Agenda Number: 1

PLANNING COMMISSION MEETING
MUNICIPAL CENTER COUNCIL CHAMBERS
Tuesday, July 5, 2011

The regular meeting of the Planning Commission was scheduled and held in the Council Chambers of the Municipal Center on July 5, 2011. Chairman Klevan welcomed everyone and asked the Commission members as well as the audience to please speak into the microphone so they could be heard. Chairman Klevan then called the meeting to order at 6:00 p.m., asking the secretary for the roll.

Ms. Rush called the roll of the Board to establish a quorum:

Commissioners Present: Jon Still, David Klevan, Alderman John Drinnon, Mike Harless, Forrest Owens, Susan Burrow and Dike Bacon.

Staff Present: Andy Pouncey, David Harris, Wade Morgan, Tim Gwaltney and Pam Rush.

Commissioners Absent: Lisa Parker

A quorum for tonight's Planning Commission meeting was established.

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1. Approval of Minutes for May 3, 2011

Chairman Klevan stated for those people who just arrived, tonight's agenda is on the front table. The first order of business is the approval of the minutes for May 3, 2011. If there were no additions, corrections or deletions to the minutes of the May 3, 2011, meeting of the Planning Commission, he would entertain a motion for approval.

Mr. Harless moved to approve the Planning Commission minutes of May 3, 2011, as submitted, seconded by Alderman Drinnon.

Chairman Klevan asked for a roll call.

Roll Call: Still – yes; Burrow – abstain; Drinnon – yes; Parker – absent; Bacon –abstain; Harless – yes; Owens - yes; Klevan – yes. **The motion was passed**

2. Consent Agenda **There was none.**

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3. Preliminary and Final Plat Approval for the Amendment to the Oak Run/Germantown Heights Subdivisions (Lots 126, 127 and 128 of the Oak Run Subdivision and Lots 60 and 61 of the Germantown Heights Subdivision)

INTRODUCTION: This is a request for preliminary and final approval of the re-subdivision of a total of five lots whose rear lot lines abut the Miller Farms drainage ditch. That ditch separates the Germantown Heights subdivision from the Oak Run subdivision. It has been converted as part of a City of Germantown capital improvement project from an open concrete-lined ditch to an underground box culvert. As a result of the conversion, all the lots that backed up to the ditch now have additional useable land area. The owners of the five lots that are part of this application have reached an agreement among themselves to shift their lot lines so as to remove land area from the lots on the east side of the ditch and add land area to the lots on the west side of the ditch. Generally, the lots on the east side (Germantown Heights subdivision) are substantially larger than the lots on the west side (Oak Run subdivision).

BACKGROUND: The Germantown Heights subdivision was approved in 1956 and the Oak Run subdivision was approved in 1978.

DISCUSSION: The purpose of this request is to move the rear lot lines of Lots 60 and 61 of Germantown Heights eastward, thereby enlarging Lots 126, 127 and 128 of the Oak Run Subdivision. The Miller Farms Ditch CIP project converted an open drainage ditch between the lots into an underground culvert. As a result, the land formerly within the ditch became "useable" land within the lots. Two lot owners (lots 60 and 61) in the Germantown Heights subdivision agreed to convey their parts of the former ditch to the three abutting lot owners within the Oak Run Subdivision. All the affected owners have consented to the re-subdivision and are part of the application. The two lots losing land will still meet the minimum lot area and building setback requirements of the "R" zoning district.

The following table describes the sizes of the affected lots before and after the resubdivision:

SUBDIVISION & LOT NO.	LOT SIZE NOW	LOT AREA TRANSFERRED	LOT SIZE AFTER
GERMANTOWN HEIGHTS	-------	--------	----------
60	42,256.55 sq. ft.	5,427.7 sq. ft.	36,828.85 sq. ft.
61	29,539.3 sq. ft.	759.3 sq. ft.	28,780 sq. ft.
OAK RUN	--------	---------	---------
126	15,126.61 sq. ft.	1,333 sq. ft.	16,459.61 sq. ft.
127	15,034.39 sq. ft.	2,004 sq. ft.	17,038.39 sq. ft.
128	19,799.4 sq. ft.	2,850 sq. ft.	22,649.42 sq. ft.

