert the access point south of College Avenue (currently serves the shopping plaza) to right-in and right-out movements only.
3. Add dedicated opposing left-turn lanes at traffic signal.
4. From Bysher Avenue to the vicinity of the fire station, transition the lane shift to accommodate parking on the northbound side of the roadway.

Corridor-Wide Improvements:

1. Road diet with shared lane markings ("sharrows")
2. Streetscaping and placemaking elements
3. Crosswalk Improvements

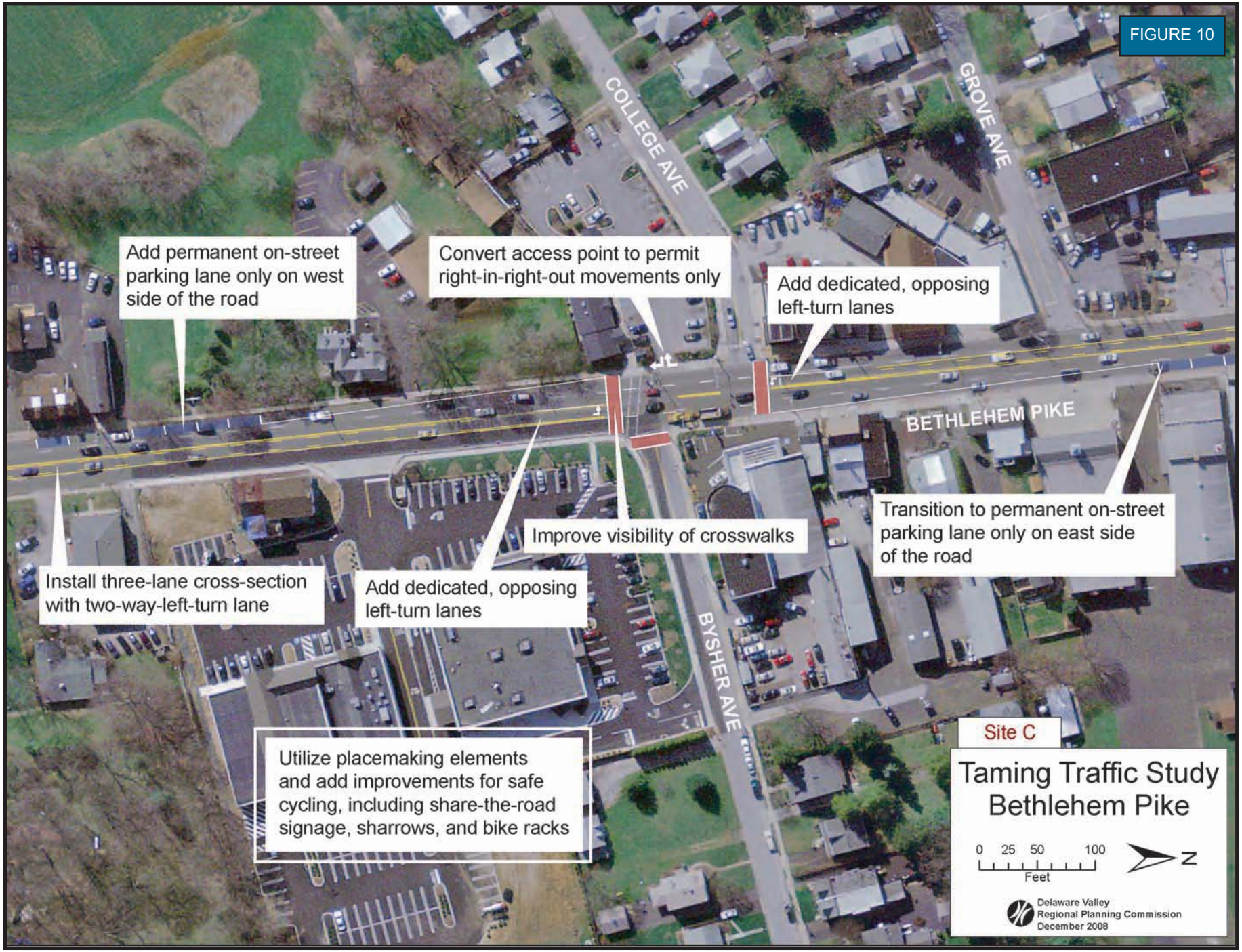
FIGURE 10
COLLEGE AVE
GROVE AVE
BETHLEHEM PIKE
BYSHER AVE
Add permanent on-street parking lane only on west side of the road
Convert access point to permit right-in-right-out movements only
Add dedicated, opposing left-turn lanes
Transition to permanent on-street parking lane only on east side of the road
Improve visibility of crosswalks
Add dedicated, opposing left-turn lanes
Install three-lane cross-section with two-way-left-turn lane
Utilize placemaking elements and add improvements for safe cycling, including share-the-road signage, sharrows, and bike racks
Site C
Taming Traffic Study
Bethlehem Pike
0 25 50 100
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Delaware Valley
Regional Planning Commission
December 2008

College Avenue Alternative

The Study Team recommended a set of fiscally constrained improvements for the intersection of Bethlehem Pike, College Avenue and Bysher Avenue, that mediated problems while keeping the overall geometry of this offset intersection (see Site C). However, the study advisory committee also supported an alternative recommendation that would dramatically alter the intersection's geometry, transforming it into an aligned, four-way intersection. Modifying the geometry to create a more traditional intersection will alleviate the majority of conflicts between turning vehicles and through traffic, making the intersection safer for both motorists and pedestrians, and improving the intersection's overall operation.

This reconfiguration would necessitate the realignment of College Avenue as it approaches its intersection with Bethlehem Pike, thereby requiring the use of adjacent land. The diagram to the right shows how this reconfiguration may take place only encroaching, in any significant way, upon the parcel that currently contains a shopping area and parking lot. This proposed realignment would require the removal of the current retail structure on the site. Because of these factors, this scenario is framed here as a conceptual, re-visioning of the intersection — a long-term alternative.

The implementation of this scenario would have several benefits in addition to improving the operation and safety of the intersection. This proposed alignment would provide for a new development parcel in the northwest quadrant of the intersection that could be used for a new structure with rear parking or a community park. It would also provide an opportunity to more appropriately locate the access points in the vicinity of this intersection, including a potential new access point for Carson Valley School (not indicated on the figure).

This alternative holds a number of significant safety, operational, and land use benefits. However, it would require cooperation from the current owner(s) of adjacent property and a significant level of funding to realign this intersection. Due to the sensitive nature of these constraints, the Study Team cannot recommend this scenario as more than a desirable long-term alternative.


FIGURE 11
ROVE AVE
Note: This is a conceptual, no-constraint revisioning of this intersection as a long-term improvement that addresses the traffic issues inherent to an off-set intersection.
COLLEGE AVE
Parking
Parking
Possible new development parcel
Possible new development parcel or park
BETHLEHEM PIKE
BYSHER AVE
College Avenue Inset
Taming Traffic Study
Bethlehem Pike
Not to scale
N
Delaware Valley
Regional Planning Commission
December 2008

Site D: Mill Road Area

More than other segments of the study corridor the area around Mill Road is highly multi-modal, including active transit stops, a trail head for a county-wide bike trail, and multiple destinations for both motorists and pedestrians. However, multiple access points on both sides of the roadway and the auto-oriented development pattern of this portion of Bethlehem Pike results in increased motorist conflicts, and an unfriendly environment for cyclists and pedestrians.

The three-lane road diet cross-section may significantly cut down on conflicts at this location, by reducing the number of lanes that turning traffic must cross over, and by providing a safe refuge lane for drivers to utilize while waiting for a clear point to merge with through traffic. In addition, the Study Team recommends encouraging businesses to consolidate access curb cuts, in order to reduce the number of points of conflict. It is to everyone's benefit to have a safe roadway.

Transit users are also at risk in this area, as bus stops lack basic amenities and safe refuges for waiting passengers. The level of transit amenities is somewhat out of line with the level of transit activity here, and deserves a higher profile. Drivers tend to proceed more slowly and cautiously when they share the roadway with other modes of travel, including cyclists, pedestrians, and transit users. Recommendations at this point serve to make alternate modes of travel safer and more prominent in the roadway landscape. The Study Team recommends adding transit shelters at this point. Since there is ample off-street parking at this point, the Study Team recommends utilizing the parking lane for a shoulder/bus pullover lane.

In addition, the Study Team observed a significant number of pedestrians crossing at Weiss Avenue, where there is currently no signal or crosswalk. The Study Team recommends installing a crosswalk at this unsignalized location. This recommendation was also made in the Vision Plan, and can function if drivers approaching the crosswalk are given clear and ample alerts through signage and/or pavement markings.

Site D Improvements:

1. Add a shoulder/bus pull-off lane on the east side (northbound) of Bethlehem Pike, north of Weiss Avenue, in place of the dedicated parking lane.
2. Install curb extensions at Weiss Avenue and Mill Road to shorten pedestrian crossing distances.
3. Install a well-marked and highly-visible crosswalk at the unsignalized intersection with Weiss Avenue, to accommodate pedestrian activity in this area.
4. Add a transit shelter and/or refuge area in the vicinity of the current SEPTA bus stop along northbound Bethlehem Pike.

Corridor-Wide Improvements:

1. Road diet with shared lane markings ("sharrows")
2. Streetscaping and placemaking elements
3. Crosswalk Improvements

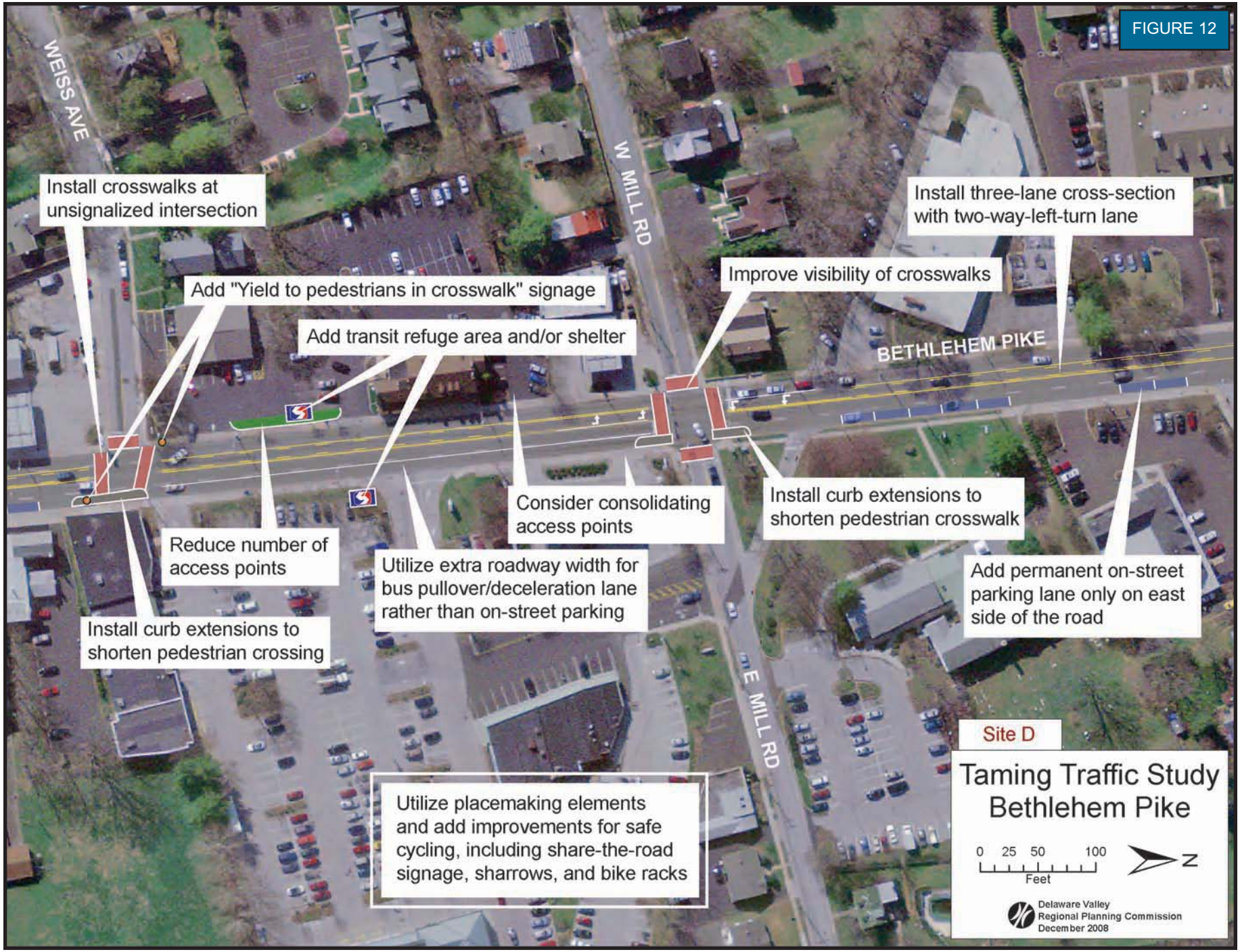
FIGURE 12
WEISS AVE
W MILL RD
BETHLEHEM PIKE
E MILL RD
Install crosswalks at unsignalized intersection
Add "Yield to pedestrians in crosswalk" signage
Add transit refuge area and/or shelter
Improve visibility of crosswalks
Install three-lane cross-section with two-way-left-turn lane
Consider consolidating access points
Install curb extensions to shorten pedestrian crosswalk
Reduce number of access points
Utilize extra roadway width for bus pullover/deceleration lane rather than on-street parking
Add permanent on-street parking lane only on east side of the road
Install curb extensions to shorten pedestrian crossing
Utilize placemaking elements and add improvements for safe cycling, including share-the-road signage, sharrows, and bike racks
Site D
Taming Traffic Study
Bethlehem Pike
0 25 50 100
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Delaware Valley
Regional Planning Commission
December 2008

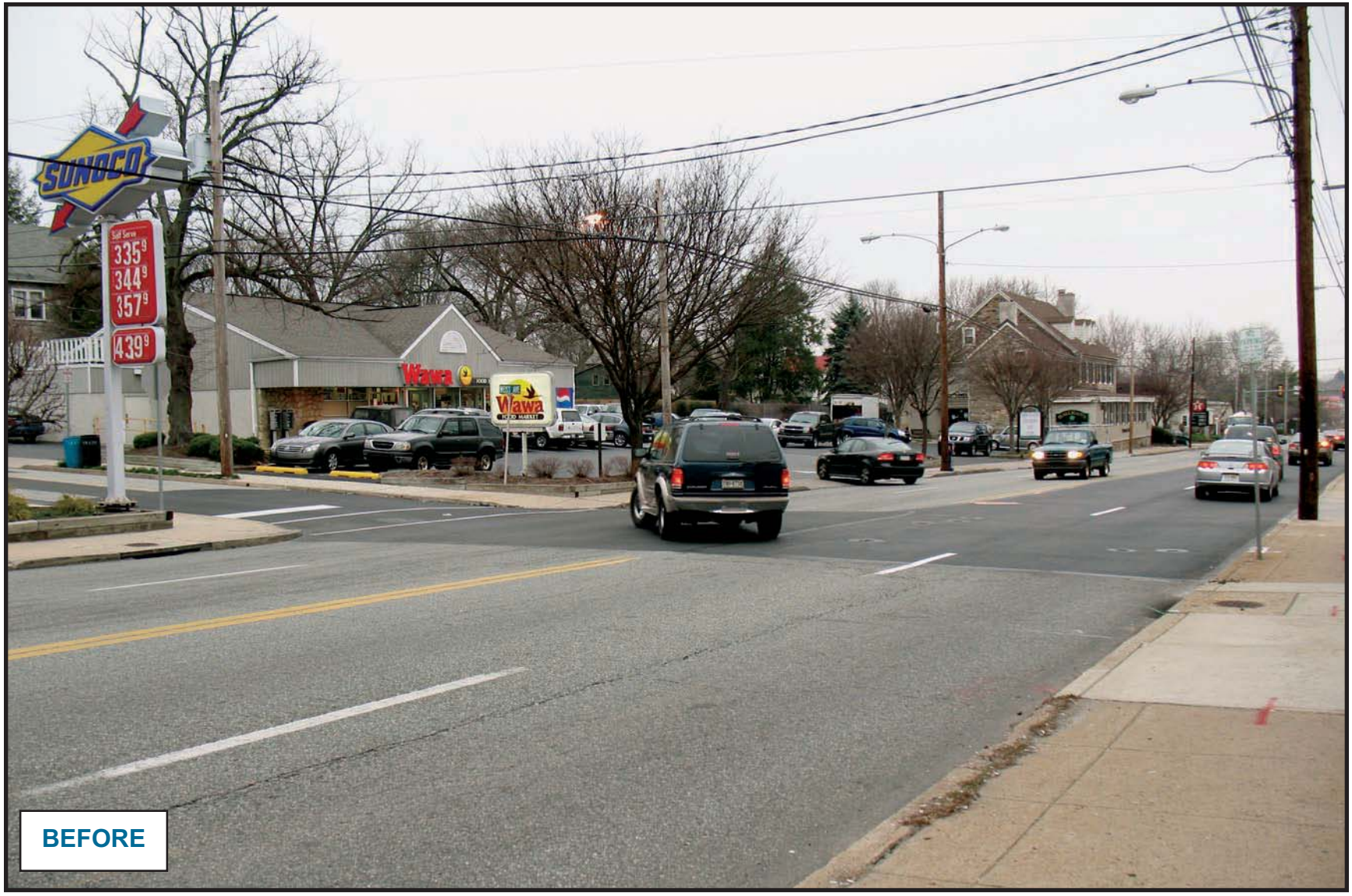

FIGURE 13: Vicinity of Weiss Avenue – Existing Conditions. *This image is a photograph of existing conditions on Bethlehem Pike, looking north toward the intersection with Mill Road. Source: DVRPC*

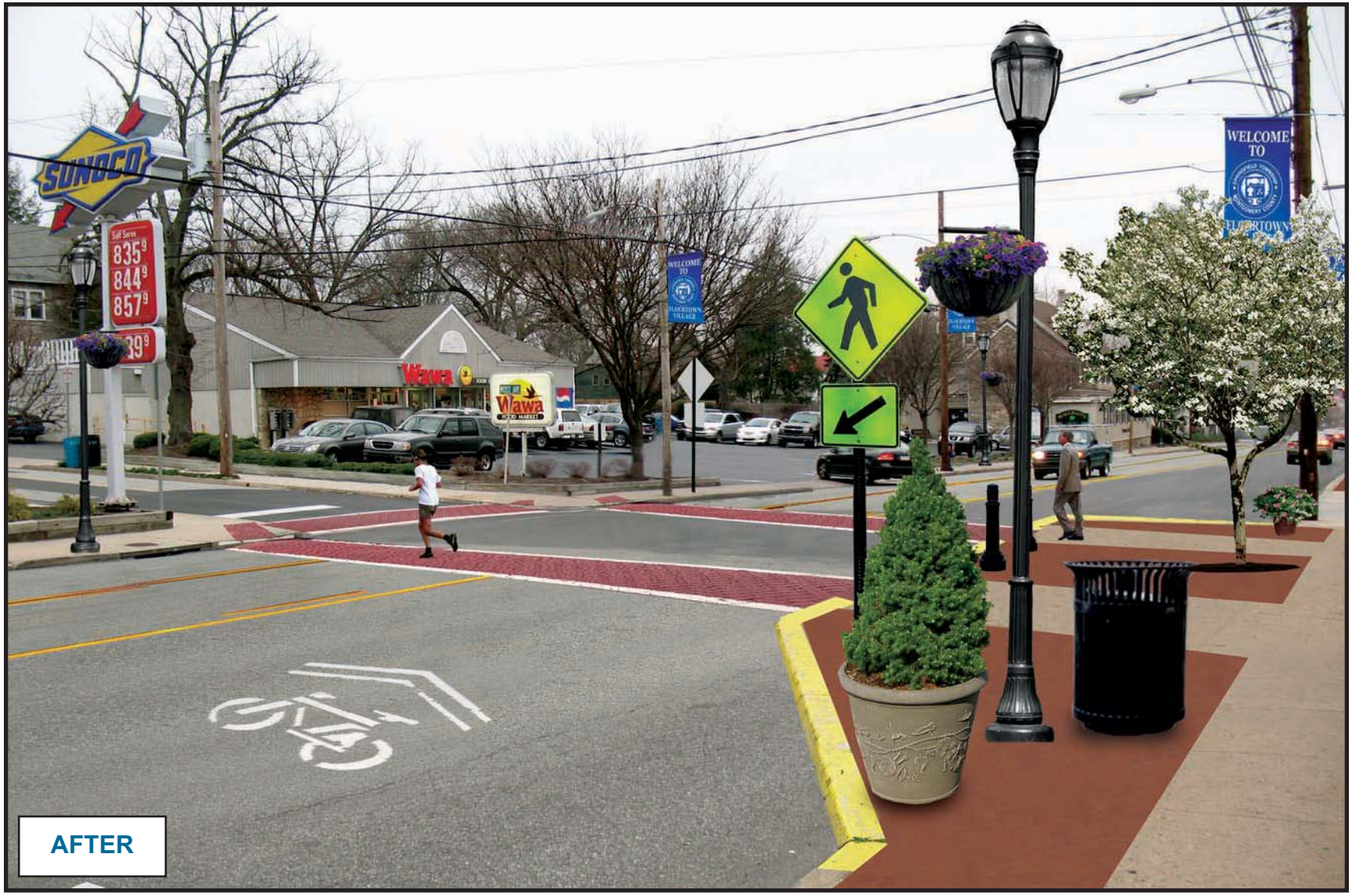

FIGURE 14: Vicinity of Montgomery Avenue – Simulation. *This image is a photo-simulation of the recommended improvements applied to the location shown on the left. Major improvements include the new crosswalk at the unsignalized Weiss Road intersection, the three-lane cross-section, shared-lane markings, dedicated parking lane, enhanced crosswalks, streetscaping, and curb extension. Source: DVRPC*

Site E: Vicinity of Springfield Avenue

The shopping center area, north of Springfield Avenue, is another example of a location where the characteristics of the roadway change significantly. Here the roadway configuration changes at the Springfield/Whitemarsh municipal border, with the four-lane cross-section in Springfield and a three-lane cross-section in Whitemarsh. Around the entrance to the shopping center, the current striping is somewhat confusing, and the change in configuration only exacerbates this ambiguity.

