OCTOBER 2007

TAMING TRAFFIC

Context-Sensitive Solutions in the DVRPC Region:

Clarksville Road, West Windsor, NJ
Parkside Avenue, Philadelphia, PA

Delaware Valley
Regional Planning
Commission

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Created in 1965, the Delaware Valley Regional Planning Commission (DVRPC) is an interstate, intercounty and intercity agency that provides continuing, comprehensive and coordinated planning to shape a vision for the future growth of the Delaware Valley region. The region includes Bucks, Chester, Delaware, and Montgomery counties, as well as the City of Philadelphia, in Pennsylvania; and Burlington, Camden, Gloucester and Mercer counties in New Jersey. DVRPC provides technical assistance and services; conducts high priority studies that respond to the requests and demands of member state and local governments; fosters cooperation among various constituents to forge a consensus on diverse regional issues; determines and meets the needs of the private sector; and practices public outreach efforts to promote two-way communication and public awareness of regional issues and the Commission.

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

October 2007

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EXECUTIVE SUMMARY

As professional planning moves toward the end of the first decade in this very young century, a noticeable emphasis is being given once again to the importance of place and community. At the same time, automobile transportation has become the de facto mode of choice for most trips: work, shopping, and child shuttling. When the traffic created by our daily routines has a negative effect on our neighborhoods, there are planning techniques that can help us to retain our sense of place, and even improve our quality of life.

That's where context-sensitive solutions (CSS) apply. This planning method, which has been gaining supporters for the last decade, looks "beyond the pavement" to the role that streets and roads can play in enhancing communities and natural environments. CSS recognizes that our neighborhood and local streets are different from major thoroughfares, and that the drivers that use these roads should behave differently. Just as important, CSS promotes the idea of streets as transportation routes that serve multiple modes of travel, including walking and bicycling, and not just driving. The primary 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.

A very important and effective tool of CSS is traffic calming. Speed tables, raised crosswalks, chicanes, median barriers, textured pavements, and bulb outs are just some of the traffic calming techniques that can be found throughout the United States, including the DVRPC 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 report details the findings and recommendations of a study focused on problem locations that will benefit from CSS and traffic calming techniques. The study team worked with a diverse group of local officials and traditional planning partners on two study locations in the region, one each in Pennsylvania and New Jersey. By working collaboratively with stakeholders, the study team developed improvement strategies that create for all users safe facilities that are in harmony with the values of the community, thus advancing the goals of CSS.

The report is divided into two main components: (1) background narrative that describes CSS and traffic calming; and (2) the local case studies in Pennsylvania and New Jersey. A photo simulation of select recommendations is included for each case study.

Parkside Avenue, City of Philadelphia, Pennsylvania, was chosen as an urban case study location. Parkside Avenue is a primary arterial road located in west Philadelphia that provides access to Fairmont Park and several local institutions: The Mann Music Center, Microsoft's High School of the Future, and the Please Touch Museum, which will soon occupy the historic Memorial Hall. The route is configured as a two-lane roadway with left-turn lanes at intersections, bike lanes, and wide shoulders where on-street parking is permitted. This study location has benefited from other planning work, namely the Centennial District Master Plan, the goals of which are echoed in this report.

At just over one mile in length, the study corridor carries both local and regional traffic and event traffic, and it serves as a connector to Girard Avenue for visitors en route to the Philadelphia Zoo located nearby at Girard Avenue and 34th Street. In addition, Parkside Avenue carries a significant amount of suburban commuter traffic bound for Center City.

Through the study process, six main issues were identified that could be addressed through traffic calming and context-sensitive solutions, and specific improvements were focused on seven site locations. In general, many of the issues addressed during the study involved the need for better pedestrian and transit amenities, and the disconnect between the park and the corridor, which presents opportunities for creating a sense of place. Other issues considered include potential pedestrian/auto conflicts at both the Girard Avenue and 52nd Street intersections with Parkside and the need for an update to the circulation pattern of the park facilities. Another issue that was of particular concern to local residents of the study advisory committee was the motorcycle racing that reportedly takes place regularly on the western half of Parkside Avenue. In addition to the need for a greater police presence, the study committee endorsed the proposal for a modern roundabout at the intersection of 50th

Street and Parkside Avenue as a more permanent, long-term solution. The intent of the roundabout at this location is to effectively break up the existing thoroughfare, which the local motorcyclists are misusing, while maintaining traffic flow along the corridor.

Clarksville Road (CR 638) in West Windsor Township, Mercer County, New Jersey, was selected for the suburban/rural case study. Clarksville Road is a two-lane facility with intermittent shoulders and sidewalks that connects with Quakerbridge Road to the southwest and Princeton-Hightstown Road to the northeast.

The study area portion of the route is just over two miles long and includes the future site of the Jewish Community Center development (about 500 feet west of the intersection of Meadow Road and Clarksville Road) northeast to Princeton-Hightstown Road. The study corridor carries a mix of local and regional traffic, including daily commuters en route to NJ Transit's Princeton Junction Station on the Northeast Corridor Line. In addition, an elementary school and a high school are located on Clarksville Road within the study area.

Through field observations and study advisory committee meetings, the study team identified seven issues to be addressed by context sensitive-solutions and traffic calming, as well as five sites in need of specific improvements. One of the greatest concerns was the behavior and speed of the traffic and the potential for conflicts with pedestrians, especially school students. In select portions of the corridor there are open fields and low-density development, which seem to encourage high average speeds. The group noted the need for more frequent and better marked pedestrian crossings to increase the profile of pedestrians. The study also recommends the use of contextual treatments to establish the corridor as a distinct place and not merely a cut through for regional traffic. West Windsor's municipal representatives fully endorsed this concept because it is in concert with concurrent planning efforts having similar goals. One such treatment that was endorsed by the team is the addition of a bicycle lane and "Share The Road" signs, where applicable.

SECTION 1:
CONTEXT-SENSITIVE SOLUTIONS

TAMING TRAFFIC

INTRODUCTION

Context-sensitive solutions (CSS) describes an approach to transportation planning with roots tracing back over 30 years. 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 a 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 a CSS approach is endorsed by many state departments of transportation, including PennDOT and NJDOT.

CSS is an approach that utilizes transportation planning to enhance communities and natural environments, while balancing the competing needs of all modes of travel. An important component of a CSS approach is that it links driving behavior with the perception of the surrounding context. CSS can also incorporate traditional traffic calming solutions, where appropriate. Traffic calming is an approach that originated in Europe and 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 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. The aim of this comprehensive approach is to change the look and feel of the roadway, which in turn may alter driver behavior and make passing motorists more aware of the dynamic atmosphere beyond the roadway.

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

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 reevaluating 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, are currently drafting a joint publication, *Smart Transportation Solutions Guidebook*, to be released by the end of 2007. It will identify roadway and roadside design values appropriate for different types of roadways in a variety of land use contexts, recommend a process for implementing context-sensitive design projects, and provide guidelines for improving the transportation system in accordance with context-sensitive and Smart Growth principles.

OVERVIEW OF CONTEXT-SENSITIVE SOLUTIONS

Placemaking Elements

Features, such as decorative lighting, landscaping and public art, give a roadway a distinct character. CSS encourages these features to be created of 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 of the gateway to Centerville, Delaware shows an effective bicycle lane and a roadway that is visibly multimodal, encouraging sharing the road. In addition to the bicycle lane are placemaking elements and a traffic calming island. 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

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 livability. 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: This federally funded program strives to establish, improve, and maintain the walking and bicycling paths to schools serving children in grades K-8.

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 multipurpose shared facilities.

ENGINEERING TRAFFIC CALMING TECHNIQUES

Volume Control Measures

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

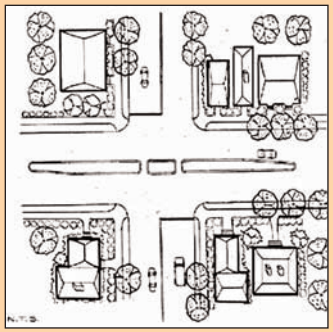
Full Street Closures: Barriers placed across a street to close the street completely to through-traffic, usually leaving only sidewalks or bicycle paths open. The barriers may consist of landscaped islands, walls, gates, side-by-side bollards, or any other obstructions that leave an opening smaller than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

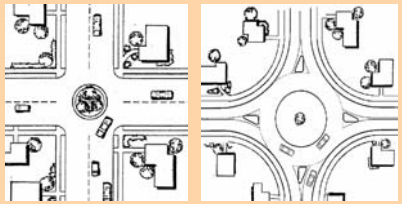
Raised Intersections: Flat raised areas covering entire intersections, with ramps on all approaches and often with brick or other textured materials on the flat section. They make entire intersections-crosswalks and all-pedestrian territory.

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 roundbout (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.

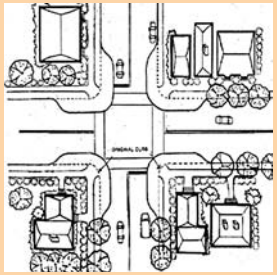


Diagram of bulbouts and a photo of a bulbout in Collingswood, NJ.

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.

TAMING TRAFFIC METHODOLOGY

This report, *Taming Traffic*, is the product of the third 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), comprised of 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.

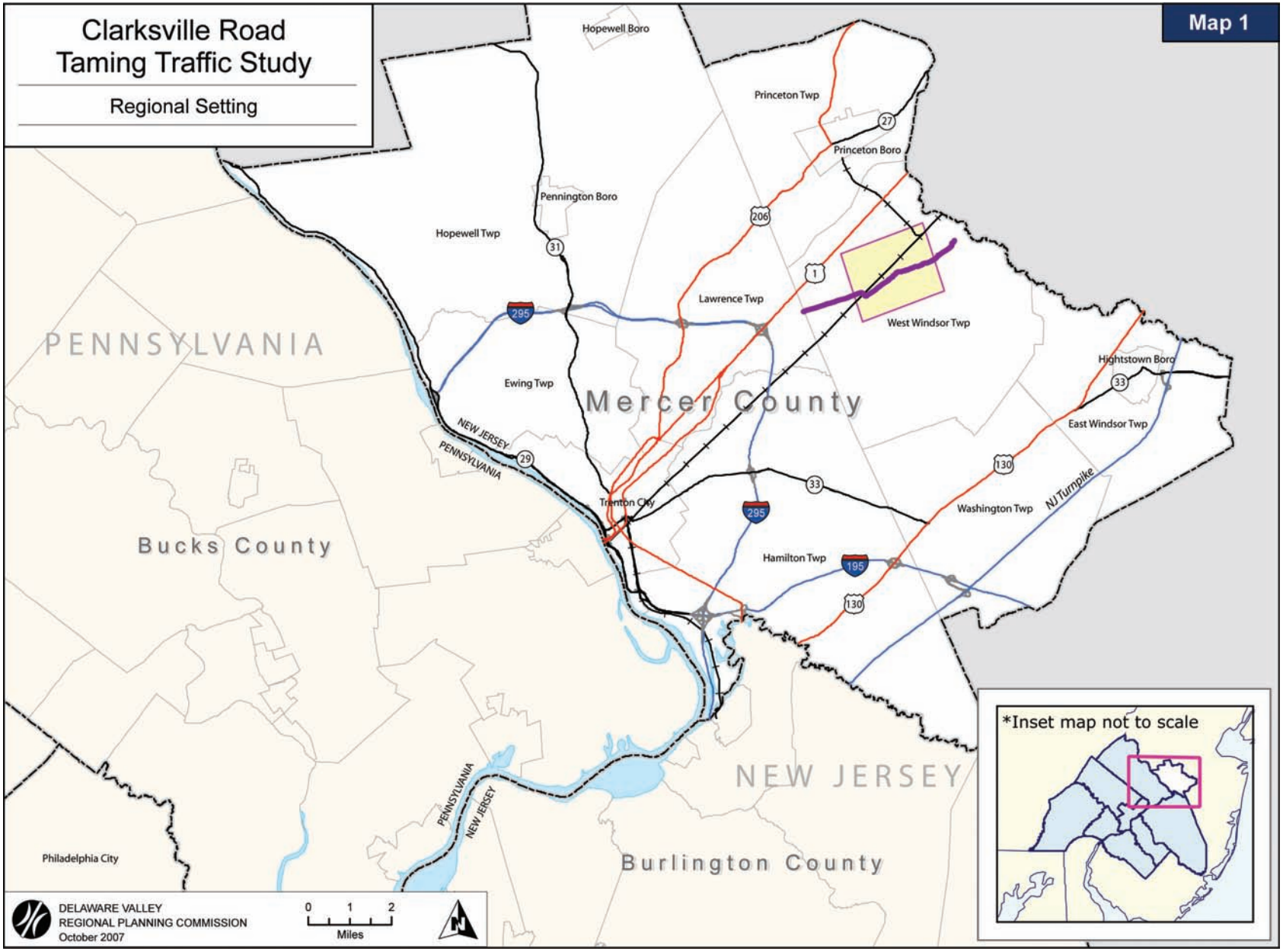
During the course of data collection and research, DVRPC staff held several internal meetings to produce a problem identification document and recommendation plans. DVRPC staff submitted the problem identification to the study advisory committee for approval, and at the second meeting with each committee,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

CLARKSVILLE ROAD STUDY SITE

WEST WINDSOR TOWNSHIP
MERCER COUNTY, NJ


Clarksville Road
Taming Traffic Study
Regional Setting
Map 1
Hopewell Boro
Princeton Twp
Princeton Boro
Pennington Boro
Hopewell Twp
Lawrence Twp
West Windsor Twp
Hightstown Boro
East Windsor Twp
Ewing Twp
Mercer County
PENNSYLVANIA
NEW JERSEY
Trenton City
Washington Twp
NJ Turnpike
Hamilton Twp
Bucks County
NEW JERSEY
Burlington County
Philadelphia City
*Inset map not to scale
DELAWARE VALLEY
REGIONAL PLANNING COMMISSION
October 2007
0 1 2
Miles

EXISTING CONDITIONS

Street Name: Clarksville Road (County Route 638)
Functional Class: Urban Minor Arterial
Posted Speed Limit: 45/20/35 MPH
AADT: 13,000-20,000

Study Site

The study area is a section of Clarksville Road (CR 638) just over 2 miles in length, spanning from the area north of Meadow Road to Princeton-Hightstown Road (CR 571). In West Windsor, Mercer County, New Jersey, Clarksville Road is close to several major commuter roadways and the New Jersey Turnpike. This route is reportedly used to bypass Route 1 (Brunswick Pike) for traffic en route to Princeton Junction. Nearby major employment centers include the Quakerbridge Mall and Lowes. See Map 1 for Regional Setting.

Roadway Conditions

Clarksville Road is an Urban Minor Arterial roadway. The roadway width, speed limit, and overall character change significantly through the 2.5-mile study corridor. Throughout most of the corridor there is one lane in each direction. However, an additional lane is added at the approach to North Post Road and Princeton-Hightstown Road to accommodate turning movements. There is also an extra lane added for about 200 feet by Heather Drive to accommodate right turns into the Avalon Watch development. Along the corridor, the cartway width ranges from 26 to 49 feet and shoulder widths vary between 2 and 12 feet. The speed limit along the corridor is, at points, 45 MPH, 35 MPH, and 25 MPH. The changes in speed limit coincide with transitions in roadway character.

Field visits and stakeholder input indicate that there is ample parking along the corridor with dedicated parking lots for each use, including Avalon Watch, the shopping center, the offices, municipal complex, and schools. There was no observed on-street parking, although the advisory committee stated that during some special events at the Maurice Hawk Elementary School, on-street parking is utilized.

Crash Summary

A cursory crash analysis was performed in an effort to identify safety problems along Clarksville Road between the area of future development located south of Meadow Road, north to Princeton-Hightstown Road (milepost 1.0-3.49). Crash data from the New Jersey Department of Transportation's (NJDOT) web page for years 2003-2005 was utilized. 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. See Map 2 for crash data.

Crash Type and Volume: During the three-year period, 143 crashes were recorded on Clarksville Road's 2.5-mile study corridor length. This is a fairly significant crash total for a county route. Fifty-six percent of the crashes were coded as "at intersection," which is defined by NJDOT as being within the stop bars of the intersecting streets, where applicable. Rear-end crashes were the most frequent collision type, accounting for 33 percent (47), followed by fixed-object crashes accounting for 24 percent (34). One pedestrian crash occurred, which may be related to the reportedly high pedestrian and bicycle activity within the study area associated with the elementary school and high school. No bicycle crashes were identified. There were no fatal crashes, 30 injury crashes, and 113 property-damage-only crashes.

Crash Clusters: A cluster of 48 crashes was identified in the vicinity of Meadow Road (milepost 1.47), which meets Clarksville Road at a T-intersection just south of the railroad bridge, and along a combination horizontal and vertical curve in the road. As a result of this geometry, sight distance is compromised, making it difficult to enter and exit this side street. With development along Meadow Road continuing, it is reasonable to expect that crash problems at this location will remain constant, or increase, as traffic volumes increase. Another concentration was identified in the vicinity of the Penn Lyle Road intersection with Clarksville Road. 31 crashes occurred between mileposts 3.28 and 3.38, a roughly 500-foot length that includes the intersection. Smaller clusters were identified at North Post Road and in the vicinity of Heather Drive, where 18 and 10 crashes occurred, respectively.

The recommended improvements at each of these four intersections are intended to eliminate the ambiguity of the existing lane configurations, for

better traffic flow, left-turn accommodation, improved pedestrian amenities, and increased safety.