The request is being sent to the Planning Commission for approval because the land area being transferred between the subdivisions amounts to over 1,000 square feet. It was concluded that such a re-subdivision exceeded the intent of the minor subdivision section of the subdivision regulations.

Board of Mayor and Aldermen approval of a development contract is not necessary. After the Planning Commission approves the request, the plat will be re-recorded.

The Technical Advisory Committee met on June 16, 2011 and had the following comments on the request:

A. PRIOR TO RECORDING OF THE SUBDIVISION PLAT

1. So as to provide an effective, clear trail of how both subdivisions have been altered, the subdivision plats of both the Oak Run and Germantown Heights subdivisions shall be re-recorded, along with the final plat for the Amendment to the Oak Run/Germantown Heights Subdivisions.
2. The following notes will be added to the Oak Run and Germantown Heights plats:
    a. This subdivision plat is being re-recorded to reflect the modification to the rear lot lines of lots 126, 127 and 128 as shown on sheets 3 and 4. (Oak Run subdivision)
    b. This subdivision plat is being re-recorded to reflect the modification to the rear lot lines of lots 60 and 61 as shown on sheet 2. (Germantown Heights subdivision)

Chairman Klevan asked if the applicant wanted to make a presentation.

Roe Poe stated he was there to answer any questions; you may have about this project.
Chairman Klevan asked if there was anyone to speak in opposition, then stated since there was no opposition he moved for a motion.

STAFF RECOMMENDATION: Approval, subject to staff comments.

SUBDIVISION & SITE PLAN REVIEW SUBCOMMITTEE REPORT: (Forrest Owens, chairman) - The subcommittee did not meet in June.

PROPOSED MOTION: To grant preliminary and final approval of the Amendment to the Oak Run/Germantown Heights Subdivisions, subject to the staff comments.

Mr. Owens moved to grant preliminary and final approval of the Amendment to the Oak Run/Germantown Heights Subdivisions, subject to the staff comments, seconded by Ms. Burrow.

Chairman Klevan asked for a roll call.

Roll Call: Still – yes; Burrow – yes; Drinnon – yes; Parker – absent; Bacon –yes; Harless –yes; Owens - yes; Klevan – yes. **The motion was passed**

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4. Germantown Bicycle Facilities Plan – Request Recommendation of Approval

INTRODUCTION: The purpose of the Germantown Bicycle Facilities Plan is to is to analyze Germantown's existing bicycle lanes against current standards for design and signage, to propose new bike lanes to connect the Germantown network to bike facilities in Memphis, Collierville and unincorporated Shelby County and to propose new bike lanes within Germantown that will provide improved connectivity to destination points such as parks, the library, shopping areas and the Smart Growth area.

BACKGROUND: Germantown's network of bike lanes was created in the 1970's and 1980's. Those bike lanes were designed to connect parks and schools within the City Limits. During the 1990's and 2000's the Greenway was constructed along the Wolf River and within power line easements as a recreational amenity for pedestrians, cyclists and joggers. The overall goal of the plan being proposed is to expand the network and increase connectivity into surrounding communities. The plan expands the existing network of bike lanes by using major and collector streets for new routes.

An initial public meeting on the plan was held on November 15, 2010. Forty-six residents attended the meeting to add their comments, suggestions and input on bicycling and pedestrian issues. The plan has already been presented to the Parks and Recreation Commission (March 24, 2011), the Public Safety Education Commission (April 4, 2011), and the Environmental Commission (May 5, 2011). Those commissions recommended approval of the plan.

DISCUSSION: The Germantown community is well suited to all forms of bicycle usage: on-street recreational riding, bicycle commuting, bike paths, trail riding, etc. The City's relatively flat topography, compact and well-defined retail areas, network of connected residential, collector streets, and wide power line and gas line easements allow for many routes that are safe and easy to cycle.