There are some conflicts with turning traffic, though nowhere near as serious as the area to the south of Mill Road. As with the other shopping center area, there is increased pedestrian activity and transit usage, but currently these modes lack adequate amenities.

The Study Team recommends converting the portion of Bethlehem Pike in Springfield Township to a three-lane cross-section, creating a seamless transition to and from Whitemarsh Township. This improvement will eliminate the somewhat ambiguous striping at the shopping center entrance, and formalize the cross-section with opposing dedicated left-turn lanes.

As with the area around the other shopping center, there is no need for on-street parking, and so the left-over pavement width should be utilized for a shoulder/bus pull-off lane. In addition, the Study Team recommends improving the visibility of pedestrian crosswalks and adding transit refuges at current SEPTA bus stop locations.

Site E Improvements:

1. Add a shoulder/bus pull-off lane on the east side (northbound) of Bethlehem Pike, in place of the dedicated parking lane.
2. Install opposing left-turn lanes at traffic signal.
3. Add a transit shelter and/or refuge area in the vicinity of the current SEPTA bus stop along both sides of Bethlehem Pike.

Corridor-Wide Improvements:

1. Road diet with shared lane markings (“sharrows”)
2. Streetscaping and placemaking elements
3. Crosswalk Improvements

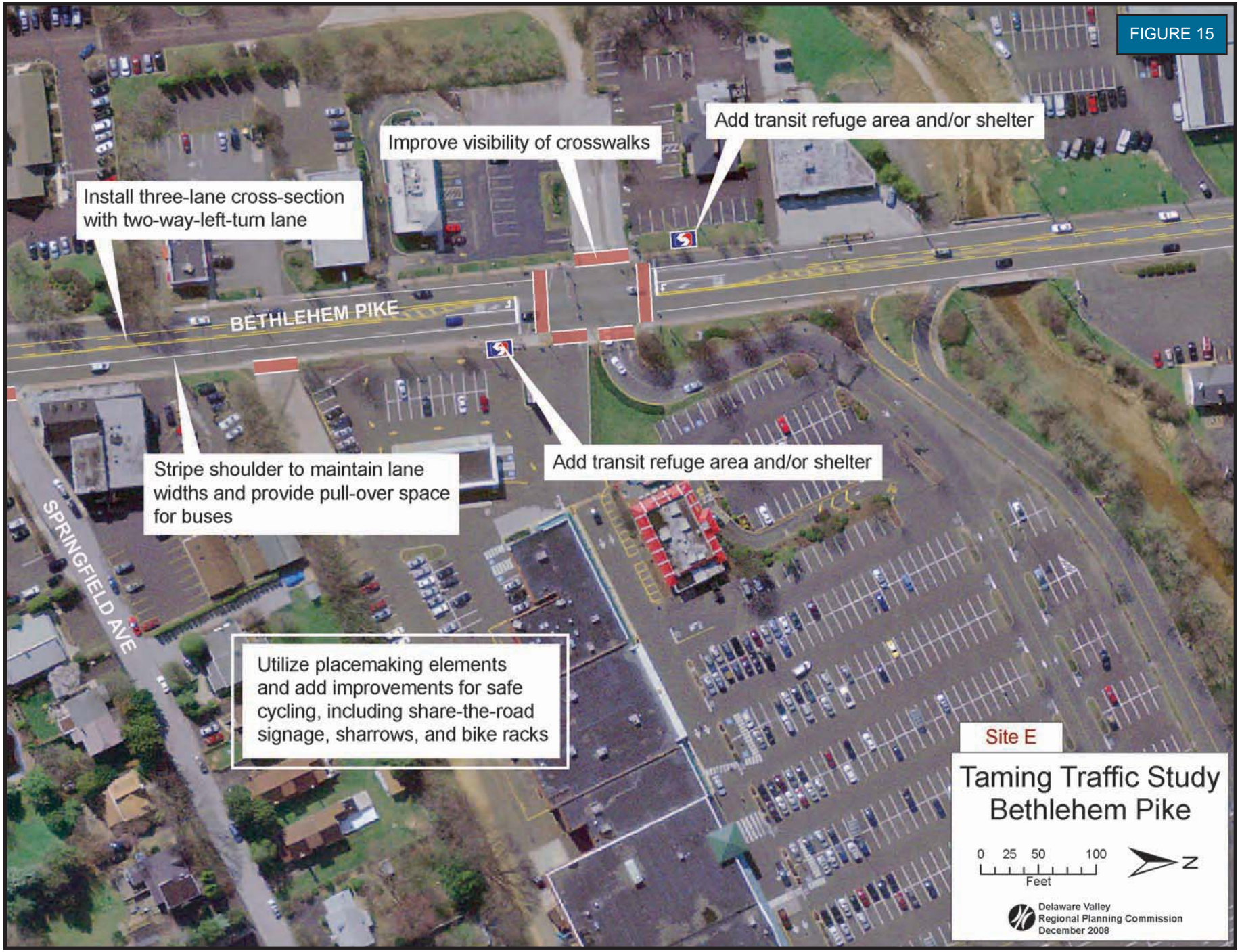
FIGURE 15
Add transit refuge area and/or shelter
Improve visibility of crosswalks
Install three-lane cross-section with two-way-left-turn lane
BETHLEHEM PIKE
Stripe shoulder to maintain lane widths and provide pull-over space for buses
Add transit refuge area and/or shelter
SPRINGFIELD AVE
Utilize placemaking elements and add improvements for safe cycling, including share-the-road signage, sharrows, and bike racks
Site E
Taming Traffic Study
Bethlehem Pike
0 25 50 100
Feet
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Delaware Valley
Regional Planning Commission
December 2008

Site F: Whitemarsh Township

The northern portion of the corridor exhibits a lower density development pattern and the same three-lane roadway configuration recommended by the Study Team for the southern portion of the study area. In this area, traffic moves at a steady flow with few conflict points. However, amenities for alternate travel modes are lacking. There are no sidewalks for much of this section, and transit stops are not well-marked.

The Study Team observed pedestrian activity in this area, and so recommends the installation of amenities for all modes to safely utilize the corridor. The Study Team suggests a continuation of share-the-road signage and shared lane markings to accommodate cyclists. A continuous sidewalk on both sides of the roadway is recommended to provide safe access for pedestrians. The addition of these multi-modal amenities will serve to further calm traffic in this area as drivers become aware of the presence of other users.

Similarly, the addition of transit shelters at SEPTA bus stop locations will provide a safe refuge for transit users and make their presence known to passing motorists. There was some discussion at the advisory committee meetings about relocating the bus stops at this site to more appropriate locations. This is a topic that Whitemarsh Township and SEPTA may wish to address.

Site F Improvements:

1. Install a continuous sidewalk along both sides of Bethlehem Pike to provide enhanced connectivity.
2. Add a transit shelter and/or refuge area in the vicinity of the current SEPTA bus stops along both sides of Bethlehem Pike.

Corridor-Wide Improvements:

1. Streetscaping and placemaking elements
2. Shared lane markings (“sharrows”)

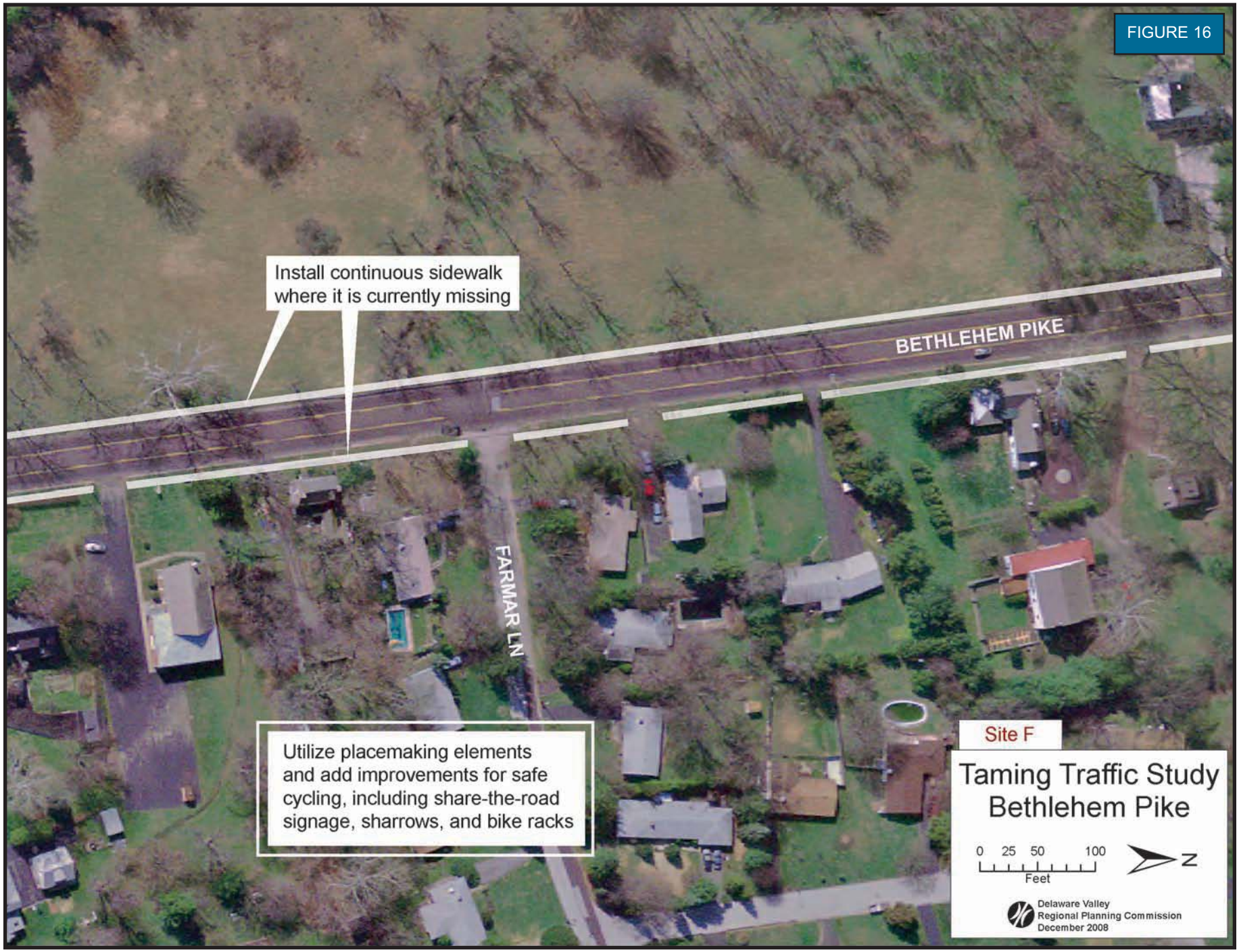
FIGURE 16
Install continuous sidewalk where it is currently missing
BETHLEHEM PIKE
FARMAR LN
Utilize placemaking elements and add improvements for safe cycling, including share-the-road signage, sharrows, and bike racks
Site F
Taming Traffic Study
Bethlehem Pike
0 25 50 100
Feet
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Delaware Valley Regional Planning Commission
December 2008

IMPLEMENTATION

It is always a challenge for municipalities to transition a concept from plan to implementation; however, Springfield and Whitemarsh townships are well positioned to realize many of the concepts recommended in the Taming Traffic study. It is easier to move a concept forward when it is reflected in a series of plans, and when it leverages enhancements to current or already planned projects.

It is important to note that the recommendations presented here are not an all-or-nothing strategy. They can and should be applied in phases. For example, this study recommends that a three-lane cross-section be installed with striping, signals, signage, curb bump outs, shared lane markings, and pedestrian crossing amenities. However, it may meet the needs of the Township and other partner agencies to concentrate on the necessities in this recommendation first, like striping and signage, and plan for more permanent items such as curb bump outs for future phases. A phased approach may increase the support and cooperation of other agencies and organizations, such as PennDOT, because of the ability to assess the success, efficiency, and cost-effectiveness of such improvements prior to the completion of an entire transformation. In addition, a phased plan spreads the financial burden more broadly, making ambitious improvements more realistic to implement. Identifying funding sources for a single element rather than a comprehensive set of components is also frequently less challenging.

Despite an emphasis on a phased approach, municipal officials should keep the big picture in mind. Many context-sensitive strategies rely on complementary elements that help alter the overall perception of a roadway. Re-striping the roadway may improve safety, but may not have visually transformative benefits unless combined with streetscaping, new crosswalks, and other placemaking improvements. It is important that municipal officials proceed in phases, in order to work most effectively with PennDOT and raise funding, while keeping their eye on the total vision for the future of Bethlehem Pike.

Bethlehem Pike is a state road, making it critical that municipal officials work closely with PennDOT, from beginning to end. While it is not PennDOT's sole responsibility to develop the recommendations in the Vision Plan and the Bethlehem Pike Corridor Study, it is important that cooperation between the agency and the local communities continues beyond this study, where PennDOT representatives have given preliminary approval of the concepts suggested herein. Considering that any roadway changes will require additional engineering analysis and official PennDOT approval, it is critical that the proposed three-lane cross-section be further studied to ensure that it can be accommodated along Bethlehem Pike without imposing significant negative impacts on roadway operations.

The recommended next step toward implementation is to seek funding for design and engineering of the proposed three-lane cross-section. This will require an engineer to run a capacity analysis of the cross-section recommended in this plan, while working with PennDOT to ensure that the analysis contains all required elements. It is critical that Springfield Township ensure this coordination with PennDOT. If the analysis is acceptable to PennDOT, the next step will be to contract with an engineer to design the re-striping, and then move toward construction. A rough estimate of costs for the design and construction of a three-lane cross-section, like the one proposed in this study is about $5.63/linear foot (LF).[1]

With gateway and streetscaping elements already in the pipeline, using the Vision Plan as a guide, and rezoning already under consideration in Springfield Township, the addition of the improvements recommended in this document should create a cumulative effect that will transform the visual and functional identity of Bethlehem Pike. These improvements will also provide a basis for enhancing safety, multi-modal mobility, attractiveness, and economic competitiveness.

[1] This figure is derived from the costs of recent striping projects of a similar nature completed using federal TE funds, administered by DVRPC. Restriping a roadway from four lanes to three lanes, with a two-way-left-turn lane, costs approximately $2.27/LF for pavement marking removal, $1.12/LF for four-inch white markings, and $2.24/LF for four-inch yellow markings.

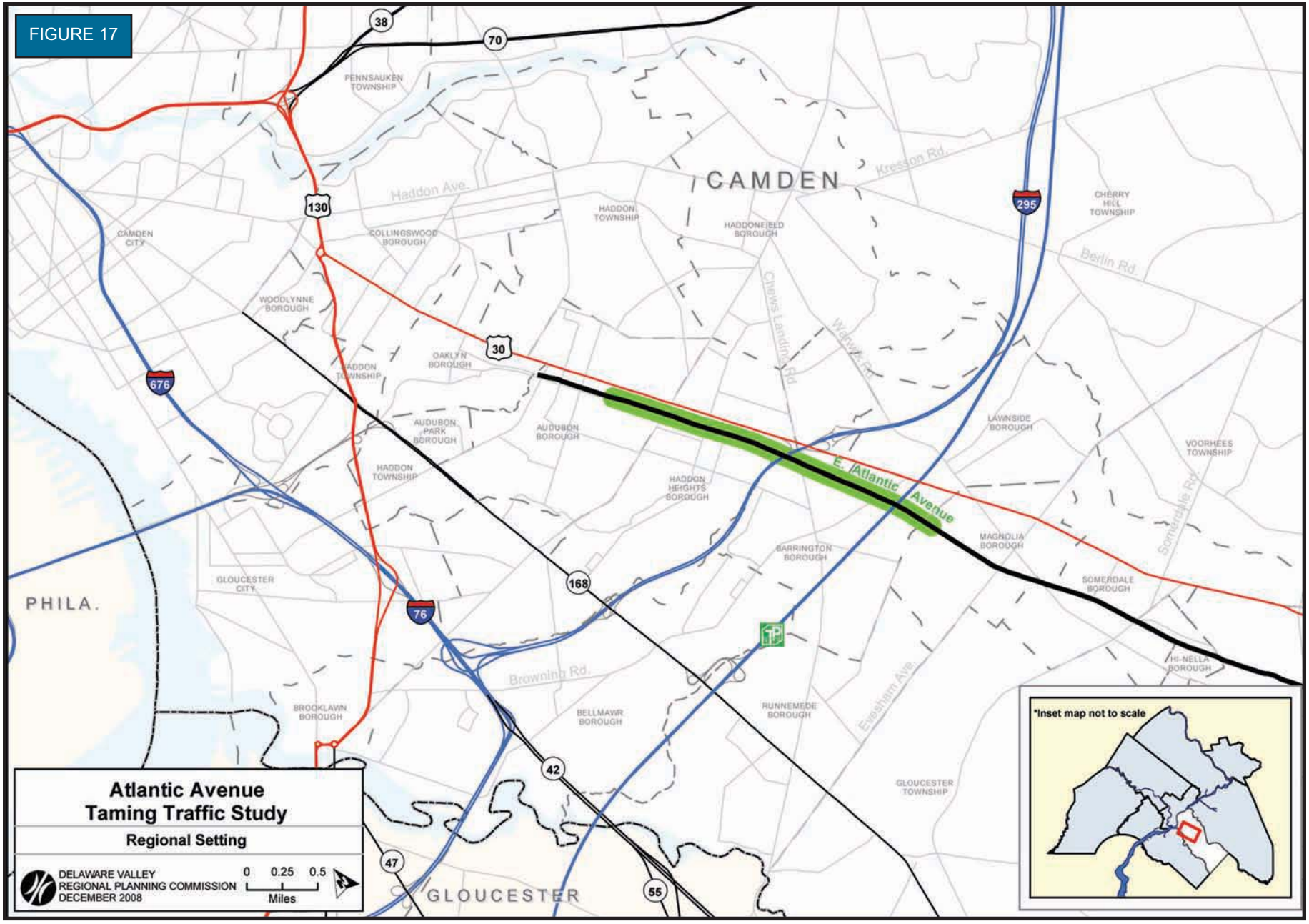
SECTION 3:

EAST ATLANTIC AVENUE STUDY SITE

AUDUBON/HADDON HEIGHTS/ BARRINGTON/LAWNSIDE BOROUGHS

CAMDEN COUNTY, NJ

FIGURE 17


38
70
PENNSAUKEN TOWNSHIP
CAMDEN
Kresson Rd.
Haddon Ave.
130
HADDON TOWNSHIP
HADDONFIELD BOROUGH
295
CHERRY HILL TOWNSHIP
CAMDEN CITY
COLLINGSWOOD BOROUGH
Berlin Rd.
Chews Landing Rd.
Warwick Rd.
WOODLYNNE BOROUGH
30
OAKLYN BOROUGH
676
HADDON TOWNSHIP
AUDUBON PARK BOROUGH
AUDUBON BOROUGH
LAWNSIDE BOROUGH
VOORHEES TOWNSHIP
HADDON TOWNSHIP
HADDON HEIGHTS BOROUGH
E. Atlantic Avenue
Somerdale Rd.
MAGNOLIA BOROUGH
BARRINGTON BOROUGH
GLOUCESTER CITY
168
SOMERDALE BOROUGH
PHILA.
76
HI-NELLA BOROUGH
Browning Rd.
Evesham Ave.
BROOKLAWN BOROUGH
BELLMAWR BOROUGH
RUNNEMEDE BOROUGH
42
GLOUCESTER TOWNSHIP
47
GLOUCESTER
55
*Inset map not to scale
Atlantic Avenue
Taming Traffic Study
Regional Setting
DELAWARE VALLEY
REGIONAL PLANNING COMMISSION
DECEMBER 2008
0 0.25 0.5
Miles

EAST ATLANTIC AVENUE: EXISTING CONDITIONS

Street Name: East Atlantic Avenue
Functional Class: Urban Collector
Posted Speed Limit: 25 MPH
AADT: N/A

Location

The study corridor is a 2-mile section of East Atlantic Avenue, running through Audubon, Haddon Heights, Barrington, and Lawnside boroughs. The cross street limits are Chestnut Street in Audubon to the west, and Davis Road in Lawnside to the east. The context of the corridor varies between single-family and multi-family residential, retail/commercial, production and shipping facilities, and undeveloped land.