Transit

The study area is within close proximity to Princeton Junction station, a major stop on the NJ Transit Northeast Corridor Rail Line, and is serviced by NJ Transit Bus Route 976, which terminates at Princeton Junction. Ridership during NJ Transit fiscal year 2007 (July 1, 2006 through June 30, 2007) on Route 976 was 38,048, with an increase of 25.8 percent since 2002. Princeton Junction is also serviced by NJ Bus Transit Route 600, which travels between Trenton and Plainsboro. In addition, the Greater Mercer Transportation Management Association operates TrainLink, a private shuttle service with peak period commuter service between the Princeton Junction Rail Station and the Princeton Forrestal Center area. See Map 3 for the transit network.

Pedestrian and Bicycling Environment

The study area comprises several contexts, centers of pedestrian activity (or nonactivity), and varying degrees of pedestrian amenities. Sidewalks are not continuous, ending at certain points, then continuing farther along the corridor. This is a result of sidewalks installed as part of various development projects.

The area at the southern end of the corridor, near the bridge over the railroad underpass, has no sidewalks or amenities whatsoever. Sections in the center of the corridor generally have sidewalks, except for a section on the east side of the roadway, north of Avalon Watch, and another area near the township municipal complex.

The area by Princeton-Hightstown Road and West Windsor-Plainsboro High School South has sidewalks, as well as other pedestrian amenities, such as marked crosswalks and countdown timers. Overall, while the pedestrian environment is adequate in some sections, in others it is significantly lacking. In order to promote the corridor as a multimodal roadway, building pedestrian connectivity across these contexts will be important.

The corridor currently has no bike lanes or other bicycling amenities, such as bicycle racks. Bicyclists were observed using the corridor, and a dozen bicycles were observed chained to poles and trees near High School South during school hours — exhibiting a real need for enhanced bicycle amenities. In most of the corridor, the cartway is wide enough to accomodate dedicated bicycle lanes. In the area by the railroad bridge, where the cartway narrows, it may be necessary for bicycles to share the road with vehicular traffic. It is noteworthy that West Windsor has an advocacy organization called the West Windsor Bicycle & Pedestrian Alliance, a not-for-profit group founded in 2006 to “promote bicycling and walking in West Windsor, emphasizing access, increased mobility, education, and safety.”

Land Use/Growth

The study corridor is characterized by several land uses. The Avalon Watch housing development is located across Clarksville Road from the Village Square Shopping Center at Heather Drive. Two schools — West Windsor-Plainsboro High School South and Maurice Hawk Elementary School — as well as the township fire station and municipal complex, are also located in the study area. There is also an office park and residential areas of varying densities along Clarksville Road.

Development/Roadway Improvements

A number of new developments and roadway improvements are planned in the corridor for the near future. Major developments include a new housing complex (Windsor Gardens) and the new campus of the Jewish Community Center, just west of Meadow Road. Major roadway projects include an intersection improvement at Clarksville and Princeton Hightstown Roads, the installation of a jughandle and improved access at Meadow Road, the widening of Penn Lyle Road, and the installation of a midblock crosswalk from Avalon Watch to the Village Square Shopping Center. This project will also incorporate median islands, dedicated left-turn lanes, and push button pedestrian signals.

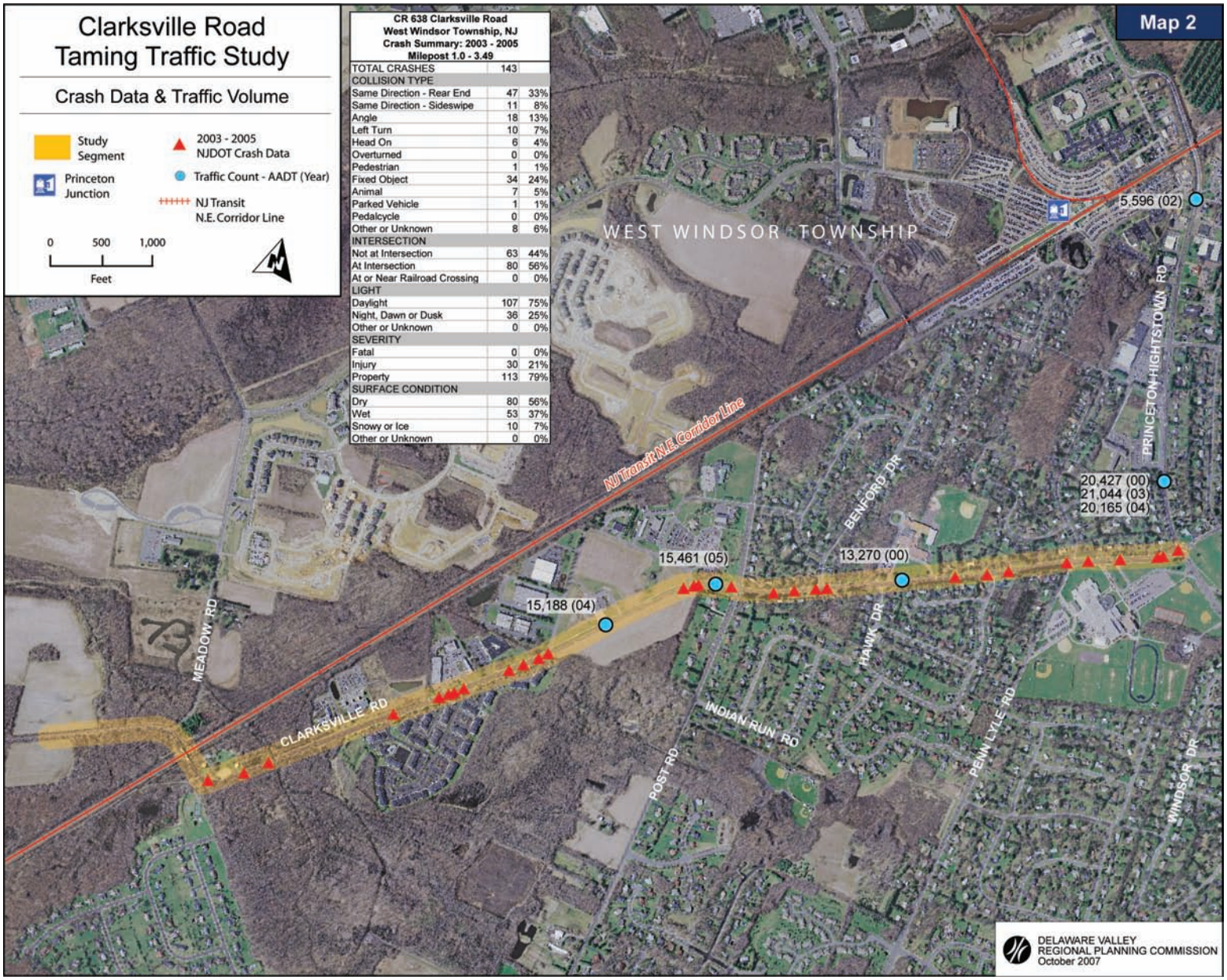
In addition, the study corridor is near a Transit Village project at Princeton Junction Station. Design alternatives are currently being drafted by RMJM Hillier, with significant input from local residents. NJ Transit has transit projects occurring within the study corridor, including the removal of the bus dropoff point at Jamie Brooks Drive (serving Avalon Watch). Clarksville Road

may also accommodate a portion of a temporary bus-rapid transit route until the final alignment is constructed outside of the study area.

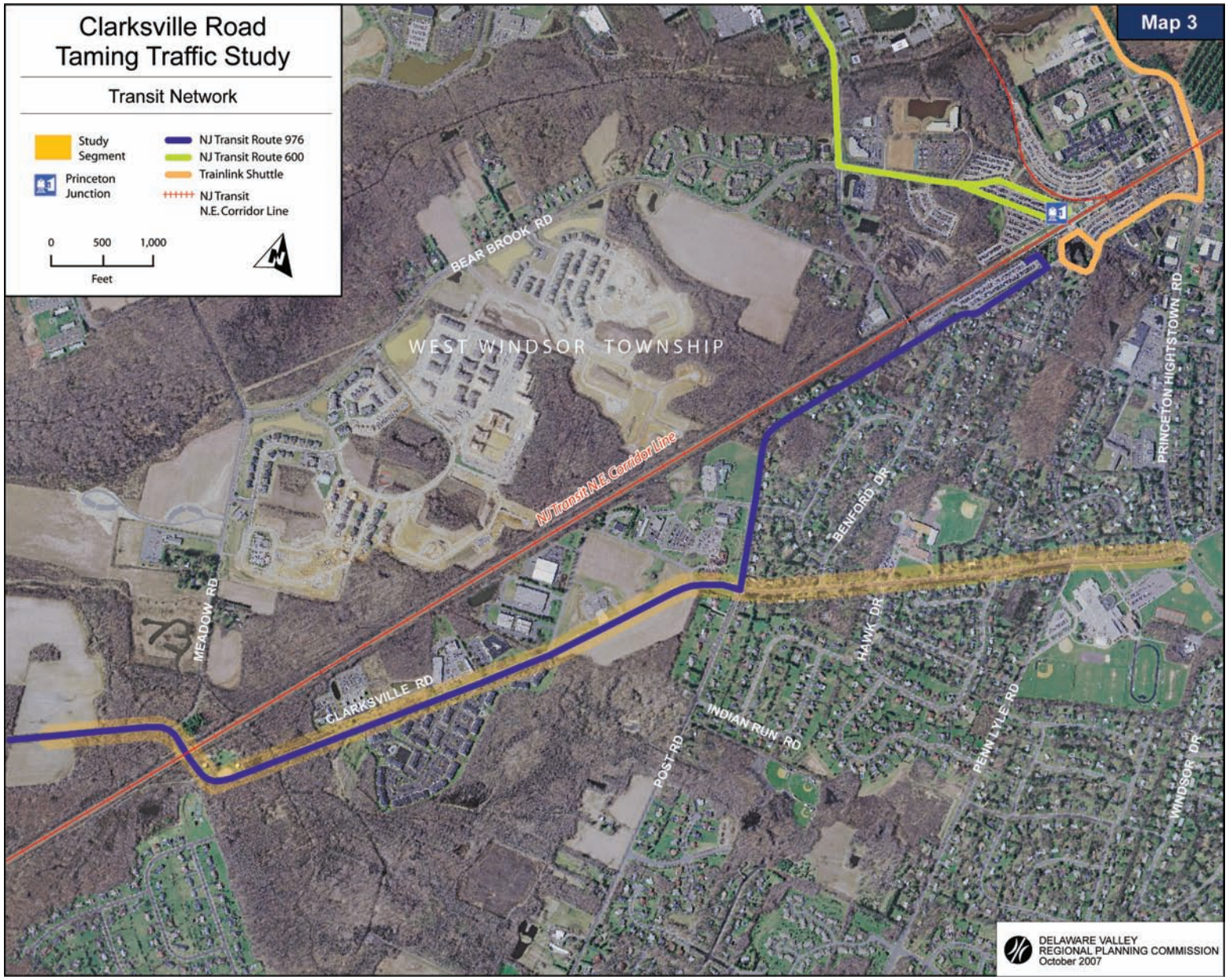
A community planning process was started in the beginning of 2007, working with RMJM Hillier, focusing on the 350-acre redevelopment area surrounding the Princeton Junction Station. The results are available online at www.wwallaboard.org.

Case for Study

The current design of Clarksville Road may not be appropriate for a corridor with residential uses and community facilities, such as schools. When fully implemented, the new and proposed developments will likely result in additional residents and increased traffic volume within the study area. These imminent changes necessitate a strategy for maintaining and improving the quality of life for the local residents of the study area and all users of Clarksville Road. The specific issues identified in the study corridor will determine the types of approaches that are most appropriate to create a context and character that complements the roadway and its surrounding land uses. Following are the primary problems in the study area that the Taming Traffic study will address.



CR 638 Clarksville Road West Windsor Township, NJ Crash Summary: 2003 - 2005 Milepost 1.0 - 3.49		
TOTAL CRASHES	143	
COLLISION TYPE		
Same Direction - Rear End	47	33%
Same Direction - Sideswipe	11	8%
Angle	18	13%
Left Turn	10	7%
Head On	6	4%
Overturned	0	0%
Pedestrian	1	1%
Fixed Object	34	24%
Animal	7	5%
Parked Vehicle	1	1%
Pedalcycle	0	0%
Other or Unknown	8	6%
INTERSECTION		
Not at Intersection	63	44%
At Intersection	80	56%
At or Near Railroad Crossing	0	0%
LIGHT		
Daylight	107	75%
Night, Dawn or Dusk	36	25%
Other or Unknown	0	0%
SEVERITY		
Fatal	0	0%
Injury	30	21%
Property	113	79%
SURFACE CONDITION		
Dry	80	56%
Wet	53	37%
Snowy or Ice	10	7%
Other or Unknown	0	0%


Clarksville Road
Taming Traffic Study
Transit Network
Study Segment
Princeton Junction
NJ Transit Route 976
NJ Transit Route 600
Trainlink Shuttle
NJ Transit N.E. Corridor Line
0
500
1,000
Feet
Map 3
WEST WINDSOR TOWNSHIP
BEAR BROOK RD
NJ Transit N.E. Corridor Line
BENFORD DR
PRINCETON HIGHTSTOWN RD
MEADOW RD
CLARKSVILLE RD
POST RD
INDIAN RUN RD
HAWK DR
PENNYLYLE RD
WINDSOR DR
DELAWARE VALLEY
REGIONAL PLANNING COMMISSION
October 2007

PROBLEM IDENTIFICATION

The following are major problems identified in the study area that may be alleviated through context-sensitive solutions.

Problem 1: Posted and Observed Speeds Inappropriate for the Context

The speed limit through much of the study corridor on Clarksville Road is 45 MPH. Due to limited sight distances and roadway geometry, the bridge over the Northeast Corridor Rail Line and its immediate approaches have posted speeds of 25 MPH. The speed limit continues at 45 MPH through a large portion of the study area where clustered housing developments, office parks, and shopping centers exist. Several new residential developments and community attractions are also proposed for areas currently posted with 45 MPH speed limits. At North Post Road traveling north through the corridor, the speed limit decreases to 35 MPH. This slower speed coincides with a change in development pattern as this section contains two schools and fairly dense residential development.

Travel speeds of 45 MPH are inappropriate for Clarksville Road, as it travels through areas with significant residential uses and substantial pedestrian activity. Coupled with the an unobstructed straightway north of the bridge, the increase in speed limit from 25 MPH to 45 MPH creates conditions that encourage speeding through an area with pedestrian and retail activity. Pending developments are expected to increase the amount of pedestrian activity on the corridor. Furthermore, the 45 MPH speed limit threatens the safety of pedestrians utilizing the proposed unsignalized mid-block pedestrian crossing that will connect Avalon Watch and the shopping plaza.

Posted speeds of 45 MPH may be inappropriate for a residential context.
Source: DVRPC

Problem 2: Inconsistent Roadway Width

Although there is consistently one lane in each direction along Clarksville Road, the lane widths and shoulder widths change dramatically. The cartway width ranges from 26 to 49 feet, with a shoulder variation from 2 to 12 feet. In the widest section between Everett Drive and North Post Road, there is no marked shoulder, resulting in very wide lanes. Traveling north from North Post Road, the roadway narrows and shoulders are marked, as the land use becomes denser residential. The abrupt transformation of wide and ambiguous lanes into a narrower passage through a dense residential area creates

The roadway width changes dramatically and suddenly at various points. This image shows the area just to the south of the Avalon Watch housing complex.
Source: DVRPC

potentially dangerous conditions. When coupled with a reduction in speed limit from 45 MPH to 35 MPH, this portion of Clarksville Road can be complicated to navigate for drivers. Wide lanes, lack of consistent shoulders, and ambiguous striping may give drivers the impression that higher speeds are acceptable.

Problem 3: Corridor Lacks a Sense of Place

Areas such as those around schools require drivers to behave with heightened awareness. However, the study area lacks visual indicators that may give drivers the impression that they should operate at slower speeds and with more caution (with the exception of flashing "school zone" beacons, which are active in the vicinity of the Maurice Hawk Elementary School). The corridor also contains areas that appear physically disconnected from each other, such as the dense residential community on the northern segment of the study area and the office parks and municipal complex on the southern end of the study area. All of these factors contribute to a general perception of the corridor as a through route rather than a destination and a community.

This view shows the northern entrance to the study corridor, by Princeton-Hightstown Road. The roadway is nondistinct, lacking gateway signage and other elements distinguishing West Windsor's character. Source: DVRPC

Problem 4: Inadequate and Infrequent Pedestrian Crossings

In an area with residential and retail uses, as well as schools and community facilities, it is important to plan for pedestrian traffic. The entire study corridor contains four pedestrian crosswalks over Clarksville Road: at North Post Road, Harris Road, and Princeton-Hightstown Road, and an unsignalized crossing by Maurice Hawk Elementary School. The township is currently in the process of installing an additional crosswalk by Avalon Watch. Study Advisory Committee (SAC) members identified that pedestrians, especially students, tend to cross midblock, where safe accommodations are missing.

The corridor lacks sufficient pedestrian crossings to accommodate the reported volume of pedestrian activity and destinations that it contains. Crosswalks exist at signalized intersections, but some common destinations are located midblock, resulting in pedestrians crossing Clarksville Road without a designated crosswalk. These locations include Pennlyle Road and other points near High School South. In addition, the existing midblock crossing at Maurice Hawk Elementary School lacks a strong visual treatment to properly alert drivers.