This report performs two purposes with regard to bicycle facilities. First, this report provides design standards for the construction, striping, signing and other design-related issues of new bicycle lanes. The *Guide for the Development of Bicycle Facilities*, published by the American Association of State Highway and Transportation Officials (AASHTO), forms the basis for most of the design standards contained in this report. That guide is considered by many jurisdictions to be the documented national standards for bicycle facility accommodations. Second, this report identifies by type the existing bicycle routes within Germantown, reviews the bicycle routes planned by governmental agencies and planning documents (City of Germantown, City of Collierville, Metropolitan Planning Organization, State of Tennessee Department of Transportation etc) and proposes new routes to fill in gaps within the system and provide connections to the bicycle routes in surrounding communities.

Staff is requesting a recommendation of approval from the Planning Commission. The plan will then be presented to the Board of Mayor and Aldermen for their approval. The approved plan will then be used as the basis for future funding of improvement projects, and will be incorporated into the Memphis region's Long Range Transportation Plan Update that is being prepared by the Metropolitan Planning Organization. The implementation of Germantown's plan may be eligible for future funding through Federal or State grants.

Mr. Harless asked in looking at the proposed bike route at Poplar Avenue by the Oakleigh traffic light – would that necessitate either widening Poplar or taking out a travel lane?

Mr. Smith answered that is a proposed bike route not an existing bike route. No sir we are not talking about taking a traffic lane away from Poplar Avenue.

Chairman Klevan noted we wanted to show all of our appreciated to Jonathan Smith and Wade Morgan for two years of hard work putting this Germantown Bicycle Facilities Plan together.
What we are voting on is the facilities plan reckoning two proposes 1) to set design standards, which are the construction, striping, signing and other design-related issues of the new bike lanes;
2) report on identifying potential future bike lanes that overlay with existing bicycle; 3) we decided in executive session that we were going to pull table 1A (Existing Germantown Bicycle Facilities) and table 1B (Major and Collectors Streets and Bike Lanes-Major Streets).

STAFF RECOMMENDATION: Approval

TRANSPORTATION AND LONG RANGE SUBCOMMITTEE REPORT: The subcommittee did not meet in June.

PROPOSED MOTION: To recommend approval of the Germantown Bicycle Facilities Plan.

Mr. Bacon moved to recommend approval of the Germantown Bicycle Facilities Plan, subject to the staff comments, seconded by Mr. Owens.

Chairman Klevan asked for a roll call.

Roll Call: Still – yes; Burrow – yes; Drinnon – yes; Parker – absent; Bacon –yes; Harless –yes; Owens - yes; Klevan – yes. **The motion was passed**

1. Chairman Klevan asked if there was any old business to come before the Commission. There was none.

2. Chairman Klevan asked if there was any new business to come before the Commission. There was none.

3. Chairman Klevan asked if there were any liaison reports. There was none.

4. ADJOURNMENT - The meeting adjourned at 6:35 p.m.

GERMANTOWN BICYCLE FACILITIES PLAN

PREPARED BY THE DEPARTMENT OF ECONOMIC AND COMMUNITY DEVELOPMENT

JUNE 2011

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INTRODUCTION

Bicycle travel has played an historic role in transportation in the United States. Even before the invention of the automobile, the League of American Wheelmen promoted improved traveled ways. Transportation officials throughout the United States are increasingly recognizing the bicycle as a viable transportation mode. While recreational cycling is, still the primary use of bicycles in this country, the number of people using bicycles for commuting and other travel purposes has been increasing since the early 1970s. Nationwide, people are recognizing the energy efficiency, cost effectiveness, health benefits and environmental advantages of bicycling. Local, state and federal agencies are responding to the increased use of bicycles by implementing a wide variety of bicycle-related projects and programs. The emphasis now being placed on bicycle transportation requires an understanding of bicycles, bicyclists and bicycle facilities. This design manual addresses these issues and clarifies the elements needed to make bicycling a viable transportation alternative.