The most predominant land use characteristic of the corridor is the Beasleys Point Secondary Rail line that follows East Atlantic Avenue along its southside adjacent to the eastbound lane. This is an active freight line operated by Conrail Shared Assets that crosses all intersecting streets in the study area at grade except for Kings Highway which passes over the rail tracks. Also paralleling East Atlantic Avenue one block north is the urban principal arterial US 30, known locally as the White Horse Pike. The study corridor handles both local and regional traffic by providing relief to the White Horse Pike.

Highway Access

Local residents gain access to I-295 via the White Horse Pike. Access to the New Jersey Turnpike and to NJ 168 Black Horse Pike can be made by way of East Atlantic Avenue's connections with major north-south county routes. Both routes are less than two miles away.

Transit Access

East Atlantic Avenue is not served by New Jersey Transit. However, the route 403 bus traverses the White Horse Pike, the 457 bus serves Kings Highway, and the 455 serves Clements Bridge Road. Stops for each of these routes are easily accessible from the study corridor.

Roadway Characteristics

East Atlantic Avenue (County Route 727) is classified as an urban collector. Although the cross-section geometry is constant at one lane per direction, the pavement width ranges between 22 and 33 feet with a varying shoulder width of 1 to 5 feet. The posted speed limit is 25 mph. There are two signalized intersections and two stop controlled intersections along the corridor. One roadway characteristic that is immediately noticeable is the corridor's inconsistent lane striping which varies between double yellow and a variety of passing accommodations. At the western end of the study corridor East Atlantic Avenue changes designation from CR 727 to CR 729 within Audubon Borough.

East Atlantic Avenue is a two-lane roadway, used as a commuter bypass, that traverses several sensitive areas, such as business centers and two school zones. Source: DVRPC

Neighboring Amenities

East Atlantic Avenue provides access to the downtown business districts of Haddon Heights and Barrington, and connects to a smaller secondary retail area in Audubon. The White Horse Plaza, a major shopping center located in Lawnside with a main entrance on the White Horse Pike, is also within the study area and has secondary access along East Atlantic Avenue. Together, these business districts offer a wide variety of retail and commercial opportunities. In Haddon Heights and Barrington there are many local eateries which anchor the downtowns as destinations.

Crash Summary

A cursory crash analysis was performed in an effort to identify crash safety problems related to the operation of the study corridor East Atlantic Avenue (CR 727 and CR 729), between the Chestnut Avenue intersection in Audubon and the Davis Avenue intersection in Lawnside (2.35 miles). Crash data from the New Jersey Department of Transportation's (NJDOT) web page for years 2005-2007 was utilized. The data analyzed in this report involves crashes coded to East Atlantic Avenue proper and to the intersection approaches of the routes it intersects: CR 656 Station Avenue, CR NJ 41 Clements Bridge Road, and CR 659 Gloucester Pike. This method ensures intersection crashes are not excluded from the analysis since NJDOT codes to the highest functioning facility as a matter of protocol. According to NJDOT, rear-end and sideswipe collisions involve traffic moving in the same direction, angle crashes involve angular traffic (i.e. north and west), and left turn and head-on crashes involve opposing traffic.

Corridor Crash Statistics

During the three-year period (2005 — 2007) 33 crashes were recorded on the East Atlantic Avenue study corridor and its major intersections within the study limits. Approximately 40% of the crashes were coded as "at intersection" which is defined by NJDOT as being within the stop bars of the intersecting streets, both signalized and unsignalized, where applicable. There are two signalized intersections on the corridor within the study area: 1) Station Avenue, and 2) Gloucester Pike. Rear-end crashes were the most frequent collision type along the corridor accounting for 30% of incidents (10 crashes), followed by right-angle crashes accounting for 27% (nine crashes). According to NJDOT a right angle crash involves vehicles traveling in angular directions to one another; i.e. north and west, east and south, etc. No pedestrian or bicycle involved crashes occurred within the study area. There were no fatal crashes, six injury crashes, and 27 property-damage-only crashes.

Crash Concentrations

No areas of great concern were identified along East Atlantic Avenue. With only 33 crashes identified within the 2.5 mile study corridor during the three-year analysis period, it is not surprising that there were no identified crash clusters. The only recognizable crash concentration was along Station Avenue in Haddon Heights within close proximity of the study corridor.

Eleven crashes were identified on Station Avenue (CR 656) in the immediate vicinity of its intersection with East Atlantic Avenue. This is a four-way intersection with stop controls on East Atlantic Avenue only. This is a busy intersection for motorists traveling to and through Haddon Heights, and for pedestrians patronizing the Haddon Heights downtown business district. Seven of the 11 crashes identified here were right-angle crashes. Currently, when northbound vehicles (moving toward the White Horse Pike) queue on Station Avenue to turn left onto westbound East Atlantic Avenue, through traffic typically squeezes past along the right side. This situation is also common on the approaches of both east and westbound East Atlantic Avenue. This practice, combined with the compromised sight distance resulting from the elevated railroad bed between East and West Atlantic Avenues presents a potentially hazardous situation for motorists, and especially for pedestrians.

The recommended improvements at this intersection are intended to eliminate opportunities to pass on the right by narrowing these very wide approach lanes on northbound Station Avenue, and east and westbound approaches on East Atlantic Avenue. By eliminating the ambiguity of the existing lane configurations, the anticipated result is better, safer traffic flow, a reduction in the number of potential vehicle conflicts, and improved pedestrian amenities.

Existing Plans and Studies

The East Atlantic Bikeway Feasibility Study was prepared by Key Engineers, Inc. for the Delaware Valley Regional Planning Commission and Camden County, in order to analyze the potential for an on and off-road bikeway on the East Atlantic Avenue corridor. The study analyzes the East Atlantic Avenue Corridor, segment by segment, from Oaklyn Borough to Clementon Borough, providing cost estimates, and a list of advantages and disadvantages for three alternatives.

The study states that the main goal of a bikeway on East Atlantic Avenue is to provide a bicycle facility that is integrated with the existing transportation system and creates a safe, convenient, and attractive bicycling and walking environment. Three approaches to bike travel within the corridor are considered: 1) Shared Roadway, 2) On-Road Bike, and 3) Off-Road Bike. While the first two alternatives use the existing roadway, the third is a facility separated from motor vehicle traffic by an open space or barrier. This can be within the roadway right-of-way (but in the travel way) or in its own independent right-of-way. This option typically takes the form of a paved bike path or trail, and is often used for biking, walking, in-line skating, and other purposes. A multi-purpose path such as this is a good option in areas without a safe and suitable street network for those uses, particularly for children and less experienced adult bicyclists.

The study's "Segment 1," which includes the Boroughs of Audubon, Haddon Heights, Barrington, and the edge of Lawnside, covers the East Atlantic Avenue Taming Traffic study limits. For each Borough, the study considers each section of the corridor and provides recommendations and respective cost estimations. For these specific segments, average Share-The-Road costs are $2,500, while On-Road and Off-Road Bike improvements have higher average costs: $203,127 for On-Road Bike and $413,515 for Off-Road Bike.

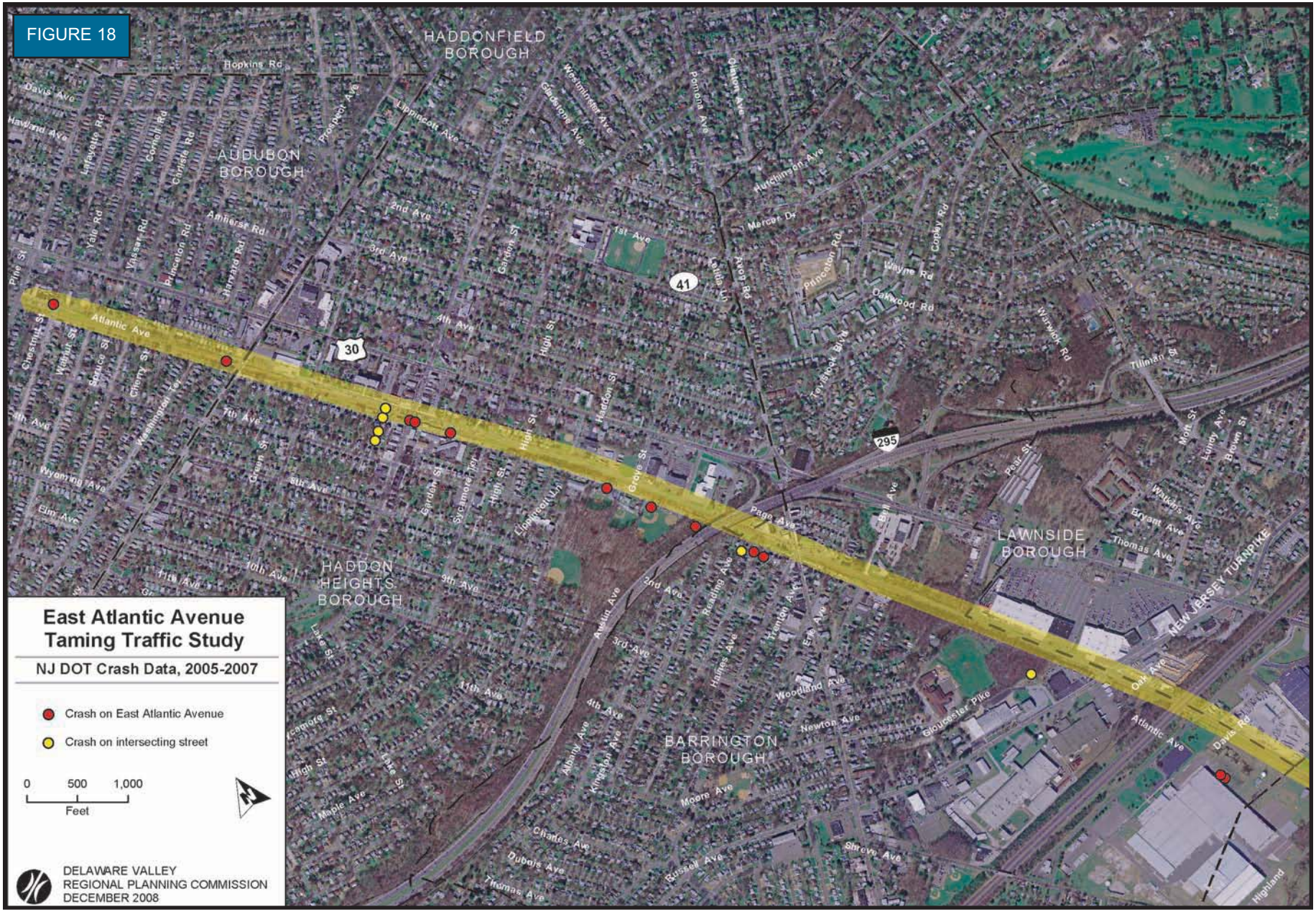
The narrative and cost estimates for the Off-Road Bike alternative is the study component most relevant to the *Taming Traffic* study which includes a recommendation for a Rail-with-Trail multi-use path. This path would also be off-road and would parallel the existing rail road tracks. Although this is only one of many recommendations contained in the *Taming Traffic* report, it is the most significant in terms of scope and cost. The Off-Road Bike cost estimates from the *East Atlantic Bikeway Feasibility Study* provide a reasonable measure of cost magnitude which is useful in the conversation regarding implementation of the Rail-with-Trail facility as described in the Taming Traffic study. Other relevant components include the project narrative on bicycle facility perceptions, and on bicycle safety.

Case For Study

The East Atlantic Avenue study corridor is an important secondary facility connecting several business districts that also provides an alternative to the White Horse Pike. These characteristics are both a blessing and a curse. Local travelers depend on this corridor for easy access between towns and shopping destinations, while regional travelers often use the route as a cut-through for avoiding the higher volumes of the White Horse Pike. Although East Atlantic Avenue is an indispensable component of the transportation network, the driving speed and behavior of the motorists using the facility sometimes compromise the quality of life desired by those residents who live along the roadway. In addition, bikers and walkers are accommodated with few amenities, which are inconsistently available. This is of particular concern due to the number of school children who daily traverse and/or cross East Atlantic.

East Atlantic Avenue has an ideal alignment and is strategically located to become an important corridor for non-motorized connectivity between each of the four study area municipalities. With the proper treatments, this goal can be achieved without sacrificing the roadway's utility as reliever to the White Horse Pike and as a commuter route.

FIGURE 18



East Atlantic Avenue Taming Traffic Study

NJ DOT Crash Data, 2005-2007

- Crash on East Atlantic Avenue
- Crash on intersecting street

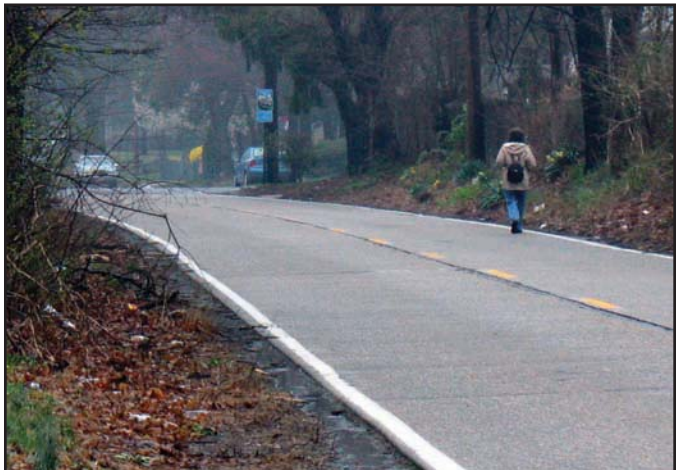
0 500 1,000
Feet

DELAWARE VALLEY
REGIONAL PLANNING COMMISSION
DECEMBER 2008

PROBLEM IDENTIFICATION

1. Inadequate or unsafe pedestrian access along most of the corridor

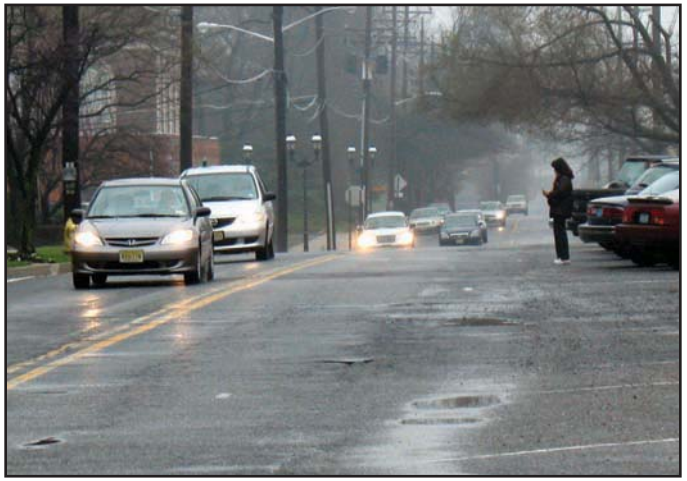
This corridor serves as a connector of business districts between study area municipalities. Currently only vehicle travel is accommodated along the study corridor section of East Atlantic Avenue. Sidewalks are intermittent, and where they do exist, are only available on one side of the roadway. The Study Team observed pedestrians throughout the study corridor despite the lack of sidewalks and an adequate shoulder area for safe walking.



Segments of the corridor lack sidewalks. Coupled with narrow shoulders and sloping berms along the roadside, pedestrians are often forced to walk in the cartway. Source: DVRPC

2. Inadequate pedestrian crossings

Intersection crossings do exist along the corridor, but are not necessarily the most pedestrian friendly. There are opportunities to improve sight distance, vehicle mobility, pedestrian profile, and pedestrian accessibility at the existing crossings. There are also opportunities to site mid-block crossings along the corridor to better connect walkers to their destinations. Curb ramps need to be evaluated for ADA compliance and crosswalk striping is due for general maintenance, and ideally an upgrade.



There are only a few crosswalks along the study corridor. Source: DVRPC

3. Corridor lacks bicycling accommodations

East Atlantic Avenue is a much more desirable cycling route than the White Horse Pike due to its considerably lower traffic volume and because there are fewer conflict points with turning vehicles. These two routes make for a natural comparison because they run parallel to each other and are connected by the same intersecting streets. Despite inconsistent shoulder widths and a lack of integrated bicycle priority, cyclists still frequent East Atlantic Avenue-further evidence that it is an ideal corridor for bicycling. This concept is discussed in the *East Atlantic Avenue Bikeway Feasibility Study* published in April of 2004. A primer for this document is included in this report.

Lack of bike lanes and sidewalks creates potentially dangerous conditions for cyclists. Source: DVRPC

4. East Atlantic Avenue is used as a cut-through or bypass route for circumventing US 30

Higher average speeds are reportedly common along East Atlantic Avenue, especially regarding the cut-through traffic seeking to bypass traffic back ups on the White Horse Pike. This can be potentially dangerous, especially when pedestrians and cyclists are sharing the roadway. Although network connectivity is important, driver behavior is at issue, not mobility. Speeding and erratic driver movements reduce the quality of life for residents and endanger the economic vitality of the pedestrian-oriented downtowns near the study area. As well, erratic driving and disregard for the speed limit are an unsafe practice.