The Avalon Watch housing complex is on the left and a shopping center is on the right; however, there is no pedestrian crossing between the two. The County has plans to add a mid-block crosswalk, though other long stretches still lack pedestrian connectivity. Source: DVRPC

Problem 5: Lane Configuration Is Confusing and Potentially Dangerous

Approaching North Post Road, traveling north, Clarksville Road widens from one lane into two unmarked lanes. Beyond the intersection the road quickly narrows to its original one-lane configuration. While the traffic signal is equipped with a left-turn arrow, the new lane is not a dedicated left-turn lane. Considering that the second lane is not marked as a turn lane, cars frequently utilize this lane as a second through lane. When the road narrows to the original one-lane configuration, cars quickly jockey for position, causing confusing and potentially dangerous driving conditions.

A similar lane adjustment occurs prior to the West Windsor Plainsboro High School South campus at Penn Lyle Road on Clarksville Road northbound. At this point, Clarksville Road once again widens into two lanes. This configuration continues until it splits into three lanes at the Princeton-Hightstown Road intersection approach (left-only/through/right-only). SAC members reported that drivers again speed up and jockey for position between the three lanes alongside the high school. Considering the high level of pedestrian activity around the school campus, as well as a high level of traffic demand, this unpredictable driver behavior presents significantly unsafe conditions for both pedestrians and drivers.

Drivers at North Post Road and Princeton Hightstown Road jockey for position as the lane configurations change. At North Post Road, shown above, the road widens to two through lanes, then narrows again to one lane, past the intersection.
Source: DVRPC

Problem 6: Roadway Does Not Adequately Accommodate Bicyclists

Currently on Clarksville Road, bicyclists share the road with vehicles because the study area does not have designated bicycle lanes. However, there is an organized and active bicycling group in West Windsor and two schools that students bicycle to and from. In addition, the bridge over the Northeast Corridor Rail Line, north of Meadow Road, is too narrow to accommodate pedestrian and bicycle traffic. This circumstance not only disrupts the continuity of the corridor, but, more importantly, creates potentially dangerous conditions when pedestrians and bicyclists seek to travel over the bridge.

A significant number of bicycles parked around High School South shows a degree of bicycle usage. However, the lack of bicycle lanes and parking racks demonstrates a need for a greater focus on the corridor's multimodality.
Source: DVRPC

Roadways that accommodate biking not only encourage a multimodal context, but may also calm traffic by visually narrowing the cartway available for vehicles and introducing additional elements into the roadway. As a result, drivers may sense that slower speeds and more careful driving behavior is necessary. Although some portions of Clarksville Road are too narrow for the addition of a bike lane in each direction, this does not preclude making the roadway bicycle friendly.

Problem 7: Lacking Sidewalks/Pedestrian Amenities in Some Sections

While some portions of Clarksville Road exhibit an acceptable level of pedestrian accessibility, other areas have no sidewalks and / or lack ADA-accessible curb cuts. Furthermore, the entire corridor lacks significant pedestrian amenities, such as wide sidewalks, benches, street furniture, and pedestrian-scale lighting. These types of improvements are important in accommodating multimodal users and creating a unique and safe sense of place. In addition, a strong pedestrian context gives drivers a visual cue that there is pedestrian activity, thereby alerting them that they may need to exercise greater awareness and caution while passing through the corridor.

The section of the corridor shown above, by Avalon Watch lacks sidewalks on one side of the street. Various points throughout the corridor lack sidewalks or have sidewalks that end suddenly.
Source: DVRPC

CORRIDOR-WIDE IMPROVEMENTS

1: Bike Lanes

Improvement: Create a five-foot-wide bike lane in both travel directions along the entire corridor. Where a bike lane is not possible due to width restraints on the cartway and/or surrounding land uses, post highly-visible "Share The Road" signage for drivers and include roadway markings to indicate that bicycle traffic is merging with automobile traffic.

Explanation: The DVRPC study team determined that Clarksville Road is an ideal route for cycling primarily due to its connectivity to other major transportation routes, its diverse land use, and the considerable roadway width throughout much of the corridor. Narrowing the cartway discourages speeding and adding bike lanes improves safety for cyclists by providing them with an exclusive portion of the roadway. A clearly defined bike lane also serves as a constant reminder to drivers of the intermodalism of the roadway, requiring increased awareness and safe speeds.

2: Crosswalk Improvements

Improvement: Replace existing standard crosswalks with textured and colored crosswalks using materials such as brick or a synthetic paving treatment. Install pedestrian signal heads and push buttons at each intersection.

Explanation: Textured and colored crosswalks serve two important purposes. They increase the driver's awareness of pedestrian crossings and may serve to physically slow traffic (depending on the tactile treatment), an effect similar to rumble strips. By using an aesthetically pleasing crosswalk treatment, in accordance with NJDOT 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. The crosswalks make a strong visual statement by raising the profile of pedestrians and slowing traffic. Similarly, the consistent implementation of pedestrian signal heads and push buttons enhances the pedestrian environment and increases driver awareness of pedestrian activity.

3: Streetscaping

Improvement: Install a unified and consistent set of pedestrian and roadway improvements that create a sense of place and identity for the corridor. These improvements may include pedestrian-scale lighting, sidewalk and crosswalk colors and materials, decorative banners, and a program of plantings and landscaping. Relocating street names to overhead mastarms, where possible, would contribute to this unified streetscaping and improve the visibility of these important wayfinding signs.

Explanation: Driver behavior is influenced by the context of the roadway. By creating a sense of place along the corridor, drivers will perceive that they are passing through a special location where there is a high frequency of non-motorized users, requiring heightened awareness and slower speeds. It is important to install the same style of improvements on both sides of the roadway in order to visually connect the diverse elements of Clarksville Road and provide a consistent look and feel.

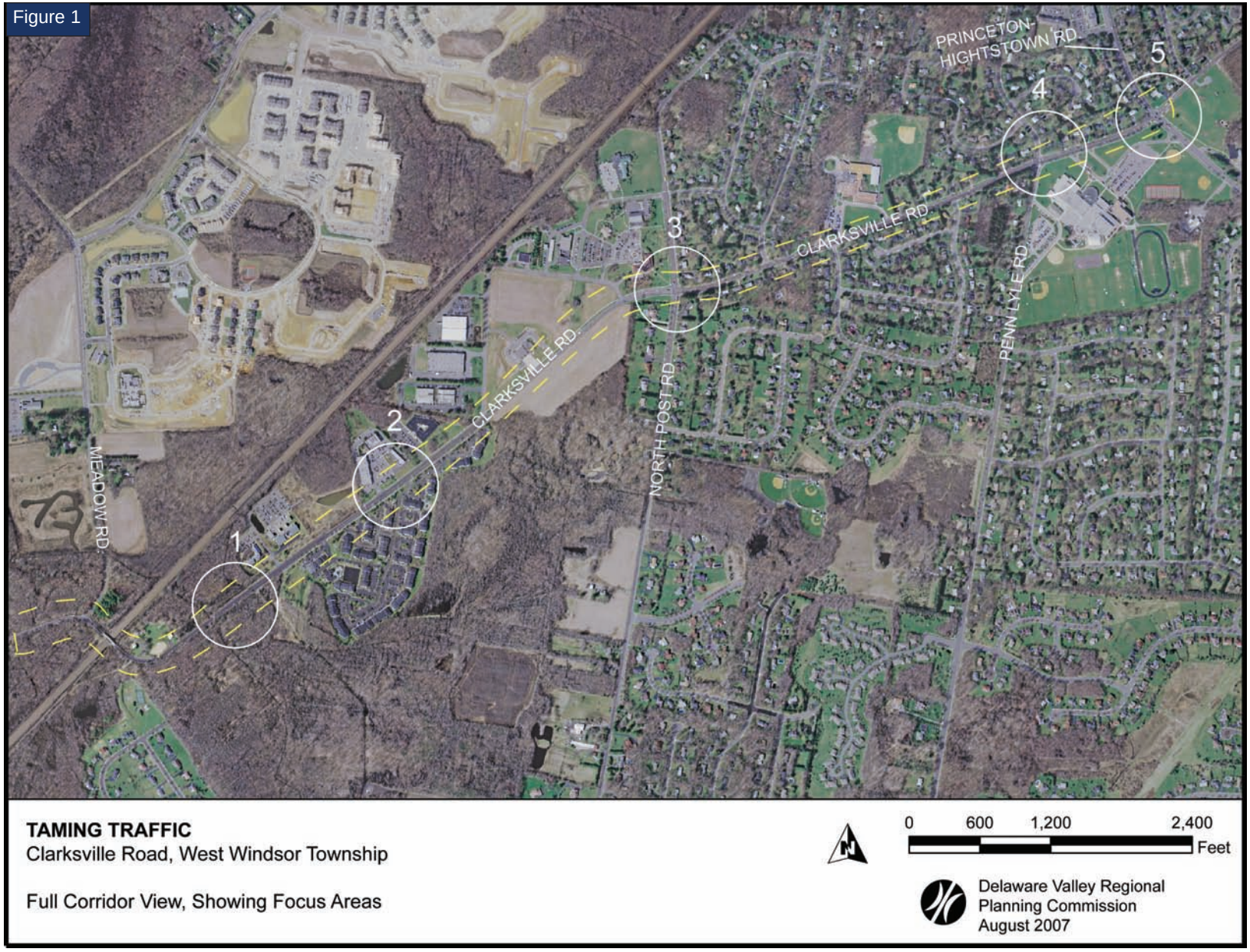
4: Straighten Crosswalks at Intersections

Improvement: Adjust the geometry of major roadway intersections to create squared, perpendicular intersections. Ensure that sidewalk improvements are designed to maximize accessibility and adhere to ADA standards.

Explanation: Several major intersections are designed with unnecessarily wide turning radii, resulting in very long pedestrian crossings. Adjusting the geometry of these intersections will create shorter crossings for pedestrians and reduced turning radii for vehicles, encouraging slower speeds. Simplified intersections create conditions that enhance the pedestrian environment and improve safety for all users.

The following pages address site-specific improvements for locations indicated on Figure 1.

Figure 1


PRINCETON-
HIGHTSTOWN RD.
5
4
3
2
1
CLARKSVILLE RD.
CLARKSVILLE RD
NORTH POST RD
PENN LYLE RD
MEADOW RD.
TAMING TRAFFIC
Clarksville Road, West Windsor Township
Full Corridor View, Showing Focus Areas
N
0
600
1,200
2,400
Feet
Delaware Valley Regional
Planning Commission
August 2007

SITE-SPECIFIC IMPROVEMENTS

Site 1: Gateway to West Windsor

Located at the southern end of the study area, this portion of Clarksville Road serves as a gateway to the corridor. Traveling north, it is the first stretch of roadway that drivers encounter after crossing over the bridge (above the Northeast Corridor railroad tracks), and traveling south is the last opportunity to slow traffic in preparation for the narrow bridge approach. Although this area does not contain bike lanes or sidewalks to accommodate alternate modes of transportation, the portion of Clarksville Road immediately to the north has ample sidewalks and has residential, office, and commercial land uses. The improvements for this site are intended to create a unique sense of place for Clarksville Road, strengthen the pedestrian environment, and discourage inappropriate driver behavior. This portion of the corridor is constrained by a wide culvert and wetlands. Sidewalks and bike lanes are recommended — as they are for the entire corridor — but their feasibility at this location depends on further study of the surrounding roadway context. The recommended improvements are shown on the right in figure 2.

Site 1 Improvements:

1: Install a planted median island to narrow the roadway and define the character of Clarksville Road, possibly with gateway signage.

2: Install new sidewalks that connect the business areas north of the site to the existing sidewalks to create a consistent pedestrian path.

Corridor-Wide Improvements:

1: Bike Lanes

2: Crosswalk Improvements

3: Streetscaping

4: Straighten Crosswalks at Intersections

Figure 2

TAMING TRAFFIC
Clarksville Road, West Windsor Township

Site 1: Gateway to West Windsor

Site 2: Village Square Shopping Center

Study Advisory Committee members noted significant pedestrian demand in this area, especially between the Village Square Shopping Center and the Avalon Watch housing development. NJ Transit has a bus stop at Heather Drive that is largely used by residents of Avalon Watch, resulting in considerable pedestrian traffic across Clarksville Road during peak periods. Currently, there is no pedestrian crosswalk between these attractions, forcing pedestrians to engage in a potentially dangerous crossing, dashing through gaps in traffic.

To address this concern, Mercer County and NJ Transit have moved forward with plans to install a midblock crosswalk from Avalon Watch to the Village Square Shopping Center. This project will also incorporate median islands, dedicated left-turn lanes, and push button activated pedestrian signal heads. These planned elements are shown on Figure 3, along with several other recommendations intended to create a safe pedestrian crossing and to calm traffic.

These recommendations are illustrated in the photo simulation in Figures 7-8.

Site 2 Improvements:

1: Install colored / textured crosswalks across the entrance to Village Square Shopping Center, Avalon Watch, and Heather Drive.

2: Install colored / textured midblock crosswalks across Clarksville Road in the vicinity of Avalon Watch.

3: Designate left-turn lanes at Village Square Shopping Center, Avalon Watch, and Heather Drive.

4: Install a planted center median along the corridor, except in areas where left-turn lanes exist.

Corridor-Wide Improvements:

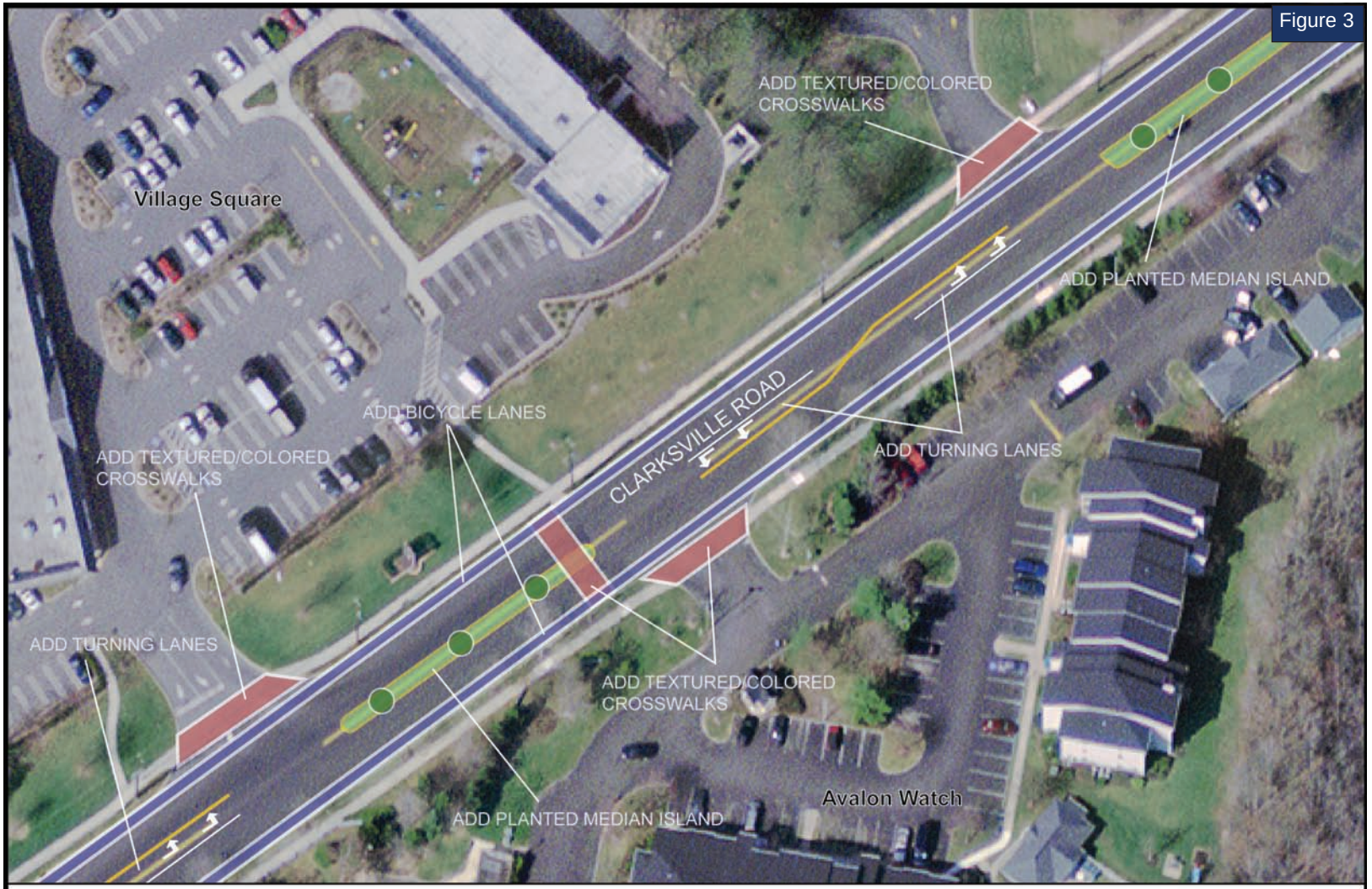
1: Bike Lanes

2: Crosswalk Improvements

3: Streetscaping

4: Straighten Crosswalks at Intersections

Figure 3



TAMING TRAFFIC
Clarksville Road, West Windsor Township

Site 2: Village Square Shopping Center

0 37.5 75 150 Feet

Delaware Valley Regional Planning Commission
July 2007

Site 3: Intersection with Post Road

Study Advisory Committee members noted that one of the primary issues at this location is the inconsistent lane configuration. Northbound drivers approaching the intersection have been observed speeding through the intersection in two through lanes in an attempt to gain first position on the upcoming single-lane portion of the roadway. To limit this potentially dangerous activity, the DVRPC study team suggests designating a left-turn lane. The current two-lane configuration of the northbound approach would be restriped as one designated left-turn lane and one through lane, aligned with the single through lane on the opposite side of the intersection. It is recommended that this configuration of one through lane and one left-turn-only lane be applied to all four legs of the intersection. These improvements appear to be both feasible and beneficial to the safety of the roadway; however, the final determination of the need for a designated left-turn lane will rely on an analysis of turning movement counts. To further calm traffic, the DVRPC study team suggests narrowing the wide northbound departure lane with either striping or a planted median island. The narrower lane will better define the roadway and force travelers to drive more carefully by encouraging slower speeds. See Figure 4 for recommended improvements to this location.