All highways, except those where cyclists are legally prohibited, should be designed and constructed under the assumption that they will be used by cyclists. Therefore, bicycles should be considered in all phases of transportation planning, new roadway design, roadway reconstruction, and capacity improvement and transit projects. Research continues to provide additional criteria for the design of appropriate bicycle facilities.

The *Guide for the Development of Bicycle Facilities* published by the American Association of State Highway and Transportation Officials (AASHTO) is considered by many jurisdictions to be the documented national standards for bicycle facility accommodations. That document was consulted and forms the basis for most of the design standards contained in this report.

PURPOSE

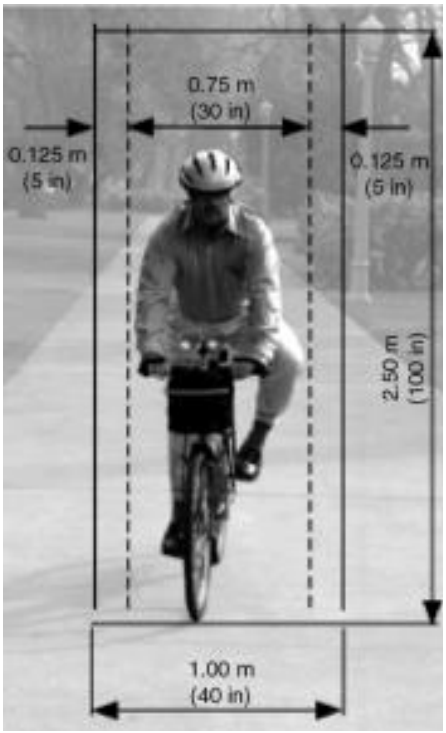
This report performs two purposes with regard to bicycle facilities. First, this report provides design standards for the construction, striping, signing and other design-related issues of new bicycle lanes. Second, it identifies by type the existing bicycle routes within Germantown, reviews the bicycle routes planned by governmental agencies and planning documents (City of Germantown, City of Collierville, Metropolitan Planning Organization, State of Tennessee Department of Transportation etc) and proposes new routes to fill in gaps within the system and provide connections to the bicycle routes in surrounding communities.

The Germantown community is well suited to all forms of bicycle usage: on-street recreational riding, bicycle commuting, bike paths, trail riding, etc. The City's relatively flat topography, compact and well-defined retail areas, network of connected residential, collector streets, and wide power line and gas line easements allow for many routes that are safe and easy to cycle. The existing network of bike lanes that was created in the 1970's and 1980's can be expanded to increase connectivity. The main impediment to cycling is Poplar Avenue due to the limited number of north-south crossing streets and the lack of room for bike lanes within the existing right-of-way.

DEFINITIONS

The following terms are used in this report in the context that follows:

- **BICYCLE**— Every vehicle propelled solely by human power upon which any person may ride, having two tandem wheels, except scooters and similar devices. The term "bicycle" for this publication also includes three and four-wheeled human-powered vehicles, but not tricycles for children.
- **BICYCLE FACILITIES**—A general term denoting improvements and provisions made by public agencies to accommodate or encourage bicycling, including parking and storage facilities, and shared roadways not specifically designated for bicycle use.
- **BICYCLE LANE or BIKE LANE**—A portion of a roadway which has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists.
- **BICYCLE PATH or BIKE PATH**—See Shared Use Path.
- **BICYCLE ROUTE SYSTEM**—A system of bikeways designated by the jurisdiction having authority with appropriate directional and informational route markers, with or without specific bicycle route numbers. Bike routes should establish a continuous routing, but may be a combination of any and all types of bikeways.
- **BIKEWAY**—A generic term for any road, street, path or way which in some manner is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.
- **HIGHWAY**—A general term denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.
- **RAIL–TRAIL**—A shared use path, either paved or unpaved, built within the right-of-way of an existing or former railroad.
- **RIGHT-OF-WAY**— A general term denoting land, property or interest therein, usually in a strip, acquired for or devoted to transportation purposes.
- **RIGHT OF WAY**— The right of one vehicle or pedestrian to proceed in a lawful manner in preference to another vehicle or pedestrian.
- **ROADWAY**— The portion of the highway, including shoulders, intended for vehicular use.
- **RUMBLE STRIPS**— A textured or grooved pavement sometimes used on or along shoulders of highways to alert motorists who stray onto the shoulder.
- **SHARED ROADWAY**— A roadway which is open to both bicycle and motor vehicle travel. This may be an existing roadway, street with wide curb lanes, or road with paved shoulders.
- **SHARED USE PATH**— A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way. Shared use paths may also be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users.
- **SHOULDER**— The portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles, for emergency use and for lateral support of sub-base, base and surface courses.
- **SIDEWALK**— The portion of a street or highway right-of-way designed for preferential or exclusive use by pedestrians.
- **SIGNED SHARED ROADWAY (SIGNED BIKE ROUTE)** — A shared roadway which has been designated by signing as a preferred route for bicycle use.
- **TRAVELED WAY**— The portion of the roadway for the movement of vehicles, exclusive of shoulders.
- **UNPAVED PATH**— Paths not surfaced with asphalt or Portland cement concrete.