Usage as a bypass route results in significant traffic along East Atlantic Avenue, resulting in behavior patterns that are potentially dangerous for the roadway's users. Source: DVRPC

5. Corridor parking lacks connections to adjacent downtown business districts

Existing parking opportunities along East Atlantic Avenue are poorly connected to the adjacent town centers in some locations, and missing in others. This issue is specific to those parts of the corridor where destinations can be found (i.e., shopping, restaurants). There are also periodic issues with poor visibility for drivers backing out of roadside parking into the cartway.

East Atlantic Avenue lacks connectivity with the nearby walkable centers. Source: DVRPC

6. Corridor-wide center line striping is not consistent

The center line along the corridor varies considerably: yellow dashed line; solid-yellow in one direction and yellow dashed in the other; and double-yellow. Dashed yellow line in any form indicates a passing zone for either or both directions of traffic. This configuration is not appropriate along the study corridor which largely serves residential needs (local circulation). The main issues are 1) the "passing sections" are book-ended by intersections, and 2) passing along this stretch of East Atlantic Avenue can be dangerous for pedestrians and bicyclists. The posted speed limit is 25 mph, but observed average travel speeds are reportedly at or above the speed limit. Allowing overtaking/passing when average speeds are already too fast for the context creates a dangerous situation.

Some parts of the study area contain dashed center lines, indicating passing zones – a configuration that may not be appropriate for the corridor. Source: DVRPC

7. East Atlantic Avenue lacks maintenance of vegetation along the lesser developed sections of the corridor

Along much of the railroad right-of-way there is a need for better vegetative maintenance. Weed growth in the absence of a coordinated landscape plan detracts from the aesthetics of the corridor. In some areas the overgrowth encroaches on the shoulder which makes walking/biking even more difficult. Aside from impeding the mobility of non-motorized vehicles and pedestrians, landscaping, and accompanying amenities such as pedestrian-scale lighting can serve to change the image of the corridor for drivers, so that they recognize there are other users and that high speeds are not appropriate in this context.

The study area lacks adequate maintenance of the roadside vegetation and pedestrian amenities that allow multi-modal usage. Source: DVRPC

8. Peak period congestion

Considerable AM peak period congestion westbound between Davis Road and Clements Bridge Road was observed on weekday mornings. A patrol officer was stationed at the stop-controlled Commerce Drive intersection directing traffic in and out of the industrial park during a Study Team field visit. This is reportedly the usual situation.

Peak period congestion is a clear problem along this narrow and multi-modal corridor. Source: DVRPC

CORRIDOR-WIDE IMPROVEMENTS

1. Rail-with-Trail

Improvement: Install a rail-with-trail system adjacent to the freight right-of-way from Chestnut Street in Audubon to Davis Road in Lawnside; and potentially beyond that point. The general trail alignment would be between East Atlantic Avenue and the railroad tracks from Chestnut Street and eventually transitioning to the West Atlantic Avenue side of the tracks in an effort to ease implementation due to land constraints.

Explanation: The East Atlantic Avenue corridor connects all of the towns in the study area and is a more desirable route than US 30 for short trips. Currently only vehicle traffic is properly accommodated along the corridor. Sidewalks are intermittent and on one side of the street only where they do exist. Due to observed pedestrian and bicycle activity on East Atlantic Avenue there is a clear need and desire to use the corridor for non-motorized travel to reach local destinations and for recreation.

The lack of space to install continuous sidewalks to accommodate pedestrians, as well as to provide bike lanes or other bicycle accommodations, necessitates alternative solutions for this corridor. A properly integrated rail-with-trail system achieves two major goals: 1) it provides a safe, aesthetically pleasing, and maintainable multi-modal path which connects destinations and is suitable for all skill levels of users; and 2) preserves an important goods movement infrastructure installation. The Study Team recognizes the difficulties that sometimes face rails-with-trails projects, foremost of which is perhaps obtaining the right-of-way to install the trail system. The Study Team views this trail system as a critical component to the safety, mobility, and attractiveness of the East Atlantic Avenue corridor, as well as a feature that contributes to the quality of life, and economic vitality of the adjacent communities.

2. Traffic Calming

Improvement: Install rumble stripes, rumble strips, reflective pavement markings, signage, and curb bump-outs to slow traffic, raise driver awareness, and encourage safe consistent speeds. In addition, establish an educational campaign that is coordinated with targeted enforcement to raise awareness of the benefits of traffic calming.

Explanation: Through engineering, education, and enforcement the East Atlantic Avenue corridor can become more desirable for multi-modal activity, more inviting to business district patrons, and continue to serve as an important route for connecting communities and providing an alternative to the White Horse Pike. Traffic calming improvements are now more common than ever and can be found anywhere there is a consensus on the need to control traffic speed and make it appropriate for its context. East Atlantic Avenue is the home to an elementary school, a senior center, and the crossroad of three business districts as well as the crossroad of school routes, all of which generate a considerable amount of pedestrian and bicycle activity. When appropriate traffic calming measures are properly implemented they serve to slow traffic to a reasonable speed, and raise the profile of non-motorized users. The result is improved quality of life for residents of the study corridor municipalities, and a safer, more accessible and attractive destination.

3. Pedestrian Crossing Improvements

Improvement: Replace existing pedestrian crosswalks with textured and colored/reflective crosswalk materials. Raised crosswalks or use of other textured materials (stamped concrete, brick) are also appropriate.

Explanation: In making a location safer and more walkable, the roadway crossing plays an important role. Improved crossings increase the driver's awareness of pedestrians which has a dual effect of creating a safer refuge for pedestrians while also serving to physically slow traffic, an effect similar to rumble strips. By using an aesthetically pleasing crosswalk treatment, in accordance with engineering standards, the pedestrian environment becomes a prominent placemaking element that will define the look and feel of the corridor and encourage sustained modification in driver behavior. It should also be noted that some crosswalk types are more effective in raising awareness of pedestrians than others (i.e. dual stripe versus continental style "zebra" striping).

It is important to note that as traffic volumes increase pedestrian crosswalks lessen in effectiveness, but do perform better when accompanied by companion strategies such as traffic calming, signs, signalization, and even targeted enforcement. Traffic volumes on East Atlantic Avenue have not reached this level of concern; however, a mid-block crossing (not at intersection) will require a more substantial improvement to optimize effectiveness. In addition, implementation of pedestrian signal heads and push buttons at signalized intersection provide additional benefits.

4. Consistent Center Line Striping

Improvement: Re-stripe the varying center line treatment to provide consistency along the breadth of the study corridor. Currently there is a mix of three striping styles: 1) yellow dashed line, 2) solid yellow in one direction and dashed in the other, and 3) double yellow.

Explanation: Dashed yellow line in any form indicates a passing zone for either or both directions of traffic. This configuration is no longer appropriate along the study corridor which largely serves residential needs; i.e. local circulation. The main issues are 1) the "passing sections" are too short and are book-ended by intersections, and 2) passing along this stretch of East Atlantic Avenue can be dangerous for pedestrians and bicyclists. The posted speed limit is 25 mph and observed average travel speeds are reportedly at or above the speed limit already. Allowing overtaking/passing creates a dangerous situation.

5. Streetscaping

Improvement: Install a unified and consistent set of roadway amenities that define the corridor giving it a sense of place and identity. These improvements typically include pedestrian-scale lighting, street furniture, decorative banners, plantings, and landscaping. In addition, redesign existing parking areas to provide better accessibility between destinations and parking areas.

Explanation: Creating a sense of place for the corridor and its various destinations through streetscaping improvements establishes a modicum of driver behavior setting it apart from adjacent areas. This technique is commonly used in downtown areas and other destination types where there is a mix of transportation modes. This improvement can be tied in with existing streetscapes to create a more pervasive aesthetic. It also provides an opportunity to better integrate existing parking opportunities along East Atlantic Avenue by better connecting them to the adjacent town centers.

The following section contains a series of two-page spreads describing and illustrating the site-specific recommendations for East Atlantic Avenue.

SITE SPECIFIC IMPROVEMENTS

The DVRPC project team has prescribed a set of improvements specific to six sites along the study corridor. These sites are identified on the attached full-corridor view, and the improvements are shown overlaid on aerial images in the attached site plan documents.

Site A: Chestnut Street, Audubon to Green Street, Haddon Heights

Located at the western end of the study corridor this segment includes the Audubon segment and the transition into Haddon Heights. The Study Team observed both pedestrian and bicycle activity along East Atlantic Avenue between Audubon and Haddon Heights where no sidewalk or bike accommodations are provided — a missing critical link. In addition, there is significant pedestrian activity in the vicinity of Atlantic Avenue Elementary School, and frequent crossings over East Atlantic Avenue from the pedestrian foot bridge by school children. Vehicles traveling along eastbound East Atlantic Avenue have a compromised view of the pedestrian crossing at Green Street due to the vertical curve. This results in inadequate stopping distance in advance of the crosswalk. Although crossing guards regulate pedestrians and vehicle traffic during the school year, no additional protection is provided after school or when school is not in session.

In addition, the passing zone striped along the Audubon section of the corridor encourages unsafe driving practices along a stretch of road that is not contextually appropriate for overtaking. The improvements here serve to provide a missing link in the pedestrian way, make the crossing safer, calm traffic, and provide a much needed dedicated corridor-wide bicycle and pedestrian facility.

Site A Improvements:

1. Chicane the roadway to the west (toward the tracks) in order to create space for the addition of a four foot minimum width sidewalk which will connect Ervin Avenue in Audubon to Green Street in Haddon Heights. The roadway chicane will also serve to provide a minor traffic calming benefit.
2. Install rumble stripes (at a minimum), and “Slow 25 MPH” pavement markings along both directions of East Atlantic Avenue to calm traffic approaching the pedestrian crossing at Green Street.
3. Upgrade the pedestrian crossing at Green Street. Possible treatments include reflective markings combined with textured pavement, raised intersection treatments, and pedestrian crossing warning signs. Effectively raising the profile of pedestrians in the crosswalks requires a combination of these treatments and installation in accordance county engineering standards.
4. Install gateway signage on both sides of the Kings Highway overpass to welcome motorists to both Audubon and Haddon Heights signifying the mulit-modal context.

Corridor-Wide Improvements:

1. Replace passing zone dashed centerline striping with solid double yellow striping.
2. Install multi-use Rail-with-Trail between rail road tracks and East Atlantic Avenue.

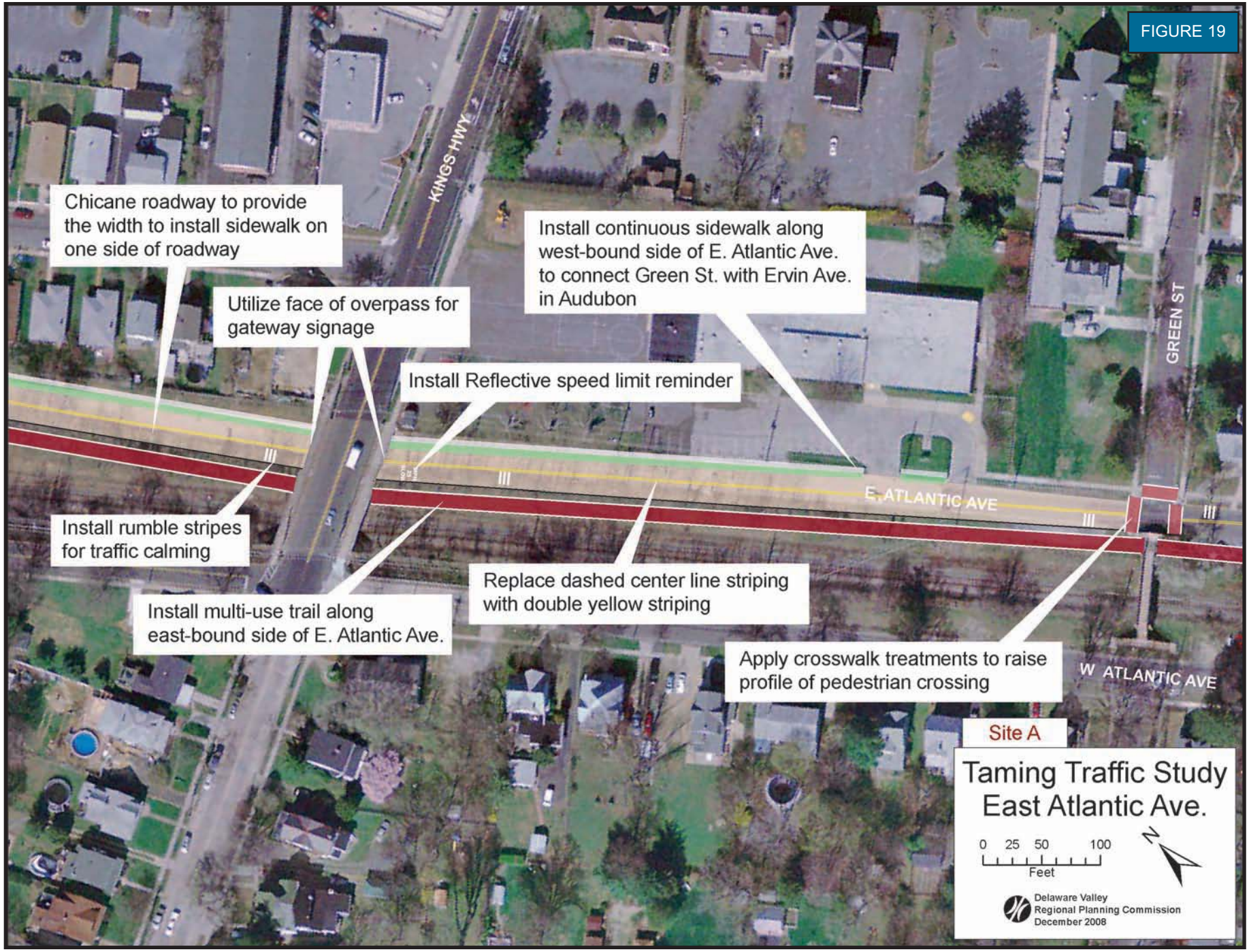


FIGURE 19
Chicane roadway to provide the width to install sidewalk on one side of roadway
Utilize face of overpass for gateway signage
Install continuous sidewalk along west-bound side of E. Atlantic Ave. to connect Green St. with Ervin Ave. in Audubon
Install Reflective speed limit reminder
Install rumble stripes for traffic calming
Install multi-use trail along east-bound side of E. Atlantic Ave.
Replace dashed center line striping with double yellow striping
Apply crosswalk treatments to raise profile of pedestrian crossing
KINGS HWY
GREEN ST
E. ATLANTIC AVE
W ATLANTIC AVE
Site A
Taming Traffic Study
East Atlantic Ave.
0 25 50 100
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FIGURE 20: Vicinity of Haddon Heights Elementary School – Existing Conditions. *This image is a photograph of existing conditions on East Atlantic Avenue, looking east, toward Haddon Heights Elementary School. Source: DVRPC*

FIGURE 21: Vicinity of Haddon Heights Elementary School – Simulation. *This image is a photo-simulation of the recommended improvements applied to the location shown on the left. Major improvements include an increased curve in the roadway to accommodate sidewalks and grass buffer (shown at left), re-striping of the roadway, speed limit pavement markings, and rumble stripes. Source: DVRPC*

Site B: Vicinity of Station Avenue, Haddon Heights

This location is at the heart of the Haddon Heights downtown business district and the site of a critical mass of pedestrian activity. The intersection of Station Avenue and East Atlantic Avenue is stop controlled for East Atlantic Avenue and free flowing for Station Avenue, all turning movements are allowed. Retail, professional, and restaurants comprise the commercial mix in the downtown. Several parking options are available: nose-in angle parking can be found along East Atlantic Avenue, off street parking is available behind the storefronts along Station Avenue, and on-street parallel spaces are available along both sides of Station Avenue.

The Stanfill Towers senior housing complex is located along East Atlantic Avenue between Green Street and Station Avenue, with aforementioned angle parking available across from the facility. A considerable number of Stanfill residents and their visitors take advantage of the parking spaces along East Atlantic Avenue. Pedestrian crossings between the parking area and the towers are a concern because they occur mid-block where no accommodations are provided. As well, it is unreasonable to force these pedestrians to an adjacent cross street due to the circuitous routing.

Several problem scenarios are apparent in this corridor segment. Pedestrians using the angle parking spaces are forced to walk in the street since sidewalks are not provided along eastbound East Atlantic Avenue. The next issue is crossing East Atlantic along Station Avenue. Although marked crosswalks are provided, problems are created by the width of the approach lanes. Thus, the pedestrian crossing is somewhat wide, and pedestrians often have to cross in front of two cars as vehicles often queue at the stop two abreast. This results in a compromised line of site for through traffic, and additional conflict points for turning traffic. These unsanctioned vehicle actions are potentially unsafe, and pose additional pedestrian safety concerns.

The recommendations for this corridor section are designed to improve pedestrian accessibility, shorten pedestrian crossings while making them safer, organize the vehicle movements at the intersection and make them safer, and calm traffic along the corridor. This is achieved through several improvements. Foremost is the installation of curb extensions to the approaches of both East Atlantic Avenue and Station Avenue. These bulb-outs keep the intersection approaches narrow to eliminate side-by-side queuing,

Site B Improvements:

1. Install curb extensions along intersection approaches as depicted in the graphic.
2. Upgrade the pedestrian crossing at Station Avenue. Possible treatments include reflective markings combined with textured pavement, raised intersection treatment, pedestrian crossing warning signs. Effectively raising the profile of pedestrians in the crosswalks requires a combination of these treatments, and installation in accordance with county engineering standards.
3. Install a mid-block pedestrian crosswalk between the entrance to Stanfill Towers and the parking area located directly across East Atlantic Avenue (see improvement #1 for possible implementation treatments).
4. Install a pedestrian walkway between the nose end of the parking spaces and the guide rail along the eastbound East Atlantic Avenue travel lane.
5. Add a crossing over Station Avenue for the multi-use Rail-with-Trail.

Corridor-Wide Improvements:

1. Replace passing zone dashed centerline striping with solid double yellow striping.
2. Install multi-use Rail-with-trail between rail road tracks and East Atlantic Avenue.