Note: While a roundabout is not recommended in this study, this intersection has been identified as a potential location where a roundabout would be feasible in DVRPC's separate Regional Roundabout Analysis study.

Site 3 Improvements:

1: Realign northbound approach through lane.

2: Convert inner northbound through lane to a designated left-turn lane.

3: Apply this same configuration with a dedicated left-turn lane to all four legs of the intersection.

4: Reconfigure intersection geometry to create a perpendicular intersection.

5: Straighten crosswalks and add textured / colored treatment.

6: Narrow cartway on Clarksville Road, north side of the intersection, with striping or a planted median.

Corridor-Wide Improvements:

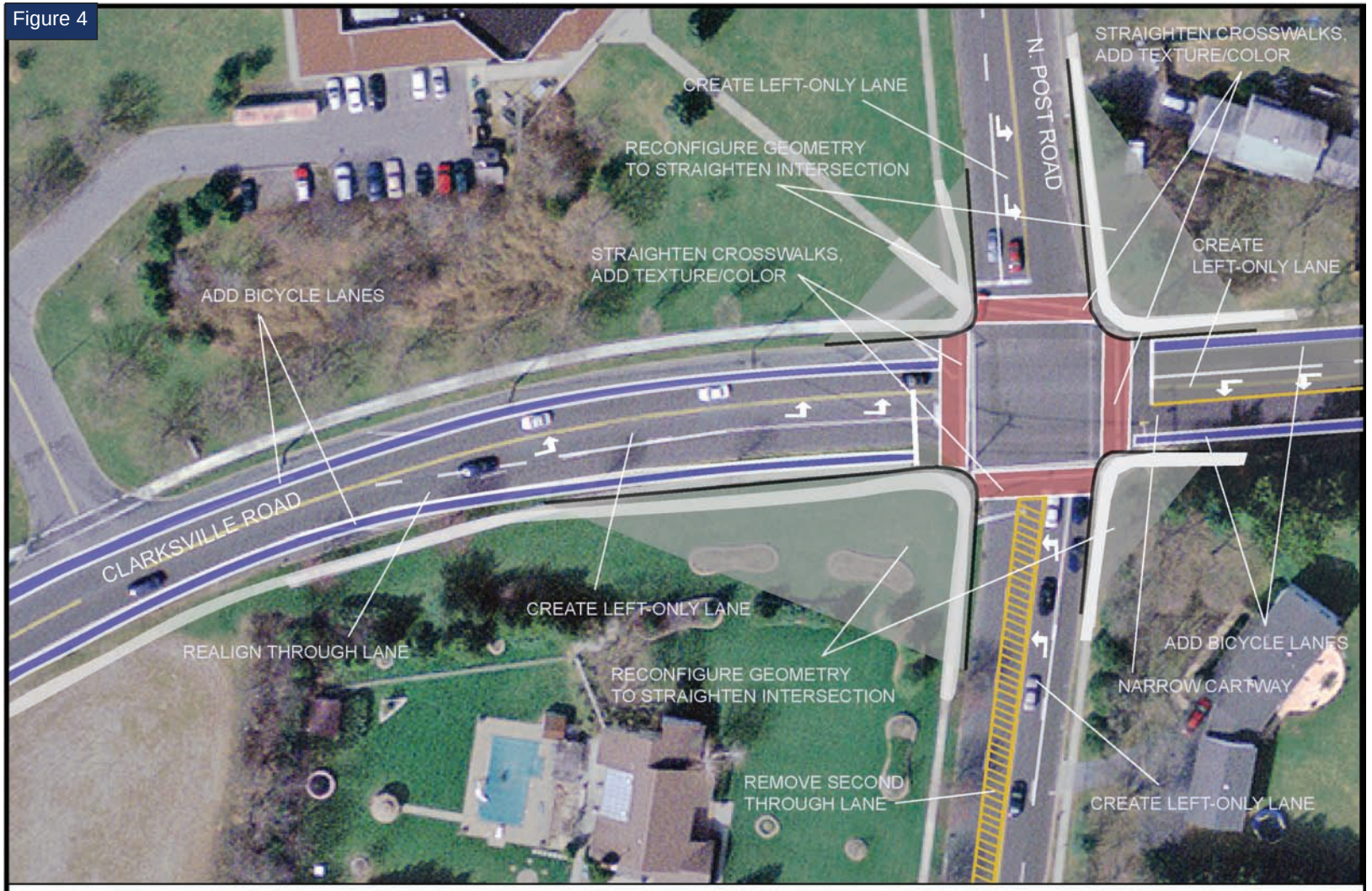
1: Bike Lanes

2: Crosswalk Improvements

3: Streetscaping

4: Straighten Crosswalks at Intersections

Figure 4



TAMING TRAFFIC
Clarksville Road, West Windsor Township

Site 3: Intersection of Clarksville Road and Post Road

0 37.5 75 150
Feet

Delaware Valley Regional
Planning Commission
August 2007

Site 4: Intersection with Penn Lyle Road

Penn Lyle Road is another location where lane configurations are different on either side of the intersection, resulting in a driving pattern of speeding through the intersection and then quickly merging into one travel lane. This behavior is potentially dangerous for both motorists and pedestrians. The DVRPC study team believes that narrowing the two-lane portions of the site to one lane, thus creating a consistent roadway configuration, will calm traffic. This improvement encourages a steadier traffic flow without significantly impacting roadway capacity. In addition, the removal of the right-turn channel on northbound Penn Lyle Road, replaced by a right-turn only lane, and subsequent realignment of the intersection, will also calm traffic. The final improvement, straightening crosswalks and adding textured / colored treatment, will improve the pedestrian environment by increasing visibility and shortening the crossing distance. This intersection is critical for the flow of school buses. As such, turning radii should be studied to determine a balance between shortening crossing distances and allowing the buses to efficiently maneuver the turns. Finally, the study team recommends installing a planted median island, with breaks placed to coincide with major access points. The recommended improvements are shown on the right in Figure 5.

These recommendations are illustrated in the photo simulation in Figures 9-10.

Site 4 Improvements:

1: Replace two northbound through lanes on Clarksville Road with one through lane.

2: Narrow southbound lane of Clarksville Road.

3: Reconfigure intersection geometry to make perpendicular.

4: Replace right-turn channel on the Penn Lyle Road northbound approach with standard right-turn lane at the signalized intersection. Maintain a turning radius adequate to accomodate buses.

5: Install planted median with breaks at major access points.

6: Straighten crosswalks and add textured / colored treatment.

Corridor-Wide Improvements:

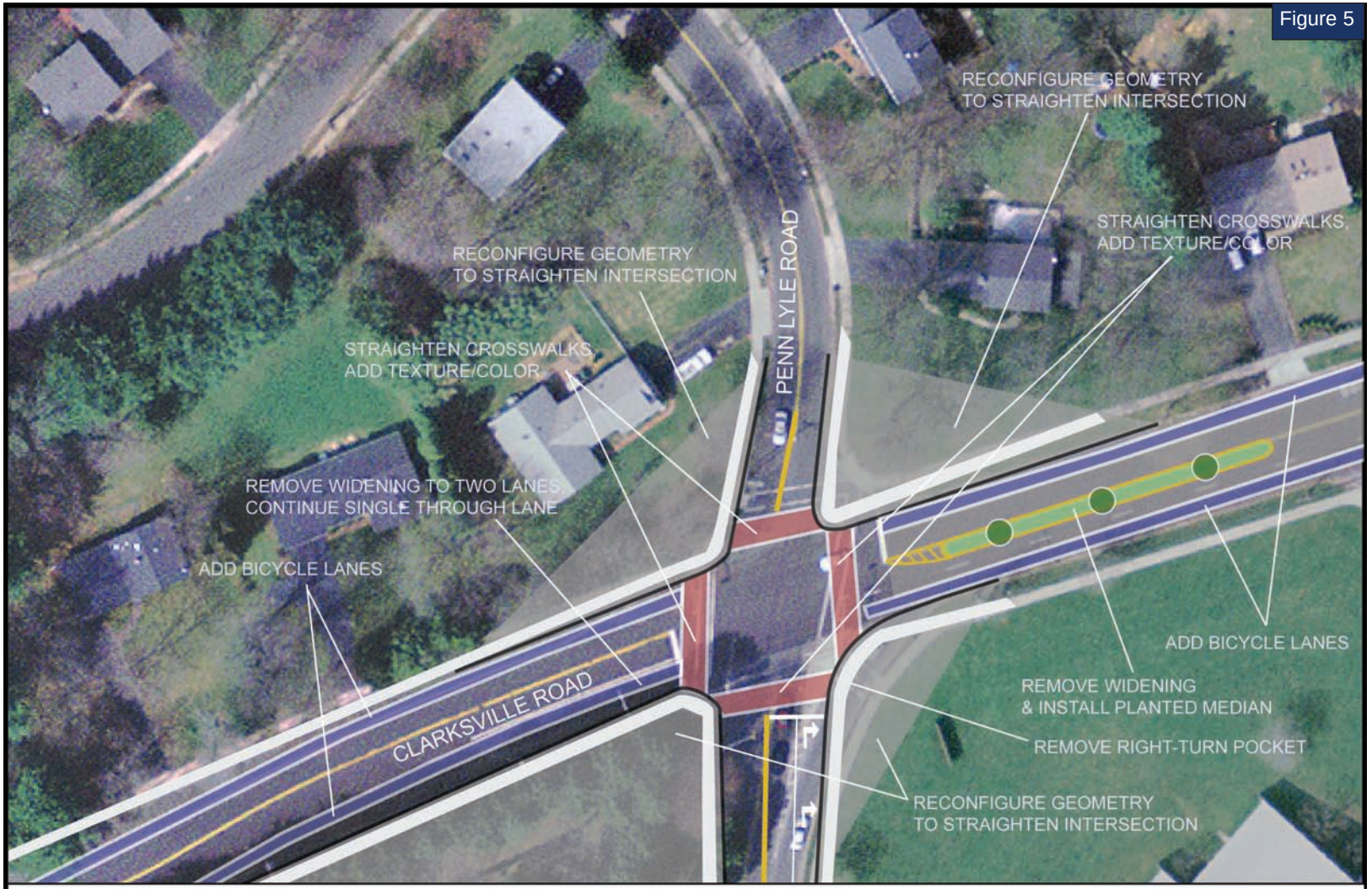
1: Bike Lanes

2: Crosswalk Improvements

3: Streetscaping

4: Straighten Crosswalks at Intersections

Figure 5



TAMING TRAFFIC
Clarksville Road, West Windsor Township

Site 4: Intersection of Clarksville Road and Penn Lyle Road

0 40 80 160
Feet

Delaware Valley Regional
Planning Commission
August 2007

Site 5: Intersection with Princeton-Hightstown Road

This intersection marks the northern terminus of the study corridor. The intersection has multiphase traffic signals and pedestrian signal heads. However, it has characteristics that encourage speeding and create a poor pedestrian environment, such as inconsistent stop bar locations, wide through lanes, and skewed and faded crosswalks. These deficiencies create potentially dangerous conditions for pedestrians. Especially because of the nearby high school, pedestrian safety must be given high priority at this intersection.

The roadway is fairly wide in this portion of Clarksville Road. To narrow the roadway and encourage more alert driving behavior, the DVRPC study team suggests the installation of a planted median. This median may be broken up to allow turning movements, especially into the school driveway. This median is an ideal location for installing a second gateway marking the north side of the corridor. This improvement will better define the roadway as it widens and promote heightened driver attention by creating a gateway. The study team also recommends the reduction of northbound through lanes from two to one, between Penn Lyle Road and the Princeton-Hightstown Road northbound approach. Since to the south of Penn Lyle Road there is only one through lane, creating a second through lane north of Penn Lyle Road encourages drivers traveling northbound to accelerate through the intersection to get into position for the turning lanes. This behavior takes place along the corridor adjacent to the high school. The DVRPC study team determined that this short stretch of two through lanes is likely unnecessary, and creates potentially unsafe conditions for pedestrians.

Tightening the turning radius in the northwest corner of the intersection will serve to slow turning movements and also reduce the crossing distance for pedestrians. As with other intersections along the corridor, the pedestrian environment could be improved by straightening the currently skewed crosswalks and adding a textured / colored treatment for better visibility. The recommended improvements at the intersection of Clarksville Road and Princeton-Hightstown Road are shown at the right in Figure 6.

Site 5 Improvements:

1: Install planted median with breaks at major turning points.

2: Reduce cartway to one through lane on Clarksville Road northbound, between Penn Lyle Road and Princeton-Hightstown Road, while not reducing the number of turning lanes.

3: Restripe right turn-only lane to be inside of bicycle lane.

4: Unify stop bar distance.

5: Tighten turning radius on northwest corner of the intersection.

6: Straighten crosswalks and add textured / colored treatment.

Corridor-Wide Improvements:

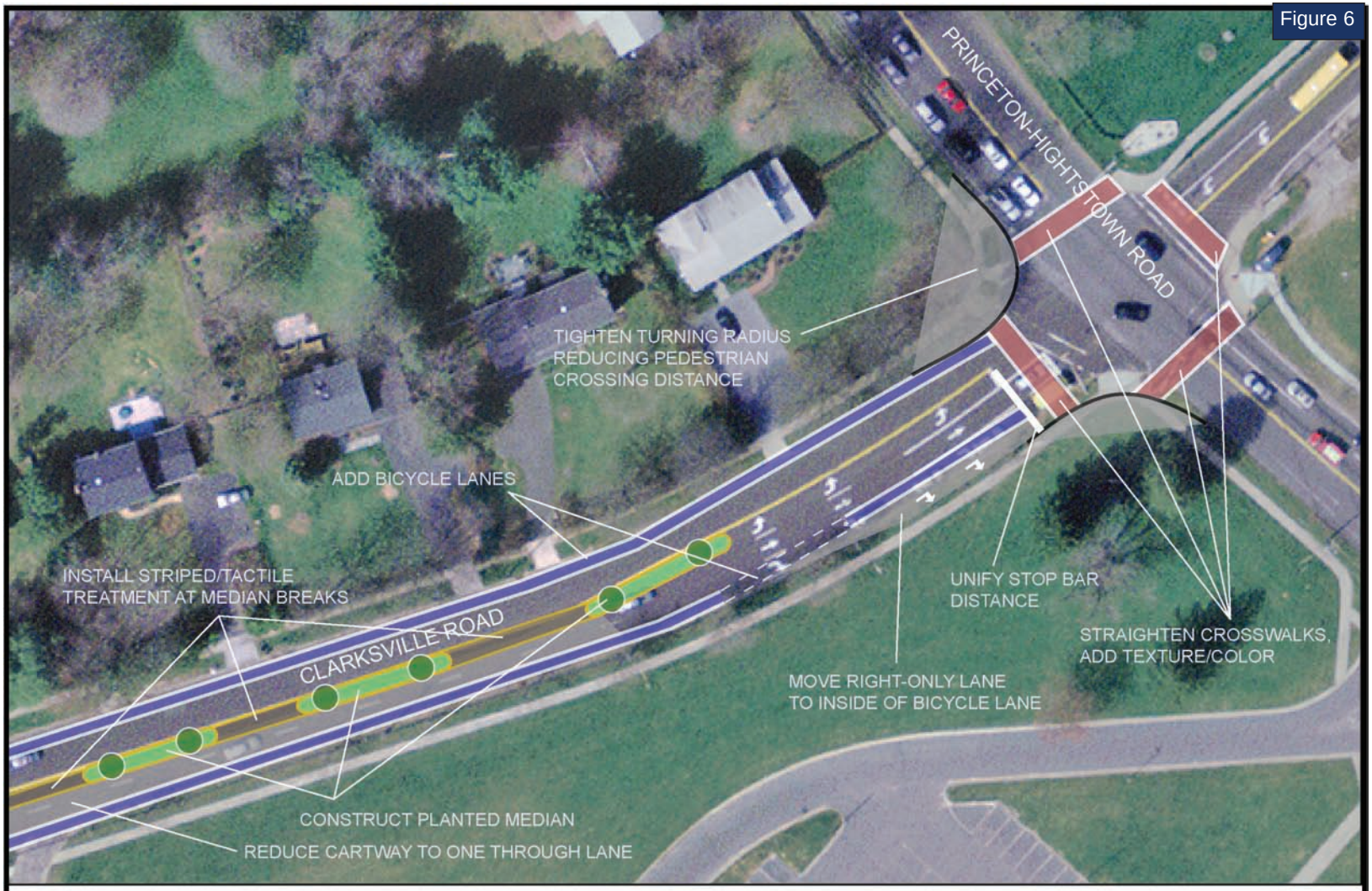
1: Bike Lanes

2: Crosswalk Improvements

3: Streetscaping

4: Straighten Crosswalks at Intersections

Figure 6



TAMING TRAFFIC
Clarksville Road, West Windsor Township

Site 5: Intersection of Clarksville Road and Princeton-Hightstown Road

0 25 50 100 Feet

Delaware Valley Regional
Planning Commission
August 2007

Figure 7

TAMING TRAFFIC
Clarksville Road, West Windsor Township

View of the south end of the corridor, just below Avalon Watch.

Source: DVRPC
October 2007

Figure 8

TAMING TRAFFIC
Clarksville Road, West Windsor Township

Photo simulation of conceptual recommendations.