THE BICYCLE

As Figure 1 shows, bicyclists require at least 40 inches (1.0 m) of essential operating space based solely on their profile. An operating space of 4 feet (1.2 m) is assumed as the minimum width for any facility designed for exclusive or preferential use by bicyclists. Where motor vehicle traffic volumes, motor vehicle or bicyclist speed, and the mix of truck and bus traffic increase, a more comfortable operating space of 5 feet (1.5 m) or more is desirable.

Figure 1: Bicycle Operating Space (source: AASHTO Guide for the Development of Bicycle Facilities)

IDENTIFICATION OF FACILITIES

Criteria for Route Selection

Bicycle routes should be designated so as to provide a network that 1) connects recognized destinations, and 2) connects local routes to routes in surrounding municipalities and unincorporated Shelby County. Destinations within Germantown include the Municipal Library, schools (public and private), parks, Germantown Municipal Center and other public facilities. Bicycle routes should use collector or arterial streets. Minor residential streets should not be designated as bicycle routes unless they connect directly to one of the destination types listed above.

Common Basis of Selection

Standards for selecting appropriate bicycle facilities are formed around three basic categories of concern:

- the skill level of the bicycle user,
- the type of roadway involved, and
- traffic operational factors.

Each category is described in detail below.

Skill Level of the Bicycle User:

Industry standards define three basic types of bicycle users:

1. **A**dvanced or experienced riders are generally using their bicycles as they would a motor vehicle. They are riding for convenience and speed and want direct access to destinations with a minimum of detour or delay. They are typically comfortable riding with motor vehicle traffic; however, they need sufficient operating space on the traveled way or

shoulder to eliminate the need for either themselves or a passing motor vehicle to shift position.

2. **B**asic or less confident adult riders may also be using their bicycles for transportation purposes, e.g., to get to the store or to visit friends, but prefer to avoid roads with fast and busy motor vehicle traffic unless there is ample roadway width to allow easy overtaking by faster motor vehicles. Thus, basic riders are comfortable riding on neighborhood streets and shared-use paths and prefer designated facilities such as bike lanes or wide shoulder lanes on busier streets.
3. **C**hildren, riding on their own or with their parents, may not travel as fast as their adult counterparts but still require access to key destinations in their community, such as schools, convenience stores and recreational facilities. Residential streets with low motor vehicle speeds, linked with shared-use paths and busier streets with well-defined pavement markings between bicycles and motor vehicles can accommodate children without encouraging them to ride in the travel lane of major arterials.

It is evident from the definitions that bicyclists with different skill levels prefer certain facility types. Advanced bicyclists, because of their advanced skills and desire for speed, convenience, and direct access, may prefer direct routes even though these routes may also carry significant vehicle traffic and lack dedicated space for bicyclists. Children, however, typically prefer separated paths or shared residential roads with little traffic.