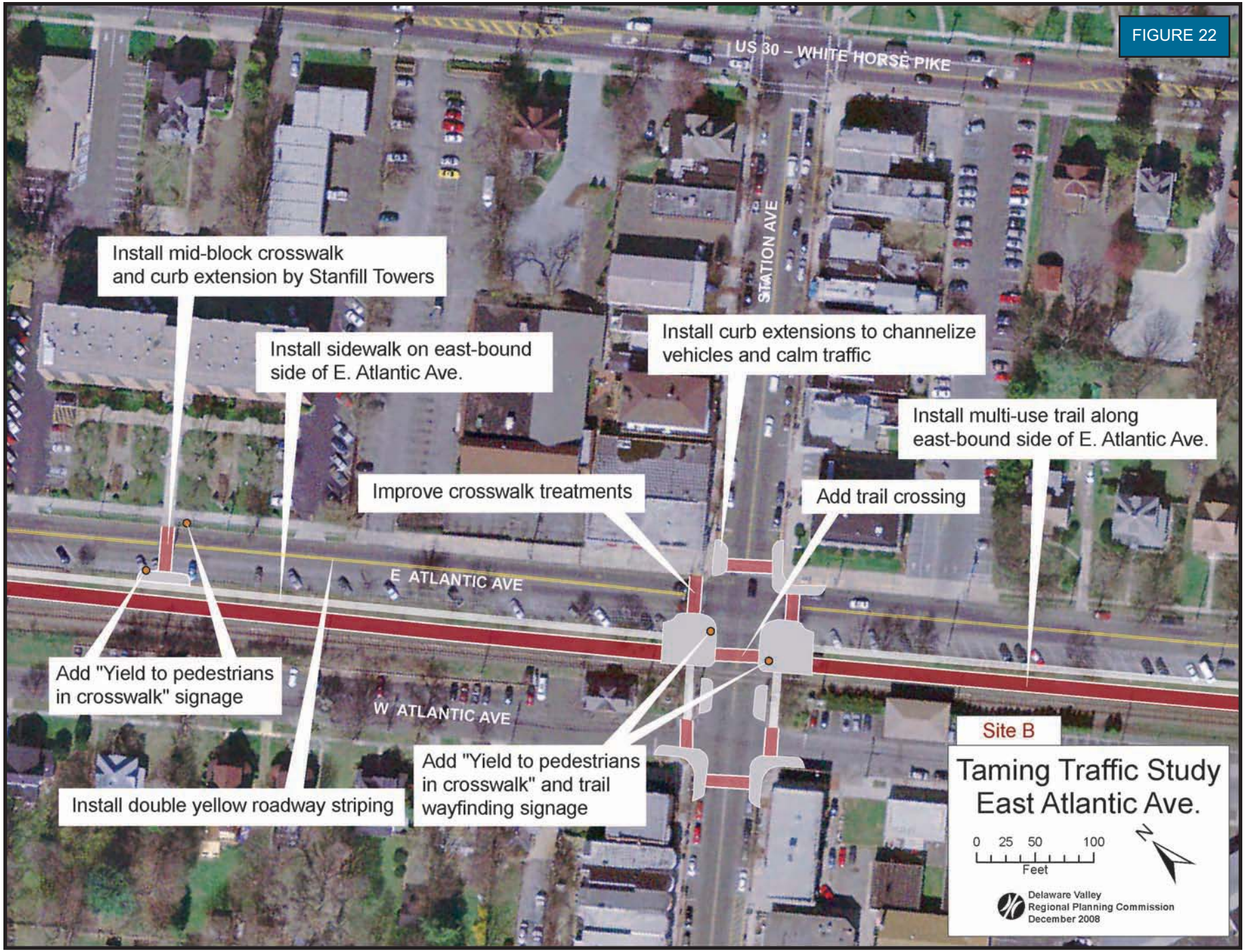
FIGURE 22
US 30 – WHITE HORSE PIKE
STATION AVE
Install mid-block crosswalk and curb extension by Stanfill Towers
Install sidewalk on east-bound side of E. Atlantic Ave.
Install curb extensions to channelize vehicles and calm traffic
Install multi-use trail along east-bound side of E. Atlantic Ave.
Improve crosswalk treatments
Add trail crossing
E ATLANTIC AVE
W ATLANTIC AVE
Add "Yield to pedestrians in crosswalk" signage
Install double yellow roadway striping
Add "Yield to pedestrians in crosswalk" and trail wayfinding signage
Site B
Taming Traffic Study
East Atlantic Ave.
0 25 50 100
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Delaware Valley Regional Planning Commission
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and shorten the pedestrian crossing. It is important to note that curb extensions are also recommended at the intersection of West Atlantic Avenue and Station Avenue as per the diagram. These serve the purpose of preventing Station Avenue through traffic from circumventing the left-turning traffic which is a potentially dangerous situation for motorists and pedestrians.

Lastly, adding a mid-block crosswalk which connects the angle parking area across from Stanfill Towers with the facility entrance completes the picture. By creating a dedicated crosswalk to and from the parking area this raises the profile of pedestrians and will serve to calm traffic if implemented with colored, textured treatments combined with reflective materials and appropriate warning signs. In addition, a sidewalk is recommended along East Atlantic Avenue between Green Street and Station Avenue, and from Station Avenue to near Garden Street. This new walkway creates an access to Station Avenue from the parking areas without forcing people into the travel lane of East Atlantic Avenue when leaving or returning to their vehicles.

Site B: Alternative Trail Crossing and Alignment

Due to the space needed between the railroad tracks and the roadway, the trail must transition from the East Atlantic Avenue side to the West Atlantic Avenue side between Clements Bridge Road and Gloucester Pike. Moving east from Gloucester Pike the trail must switch back to the East Atlantic Avenue side of the tracks due to conflicts with rail spurs that serve the industrial park. Although these transitions are not ideal, they are necessary and will occur at intersections where the rail line already crosses side streets at grade-thus eliminating the need for additional track crossing points. Concessions such as these are commonplace in trail projects.

Upon recommendation by the study advisory committee the report includes a photo-simulation of an alternative trail alignment, which transitions the trail to the West Atlantic Avenue side of the railroad tracks at Station Avenue, instead of the originally proposed transition at Clements Bridge Road (see Figure 23). Because there are space constraints and physical impediments to be considered at each location, implementation of either alternative will require a detailed evaluation of costs and benefits. Neither transition location is ready for implementation in its current state.

Site B: Station Avenue Trail Transition Alternative

At Station Avenue the primary impediment to the trail alignment is the historic train station building, located within approximately 10 feet of the tracks on the West Atlantic Avenue side. This narrow space provides a less-than-ideal situation. Since the building is a local landmark, and should not be torn down or moved, the only practical alternatives include: a partition between the tracks and the trail which leaves virtually no separation between the trail and the building, a partial on-street trail alignment which is circuitous and forces trail uses to mix with traffic, or a new, trail-only crossing over the tracks, east of Station Avenue, at a point beyond the historic station building. Some creativity is necessary with any of these three options. The benefit is that the area between West Atlantic Avenue and the tracks is fairly wide and mostly level between Station Avenue and Clements Bridge Road.

Each alternative presents constraints and opportunities. The decision of which alternative to pursue will be the responsibility of the implementing agency. The best plan will incorporate thorough consideration and a robust public involvement component.


FIGURE 23
STATION AVE
Proposed alternate trail alignment along
West Atlantic side of railroad tracks
E ATLANTIC AVE
W ATLANTIC AVE
Alternate Trail Alignment
Taming Traffic Study
East Atlantic Ave.
Not to scale
N
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Site C: Vicinity of Garden Street, Haddon Heights

This location serves as the transition area into the Haddon Heights downtown for vehicles traveling westward along East Atlantic Avenue. This is also a location which will see an increase in both vehicle and pedestrian traffic, and possibly bicycle traffic, due to the newly completed condominiums located along the East Atlantic Avenue parallel route. Called Kings Run, this new development is an age restricted complex of fifty plus units. This additional housing strengthens the case for improved crossing amenities along the corridor, and a stronger connection with the Haddon Heights and Barrington downtown business districts.

With the installation of the multi-use Rail-with-Trail facility, the placement of a mid-block crosswalk at Garden Street will serve as an important connection between the neighborhood and the trail. In addition to raising the profile of pedestrians this crossing can also provide a traffic calming benefit depending on the selected design.

It was pointed out by the study advisory committee that eastbound East Atlantic Avenue traffic turning left onto the parallel route (going up the hill) often makes this movement without slowing down. This is possible due to the current roadway alignment which does not force motorists to stop before turning onto the parallel residential street of East Atlantic Avenue. This movement is a safety concern for the residents along the street. With the opening of King's Run and the subsequent increase in traffic on the parallel route it is possible that this problem will worsen.

Site C Improvements:

1. Chicane the roadway to the west (toward the tracks) in order to create space for the addition of a four foot minimum width sidewalk which will connect Ervin Avenue in Audubon to Green Street in Haddon Heights. The roadway chicane will also serve to provide a minor traffic calming benefit.
2. Install rumble stripes (at a minimum), and "Slow 25 MPH" pavement markings along both directions of East Atlantic Avenue to calm traffic approaching the pedestrian crossing at Green Street.
3. Upgrade the pedestrian crossing at Green Street. Possible treatments include reflective markings combined with textured pavement, raised intersection treatments, and pedestrian crossing warning signs. Effectively raising the profile of pedestrians in the crosswalks requires a combination of these treatments and installation in accordance county engineering standards.
4. Install a mid-block pedestrian crosswalk between Garden Street and the proposed multi-use Rail-with-Trail. (see improvement #1 for possible implementation treatments).
5. Add curbing and median island as depicted in graphic to better separate East Atlantic Avenue with the parallel residential facility to prevent speeding of eastbound East Atlantic traffic turning left onto the parallel route.

Corridor-Wide Improvements:

1. Replace passing zone dashed centerline striping with solid double yellow striping.
2. Install multi-use Rail-with-Trail between rail road tracks and East Atlantic Avenue.

FIGURE 24


US 30 – WHITE HORSE PIKE
HIGH ST
GARDEN ST
Install multi-use trail
Improve crosswalk at intersection
Add "Yield to pedestrians in crosswalk" signage
Replace center line with double yellow striping
E. ATLANTIC AVE
Site C
Install crosswalk at unsignalized intersection
Curb extension of East Atlantic parallel route for traffic calming
GARDEN ST
SYCAMORE TER
W. ATLANTIC AVE
Taming Traffic Study
East Atlantic Ave.
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Site D: Intersection of East Atlantic Avenue and Clements Bridge Road, Haddon Heights and Barrington Boroughs

This location serves as the gateway to the Barrington downtown business district and includes the municipal boundary between Haddon Heights and Barrington boroughs. Several businesses are located in the vicinity of the intersection and Barrington's main street and town center, including an even greater concentration of commerce along Clements Bridge Road, is not far to the south. The intersection at East Atlantic Avenue and Clements Bridge Road is signalized and provides dedicated left-turn movements for all four approaches. The signal phasing also includes Barrington Avenue which parallels East Atlantic to the south. NJ 41 Clements Bridge Road is an important north-south route traversing three counties and connecting Maple Shade in the north to Deptford Township in the south. It carries a considerable amount of traffic during both the AM and PM commuting peaks, as well as during the mid-day.

Barrington Elementary School children cross East Atlantic Avenue to reach Woodland Elementary School on the south side, and high school students cross the same point en-route to the Haddon Heights Regional High School located on the north side. This location is manned by a crossing guard during school commuting hours. Signalization and pedestrian improvements were implemented at this location in the recent past. Generally speaking, these improvements provided some level of benefit to pedestrians, while greatly improving the vehicle operations of the intersection.

The recommendations for this corridor section are designed to improve pedestrian accessibility even more by shortening pedestrian crossings, and raising the profile of pedestrians. This is needed because of the significant foot traffic and vehicle traffic that passes through this intersection. This is also the originally recommended point for the multi-use Rail-with-Trial to cross the railroad tracks and continue on the other side. At this point in the corridor the amount of available space between the tracks and East Atlantic Avenue is reduced greatly to the point at which the trail cannot be situated, as opposed to the other side which has ample room. The recommended crossing point over Clements Bridge Road is between East Atlantic and Barrington Avenues, aligning with the Rail-with-Trail as depicted in the graphic.

Site D Improvements:

1. Upgrade the pedestrian crossings over East Atlantic Avenue and Clements Bridge Road at the intersection. Possible treatments include reflective markings combined with textured pavement, raised intersection treatment, and pedestrian crossing warning signs. Effectively raising the profile of pedestrians in the crosswalks requires a combination of these treatments, and installation in accordance county engineering standards.
2. Switch the multi-use Rail-with-Trail to the south side of the rail road tracks.
3. Add trail crossing over Clements Bridge Road which aligns with the trail on the west side of the rail road tracks.

Corridor-Wide Improvements:

1. Replace passing zone dashed centerline striping with solid double yellow striping.
2. Install multi-use Rail-with-trail between rail road tracks and East Atlantic Avenue.

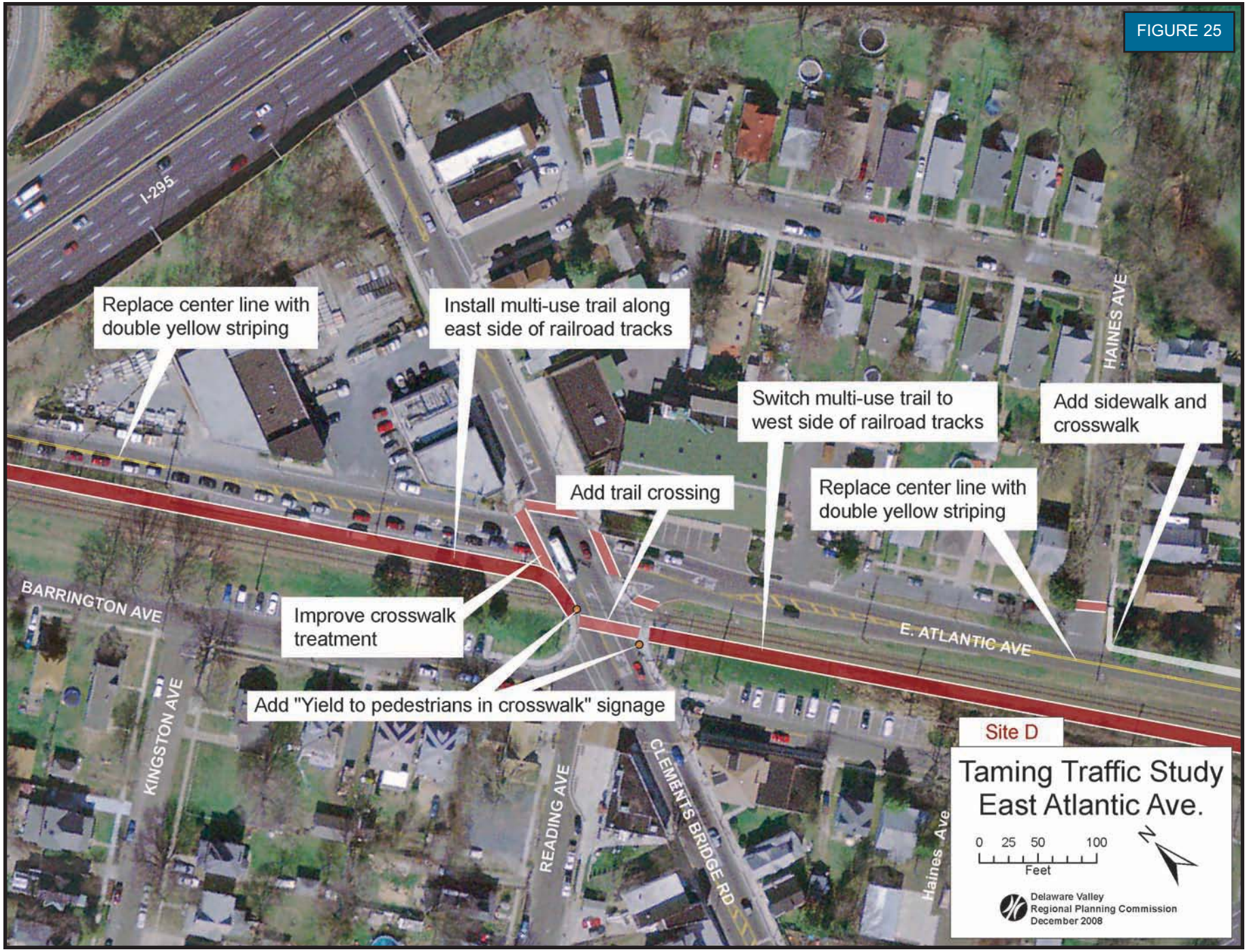
FIGURE 25
I-295
Replace center line with double yellow striping
Install multi-use trail along east side of railroad tracks
HAINES AVE
Switch multi-use trail to west side of railroad tracks
Add sidewalk and crosswalk
Add trail crossing
Replace center line with double yellow striping
BARRINGTON AVE
Improve crosswalk treatment
E. ATLANTIC AVE
Add "Yield to pedestrians in crosswalk" signage
KINGSTON AVE
READING AVE
CLEMENTS BRIDGE RD
Haines Ave
Site D
Taming Traffic Study
East Atlantic Ave.
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FIGURE 26: Vicinity of Clements Bridge Road, Looking West – Existing Conditions. *This image is a photograph of existing conditions by East Atlantic Avenue, looking west. Source: DVRPC*

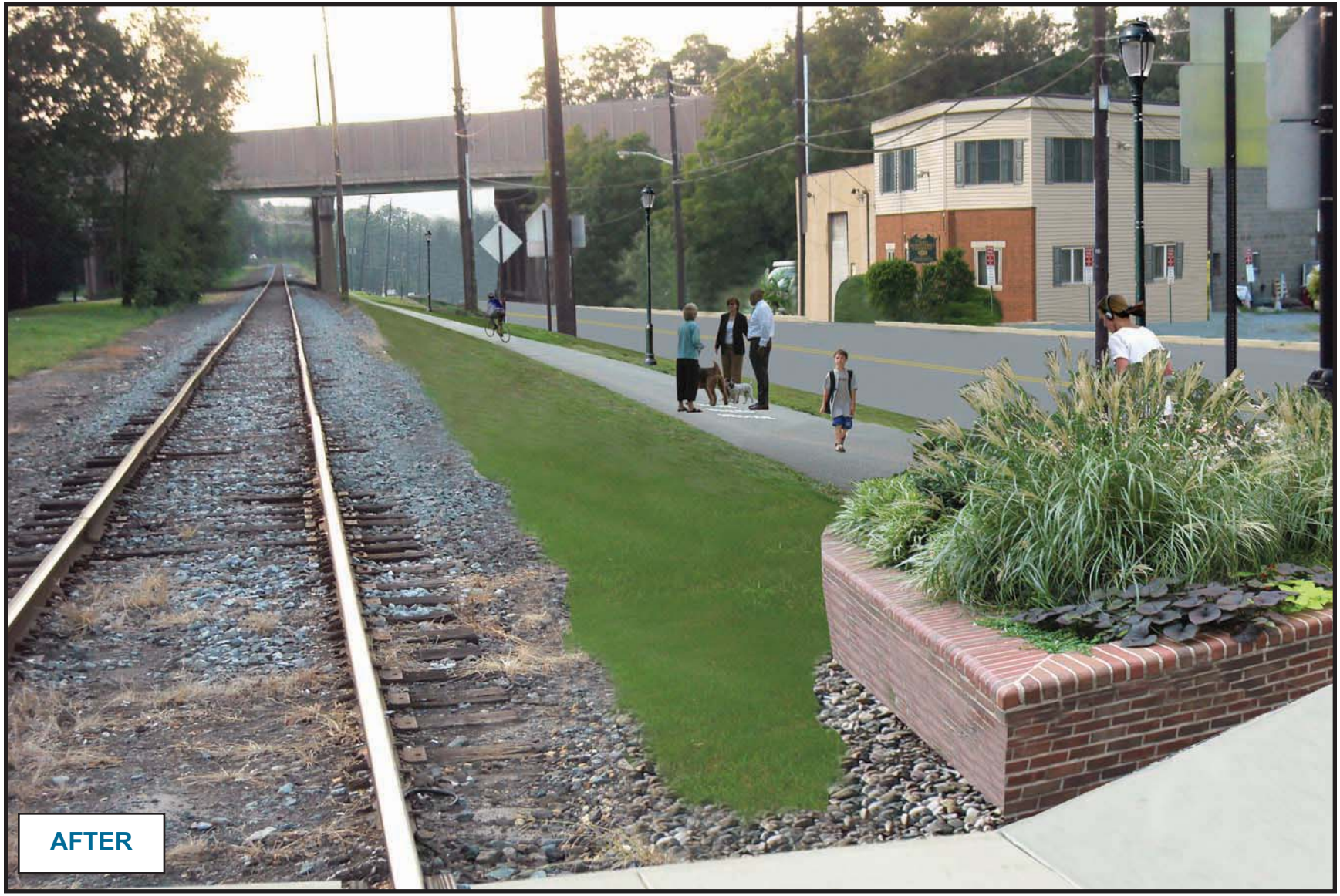


FIGURE 27: Vicinity of Clements Bridge Road, Looking West – Simulation. *This image is a photo-simulation of the recommended improvements applied to the location shown on the left. Major improvements include the lane re-striping on East Atlantic Avenue and the installation of a multi-use trail along the railway. Source: DVRPC*

FIGURE 28: Vicinity of Clements Bridge Road, Looking East – Existing Conditions. *This image is a photograph of existing conditions along East Atlantic Avenue, looking east, with Clements Bridge Road crossing over East Atlantic in the foreground. Source: DVRPC*