Source: DVRPC
October 2007

Figure 9

TAMING TRAFFIC
Clarksville Road, West Windsor Township

View of the intersection of Clarksville Road and Penn Lyle Road.

Source: DVRPC
October 2007

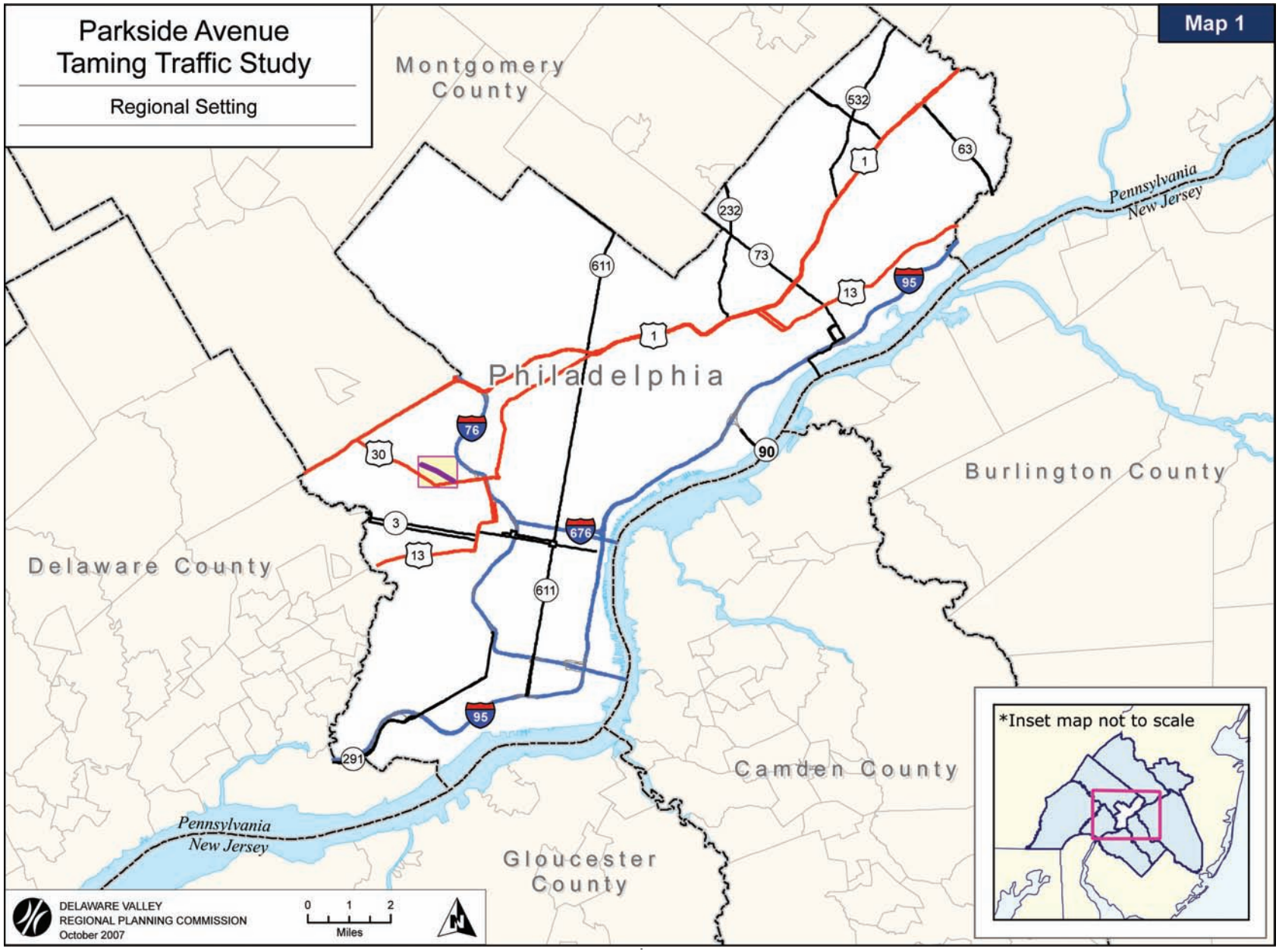
Figure 10

TAMING TRAFFIC
Clarksville Road, West Windsor Township

Photo simulation of conceptual recommendations.

Source: DVRPC
October 2007

SECTION 3:
PARKSIDE AVENUE STUDY SITE
PHILADELPHIA, PA


Parkside Avenue
Taming Traffic Study
Regional Setting
Map 1
Montgomery County
Philadelphia
Delaware County
Burlington County
Camden County
Gloucester County
Pennsylvania
New Jersey
Pennsylvania
New Jersey
532
1
63
232
73
611
13
95
1
76
30
90
3
676
13
611
95
291
*Inset map not to scale
DELAWARE VALLEY
REGIONAL PLANNING COMMISSION
October 2007
0 1 2
Miles
N

EXISTING CONDITIONS

Street Name: Parkside Avenue (SR 3017)
Functional Class: Collector
Posted Speed Limit: 35 MPH
AADT: 3,000-7,000

Study Area

The study area section of Parkside Avenue (SR 3017), in West Philadelphia, is just over one mile in length, spanning from the intersection of 40th Street and Girard Avenue on the southeast to 52nd Street at the northwest. The study site is in close proximity to two access points to Route 76, the Schuylkill Expressway. It has easy access to Center City, University City, and City Avenue. The study corridor currently serves as a significant commuter route into Center City. See Map 4 for regional setting.

Roadway Conditions

The study area currently contains one travel lane in each direction, with a center turning lane through most of the study area. It has parallel street parking along its entire span on both sides of the roadway. The three major corridor intersections, Girard Avenue, Belmont Avenue, and 52nd Street, experience considerable traffic volumes during peak periods. From roughly Girard Avenue to Belmont Avenue, Parkside Avenue is mirrored by two parallel roadways to the north: North and South Concourse Drives. The roadway is consistently about 60 feet in total pavement width.

Crash Summary

A cursory crash analysis was performed in an effort to identify safety problems related to the operation of the study corridor: Parkside Avenue (SR 3017) from Girard Avenue to 52nd Street (segment 70, offset 0, to segment 81, offset 2965). Crash data for years 2003-2005 from the Pennsylvania Department of Transportation's CDART crash database was utilized.

Crash Type and Volume: During the three-year period, 38 crashes were recorded on Parkside Avenue's one-mile study corridor length. Fifty percent of the crashes were coded at four-way intersections, 29 percent at "T-intersections," and the remaining 21 percent at midblock locations. Angle crashes were the most frequent collision type, accounting for 32 percent (12 crashes), followed by rear-end and head-on crashes, accounting for 21 percent, or eight crashes each. Seven pedestrian crashes occurred, which may be related to the significant pedestrian and intermodal activities within the study area associated with Fairmount Park and several other destinations, including the Business Technology Center, Discovery Charter School, and the Mann Center for the Performing Arts. No bicycle crashes were identified in the analysis. Thirty eight persons were injured during the study period. No fatalities were recorded.

Crash Clusters: The largest concentration of crashes was identified in the vicinity of the intersection of Belmont and Parkside Avenues, accounting for nearly 50 percent of the corridor total. This is not necessarily unreasonable, since Belmont Avenue carries a large volume of traffic between City Avenue (US 1) to the north and Lancaster Avenue (US 30) to the south, and the Schuylkill Expressway (I-76), via Montgomery Drive.

The intersection of Belmont and Parkside avenues has recently been reconstructed. The new configuration has eliminated two of the four channelized right-turn lanes and replaced them with at-intersection right turns. The newly available land has been used to fill the former sidewalk gap caused by the turn lane. See Map 5 for Crash Data.

Transit

The study site is serviced heavily by mass transit, including SEPTA bus routes 38, 40, 43, 52, and 64, as well as the Girard Avenue Route 15 trolley. The combined annual ridership on these lines in 2005 was over 12 million passengers with Routes 52 and 15 representing the highest ridership volumes. Map 6 shows the transit network in the study area.

Pedestrian and Bicycling Environment

The study site receives significant pedestrian activity due to its dense neighborhood, Fairmount Park, and proximity to major destinations. It has sidewalks on the neighborhood side; on the park side the roadway is lined with the recently installed Parkside Promenade – a wide, multiuse trail. At some points there are very long distances between crosswalks, especially west of Belmont Avenue, making crossing to the park difficult and potentially dangerous. The study corridor is striped for bicycle lanes in both directions, and in addition, bicycling is accommodated by the promenade.

Land Use/Growth

The study area is bordered by Fairmount Park on the north and the East Parkside Neighborhood, an industrial park, and West Parkside Neighborhood to the south. The Philadelphia Zoo sits just to the southeast of the study site and the Mann Center for the Performing Arts is located on the northwest end of the corridor. There are several schools on or near the study area, including the School District's High School of the Future (Parkside near 40th Street), Discovery Charter School (5000 block of Parkside Avenue), and the Joseph Leidy Elementary School (just south of the study area on Belmont Avenue).

One of Parkside Avenue's key assets is its heritage and architecture. Parkside Avenue was historically developed following the 1876 Centennial Exhibition, when German beer barons commissioned elaborate mansions and apartments to be built on the Avenue in the 1890s. Today, these mansions make up the backbone of the Parkside National Register Historic District and many have been restored to their original splendor. Nearby the study corridor is historic Memorial Hall, from the Centennial, and the grand Civil War Memorial.

Development/Roadway Improvements

The Parkside neighborhood is currently in transition, with new developments planned, accompanied by substantial residential property speculation. The High School of the Future, at the intersection of Parkside and Girard avenues, was only recently completed and opened. The Route 15 trolley was recently reinstalled, replacing a former bus line. Also, the West Parkside neighborhood sits within a Federal Empowerment Zone area and has seen the restoration of a row of historic homes, as well as a number of other improvements.

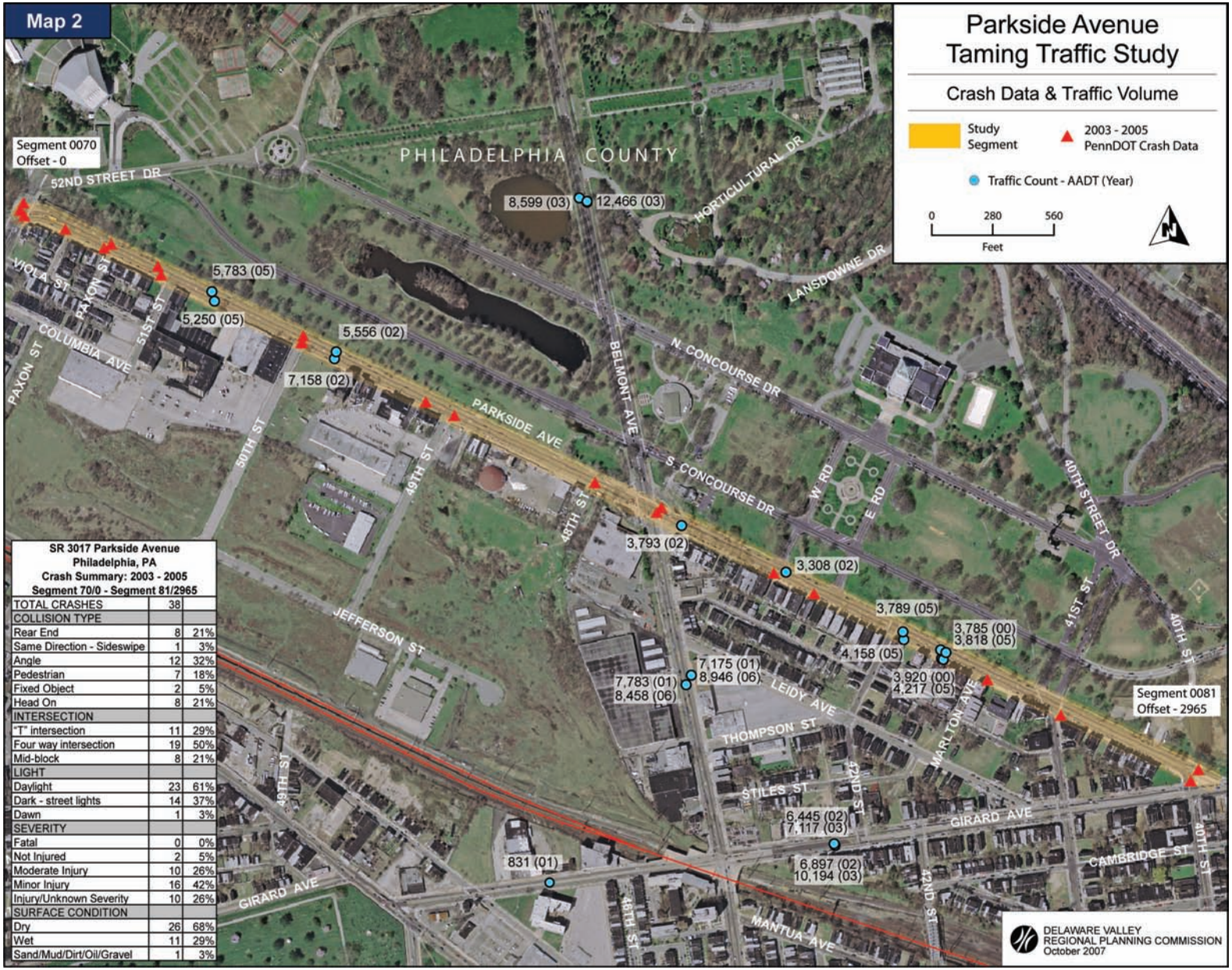
The Please Touch Museum will be opening in its new home at Memorial Hall in the fall of 2008. The Philadelphia Zoo has plans for a new multimodal transportation hub and parking garage. The Mann Center is in the process of a major renovation and expansion. Finally, the Goldenberg Group recently broke ground on a 30-acre shopping center development, just south of the study site along 52nd Street.

In addition, the Fairmount Park Commission was the client for a major planning study carried out by MGA Partners called *The Centennial District Master Plan*, laying out a vision for transforming the parkland into a cohesive entertainment and recreation district. The Park Commission has allocated funds for the first phase of the plan — the Parkside Promenade — that is scheduled to start in spring 2007. The Park Commission is also identifying funds for a circulation and signage study.

Case For Study

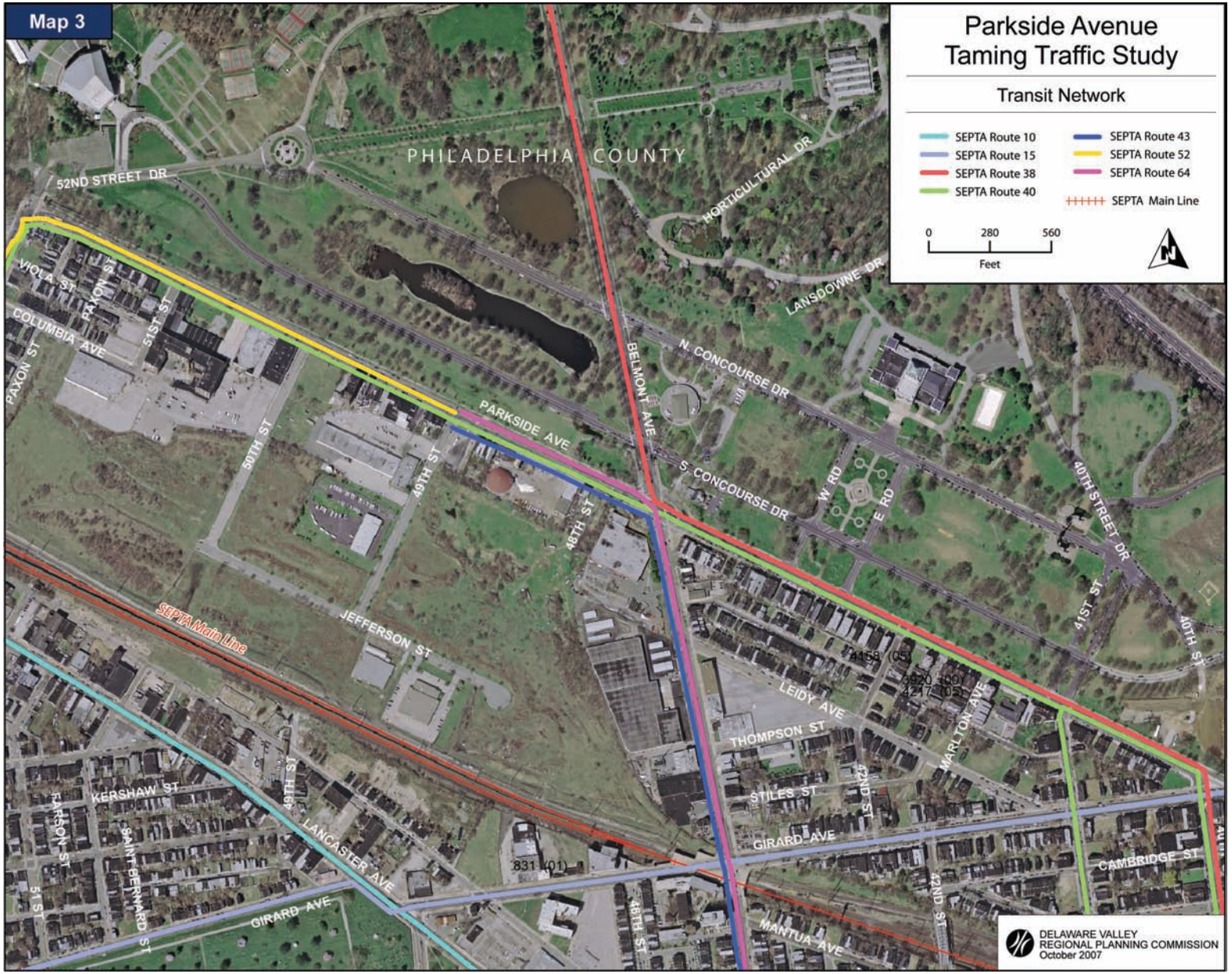
The Centennial District Master Plan states that "the plan envisions a more dynamic relationship between the park and neighborhood. Aided by appropriate traffic calming measures, Parkside and Girard avenues should be tree-lined city streets with pedestrian scaled lighting, rebuilt sidewalks, and numerous controlled intersections." Parkside Avenue is going to be the spine of the Centennial District, linking numerous destinations and bringing the park and the neighborhood together.