The Type of Roadway Involved

Another important consideration is whether the bicycle accommodation is being considered for new construction, reconstruction, or is a retrofit to an existing facility. Different opportunities are afforded to transportation planners and engineers depending on the type of project. For example, accommodating bicyclists with shared roadway signs and shared roadway markings could be done through a typical resurfacing project whereas constructing a new shared-use path on a new alignment will likely be a capital improvement project. The important point is that there are varying means to provide bicycle facility accommodations, whether it is through routine maintenance and/or the construction of a new roadway or development.

Traffic Operational Factors

Transportation planners and engineers working with bicycle facilities have a general consensus regarding the traffic operations and design factors having the greatest effect on bicycle use. The six factors most often cited include:

1. **Traffic Volume** - Higher motor vehicle traffic volumes represent greater potential risk for bicyclists and the more frequent overtaking situations are less comfortable for children and basic riders unless special design treatments are provided.
2. **Average Motor Vehicle Operating Speed** - The average operating speed is more important than the posted speed limit, and better reflects local conditions. Again, motor vehicle speed can have a negative impact on risk and comfort unless mitigated by special design treatments.
3. **Traffic Mix** - The regular presence of trucks, buses, and/or recreation vehicles (i.e., approximately 30 per hour or more) can increase risk and have a negative impact on comfort for bicyclists. At high speeds, the windblast from such vehicles can create a serious risk of falls. Many bicyclists will choose a different route or not ride at all where

there is a regular presence of such traffic unless they are able to remove themselves several feet from these motor vehicles.

4. **On-Street Parking** - The presence of on-street parking increases the width needed in the adjacent travel lane or bike lane to accommodate bicycles because of the risk of running into an open car door. This is primarily a concern associated with streets and highways built with an urban section.
5. **Sight Distance** - "Inadequate sight distance" for bicyclists primarily relates to situations where bicycles are being overtaken by motor vehicles and where the sight distance is likely less than that needed for a motor vehicle operator to either change lane positions or slow to the bicyclist's speed. This problem is primarily associated with rural highways, although some urban streets have sight distance problems due to poor design and/or sight obstructions.
6. **Number of Intersections** – Intersections poses special challenges to bicycle and motor vehicle operators, especially when bike lanes or separate bike paths are introduced. The AASHTO *Guide* and various State design manuals include general guidelines for intersection treatments. When possible, the number and/or frequency of intersections should be considered when assessing the use of bike lanes.

Types of Bicycle Facilities

After the route is selected, the facility can then be designed. The selection of an appropriate bicycle facility for a specific situation depends on many factors, including vehicular and bicycle traffic characteristics, adjacent land use and expected growth patterns, the ability of the users, specific corridor conditions and facility cost.

On-Street Bicycle Facilities

Roadway–based bicycle facilities include shared roadways, signed bike routes, wide curb lanes, paved shoulders, and bike lanes. The following section describes each of these on-street bicycle facilities.

Shared Roadway (No Bikeway Designation)

Most bicycle travel in the United States now occurs on streets and highways without bikeway designations. This probably will be true in the future as well. In some instances, a community's existing street system may be fully adequate for efficient bicycle travel and signing and striping for bicycle use may be unnecessary. In other cases, some streets and highways may be unsuitable for bicycle travel at present, and it would be inappropriate to encourage bicycle travel by designating the routes as bikeways. Finally, some routes may not be considered high bicycle demand corridors, and it would be inappropriate to designate them as bikeways regardless of roadway conditions (e.g., minor residential streets). Some rural highways are used by touring bicyclists for intercity and recreational travel. In most cases, such routes should only be designated as bikeways where there is a need for enhanced continuity with other bicycle routes. However, the development and maintenance of 1.2-m (4-foot) paved shoulders with a 100-mm (4-inch) edge stripe can significantly improve the safety and convenience of bicyclists and motorists along such routes.