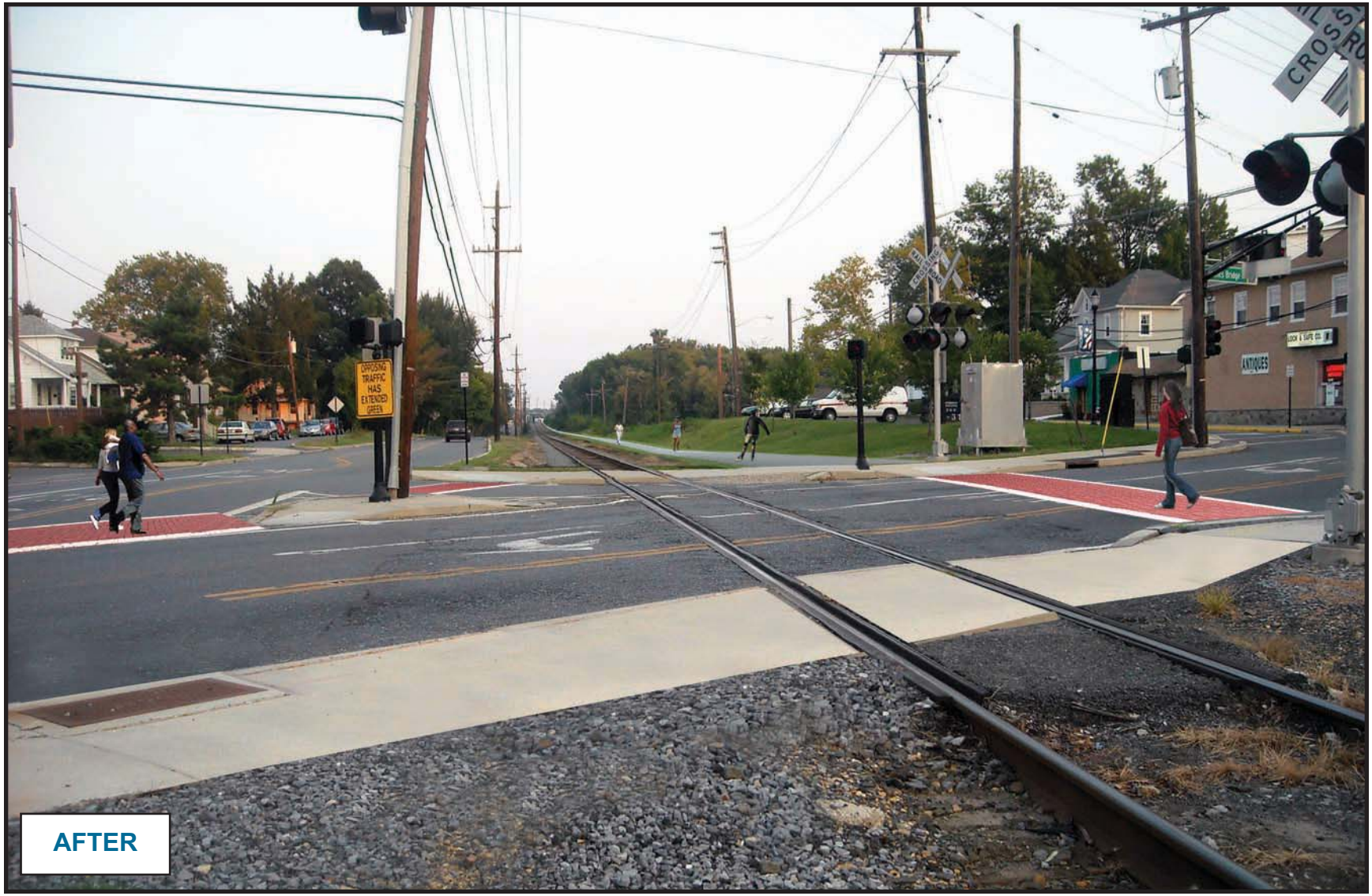


FIGURE 29: Vicinity of Clements Bridge Road, Looking East – Simulation. *This image is a photo-simulation of the recommended improvements applied to the location shown on the left. Major improvements include the multi-use trail crossing over to the south-side of the railroad tracks, high-visibility crosswalks, and improved sidewalk treatments. Source: DVRPC*

Site D: Alternative Trail Crossing and Alignment

As per the trail transition discussion found on page 80 under Site B, the following text describes the issues for consideration at Clements Bridge Road.

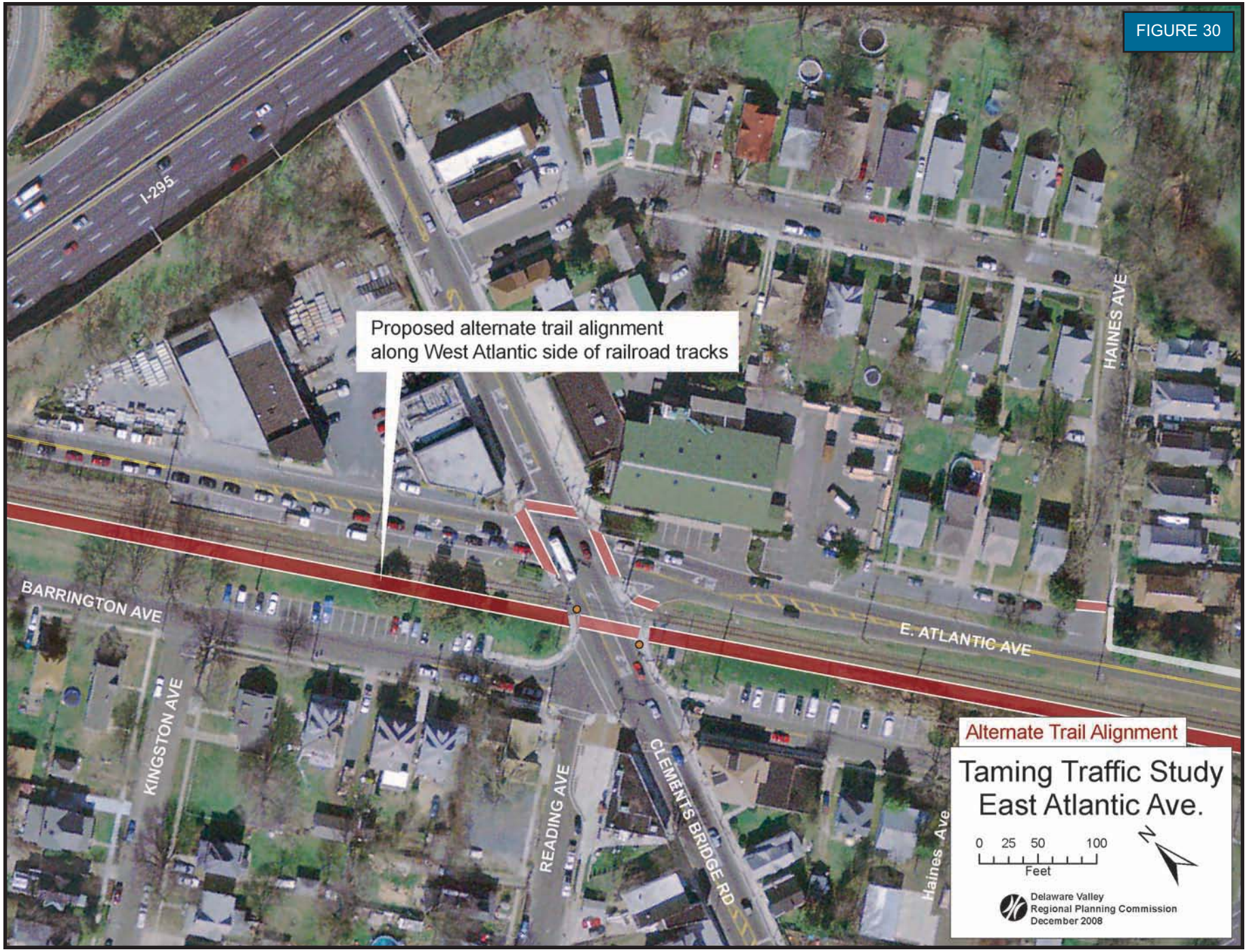
Site D: Clements Bridge Road Trail Transition Alternative

At Clements Bridge Road there are two primary impediments to the trail alignment: 1) the I-295 support pylons, and 2) the grade differential between the rail road tracks and the cartway of East Atlantic Avenue. The study team addressed these issues by gradually transitioning the trail to the road side of the pylons where there is an asphalt shoulder, and continuing along this alignment through an existing on-street parking area leading up to the intersection. The trail would then cross the tracks by following an improved sidewalk along Clements Bridge Road, then crossing Clements Bridge Road at the mid-point between the intersections, similar to the proposed configuration for the Station Avenue alternative (see page 80).

The aforementioned impediments would be overcome by adopting the Station Avenue alternative, thereby siting the trail on the West Atlantic Avenue side of the tracks from Station Avenue to Clements Bridge Road. However, the Station Avenue alternative presents its own impediments that are equally challenging, requiring creativity and trade-offs in order to be implemented. One benefit of the Station Avenue alternative is the wide and level alignment where the trail would meet Clements Bridge Road. This alternative also retains the on-street parking currently found along East Atlantic Avenue near the intersection.

Each alternative presents constraints and opportunities. The decision of which alternative to pursue will be the responsibility of the implementing agency. The best plan will incorporate thorough consideration and a robust public involvement component.

FIGURE 30


I-295
Proposed alternate trail alignment
along West Atlantic side of railroad tracks
HAINES AVE
BARRINGTON AVE
KINGSTON AVE
READING AVE
CLEMENTS BRIDGE RD
E. ATLANTIC AVE
Haines Ave
Alternate Trail Alignment
Taming Traffic Study
East Atlantic Ave.
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Site E: Midway Between Clements Bridge Road and Gloucester Pike

This section of East Atlantic Avenue includes a very short stretch of residential development which fronts the westbound lane between Clements Bridge Road and Haines Avenue. The balance of this section is wooded with the eastern segment consisting of the backside of the big box stores in the White Horse Plaza adjacent to the westbound lane. Eastbound East Atlantic Avenue is bordered by the railroad tracks. The short sidewalk along westbound East Atlantic ends at Haines Avenue and does not connect to the shopping center. No other sidewalks are provided in this section and there is virtually no shoulder to informally accommodate pedestrian and/or bicycle movements. Despite these impediments, bikers and walkers are not an uncommon sight. This is because East Atlantic Avenue provides backdoor access to the White Horse Plaza, the main entrance for which is situated on US 30 White Horse Pike.

The undeveloped tract of land situated along westbound East Atlantic Avenue between Haines Avenue and the Home Depot building is slated for development according to officials from Barrington Borough. This provides an excellent opportunity for implementation of a sidewalk/walkway to connect the residences near Haines Avenue with the White Horse Plaza. As well, the mulit-use Rail-with-Trail will serve as a compliment to the proposed sidewalk.

The recommendations for this corridor section are intended to create a needed pedestrian and bicycle link between Barrington's main street and the White Horse Plaza. Additional recommendations are listed at right.

Site E Improvements:

1. Add sidewalk/walkway along westbound East Atlantic Avenue to connect Haines Avenue with the White Horse Plaza.
2. Install a pedestrian crosswalk treatment over the back entrance to the shopping center.

Corridor-Wide Improvements:

1. Replace passing zone dashed centerline striping with solid double yellow striping.
2. Install multi-use Rail-with-trail between rail road tracks and East Atlantic Avenue.

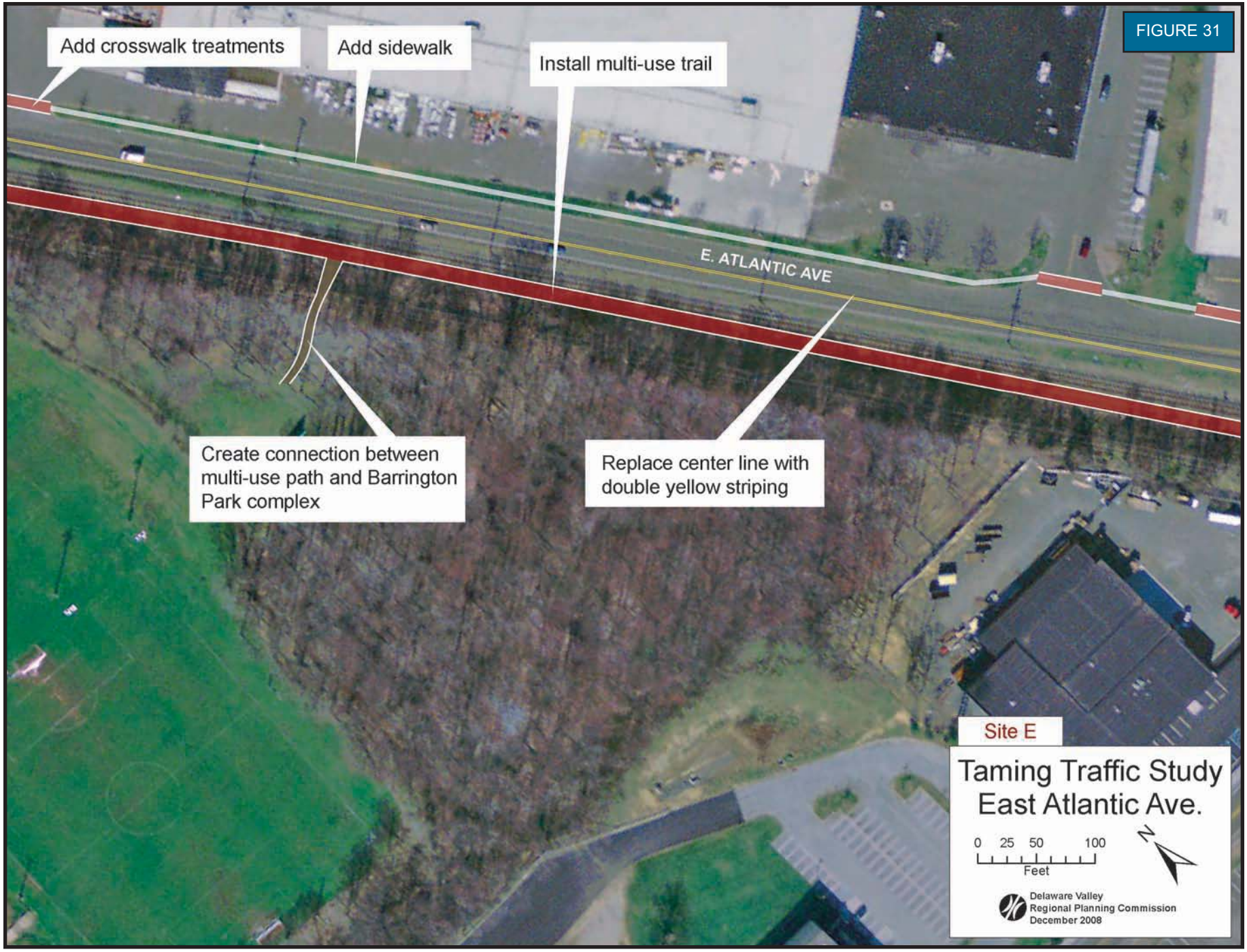
FIGURE 31
Add crosswalk treatments
Add sidewalk
Install multi-use trail
E. ATLANTIC AVE
Create connection between multi-use path and Barrington Park complex
Replace center line with double yellow striping
Site E
Taming Traffic Study
East Atlantic Ave.
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Site F: Intersection of East Atlantic Avenue and Gloucester Pike, Barrington and Lawnside Boroughs

This section of the corridor marks the eastern limit of the study area. The intersection of East Atlantic Avenue and Gloucester Pike experiences the heaviest traffic volumes of the corridor, and the most significant volume of truck traffic as observed during field visits and supported by the study advisory committee. Each of the intersection's four quadrants is developed with commercial uses, although none are pedestrian oriented. The development includes a school bus depot, a warehouse, and the backside of a grocery store that has its entrance within the White Horse Plaza.

While pedestrian and bicycle activity is not as significant here as it is at other locations along the corridor, this is still an important crossing for pedestrians and bicyclists en-route to and from the White Horse Plaza shopping center. Also, this is an important link for the multi-use trail which changes track sides again. The purpose of the change is to avoid conflicts with a rail spur that serves the industrial park located along eastbound East Atlantic Avenue.

The improvements here are intended to improve the environment for walking and bicycling, and continue the multi-use Rail-with-Trail.

Site F Improvements:

1. Upgrade the pedestrian crossings over East Atlantic Avenue and Gloucester Pike at the intersection. Possible treatments include reflective markings combined with textured pavement, raised intersection treatment, and pedestrian crossing warning signs. Effectively raising the profile of pedestrians in the crosswalks requires a combination of these treatments, and installation in accordance county engineering standards.
2. Switch the multi-use Rail-with-Trail back to the east side of the rail road tracks.

Corridor-Wide Improvements:

1. Replace passing zone dashed center line striping with solid double yellow striping. Install multi-use Rail-with-trail between railroad tracks and East Atlantic Avenue.

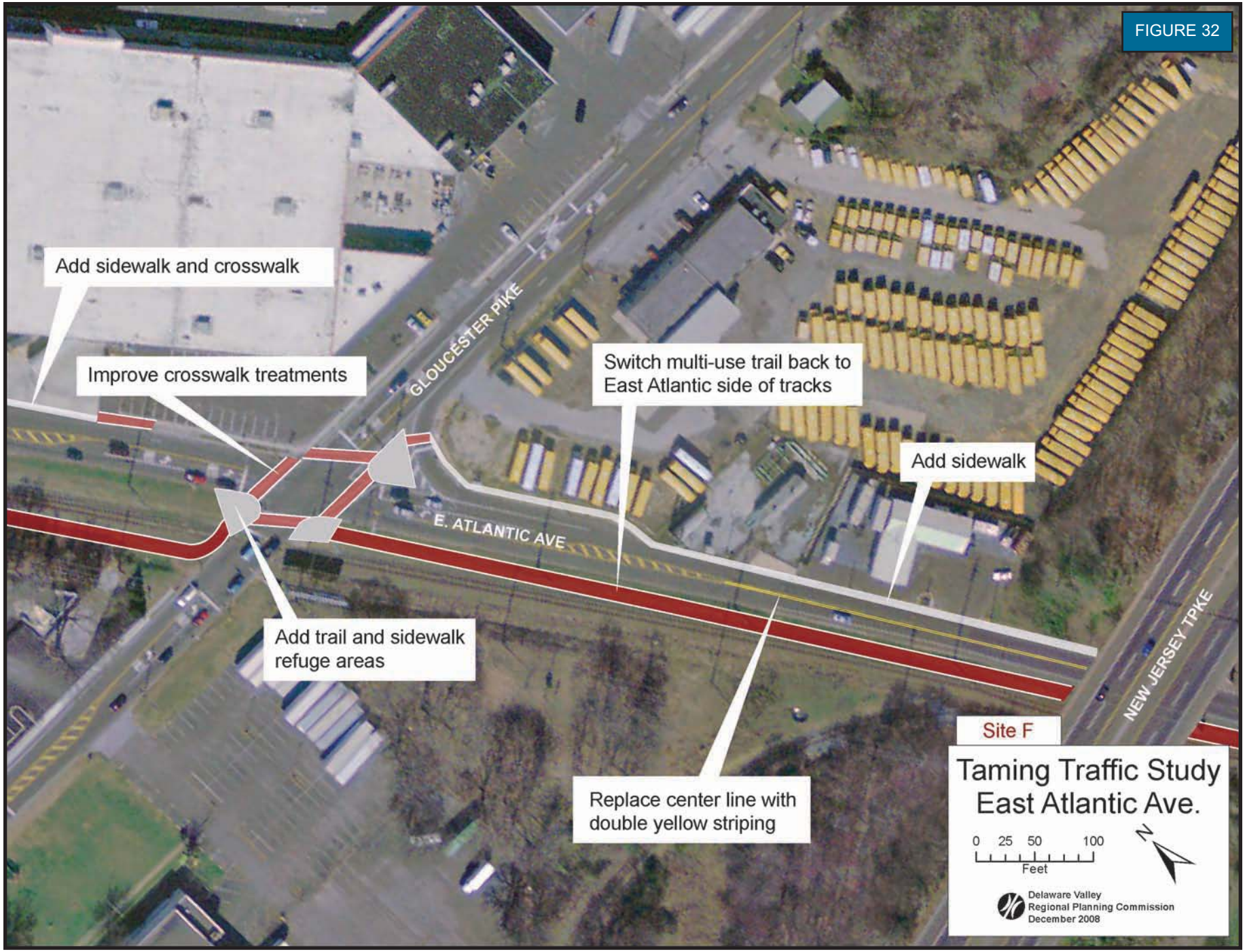
FIGURE 32
Add sidewalk and crosswalk
Improve crosswalk treatments
GLOUCESTER PIKE
Switch multi-use trail back to East Atlantic side of tracks
Add sidewalk
E. ATLANTIC AVE
Add trail and sidewalk refuge areas
NEW JERSEY TPKE
Replace center line with double yellow striping
Site F
Taming Traffic Study
East Atlantic Ave.
0 25 50 100
Feet
N
Delaware Valley
Regional Planning Commission
December 2008

IMPLEMENTATION

Although it is challenging to create a tangible reality from a conceptual plan such as this, the communities involved in this study can benefit from multi-municipal cooperation and support from Camden County and other stakeholders. This report provides a foundation from which the local communities can work to define concrete, realistic projects. When partner organizations and funding agencies recognize that each small project is part of a larger framework, it is easier to obtain funding and move projects forward.