However, the roadway is currently bland, wide, and does not build strong connections between its two sides. It is used as a commuter route, and its engineering and signal spacing allow high speeds on vacant long stretches of open road. The specific problems and issues in the study corridor will determine the types of approaches that may be appropriate to match the roadway and its context. Following are some of the major problems that have been identified by the Study Advisory Committee (SAC) and that the Taming Traffic study will address.



SR 3017 Parkside Avenue
Philadelphia, PA
Crash Summary: 2003 - 2005
Segment 70/0 - Segment 81/2965

TOTAL CRASHES	38	
COLLISION TYPE		
Rear End	8	21%
Same Direction - Sideswipe	1	3%
Angle	12	32%
Pedestrian	7	18%
Fixed Object	2	5%
Head On	8	21%
INTERSECTION		
"T" intersection	11	29%
Four way intersection	19	50%
Mid-block	8	21%
LIGHT		
Daylight	23	61%
Dark - street lights	14	37%
Dawn	1	3%
SEVERITY		
Fatal	0	0%
Not Injured	2	5%
Moderate Injury	10	26%
Minor Injury	16	42%
Injury/Unknown Severity	10	26%
SURFACE CONDITION		
Dry	26	68%
Wet	11	29%
Sand/Mud/Dirt/Oil/Gravel	1	3%


Map 3
Parkside Avenue
Taming Traffic Study
Transit Network
SEPTA Route 10
SEPTA Route 15
SEPTA Route 38
SEPTA Route 40
SEPTA Route 43
SEPTA Route 52
SEPTA Route 64
SEPTA Main Line
0
280
560
Feet
PHILADELPHIA COUNTY
52ND STREET DR
HORTICULTURAL DR
LANSDOWNE DR
VIOLA ST
PAXON ST
COLUMBIA AVE
51ST ST
N. CONCOURSE DR
BELMONT AVE
PARKSIDE AVE
50TH ST
49TH ST
48TH ST
S. CONCOURSE DR
W. RD
E. RD
40TH STREET DR
41ST ST
40TH ST
SEPTA Main Line
JEFFERSON ST
LEIDY AVE
THOMPSON ST
MARLTON AVE
STILES ST
42ND ST
GIRARD AVE
CAMBRIDGE ST
KERSHAW ST
PARSON ST
SAINT BERNARD ST
51 ST
LANCASTER AVE
MANTUA AVE
DELAWARE VALLEY
REGIONAL PLANNING COMMISSION
October 2007

PROBLEM IDENTIFICATION

Problem 1: Roadway Design Encourages Speeding and Motorcycle Racing

The distance from 52nd Street to Belmont Avenue is over 3,000 feet of straight roadway without a traffic signal. This very long straight segment encourages speeding and especially enables motorcycle racing, an activity cited as a major problem by the SAC. As many as 100 motorcycles gather along this stretch at various times of day, although the problem is apparently at its worst during warm weather evenings. The SAC expressed that the lack of police enforcement is an issue. However, this section of Parkside Avenue does little to discourage racing due to its wide and straight design. In the absence of a consistent police presence, traffic calming devices and other context-sensitive approaches could be used to alter the roadway so that it no longer accommodates this undesirable use.

The long straightaway on Parkside Avenue, between 52nd Street and Belmont Avenue, is 3,000 feet without a traffic signal, creating ideal conditions for speeding. Source: DVRPC

Problem 2: Insufficient Number of Crosswalks, Poor Pedestrian Connectivity

There are five crosswalks over Parkside Avenue within the study corridor. There is one at each end of the corridor (at 52nd Street and Girard Avenue), and there are crosswalks at 41st Street, 42nd Street, and Belmont Avenue. Considering the overall length of the corridor and the variety of destinations on both sides of Parkside Avenue, the current crosswalks do not adequately serve the needs of pedestrians. This lack of pedestrian access forces pedestrians to either walk very long distances or to jaywalk — especially between 52nd Street and Belmont Avenue. The lack of crossings also separates the neighborhoods from Fairmount Park. As the Centennial District develops, it will be especially critical to provide sufficient pedestrian linkages between the two sides of Parkside Avenue and ample pedestrian access points along the corridor.

This same segment of the roadway also has no pedestrian crosswalks, but has numerous destinations that generate pedestrian traffic across Parkside Avenue. Source: DVRPC

Problem 3: Corridor Lacks a Sense of Place, and Connection with the Park

Although the historic neighborhood and the vast parkland both contain important destinations, amenities, and aesthetic appeal, the roadway does not contain visual cues and amenities that identify it as a special place — one where drivers should exercise heightened attention and modify their speed and behavior accordingly. This lack of sense of place contributes to the corridor's perception as a through route as opposed to the backbone of a vibrant community and cultural district. Parkside Avenue fails to connect the neighborhood with the assets of Fairmount Park.

Despite the rich asset of Fairmount Park across the street, Parkside Avenue seems to have little connectivity to the park, and the developed side of the street feels distant from the lush, tree-lined walkways found adjacent to the park. Source: DVRPC

Problem 4: Transit Stops are Unwelcoming

Though a few bus stops along the corridor include standard shelters, most stops are marked with nothing but a sign hung on a telephone pole. In addition, the 49th Street terminal is unattractive and unwelcoming. For the roadway to be truly multimodal and to provide amenities for all of its users, it should reflect its wealth of transit options with stops that are clearly marked and inviting, and that promote safe linkages to other modes of transportation. Lacking transit amenities creates a disincentive to potential transit users en route to the corridor's institutions, i.e., the Mann Center, School of the Future, and the forthcoming Please Touch Museum. In addition, as the Fairmount Park Commission seeks to market the area as the Centennial District, it will be critical to provide improved amenities for transit as well as cars and bicycles.

The SEPTA bus terminal at 49th Street (shown above) is unattractive and uninviting. Transit stops throughout the corridor are not well marked and have poor facilities for riders. Source: DVRPC

Problem 5: Corridor Lacks Sufficient Planning to Mediate Issues with Adjacent Institutions

The study advisory committee cited both significant traffic and unsafe driver behavior on the corridor as a result of cars exiting from major institutions — especially the Mann Center after concerts. Frequently, cars park along Parkside Avenue or exit from the Mann's parking lot and make potentially dangerous U-turns. Motorists also drive quickly through the corridor to avoid congestion on the way to the I-76 expressway access via Belmont Avenue. Although these conditions could be lessened through calming, the roadway would still require circulation, engineering, and policy solutions to deal with these issues holistically.

The roadway configuration is not ideal for ensuring safe access to the major institutions like the Mann Center, School of the Future, and Please Touch Museum (currently moving into Memorial Hall, shown above). There are also conflicts between the traffic to these institutions and the quality of life and safety for the Parkside neighborhood. Source: DVRPC

Problem 6: Girard Avenue Intersection is Confusing and Potentially Dangerous

SEPTA recently reinstalled the Route 15 trolley on Girard Avenue. SEPTA worked with the Streets Department to realign the intersection of Parkside and Girard Avenues to accomodate a new concrete island with a trolley right-of-way through its center. The study advisory committee cited the newly realigned intersection as an undesirable change in the intersection's geometry that is unclear and potentially dangerous for drivers and pedestrians. In addition, the intersection is at-grade with the trolley and contains several trolley stops on the median, along Girard Avenue, creating potential confusion and conflicts between vehicular traffic, the trolley, and pedestrians. It is an intersection that has garnered significant local attention and a call for its redesign from local organizations.

The intersection of Parkside Avenue, Girard Avenue, and 40th Street is confusing and potentially dangerous for drivers and pedestrians, especially students crossing to the High School of the Future. Source: DVRPC

CORRIDOR-WIDE IMPROVEMENTS

The DVRPC project team recommends a number of corridor-wide improvements that will have wide-reaching impact on the study corridor, addressing several of the above-stated problems. When implemented collectively, these improvements create a consistent program of roadway treatments that serve to improve the overall safety of the corridor for all users, and to alter the perception of the corridor for drivers in the interest of calming traffic. In all of these improvements, the study avisory committee made it clear that implementation would require a careful consideration of maintenance costs. Some of these elements would require maintenance agreements with the city. In general, using high-quality materials would reduce long-term maintenance costs, though adding additional costs upfront.

1: Median Island

Improvement: Install a corridor-long planted median island in place of the center striping and turning lane where roadway configuration permits (i.e., where the center lane is wide enough to accommodate a median and where there is a not an intersecting street or major access point). This improvement will not eliminate left-turn access to intersecting streets and park access points.

Explanation: The DVRPC study team determined that there are too few necessary left-turn opportunities along the corridor to warrant the continuous center turning lane that currently exists on Parkside Avenue. Replacing this lane with a planted median with periodic breaks and left-turn stacking lanes at intersecting streets will continue to allow necessary turning movements without negatively impacting capacity.

A wide open roadway encourages speeding; narrowing a roadway discourages it. Bringing the surrounding context in view of the roadway is a common technique used to increase driver awareness, further inducing slower speeds. This vegetated median will serve to visually give the impression that the roadway is passing through the park, rather than being separated from it.

Replacing the center striping and turning lane with a corridor-wide planted median serves a number of traffic calming purposes: narrowing the cartway width, allowing a visual connection with Fairmount Park, providing a potential pedestrian crossing refuge, reducing unnecessary turning movements, and creating space to install placemaking amenities, such as boulevard lighting, banners, and decorative planting (see attached photo simulation).

Planted medians may be a strong positive element for improving this corridor, but they do require maintenance. Some treatments, like grass and certain types of plantings, are fairly simple and inexpensive to maintain; however, the Fairmount Park Commission, City Streets Department, PennDOT, and the local community should consider the issue of maintenance early in the planning process if this element is adopted.

2: Textured/Colored Crosswalks

Improvement: Replace existing standard or Continental crosswalks with textured and colored crosswalks using materials such as brick or a synthetic paving treatment.

Explanation: Textured and colored crosswalks serve two important purposes. They increase the driver's awareness of pedestrian crossings and may also serve to physically slow traffic (depending on the tactile treatment), similar in function to rumble strips. By using an aesthetically pleasing crosswalk treatment (in accordance with PennDOT standards), the pedestrian environment becomes a prominent placemaking element that will define the look and feel of the corridor. In this way, the crosswalks can make a strong visual statement as an integral part of Fairmount Park and the Centennial District, while protecting pedestrians and slowing traffic. All crosswalk improvements should meet PennDOT's and the city's standards and specifications.

3: Streetscaping

Improvement: Install a unified and consistent set of pedestrian and roadway improvements that create a sense of place and identity for the corridor. These improvements may include boulevard and pedestrian-scale lighting, sidewalk and crosswalk colors and materials, street furniture, decorative banners, and a program of plantings and landscaping. The Fairmount Park Commission has already begun a program of installing the ornate "Cret" lamp posts along the

Parkside Promenade. These posts are more expensive to purchase and the city does not generally own and maintain them. For this reason, a combination of Cret poles at gateway locations and the city's standard pedestrian poles for the rest of the corridor may be adopted. It is also suggested that streetscaping improvements are accomplished with the use of high-quality materials. Despite the higher initial cost for higher-quality items, their strength and endurance incurs fewer long-term maintenance and replacement costs than cheaper materials and treatments.

Explanation: Driver behavior is influenced by the context of the roadway. By creating a sense of place along the corridor, drivers will perceive that they are passing through a special location where there is a high frequency of non-motorized users, requiring heightened awareness and slower speeds. It is important to install the same style of improvements on all three sides of the roadway (neighborhood-side, median, and park-side) in order to connect the neighborhood to the park, visually, and provide a consistent look and feel.

4: Attractive and Visible Transit Stops

Improvement: Install highly visible, attractive, and informative transit shelters and signage. Provide pedestrian amenities and safe pedestrian access to and from transit facilities.

Explanation: Access to transit has a symbiotic relationship with increased pedestrian activity, both of which strengthen a roadway's multimodal functionality. Transit stops must be clear and visible to pedestrians and drivers alike. There are designs of transit stops that are appropriate for a park setting and are highly attractive. Such shelters should be installed at all major stops and highly-visible signage should be installed at other locations.

The following pages address site-specific improvements for locations indicated on Figure 11.

Figure 11

TAMING TRAFFIC
Parkside Avenue, Philadelphia

Full Corridor View, Showing Focus Areas

0 435 870 1,740
Feet

Delaware Valley Regional Planning Commission
August 2007

SITE-SPECIFIC IMPROVEMENTS

The DVRPC project staff has prescribed a set of improvements specific to seven 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.

The intersection with Belmont Avenue is distinctly missing from these sites. The study team considered the recent improvements to the intersection (removal of the right-turn channel and installation of the Negro Leagues Memorial Park) and determined that this intersection is actually quite effective in terms of balancing traffic and surrounding uses, and does not need treatment beyond the corridor-wide improvements.

Site 1: Intersection with 52nd Street

Located at the western end of the study area, this intersection marks one of the gateways to the corridor. It is a major access point for the Mann Center and is in the vicinity of the stretch of Parkside Avenue commonly used for unauthorized motorcycle racing. The intersection is wide and somewhat confusing due to the skewed intersection, the curve in the roadway, the right-turn pocket, and a wide roadway with rounded corners, creating long pedestrian crossings. The improvements for this site are intended to create a stronger pedestrian environment and discourage inappropriate driver behavior. This intersection is expected to serve as one of the main access points for a new shopping center, currently under construction on 52nd Street, just south of the study corridor. For this reason, further study of traffic patterns and turning movements resulting from this development may be necessary to inform these recommendations. The recommended improvements are shown in Figure 12.

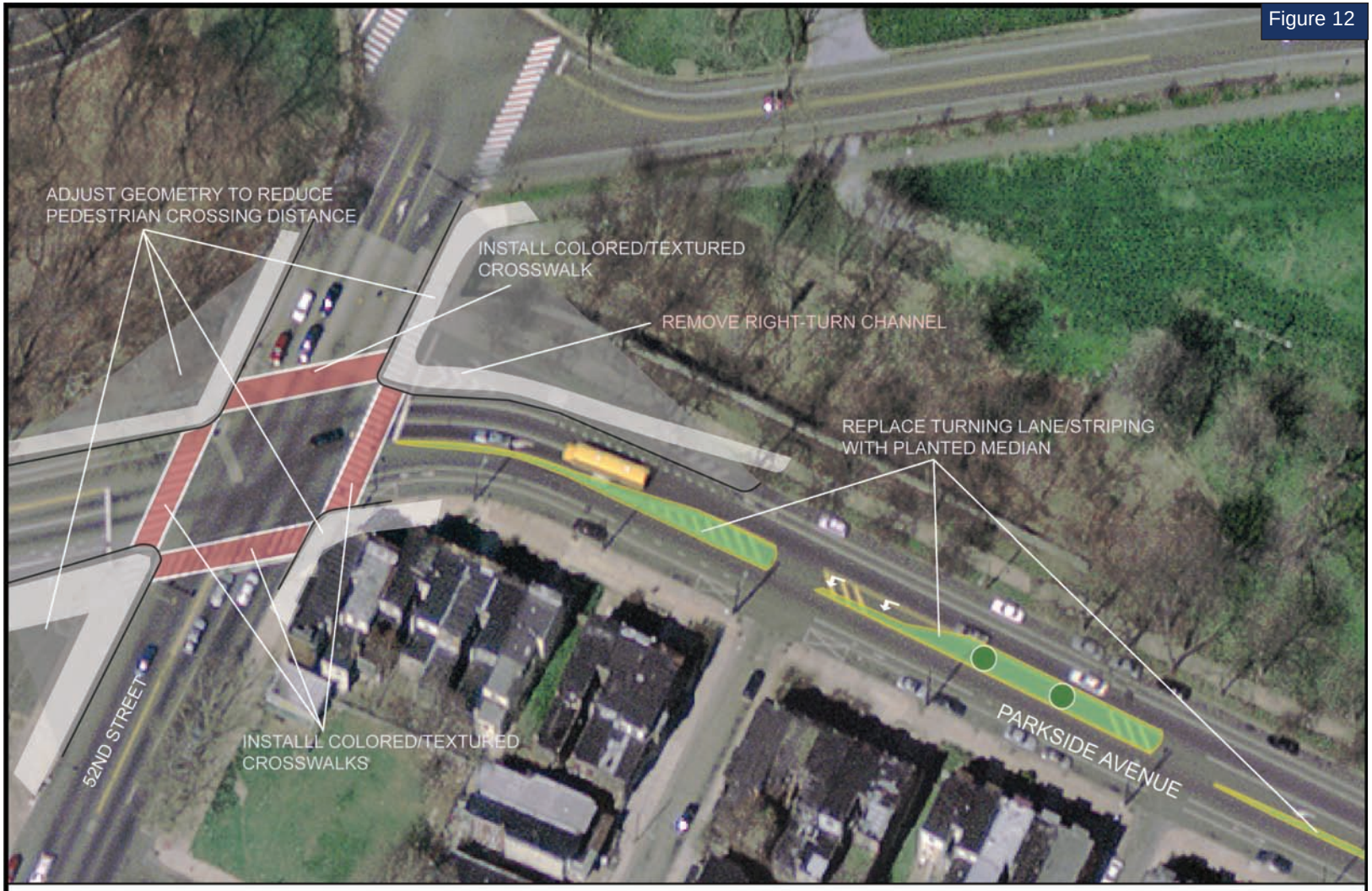
Site 1 Improvements:

1. Straighten the skewed intersection to shorten pedestrian crossings.
2. Install textured/colored crosswalks to protect pedestrians and slow traffic.
3. Install a crosswalk on the north side of the intersection over 52nd Street.
4. Remove the right-turn pocket from Parkside Avenue north onto 52nd Street.
5. Create a center median to narrow the roadway and better delineate the lane configuration.