Signed Shared Roadway

Signed shared roadways are designated only by bike route signs, and serve either to: a) Provide continuity to other bicycle facilities (usually Bike Lanes); or b) Designate preferred routes through high-demand corridors. As with bike lanes, signing of shared roadways should indicate to bicyclists that particular advantages exist to using these routes compared with alternative routes. This means that responsible agencies have taken actions to assure that these routes are suitable as shared routes and will be maintained in a manner consistent with the needs of bicyclists. Signing also serves to advise vehicle drivers that bicycles are present.

Bike Lane or Bicycle Lane

Bike lanes are established with appropriate pavement markings and signing along streets in corridors where there is significant bicycle demand and where there are distinct needs that can be served by them. The purpose should be to improve conditions for bicyclists on the streets. Bike lanes are intended to delineate the right of way assigned to bicyclists and motorists and to provide for more predictable movements by each. Bike lanes also help to increase the total capacities of highways carrying mixed bicycle and motor vehicle traffic. Another important reason for constructing bike lanes is to better accommodate bicyclists where insufficient space exists for comfortable bicycling on existing streets. This may be accomplished by reducing the width of vehicular lanes or prohibiting parking in order to delineate bike lanes. In addition to lane striping, other measures should be taken to ensure that bicycle lanes are effective facilities. In particular, bicycle-safe drainage inlet grates should be used, pavement surfaces should be smooth, and traffic signals should be responsive to bicyclists. Regular maintenance of bicycle lanes should be a top priority, since bicyclists are unable to use a lane with potholes, debris or broken glass. If bicycle travel is to be improved, special efforts should be made to assure that a high quality network is provided with these lanes. However, the needs of both the motorist and the bicyclist must be considered in the decision to provide bike lanes.

Shared Use Path

Generally, shared use paths should be used to serve corridors not served by streets and highways or where wide utility or former railroad right-of-way exists, permitting such facilities to be constructed away from the influence of parallel streets. Shared use paths should offer opportunities not provided by the road system. They can provide a recreational opportunity or, in some instances, can serve as direct commute routes if cross flow by motor vehicles and pedestrians is minimized. The most common applications are along rivers, oceanfronts, canals, utility rights-of-way, former or active railroad rights-of-way, within college campuses, or within and between parks. There may also be situations where such facilities can be provided as part of planned developments. Another common application of shared use paths is to close gaps in bicycle travel caused by construction of cul-de-sacs, railroads and freeways or to circumvent natural barriers (rivers, mountains, etc.). While shared use paths should be designed with the bicyclist's safety in mind, other users such as pedestrians, joggers, dog walkers, people pushing baby carriages, persons in wheelchairs, skate boarders, in-line skaters and others are also likely to use such paths. In selecting the proper facility, an overriding concern is to assure that the proposed facility will not encourage or require bicyclists or motorists to operate in a manner that is inconsistent with the rules of the road. The needs of both motorists and bicyclists must be considered in selecting the appropriate type of facility. An important consideration in selecting

the type of facility is continuity. Alternating segments of shared use paths and bike lanes along a route are generally inappropriate and inconvenient because street crossings by bicyclists may be required when the route changes character. Also, wrong-way bicycle travel with a higher potential for crashes may occur on the street beyond the ends of shared use paths because of the inconvenience of having to cross the street.

Sidewalks

Sidewalks generally are not acceptable for bicycling. However, in a few limited situations, such as on long and narrow bridges and where bicyclists are incidental or infrequent users, the sidewalk can serve as an alternate facility. Any significant difference in height from the roadway should be protected by a suitable barrier between the sidewalk and roadway.

SELECTION OF A BICYCLE FACILITY

Many factors should be considered in determining the appropriate bicycle facility type, location and priority for implementation. In addition to the guidelines below, the Federal Highway Administration provides guidance on facility selection in the 1994 publication Selecting Roadway Design Treatments to Accommodate Bicycles.