It is important to note that the recommendations presented here are not an all-or-nothing strategy. They can and should be applied in phases and there is certainly an opportunity for multiple projects to move forward on an overlapping schedule. For example, this study recommends a continuous multi-use path along the current rail line. This improvement will bring great benefits to each of the boroughs through which it passes, as well as residents of the larger community. However, considering the numerous entities involved in a transition such as this, and the sensitive and complex matters of safety and liability, utility easements, and public access, the implementation of this improvement may take much longer than the more simple and straightforward suggestions like enhanced pedestrian amenities or consistent roadway striping.

It is the responsibility of all communities and stakeholders involved to ensure that any relatively inexpensive, short-term projects such as the aforementioned roadway striping, can move to immediate design and implementation, concurrent with early-stage actions to advance more complex project, like the rails-with-trails alignment. This latter recommendation will require significant discussion, consensus building, and support from necessary parties. Project phasing or staggering may also be necessary to accommodate funding opportunities as they arise.

Despite an emphasis on phasing and staggering the improvements suggested in this report, municipal officials should not forget the big-picture and comprehensive goal. Many context-sensitive strategies rely on complementary elements that help alter the overall perception of a roadway. Re-striping the roadway may improve safety, but may not have visually transformative benefits unless combined with streetscaping, new crosswalks, and other placemaking improvements. It is important that municipal officials proceed in small steps, in order to work most effectively with partners and raise funding, while keeping their eye on the total vision for the future of East Atlantic Avenue.

East Atlantic Avenue is a county route, making it critical that municipal officials work closely with Camden County staff throughout the entire process of transforming this corridor. While it is not the county's sole responsibility to develop the recommendations in this study, it is important that cooperation between the county and the local communities continues beyond this study.

The recommended next step toward implementation is a two-pronged approach. Involved communities and stakeholders should work together to develop a dialogue with CSX to work out the potential stumbling blocks. The involvement of local and county officials as well as state representatives may impress upon CSX the importance of this project for the larger region and may provide the necessary leverage to advance significant progress for this project. Tandem to these ongoing discussions and negotiations, local and county officials should secure funding to design and implement several of the other smaller projects suggested herein.

A rough estimate of costs for a trail installation, like that proposed in this study, is between $350,000 and $550,000.[1] Using this study as representation of the future vision for East Atlantic Avenue, individual improvements can be completed to create a cumulative effect that will transform the visual and functional identity of this corridor. These recommended improvements will also provide a basis for enhancing safety, multi-modal mobility, attractiveness, and economic competitiveness.

[1] These figures are based on cost estimates from the report, *East Atlantic Avenue Bikeway,* developed by Key Engineers for DVRPC and Camden County (2004). In addition, these figures match the costs of recent trail projects of a similar nature completed using federal TE funds, administered by DVRPC.

SECTION 4:
CONCLUSION AND BIBLIOGRAPHY

CONCLUSION

The form of development and resulting transportation issues are substantially different between the two case study locations. However, both hold great potential to develop a sense of place, with enhanced safety and multi-modality through context-sensitive solutions. This study proposes a set of recommendations, developed by a diverse group of stakeholders, to guide local municipalities in their pursuit to transform the character of their roadways.

Bethlehem Pike is a largely automotive-oriented corridor with inconsistent character, surface parking lots fronting the roadway, intermittent sidewalks, and on-street parking in the rightmost travel lane during non-peak hours. In addition, the topography of the corridor creates some areas where speeding is common, where turning movements may be hazardous due to the frequency of access points. However, Bethlehem Pike also contains areas with great potential for leveraging historic assets, and defining an attractive, main-street character. The set of recommendations in this study aim to promote safety, multi-modality, place making, and opportunities for local economic development.

The implementation of improved pedestrian, cyclist, and transit user amenities will contribute to an improved context where multimodal transportation is a priority. In addition, formalized permanent on-street parking, the application of traffic calming techniques such as curb extensions, and the inclusion of a consistent access management plan will help to limit the conflict points along the corridor and improve sight distance, thus increasing the safety of motorists and other roadway users alike. Perhaps the most significant recommendation —the conversion of the current roadway configuration to a road-diet, three-lane cross-section—has been suggested in past studies, but for the first time, has been developed with the input of county, state, regional, and local officials, including PennDOT. Early-stage buy-in of these recommendations will be critical for their implementation.

East Atlantic Avenue is characterized by dense development and a variety of land uses, including an elementary school, which increases the non-motorized traffic in the surrounding area. Most of the area's land uses directly abut the roadway, creating a main-street feel. Despite the number of destinations in the study area that generate considerable pedestrian activity, much of the corridor lacks safe and adequate pedestrian and bicycling accommodations. Furthermore, East Atlantic Avenue is frequently used as a cut-through or bypass route for circumventing US 30. This use creates an increase in traffic volume and often results in speeding and other erratic driving behaviors. Finally, the roadway is not consistently striped, leading to some driver confusion and inappropriate passing. Enhancing pedestrian and cyclist amenities and establishing clear and consistent lane configurations will contribute to the creation of a roadway that is more desirable to local residents, and safe for all modes of travel. Implementation of the techniques set forth in this analysis will also be a positive step toward better balancing the needs of all roadway users while preserving and enhancing the unique sense of place already present in the communities along East Atlantic Avenue.

Rarely is a problem solved by just one measure alone. By combining a range of context-sensitive solutions, traffic calming, and smart-growth principles, these communities can create a safer environment for all roadway users and also develop a distinct sense of place that sets them apart from their neighbors. While many techniques may improve a community, the greatest success comes as a result of comprehensive programs that represent a combination of function and aesthetics, attractiveness, and cost effectiveness. The realization of these strategies will require a step-by-step approach, while maintaining a big-picture view and cooperating with multiple levels of government and community leaders.

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APPENDIX A: SAMPLE COST ESTIMATES

SAMPLE COST ESTIMATES FOR RECOMMENDED ELEMENTS

Below are sample cost estimates for some of the elements recommended in this report. The figures for lane restriping, streetscape projects, and trail projects are derived from the costs of recent projects completed using federal Transportation Enhancements (TE) funds, administered by DVRPC (2008). The costs for crosswalk treatments come from Chris Knigge, Princeton Borough Engineering Department (2008).

Lane Restriping

Pavement Marking Removal: $1.70/square foot

Four-Inch White Markings: $0.56/linear foot

Four-Inch Yellow Markings: $0.56/linear foot

To restripe a roadway from four lanes to three, with a center two-way-left-turn lane: Approximately $5.63/linear foot.

Streetscape Projects

Projects range from $300,000 to $1,000,000 per block (both sides of the street). This cost range is wide due to the numerous elements and quality of fixtures that may be used in streetscaping projects. Streetscaping elements typically include street furniture, pedestrian lighting, decorative crosswalks, brick-inlaid sidewalks and replacement of all existing sidewalk and curbing.

Trail Projects

Simple trail projects, which include hard surface such as asphalt, and that do not involve major structural work, range from $350,000/mile to $450,000/mile. Larger projects that involve major structure work and right-of-way acquisition may cost between $2 million to $5 million per mile.

Crosswalk Treatments

Brick Crosswalk: $270/square yard

Concrete Stamping: $115/square yard

Proprietary Synthetic Treatment: $360/square yard

SAMPLE TRAFFIC CALMING COSTS

The following are sample costs for various traffic calming techniques, arranged from least to most expensive. These were culled from various sources, including ITE's *Traffic Calming State of the Practice*, which gathered data in the late 1990s from such locations as Sarasota, Florida, Portland, Oregon, and Seattle, Washington. Another primary source was the *Traffic Calming Handbook*, produced by PennDOT in 2001. Prices differ based on numerous variables, including materials, project extent, and local economies. These costs do not include expenses for design and engineering.

Technique	Estimated Cost	Additional Comments
Bike Lane	$5,000 — $10,000 per mile	
Center Island	$5,000 — $15,000	Cost depends on size, curbing, and landscape features.
Chicane	$6,000 — $14,000	Chicanes are less expensive when existing curb is kept and the new curb is precast instead of removing the existing curb and pouring in place the new curb.
Choker	$7,000 — $13,000	Asphalt streets are less expensive than concrete streets.
Curb Bulbout	$7,000 — $10,000 per pair	Midblock measures may cost less ($4,000) if they are smaller.
Curb Ramp	$1,500	
Diagonal Diverter	$7,500 — $20,000	Cost can be greater depending on intersection width, drainage requirements, and landscaping.
Gateway Treatment	$5,000 — $20,000	Cost depends on the design and extent of physical elements used.
Median Barrier	$50 — $250 sq yd (textured)	
Raised Crosswalk	$10,000 — $20,000	
Raised Intersection	$2,000 — $10,000	Cost depends on the width of intersecting roadways and drainage requirements.
Speed Hump or Table	$15,000 — $60,000	Cost depends on roadway width.
Street Closure	$1,500 — $3,500	
Roundabout	$1,500 — $25,000+	Roundabouts that fit within existing curbs, gutters, and drains, and have no irrigation for landscaping, are least expensive. Costs increase if right-of-way needs to be acquired or utilities need to be relocated. More complicated installations may cost $20,000+.
Traffic Sign	$3,000 — $20,000+	
Traffic Signal	$15,000 — $60,000	

Sources: See introductory paragraph above

APPENDIX B: FUNDING SOURCES

FUNDING SOURCES FOR SPRINGFIELD TOWNSHIP

BIKES BELONG COALITION

Eligibility: Federal, state, regional, county, and municipal agencies, nonprofits, organizations whose mission is expressly related to bicycle advocacy

Purpose: Funds bicycle facilities and paths that encourage facility, education, and capacity building

Terms: $10,000 or less

Deadline: Applications accepted quarterly

Contact: Bikes Belong Coalition

Phone: 617-734-2111

Website: www.bikesbelong.org

CERTIFIED LOCAL GOVERNMENTS GRANT PROGRAM (CLG)

Eligibility: Limited to Certified Local Governments

Purpose: To promote and protect historic properties and planning for historic districts

Terms: Grants up to 60%

Deadline: Annual

Contact: Pennsylvania Bureau of Historic Preservation

Phone: 717-787-0771

Website: www.artsnet.org

CLANEIL FOUNDATION INC.

Eligibility: Southeastern Pennsylvania local governments, nonprofits

Purpose: Grants for building arts, education, environment and community development.

Terms: Grants range from $1,000 to $290,000 for building renovation, conferences, consulting, land acquisition, and development.

Deadline: Ongoing; must submit letter of intent.

Contact: Claneil Foundation Inc.

Phone: 610-941-1143

Website: n/a

COMMUNITY CONSERVATION PARTNERSHIP PROGRAM

Eligibility: Two or more Pennsylvania local governments, land trusts, municipal agencies, nonprofits

Purpose: Funds improvements to important public spaces in urban settings

Terms: Reimbursement grants for planning. Grants typically range from $10,000 to $40,000.

Contact: Pennsylvania Department of Conservation and Natural Resources

Phone: 215-560-1183

Website: www.dcnr.state.pa.us

COMMUNITY CONSERVATION PARTNERSHIPS PROGRAM (C2P2)

Eligibility: Pennsylvania local governments

Purpose: Rehabilitates and develops parks and recreational facilities

Terms: A match of 50% is required

Contact: Regional Recreation and Park Advisor

Phone: 215-560-1182

Website: www.inventpa.com

COMMUNITY DEVELOPMENT BLOCK GRANT (CDBG)

Eligibility: Pennsylvania local governments, nonprofits, for-profit developers

Purpose: Provides grants and technical assistance for federal designated municipalities for any type of community development

Terms: 70% of each grant must be used for activities that benefit low-moderate income persons. Competitive Program — $500,000 maximum

Deadline: Applications accepted quarterly

Contact: Pennsylvania Department of Community and Economic Development or County Housing Department

Phone: 866-GO-NEWPA (866-466-3972)

Website: www.newpa.com

COMMUNITY REVITALIZATION PROGRAM

Eligibility: Pennsylvania local governments, redevelopment authorities, industrial development agencies, and nonprofits.

Purpose: To support local initiatives that promotes the stability of communities.

Terms: Grants of $5,000-$25,000

Deadline: Three funding rounds during fiscal year. No more than one application is allowed in any one fiscal year.

Contact: Pennsylvania Department of Community and Economic Development, Customer Service Center

Phone: 866-GO-NEWPA (866-466-3972)

Website: www.newpa.com

COMMUNITY TRANSPORTATION DEVELOPMENT FUND (CTDF)

Eligibility: Nonprofit transit providers, public agencies, local and state governments, and community organizations

Purpose: To promote better transportation options

Terms: Low interest loans of up to $150,000 per recipient and 75% of the total project cost

Deadline: Varies; there are several funding options that require a one time service fee

Contact: Community Transportation Associate of America

Phone: 202-661-0210

Website: www.ctaa.org

ELM STREET PROGRAM

Eligibility: Pennsylvania local governments, redevelopment authorities, nonprofit economic development organizations, other nonprofits, BIDs, neighborhood improvement districts (Elm Street)

Purpose: Provides grants for planning, technical assistance and physical improvements to residential and mixed use areas in proximity to central business districts.

Terms: Maximum $50,000 for administrative grants; Maximum $250,000 for development projects and loans.

Contact: Pennsylvania Department of Community and Economic Development

Phone: 866-GO-NEWPA (866-466-3972)

Website: www.newpa.com

FEDERAL HISTORIC PRESERVATION TAX INCENTIVES

Eligibility: Local governments in Montgomery County

Purpose: To encourage the preservation of historic buildings.

Terms: Buildings must be in depreciable assets. Rehabilitation must be greater than $5,000.

Deadline: Ongoing

Contact: State Historic Preservation Officer

Phone: 717-787-291

Website: www.cr.nps.gov

GROWING GREENER II

Eligibility: Pennsylvania local governments and nonprofits

Purpose: Provides redevelopment grants to municipalities and nonprofits to help a community's downtown redevelopment effort, focusing on the improvement of downtown sites and buildings.

Terms: No minimum or Maximum; Typical grants average between $250,000 and $500,000

Deadline: Varies

Contact: Pennsylvania Department of Community and Economic Development, Customer Service Center

Phone: 866-GO-NEWPA (866-466-3972)

Website: www.newpa.com

HISTORIC PRESERVATION GRANTS

Eligibility: Pennsylvania local governments, historical societies, historic preservation organizations, conservancies, educational institutions, museum, and multi-purpose organizations

Purpose: To identify, preserve, promote, and protect the historic and archaeological resources of Pennsylvania for the public.

Terms: Maximum $5,000, with no match. Over $5,001 requires a 50/50 match.

Deadline: Varies

Contact: Pennsylvania Historical and Museum Commission, Bureau for Historic Preservation

Phone: 717-201-3231

Website: www.artsnet.org

KEYSTONE HISTORIC PRESERVATION GRANT PROGRAM

Eligibility: Pennsylvania local governments and nonprofits

Purpose: Provides funding for preservation, restoration, and rehabilitation projects of historic resources listed or eligible for the National Register of Historic Places.

Terms: Grants will be funded at 50%.

Deadline: Varies

Contact: Keystone Historic Preservation

Phone: 800-201-3231

Website: www.artsnet.org

LIQUID FUELS TAX PROGRAM

Eligibility: Pennsylvania local governments

Purpose: Provides funds for any road related activity

Terms: Varies

Deadline: Annual

Contact: Pennsylvania Department of Transportation, District 6-0

Phone: 610-205-6539

Website: www.dot.state.pa.us

LOCAL HISTORY GRANTS

Eligibility: Pennsylvania local governments, institutions, community groups, heritage organizations or school districts

Purpose: Funding for the research, development, and execution of public programs that present Pennsylvania history.

Terms: Grants up to $5,000 with no matching funds; Grants between $5,000 and $15,000 require a 50% local match.

Contact: Pennsylvania Historical and Museum Commission

Phone: 717-772-0921

Website: www.artsnet.org

HOME TOWN STREETS /SAFE ROUTES TO SCHOOL (HTS/SRS)

Eligibility: Federal or state agencies, Pennsylvania county or local governments, school districts, nonprofits

Purpose: Encourages the reinvestment in and redevelopment of downtowns

Terms: 80% of total costs. Projects must be included in the 12-year Transportation Improvement Program (TIP)

Deadline: Varies

Contact: Delaware Valley Regional Planning Commission (DVRPC)

Phone: 215-238-2881

Website: www.dvrpc.org/transportation/capital/hts_srs.htm

LOCAL MUNICIPAL RESOURCES AND DEVELOPMENT PROGRAM (LMRDP)

Eligibility: Pennsylvania local governments, nonprofits

Purpose: Provides grants to municipalities for improving the quality of life within the community

Terms: No maximum or minimum

Deadline: Continuous

Contact: Pennsylvania Department of Community and Economic Development, Customer Service Center

Phone: 800-379-7448

Website: www.newpa.com

LOWES HOME IMPROVEMENT

Eligibility: Nonprofits

Purpose: The Lowe's Charitable & Educational Foundation is dedicated to improving the communities we serve through support of public education, community improvement projects and home safety initiatives.

Terms: $5,000 to $25,000 with a total of about $3 million annually.

Deadline: Varies

Contact: Lowe's Companies, Inc.

Phone: n/a

Website: www.lowes.com

MAIN STREET PROGRAM

Eligibility: Pennsylvania municipalities and downtowns

Purpose: Provides funds for administrative costs associated with Main Street Manager positions and offices, physical improvements, and acquisition costs.

Terms: $115,000 over a 5-year period; Downtown Reinvestment and Anchor Building components: up to $250,000 or not to exceed 30% of project costs.

Contact: Pennsylvania Department of Community and Economic Development

Phone: 866-GO-NEWPA (866-466-3972)

Website: www.newpa.com

MONTGOMERY COUNTY COMMUNITY REVITALIZATION PROGRAM

Eligibility: Targeted areas in Montgomery County

Purpose: To invest and stabilize older boroughs and townships in Montgomery County.

Terms: Required match between 25% and 10%.

Deadline: Annual applications. Revitalization plans must be completed prior.

Contact: Montgomery County Department of Planning

Phone: 610-278-3728

Website: www.montcopa.org

MUNICIPAL CHALLENGE GRANT

Eligibility: Pennsylvania local governments

Purpose: For the purchase and delivery of up to 50 trees

Terms: Grant funds must be matched with non federal dollars. For municipalities with population of less than 5,000; 10 trees/year, $1,500 maximum grant. For municipalities with population between 25,000-50,000, 40 trees/year, $4,500 maximum grant.