Corridor-Wide Improvements:

1. Median Island
2. Textured/Colored Crosswalks
3. Streetscaping
4. Attractive and Visible Transit Stops

Figure 12



TAMING TRAFFIC
Parkside Avenue, Philadelphia

Site 1: Intersection of Parkside Avenue and 52nd Street

0 37.5 75 150
Feet

Delaware Valley Regional
Planning Commission
August 2007

Site 2: Intersection with 51st Street

The study team witnessed significant pedestrian demand for crossing Parkside Avenue at this point. The Discovery Charter School and Parkside Business Center are at this location. However, there is no marked crossing. Signalization at this intersection is planned by the City Streets Department, making it an appropriate location to install crosswalks. This location is also in the center of the area plagued by motorcycle racing. The improvements here serve to create pedestrian access and slow traffic. The recommended improvements are shown in Figure 13.

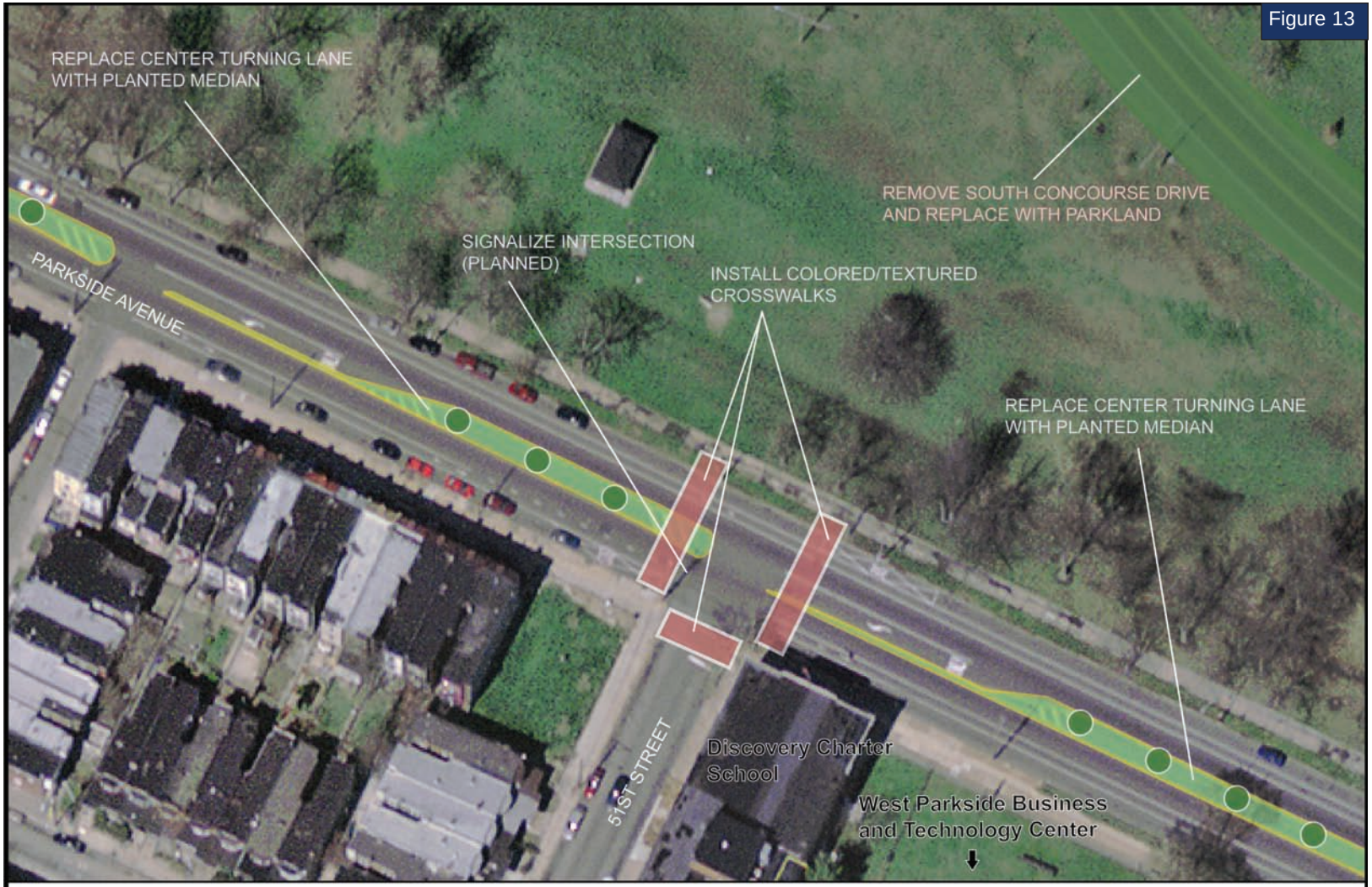
Site 2 Improvements:

1. Install pedestrian crossings at the soon-to-be signalized intersection with access to the refuge island.
2. Install textured/colored crosswalks that will also serve to slow traffic (in the fashion of rumble strips).
3. Close South Concourse Drive (also identified by the Centennial District Master Plan) and replace it with parkland. This will serve to slow traffic and reduce the number of potential conflict points for vehicles and pedestrians.
4. Create a center median.

Corridor-Wide Improvements:

1. Median Island
2. Textured/Colored Crosswalks
3. Streetscaping
4. Attractive and Visible Transit Stops

Figure 13



TAMING TRAFFIC
Parkside Avenue, Philadelphia

Site 2: Intersection of Parkside Avenue and 51st Street

0 37.5 75 150
Feet

Delaware Valley Regional
Planning Commission
August 2007

Site 3: Intersection with 50th Street

This location is in the heart of the area used for motorcycle racing. The DVRPC study team determined that an engineering solution could permanently remove this undesirable usage without compromising the capacity, level of service, or safety of Parkside Avenue. Signalization is expensive and does not create a physical barrier, allowing it to be ignored by the racers. Additionally, installing a signal in a location where traffic volumes do not warrant one may result in other problems for the operation of the roadway. The study team determined that the most effective, attractive, permanent, and affordable (less expensive than signalization) approach would be to install a roundabout at this location.

According to the U.S. Department of Transportation, Federal Highway Administration's publication *Roundabouts: An Informational Guide*, "neighborhood traffic circles are typically built at the intersections of local streets for reasons of traffic calming and/or aesthetics." Roundabouts are a modern variation on the traffic circle that gives priority to circulating traffic and provides safe pedestrian crossing access. The roundabout shown in the attached site plan follows the specifications and dimensions of FHWA's guide for an "Urban Single-Lane" roundabout.

The roundabout would provide a physical obstruction along Parkside Avenue, making it a far less attractive venue for motorcycle racing. It could also serve as a gateway to the industrial park and West Parkside neighborhood, with the opportunity to install greenery and sculptural elements on the raised center section. A fourth leg could also be added to the roundabout on the north, if desired, to create a connection with a new parking lot, providing access to the park, or to the area to the north, by the Mann Center. The recommended improvements for the intersection of Parkside Avenue and 50th Street are shown in Figure 14.

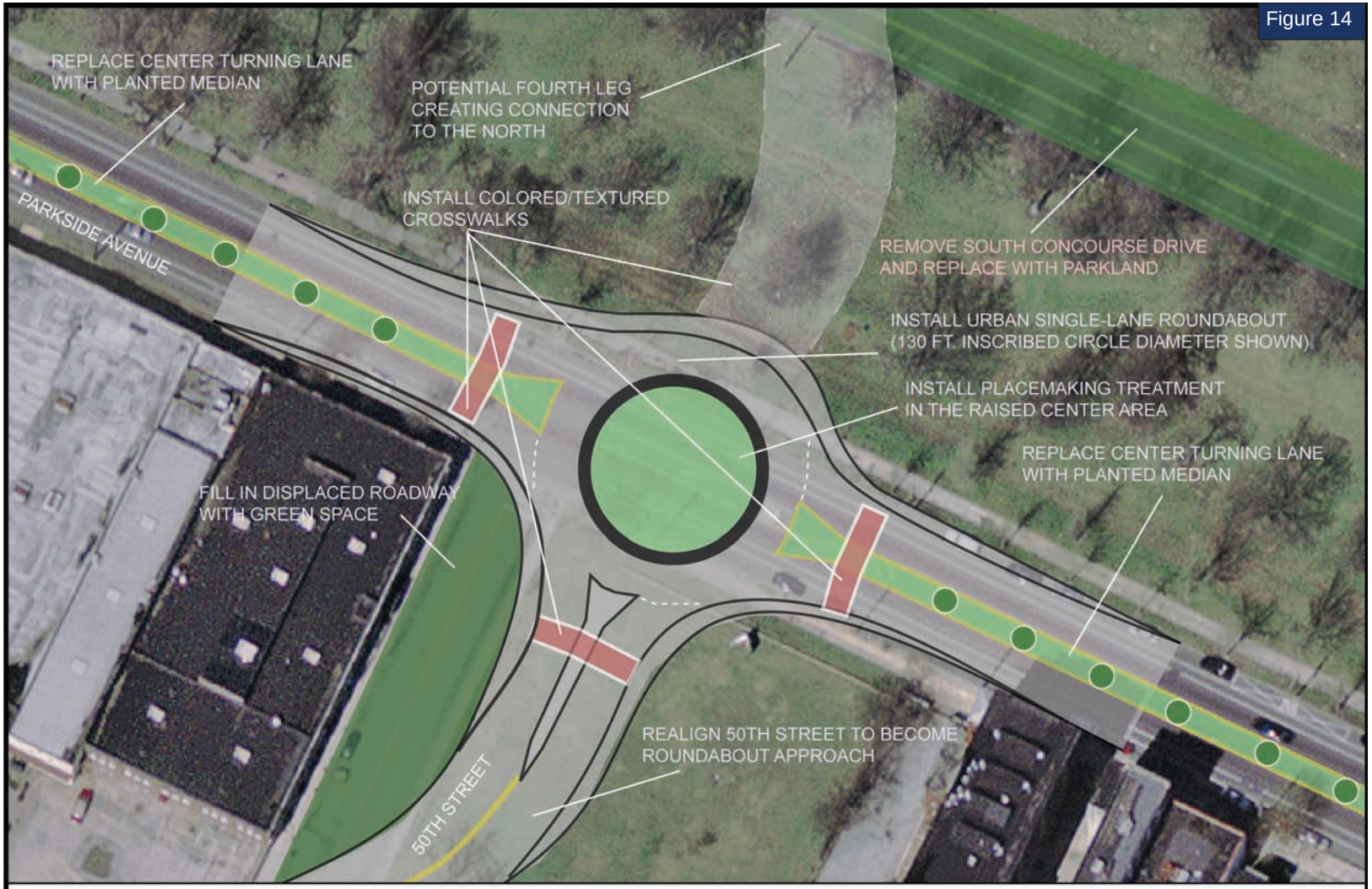
Site 3 Improvements:

1. Install an "Urban Single-Lane" roundabout at 50th Street.
2. Realign 50th Street to become one of the three roundabout approaches.
3. Add pedestrian crossing points at each roundabout approach.
4. Close South Concourse Drive.
5. Create a center median.

Corridor-Wide Improvements:

1. Median Island
2. Textured/Colored Crosswalks
3. Streetscaping
4. Attractive and Visible Transit Stops

Figure 14



TAMING TRAFFIC
Parkside Avenue, Philadelphia

Site 3: Intersection of Parkside Avenue and 50th Street

0 37.5 75 150
Feet

Delaware Valley Regional Planning Commission
August 2007

Site 4: Intersection with 49th Street

This location contains the SEPTA bus turnaround, which is little more than a large asphalt parking lot and a very basic bus stop and shelter, with no pedestrian access across Parkside Avenue between the park to the bus stop. Recommendations at this point serve to make the transit stop more attractive and to build connectivity with the park. The recommended improvements are shown in Figure 15.

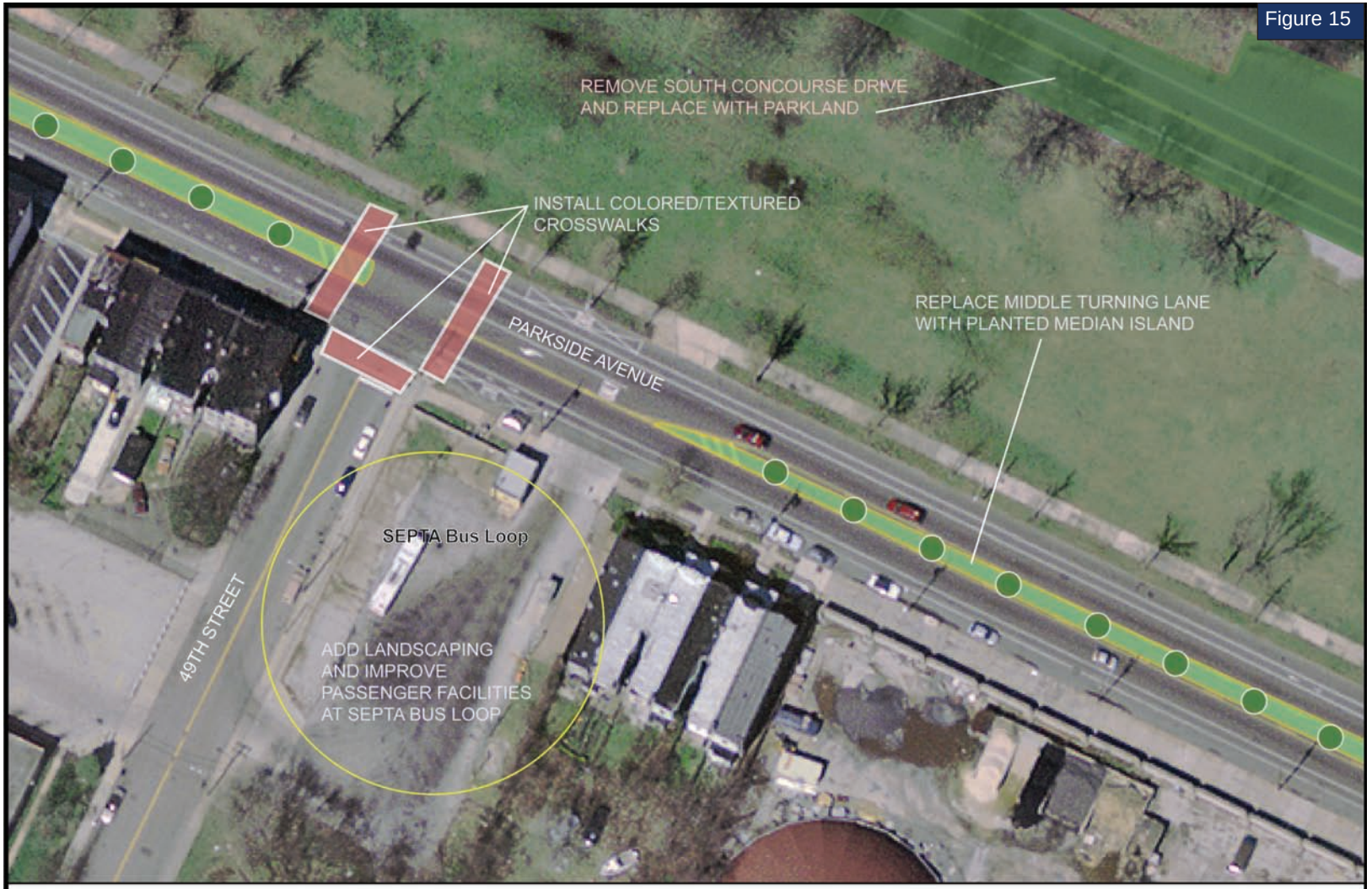
Site 4 Improvements:

1. Add landscaping and improve pedestrian transit facilities at the bus turnaround.
2. Add a pedestrian crossing over Parkside Avenue at 49th Street.
3. Close South Concourse Drive.
4. Create a center median.

Corridor-Wide Improvements:

1. Median Island
2. Textured/Colored Crosswalks
3. Streetscaping
4. Attractive and Visible Transit Stops

Figure 15



TAMING TRAFFIC
Parkside Avenue, Philadelphia

Site 4: Intersection of Parkside Avenue and 49th Street

0 37.5 75 150
Feet

Delaware Valley Regional
Planning Commission
August 2007

Site 5: Intersection with East and West Memorial Hall Drives

With the Please Touch Museum relocating to Memorial Hall, it is important to have well-defined access to Memorial Hall in order to improve pedestrian safety around the museum and to manage vehicular traffic through the park. The study team recommends closing East Memorial Hall Drive to all vehicular access and restoring parkland in its place. The roadway was deemed redundant with West Memorial Hall Drive and it creates an environment potentially dangerous for pedestrians. This location is at the center of a long gap between pedestrian crosswalks along Parkside Avenue, making it an ideal place for an additional midblock crossing for access to the Park, the Please Touch Museum, and Kelly Pool. The recommended improvements are shown in Figure 16.