Deadline: Fall/Spring

Contact: Pennsylvania Urban and Community Forestry Council

Phone: 717-783-0385

Website: www.dcnr.state.pa.us

PECO GREEN REGIONS

Eligibility: Municipalities in Bucks, Chester, Delaware, Montgomery, and Philadelphia counties

Purpose: Protects, acquires, and enhances open space

Terms: Grants of up to $10,000

Deadline: Spring and fall

Contact: Natural Lands Trust

Phone: 610-353-5597

Website: www.natlands.org

PENNSYLVANIA HERITAGE PARKS PROGRAM

Eligibility: Pennsylvania local governments, nonprofits or federally designated commissions

Purpose: To promote public/private partnerships to preserve and enhance natural and historic recreation resources

Terms: Grants required a 25% to 50% match

Deadline: Annual

Contact: Schuylkill River Greenway Association

Phone: 484-945-0200

Website: www.schuylkillriver.org

PENNSYLVANIA INFRASTRUCTURE BANK

Eligibility: Pennsylvania local governments and contractors

Purpose: To provide low-cost financing to municipalities and contractors for eligible transportation improvements.

Terms: Low-interest loans rams from $49,000 to $3.9 million through a revolving loan fund for implementation.

Deadline: Ongoing

Contact: Pennsylvania Department of Transportation (PennDOT)

Phone: 717-772-1772

Website: www.dot.state.pa.us

THE PHILADELPHIA FOUNDATION

Eligibility: Must be 501 (c) (3) nonprofits

Purpose: Improves the quality of life in Southeastern PA

Terms: Grants from $3,000 to $50,000

Deadline: Spring and fall

Contact: Philadelphia Foundation

Phone: 215-563-6417

Website: www.philadfound.org

PRESERVATION FUND

Eligibility: Tax-exempt nonprofits and local governments

Purpose: To preserve properties listed or eligible for the National Register for Historic Places

Terms: Funds in low-interest loans and grants

Deadline: Varies

Contact: Northeast Field Office

Phone: 215-848-8033

Website: www.nationatrust.org

REVOLVING FUND FOR HISTORIC PROPERTY ACQUISITION

Eligibility: Government agencies, nonprofits or community groups

Purpose: To acquire threatened historic properties

Terms: Low-interest loans up to 96 months; grants up to $50,000

Deadline: Ongoing

Contact: Preservation Pennsylvania

Phone: 717-234-2310

Website: www.preservationpa.org

SAVE AMERICA'S TREASURES

Eligibility: Tax-exempt nonprofits and local governments

Purpose: To create public/private commitments that increase awareness of adaptive reuse efforts.

Terms: Dollar for dollar matching grants. Minimum grant amounts range from $50,000 to $250,000, depending on request.

Deadline: Annual

Contact: National Park Service

Phone: 215-597-7995

Website: www.nps.gov

TRANSIT RESEARCH AND DEMONSTRATION PROGRAM

Eligibility: Pennsylvania local governments, transit operators, university, and transit organizations

Purpose: To fund innovative projects that improves the attractiveness of public transit

Terms: Grants for 80% of funding with a 20% local match.

Deadline: Ongoing

Contact: Pennsylvania Department of Transportation, Transit Research and Demonstration Program

Phone: 717-705-1493

Website: www.dot.state.pa.us

TRANSPORTATION AND COMMUNITY DEVELOPMENT INITIATIVE (TCDI)

Eligibility: Eligible municipalities

Purpose: Support local planning projects to improve transportation and encourage redevelopment.

Terms: Grants up to $100,000 of total project cost; 20% local match required.

Deadline: Annual

Contact: Delaware Valley Regional Planning Commission (DVRPC)

Phone: 215-592-1800

Website: www.dvrpc.org

TRANSPORTATION ENHANCEMENTS PROGRAM (TE)

Eligibility: Pennsylvania local governments, counties, state or federal agencies, nonprofits

Purpose: Funds nontraditional projects designed to enhance the transportation experience, to mitigate the impacts of transportation facilities on communities and the environment, and to enhance community character through transportation-related improvements

Terms: 80% to 90% of costs can be funded

Deadline: Varies by state

Contact: Delaware Valley Regional Planning Commission (DVRPC)

Phone: 215.592-1800

Website: www.dvrpc.org/transportation

TREEVITALIZE

Eligibility: Organizations and local governments in Bucks, Chester, Delaware, Montgomery, and Philadelphia Counties

Purpose: To help restore tree cover, educate citizens about planting trees, and build capacity among local governments to understand, protect and restore their urban trees.

Terms: Contribution of trees and related materials

Deadline: Varies

Contact: Pennsylvania Horticultural Society

Phone: 215-988-8795

Website: www.treevitalize.net

WILLIAM PENN FOUNDATION

Eligibility: Must be 501(c)(3)

Purpose: To promote the arts and culture, youth, and community development

Terms: Grants average $10,000 to $500,000

Deadline: Ongoing; must send letter of intent

Contact: William Penn Foundation

Phone: 215-988-1830

Website: www.williampennfoundation.com

FUNDING SOURCES FOR AUDUBON, HADDON HEIGHTS, BARRINGTON, & LAWNSIDE BOROUGHS

BICYCLE/PEDESTRIAN PLANNING ASSISTANCE

Eligibility: New Jersey municipalities

Purpose: Provides municipalities with consultant expertise to develop circulation elements and other transportation related initiatives

Terms: Varies

Contact: New Jersey Department of Transportation

Phone: 609-530-2856

Website: www.state.nj.us/transportation

BIKES BELONG COALITION

Eligibility: Federal, state, regional, county and municipal agencies, nonprofits, organizations whose mission is expressly related to bicycle advocacy

Purpose: Provides funds for bicycle facilities and paths that encourage facility, education, and capacity building

Terms: $10,000 or less

Deadline: Applications accepted quarterly

Contact: Bikes Belong Coalition

Phone: 617-734-2111

Website: www.bikesbelong.org

CENTERS OF PLACE PROGRAM

Eligibility: New Jersey municipalities that formally participated in the implementation of the State Plan

Purpose: Provides preliminary and final design funding and construction dollars to eligible communities

Terms: Varies

Deadline: Varies

Contact: New Jersey Department of Transportation — District 4

Phone: 856-486-6618

Website: www.state.nj.us/transportation

COMMUNITY TRANSPORTATION DEVELOPMENT FUND (CTDF)

Eligibility: Nonprofit transit providers, public agencies, local and state governments, community organizations

Purpose: Promote better transportation options

Terms: Low interest loans of up to $150,000 per recipient and 75% of the total project cost

Deadline: Varies; there are several funding options that require a one-time service fee

Contact: Community Transportation Association of America

Phone: 202-661-0210

Website: www.ctaa.org

COUNTY AID PROGRAM

Eligibility: New Jersey counties

Purpose: Provides funds for public road and bridge improvements under county jurisdiction

Terms: Minimum allotment is $300,000 per county

Contact: New Jersey Department of Transportation

Phone: 609-530-2856

Website: www.state.nj.us/transportation

CAMDEN COUNTY IMPROVEMENT AUTHORITY

Eligibility: Camden County local governments, corporations, and nonprofits

Purpose: Provides cost effective financing to better the communities in Camden County.

Terms: Varies

Deadline: Ongoing

Contact: Camden County Improvement Authority

Phone: 856-751-2242

Website: www.camdencounty.com

FUND FOR COMMUNITY ECONOMIC DEVELOPMENT

Eligibility: New Jersey Community Development Organizations, developers

Purpose: Finance feasibility studies or other predevelopment activities

Terms: Low-interest loans up to $50,000

Contact: New Jersey Economic Development Authority

Phone: 609-777-4898

Website: www.njeda.com

GREEN ACRES GRANTS AND LOANS

Eligibility: New Jersey municipal and county governments

Purpose: Acquire or develop municipal land for public recreation and conservation purposes

Terms: Varies

Deadline: Continuous

Contact: New Jersey Department of Environmental Protection, Bureau of Local Assistance and Program Policy

Phone: 609-984-0570

Website: www.dep.state.nj.us/greenacres

KODAK AMERICAN GREENWAYS GRANTS

Eligibility: Local, regional, or statewide nonprofits, public agencies, community organizations

Purpose: Provides grants to stimulate planning and the design of greenways in communities

Terms: Maximum grant amount is $2,500

Deadline: Annual

Contact: The Conservation Fund

Phone: 703-525-6300

Website: www.conservationfund.com

LOCAL DISCRETIONARY AID

Eligibility: New Jersey municipalities, counties

Purpose: Provides funding for emergencies, as well as for pedestrian safety and bicycle projects

Terms: At the discretion of the Commission of Transportation

Contact: New Jersey Department of Transportation

Website: www.state.nj.us/transportation

LOCAL LEAD / LOCAL SCOPING

Eligibility: New Jersey municipalities and counties

Purpose: Provides an opportunity for subregions to apply for funding for the design, right-of-way, or construction

Terms: Must meet select criteria; construction costs must be a minimum of $250,000

Deadline: Varies

Contact: New Jersey Department of Transportation

Website: www.state.nj.us/transportation

LOCAL TRANSPORTATION PLANNING ASSISTANCE PROGRAM (LTPA)

Eligibility: New Jersey municipalities

Purpose: Provides municipalities with consultant expertise to address local transportation and quality of life issues.

Terms: Varies

Contact: New Jersey Department of Transportation

Phone: 609-590-2856

Website: www.state.nj.us/transportation

LOCALLY INITIATED PEDESTRIAN PROJECTS

Eligibility: New Jersey counties and municipalities

Purpose: Provides funds for municipalities and counties for pedestrian access construction

Terms: Varies

Contact: New Jersey Department of Transportation — District 4

Phone: 856 -486-6618

Website: www.state.nj.us/transportation

LOWE'S HOME IMPROVEMENT

Eligibility: Nonprofits

Purpose: The Lowe's Charitable & Educational Foundation is dedicated to improving the communities we serve through support of public education, community improvement projects, and home safety initiatives

Terms: $5,000 to $25,000 with a total of about $3 million annually

Deadline: Varies

Contact: Lowe's Companies, Inc.

Website: www.lowes.com

MUNICIPAL LOANS

Eligibility: New Jersey municipalities, counties, redevelopment entities, homeowners

Purpose: Returns contaminated and underutilized properties to productive reuse.

Terms: Loans: $1 million per year per site ($3 million for municipalities) may be borrowed at 2 points below the Federal Rate.

Deadline: Continuous (partnership with NJDEP)

Contact: New Jersey Economic Development Authority, Hazardous Discharge Site Remediation Fund

Phone: 609-777-0990

Website: www.njeda.com

MUNICIPAL LOAN POOL PROGRAM

Eligibility: New Jersey municipalities

Purpose: Funding equipment purchases, capital improvements or refinance debt

Contact: New Jersey Economic Development Authority

Phone: 609-292-0192

Website: www.njeda.com

MUNICIPAL POOLED FINANCING PROGRAM

Eligibility: Camden County municipalities

Purpose: To provide cost effective financing to build or purchase capital projects

Terms: Varies; reduced loan rates are available

Deadline: Continuous

Contact: Camden County, Department of Finance

Phone: 856-751-2242

Website: www.camdencounty.com

NATIONAL RECREATIONAL TRAILS PROGRAM

Eligibility: Local, county, and state governments, nonprofits

Purpose: Provides for the development and maintenance of trails and trail facilities

Terms: Maximum grant award is $25,000

Deadline: Annual

Contact: New Jersey Department of Environmental Protection, Division of Parks and Forestry

Phone: 609-984-0404

Website: www.nj.gov/dep

PUBLIC WORKS (CAPITAL) FUNDING

Eligibility: New Jersey municipalities or counties

Purpose: Provides funds for smart transportation and land use projects through bonding

Terms: Varies

Contact: County Planning Department

Website: www.state.nj.us/transportation

RIVERS, TRAILS, AND CONSERVATION ASSISTANCE

Eligibility: Local governments, states, and nonprofits

Purpose: technical assistance to communities for trials and greenway planning.

Terms: Technical assistance is for one year

Deadline: Annual

Contact: National Park Service, Rivers and Trails Assistance, Philadelphia Office

Phone: 215-597-1581

Website: www.nps.gov

SAFE STREETS TO SCHOOL

Eligibility: New Jersey municipalities

Purpose: Provides funding for communities seeking to improve the safety of children walking to school

Terms: Varies

Contact: New Jersey Department of Transportation (NJDOT)

Phone: 609-530-6551

Website: www.state.nj.us/transportation

SMART FUTURES GRANT

Eligibility: New Jersey local governments, counties, nonprofits

Purpose: Funds projects that balance development and redevelopment with the preservation of open space and environmental resources

Terms: Grants are announced yearly

Contact: Department of Community Affairs, Office of Smart Growth

Phone: 609-292-7156

Website: www.dca.state.nj.us

SMART GROWTH PLANNING GRANTS FOR MUNICIPALITIES

Eligibility: New Jersey municipalities

Purpose: To fund various planning studies

Terms: Maximum of $20,000

Contact: Association of New Jersey Environmental Commissions (ANJEC)

Phone: 973-539-7547

Website: www.anjec.org

SMART GROWTH PREDEVELOPMENT FUNDING

Eligibility: Developers undertaking mixed use projects, development suburban and rural communities.

Purpose: To finance site preparations costs such as demolition, removal of debris or engineering.

Terms: Low-interest loans and loan guarantees up to $1 million

Deadline: Varies

Contact: New Jersey Economic Development Authority

Phone: 609-777-4898

Website: www.njeda.com

TRANSPORTATION AND COMMUNITY DEVELOPMENT INITIATIVE (TCDI)

Eligibility: Eligible municipalities

Purpose: Support local planning projects to improve transportation and encourage redevelopment.

Terms: Grants up to $100,000 of total project cost; 20% local match required.

Deadline: Annual

Contact: Delaware Valley Regional Planning Commission (DVRPC)

Phone: 215-592-1800

Website: www.dvrpc.org

TRANSPORTATION ENHANCEMENTS (TE)

Eligibility: New Jersey municipalities and counties

Purpose: Provides funds for community-based project that expand travel choices and enhance the transportation network

Terms: Varies; this is a competitive program

Deadline: Varies

Contact: New Jersey Department of Transportation, Division of Local Aid and Economic Development

Phone: 215-238-2881

Website: www.dvrpc.org/transportation/capital/te/pa.htm

APPENDIX C:
STUDY ADVISORY COMMITTEES

STUDY ADVISORY COMMITTEES

Bethlehem Pike

Donald Berger
Township Manager, Springfield Township

Joan Biddle
Whitemarsh Township Resident

Jack Connor
Public Works, Springfield Township

Jane Fisher
Whitemarsh Township Resident

John Gross
Springfield Township Police, Traffic Safety

Doug Heller
Springfield Township Commissioner

Dan Helwig
Springfield Township Business Owner

Jean Holland
Montgomery County Planning Commission

Randall Hummel
Chief, Springfield Township Police Department

Dan Johnson
Friends of Historic Bethlehem Pike (FOHBP)

Susan LaPenta
Traffic Control Services, PennDOT 6-0

Steve Lester
Springfield Township Resident

Wesley Ratko
Montgomery County Planning Commission

Jane Roberts
Friends of Historic Bethlehem Pike (FOHBP)

Donald Sirianni
Public Works, Springfield Township

Michael Taylor
Assistant Township Manager, Springfield Township

Robert Wilmot
Flourtown Fire Department

Peter Wilson
Springfield Township Resident

Nancy Story
Springfield Township Resident

Bernie McLafferty
Springfield Township Resident

Wayne Johnston
Director of Transportation, Springfield Township School District

John Calnan
SEPTA

Fran Hanney
Traffic Control Services Manager, PennDOT District 6-0

George Wilmot
Chief, Flourtown Fire Department

East Atlantic Avenue

Scott Alexander
Mayor, Haddon Heights Borough

Edward Catts
Captain, Barrington Borough Police Department

Abhijit Chatterjee
Smith Co. Engineering representing Lawnside Borough

Joe Eisenhardt
Chief, Barrington Borough Police Department

Gregory Evans
Key Engineers representing Barrington Borough

Rich Kinkler
Chief, Haddon Heights Police Department

Andrew Levecchia
Camden County Improvement Authority

Anthony O'Toole
Camden County Department of Public Works, Division of Engineering

John Rink
Mayor, Barrington Borough

Trish Shields
Haddon Heights Borough Council

Marshall Simmons
Captain, Haddon Heights Police Department

DVRPC Staff

Kevin Murphy
Senior Transportation Planner

Kelly Rossiter
Regional Planner

Gregory Heller
Planning and Design Analyst

TAMING TRAFFIC: CONTEXT-SENSITIVE SOLUTIONS IN THE DVRPC REGION

Publication Number: 08044

Date Published: December 2008

Geographic Area Covered: Nine-County Delaware Valley Region, including the counties of Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer in New Jersey; and specifically Springfield and Whitemarsh Townships in Montgomery County, PA, and the boroughs of Audubon, Haddon Heights, Barrington, and Lawnside in Camden County, NJ.

Key Words: Traffic calming, context-sensitive solutions, context-sensitive design, balanced circulation, NJDOT, PennDOT, enforcement, engineering, education, policy, vertical deflection, horizontal deflection, shared lane marking, sharrow, rails-with-trails, road diet, smart growth, placemaking, curb extension, bumpout, multi-modal, chicane, rumble stripe, crosswalk, multi-use trail.

Abstract: This report focuses on the application of context-sensitive solutions (CSS) principles and best practices, including traffic calming, focusing on two case study sites within the DVRPC region — Bethlehem Pike in Springfield and Whitemarsh Townships, Montgomery County, PA, and East Atlantic Avenue in Audubon, Haddon Heights, Barrington, and Lawnside in Camden County, NJ. CSS is a means to link land use and transportation planning and implementation. Pennsylvania and New Jersey case studies are included, with recommendations and before and after photo simulations. The study includes an explanation of traffic calming and related terms and a discussion of policy at the state level and in the Delaware Valley region.

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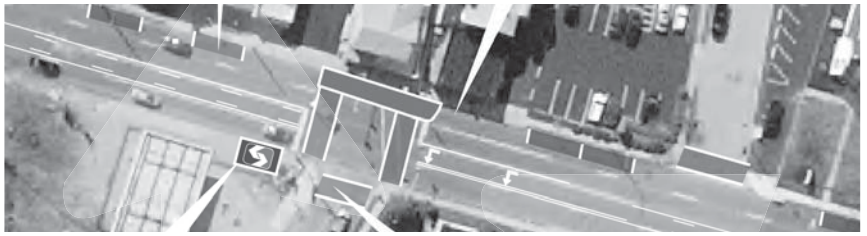
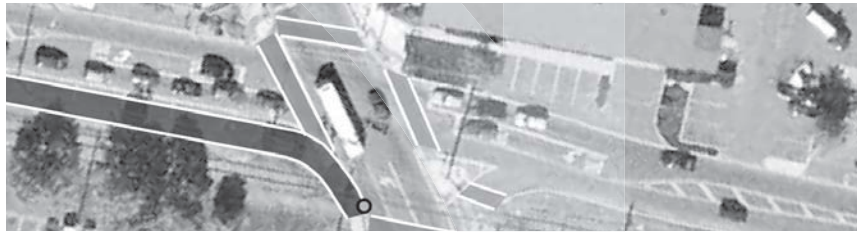


DECEMBER 2008

TAMING TRAFFIC



Context-Sensitive Solutions in the DVRPC Region:

Bethlehem Pike:
Springfield/Whitemarsh Townships, Montgomery County, PA

East Atlantic Avenue:
Audubon/Haddon Heights/Barrington/Lawnside Boroughs
Camden County, NJ

Delaware Valley
Regional Planning
Commission