These recommendations are illustrated in the photo simulation in Figures 19-20.

Site 5 Improvements:

1. Close East Memorial Drive and replace it with parkland.
2. Install a midblock crosswalk aligned with the sidewalk along West Memorial Hall Drive.
3. Close South Concourse Drive.
4. Create a center median.
5. Add curbside parking made available through the closing of East Memorial Hall Drive.

Corridor-Wide Improvements:

1. Median Island
2. Textured/Colored Crosswalks
3. Streetscaping
4. Attractive and Visible Transit Stops

Figure 16

TAMING TRAFFIC
Parkside Avenue, Philadelphia

Site 5: Intersection of Parkside Avenue and East/West Memorial Hall Drives

0 37.5 75 150
Feet

Delaware Valley Regional
Planning Commission
August 2007

Site 6: Intersection with 41st Street

This location has two parallel access roads connecting Parkside Avenue with North and South Concourse Drives. Each access road is one way, although only the northbound route is aligned with the intersection at 41st Street and Parkside Avenue. Because the southbound route is offset from 41st Street, southbound traffic from Concourse Drive utilizing this access road must turn left onto Parkside Avenue and immediately turn right onto 41st Street, or drive diagonally across the intersection. In either case, the intersection is confusing and promotes potentially unsafe driver behavior. Also as a result of the southbound access road, the pedestrian crosswalk over Parkside Avenue is very long and aligned at a sharp angle.

The study team recommends removing the southbound access road and converting the northbound road into a two-way street, thereby aligning it in both directions with 41st Street. This action removes the potentially unsafe driving behavior associated with an offset intersection and also allows the pedestrian crosswalk over Parkside Avenue to be straightened, resulting in a shorter crossing distance than in the current configuration. The recommended improvements are shown in Figure 17.

Site 6 Improvements:

1. Close the southbound access road and convert to parkland.
2. Change the northbound road (aligned with 41st Street) from a one-way road to a two-way road.
3. Straighten the pedestrian crosswalks.
4. Close South Concourse Drive.
5. Create a center median.

Corridor-Wide Improvements:

1. Median Island
2. Textured/Colored Crosswalks
3. Streetscaping
4. Attractive and Visible Transit Stops

Figure 17

TAMING TRAFFIC
Parkside Avenue, Philadelphia

Site 6: Intersection of Parkside Avenue and 41st Street

0 37.5 75 150
Feet

Delaware Valley Regional
Planning Commission
August 2007

Site 7: Intersection with Girard Avenue

This intersection is currently confusing and has poor pedestrian access due to the alignment of turning lanes and the presence of SEPTA trolley right-of-way. After observing conditions during peak and off-peak periods, the study team determined that there is a need for improved pedestrian access, especially to the High School of the Future, as students were seen crossing in potentially dangerous situations. In addition, students and faculty seemed inclined to cross at an unsignalized point to the north of the intersection rather than walk to the intersection to take advantage of the existing crosswalk. Unfortunately, the existing crosswalks do not follow the typical path of the students, who seem to prefer a more direct route. Another consideration is school foot traffic coming from the Girard Avenue Trolley stop located on the west side of the Parkside/Girard Avenue intersection.

The right-turn channel for traffic traveling westbound on Girard Avenue to turn northbound onto Parkside Avenue currently directs traffic right through the major school route crossing point. This is not a safe or desirable situation. The study team recommends that this channel be removed and that the existing concrete median be extended to the curb line to provide a safe and short crossing for students en route to and from the high school. In addition, the median should be planted so as to create a more attractive gateway to Parkside Avenue, the Centennial District, and the high school.

In place of the right-turn channel, the study team recommends installing a right-turn lane at the signalized intersection. Due to the width of Girard Avenue at this point, a turning lane pocket of significant length can be created with striping, thus improving the intersection without negatively impacting right-turn capacity or disrupting the flow of through traffic. Further analysis and a turning movement study may be necessary before implementing this recommendation.

The roadway configuration could easily be adapted to make the intersection's geometry more apparent to approaching drivers and cause them to slow their speeds. Vehicles traveling south along Parkside around the curve to the intersection with Girard were observed traveling at inappropriate speeds. This could be addressed by planting the concrete median, as specified above, and by curving the corridor-wide center median around with traffic so as to demarcate the travel lane for drivers.

Finally, the trolley right-of-way on Girard Avenue is not well marked and automobiles often drive in it. The result is a sort of roadway chaos that is dangerous for all users, especially pedestrians. This problem could be addressed simply by marking the right-of-way with a texture, color, or curbing treatment to restrict automobile traffic to designated lanes, keeping it from driving in the trolley right-of-way. The recommended improvements are shown in Figure 18 and illustrated in the **photo simulation in Figures 19-20.**

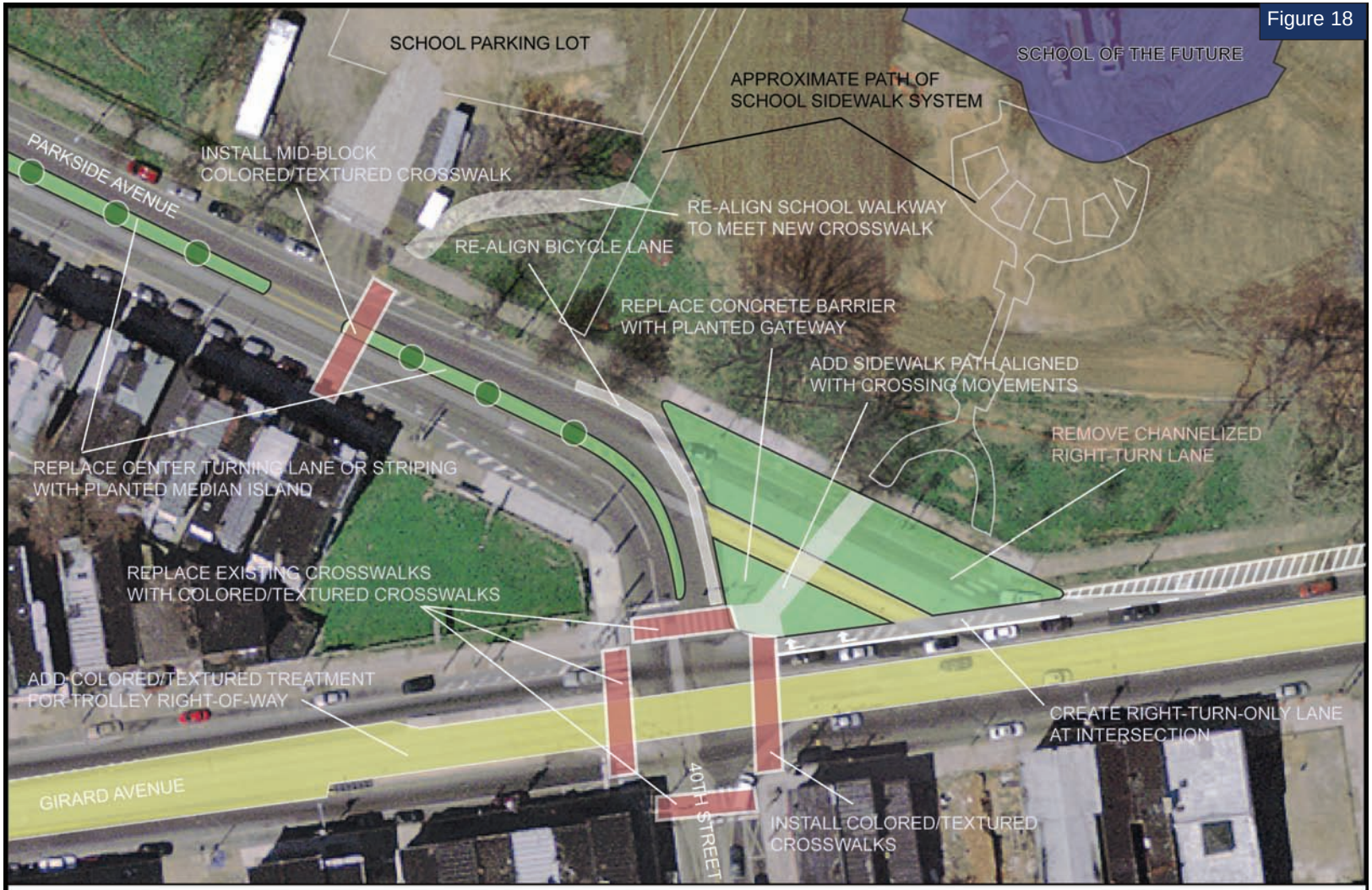
Site 7 Improvements:

1. Add a midblock pedestrian crosswalk north of the intersection, aligned with a modified walkway entrance to the high school to provide a safe crossing for pedestrian traffic over Parkside Avenue. This crosswalk may also serve to slow traffic approaching the intersection.
2. Close the right-turn channel from Girard Avenue onto Parkside Avenue and replace it with a traditional right-turn-only lane at the intersection.
3. Transform the existing triangular shaped concrete island into a landscaped gateway and connect it to the park with a continuous pedestrian pathway.
4. Visually mark the trolley right-of-way to discourage automobile access in the right-of-way.
5. Create a center median island to visually guide traffic around the curve and encourage slower speeds approaching the intersection.
6. Add textured/colored crosswalks.

Corridor-Wide Improvements:

1. Median Island
2. Textured/Colored Crosswalks
3. Streetscaping
4. Attractive and Visible Transit Stops

Figure 18



TAMING TRAFFIC
Parkside Avenue, Philadelphia

Site 7: Intersection of Parkside Avenue, Girard Avenue and 40th Street

0 37.5 75 150
Feet

Delaware Valley Regional
Planning Commission
August 2007

Figure 19

TAMING TRAFFIC
Parkside Avenue, Philadelphia

View of Parkside Avenue by West Memorial Hall Drive.

Source: DVRPC
October 2007

Figure 20

TAMING TRAFFIC
Parkside Avenue, Philadelphia

Photo simulation of conceptual recommendations.

Source: DVRPC
October 2007

Figure 21

TAMING TRAFFIC
Parkside Avenue, Philadelphia

View of the intersection of Parkside Avenue and Girard Avenue.

Source: DVRPC
October 2007

Figure 22

TAMING TRAFFIC
Parkside Avenue, Philadelphia

Photo simulation of conceptual recommendations.

Source: DVRPC
October 2007

SECTION 4:
CONCLUSION AND BIBLIOGRAPHY

CONCLUSION

This year's Taming Traffic report presents two case study locations, one suburban community and one urban area, each with very different issues. Both corridors contain an array of land uses and destinations; however, inefficient and sometimes confusing lane configurations cause potentially dangerous conditions for motorists and, more significantly, for cyclists and pedestrians. Although each location is a center of activity for the surrounding community, there is little or no change in context to alert motorists that they have entered a distinct neighborhood where driver behavior is expected to change. In both cases the need for a change in context is related to improved safety and efficiency of the multimodal roadway.

Clarksville Road (CR 638) is home to a variety of land uses, including two local schools, which increase the nonmotorized traffic in the surrounding area. This roadway is exceedingly wide in most places and has varying lane configurations, which can be onerous for pedestrians and somewhat confusing for motorists and bicyclists. Enhancing crossing amenities and creating more clear and consistent lane configurations will contribute to an improved suburban atmosphere where multimodal transportation is a priority.

In the Parkside neighborhood of the City of Philadelphia, local and regional automobile traffic mixes with bus and trolley transit service, as well as with pedestrians and bicycle users representing a variety of trip purposes. With its straight, unobstructed orientation and few traffic signals, Parkside Avenue has become a desirable location for motorcycle racing, which disturbs the surrounding community and presents potentially dangerous conditions for other roadway users. In addition, the multitude of destinations within the corridor generates considerable visitor traffic, transit demand, and pedestrian activity without appropriate facilities and amenities to handle such activity. Implementing better pedestrian and transit amenities, improving the landscaping and aesthetic treatments to create a unique character, and installing engineering elements to interrupt the straight roadway are just a few of the improvements that will make Parkside Avenue unforgettable for visitors, more desirable to local residents, and safe for all modes of travel.

Implementation of the traffic calming techniques set forth in this analysis will be a positive step toward better balancing the needs of all roadway users while creating a sense of place. Rarely is a problem solved by just one measure alone. By combining traditional traffic calming principles with other CSS and Smart Growth elements, these communities can develop a distinct sense of place. While many techniques may improve a community, the best programs represent a combination of function and aesthetics, attractiveness, and cost-effectiveness.

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APPENDIX A:
SAMPLE COST ESTIMATES

The following are sample costs for various traffic calming techniques arranged from least to most expensive. These were culled from various sources, including the ITE *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 for the cost estimates below was the *Traffic Calming Handbook*, produced by the Pennsylvania Department of Transportation in 2001. Prices will differ based on numerous variables, including materials, project extent, and local economies. The costs suggested do not include necessary expenses for the planning and engineering of these techniques.

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 Bulb	$7,000 - $10,000 per pair	Midblock measures may cost less ($4,000) if they are smaller.
Curb Ramp	$1,500	Bike Lane
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.
Marked Crosswalk	$100 - $3,000	As expected, costs are lower for painted crosswalks compared to textured crosswalks, such as brick, patterned concrete, etc.
Median Barrier	$50 - $150 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	More costly street closures involve poured-in-place curbs, landscaping, and sidewalks. Full-street closures can be much more expensive than partial street closures.
Traffic Circle	$1,500 - $25,000+	Traffic circles 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

Sources for West Windsor Township, NJ

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

BURLINGTON COUNTY BRIDGE COMMISSION

Eligibility: New Jersey school districts, local governments, fire departments, local authorities

Purpose: Provides a low-cost alternative through grants, bonds, and other financing methods to municipal government to purchase capital investments

Terms: Varies

Deadline: n/a

Contact: Burlington County Bridge Commission

Phone: 856-829-1900

Website: www.bcbridges.com

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 Associate 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

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

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

MERCER COUNTY IMPROVEMENT AUTHORITY

Eligibility: Mercer County school districts, local governments, fire departments, nonprofits

Purpose: Provides cost-effective financing to build or purchase capital projects and equipment

Contact: Mercer County Improvement Authority

Phone: 609-278-8100

Website: www.mcia-nj.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

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

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

Sources for Philadelphia, PA

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

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

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: http://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

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

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

TRANSIT REVITALIZATION INVESTMENT DISTRICT (TRID)

Eligibility: Pennsylvania local governments, counties, transportation authorities, public transit agencies

Purpose: Encourages private sector investment and revitalization of areas immediately adjacent to transit

Terms: 25% match for TRID planning study

Deadline: Ongoing

Contact: Pennsylvania Department of Community and Economic Development

Phone: 866-466-3972

Website: http://www.newpa.com

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

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

APPENDIX C:
STUDY ADVISORY COMMITTEES

CLARKSVILLE ROAD

Ken Carlson
President, West Windsor Bicycle and Pedestrian Alliance

George Fallat
Traffic Engineer, Mercer County

Mayor Shing-Fu Hsueh
West Windsor Township

Matt Lawson
Planning Director, Mercer County Planning Commission

Christopher Marion
Business Administrator, West Windsor Township

Jim Parvesse
Township Engineer, West Windsor Township

Chief Joseph Pica Jr.
West Windsor Police Department

Jim Schwarzwalder
NJ Transit

Ed Treadaway
Transportation Coordinator, West Windsor-Plainsboro Regional School District

Patricia Ward
Director of Community Development, West Windsor Township

Jim Wilno
Senior Service Planner, NJ Transit

PARKSIDE AVENUE

City Councilwoman Jannie Blackwell
Philadelphia 3rd District

City Councilwoman Carol Ann Campbell

Officer Blendina Corbin
16th Philadelphia Police District
Philadelphia 4th District

Robert Cousar
Executive Director, East Parkside Residents Assoc.

Stephanie Craighead
Fairmount Park Commission

Steve D'Antonio
SEPTA

Jim Dellipriscoli
Senior Operations Planner, SEPTA

Kristin DelRossi
District Traffic Engineer, Philadelphia Streets Dept.

Charles Denny
Traffic Engineer, Philadelphia Streets Dept.

Patricia Ellis
Service Planning, SEPTA

Mark Focht
Executive Director, Fairmount Park Commission

Andrew Frishkoff
Director of Economic Development, Philadelphia Office of Neighborhood Transformation

Alan Greenberger
Principal, MGA Partners, Architects

Fran Hanney
Traffic Control Services Manager, PennDOT

Brendan Lee
Office of School Safety, School District of Philadelphia

Officer Linder
Community Relations Officer, 19th Philadelphia Police District

A. Herring-Miller
Program Manager, Philadelphia Office of Neighborhood Transformation

Officer Erica Parker
16th Philadelphia Police District

Richard Redding
Director, Community Planning Division, Philadelphia City Planning Commission

Michael Roepel
Community Planner, Philadelphia City Planning Commission

Deborah Schaaf
Strategic Planning and Policy, Philadelphia City Planning Commission

Michelle Webb
Community Planner, Philadelphia City Planning Commission

Delcina Wilson
Philadelphia Committee Person 24-9

Stanley Wilson
Block Captain

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: 07054

Date Published: October 2007

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 West Windsor Township in Mercer County, and the Parkside neighborhood in the City of Philadelphia.

Key Words: Traffic calming, context-sensitive solutions, context-sensitive design, balanced circulation, NJDOT, PennDOT, Clarksville Road, West Windsor, Parkside Avenue, Philadelphia, enforcement, engineering, education, policy, vertical deflection, horizontal deflection.

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 — Clarksville Road, West Windsor Township, Mercer County, New Jersey and Parkside Avenue, Philadelphia, Pennsylvania. 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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