- *Skill Level of Users*—As described in the section on Bicycle Users earlier in this chapter, consideration should be given to the skills and preferences of the types of bicyclists who will use the facility. Facilities near schools, parks and residential neighborhoods are likely to attract a higher percentage of basic and child bicyclists than advanced bicyclists.
- Motor Vehicle Parking—The turnover and density of on-street parking can affect bicyclist safety (e.g., opening car doors and cars leaving parallel parking spaces). Diagonal and perpendicular parking arrangements are not compatible with bicycle facilities because of restricted sight distance and the related potential for bicycle-motor vehicle conflicts. They should be avoided wherever possible.
- *Barriers*—In some areas, there are physical barriers to bicycle travel caused by topographical features, such as rivers, railroads, freeways or other impediments. In such cases, providing a facility to overcome a barrier can create new opportunities for bicycling.
- *Crash Reduction*—The reduction or prevention of bicycle crashes (i.e., bicycle/motor vehicle, bicycle/bicycle, bicycle/pedestrian and single bicycle crashes) is important. Therefore, the potential for reducing crash problems through the improvement of a facility should be assessed. Plans for constructing new bicycle facilities should be reviewed to identify and resolve potential safety issues.
- *Directness*—Particularly for utilitarian bicycle trips, facilities should connect traffic generators and should be located along a direct line of travel that is convenient for users.
- *Accessibility*—In locating a bicycle facility, consideration should be given to the provision for frequent and convenient bicycle access, especially in residential areas. Adequate access for emergency, maintenance and service vehicles should also be considered. Other major traffic generators such as educational facilities, office buildings, shopping areas, parks and museums should also be considered when evaluating bicycle accessibility.
- *Aesthetics*—Scenery is an important consideration along a facility, particularly for a facility that will serve a primarily recreational purpose. Trees can also provide cooler riding conditions in summer and can provide a windbreak.

- *Personal Safety/Security*—The potential for criminal acts against bicyclists, especially along isolated shared use paths, and the possibility of theft or vandalism at parking locations, should be considered.
- *Stops*—Bicyclists have a strong inherent desire to maintain momentum. If bicyclists are required to make frequent stops, they may avoid the route or disregard traffic control devices.
- *Conflicts*—Different types of facilities introduce different types of conflicts. Facilities on the roadway can result in conflicts between bicyclists and motorists. Shared use paths can involve conflicts between bicyclists, horseback riders, skaters, runners and pedestrians on the facility. Conflicts between bicyclists and motorists may also occur at highway and driveway intersections.
- *Maintenance*—Designs, which facilitate and simplify maintenance will improve the safety and use of a facility. A local or regional bikeway maintenance program is essential.
- *Pavement surface quality*—Bikeways should be free of bumps, holes and other surface irregularities if they are to attract and satisfy the needs of bicyclists. Utility covers and drainage grates should be at grade and, if possible, outside the expected path of travel. Railroad crossings should be improved as necessary to provide for safe bicycle crossings.
- *Truck and Bus Traffic*—Because of their width, high–speed trucks, buses, motor homes and trailers can cause special problems for bicyclists. Where bus stops are located along a bicycle route, conflicts with bus loading and unloading and pavement deterioration, such as asphalt pavement shoving, may also be problems.
- *Traffic Volumes and Speeds*—For facilities on roadways, motor vehicle traffic volumes and speeds must be considered along with the roadway width. Commuting bicyclists frequently use arterial streets because they minimize delay and offer continuity for long trips. If adequate width for all vehicles is available on the more heavily traveled streets, it can be more desirable to improve such streets than adjacent streets. When this is not possible, a nearby parallel street may be improved for bicyclists, if stops are minimal and other route conditions are adequate. When such a parallel facility is improved, care must be taken that motor vehicle traffic is not diverted. While inexperienced bicyclists prefer more lightly traveled streets, it should be remembered that preferred routes may change over time as skill levels change.
- *Bridges*—Bridges can serve an important function by providing bicycle access across barriers. However, some bridge features restrict bicycle access and/or create unfavorable conditions for bicyclists. The most common of these are curb-to-curb widths that are narrower than the approach roadways (especially where combined with relatively steep grades), open grated metal decks found on many spans, low railings or parapets, and certain types of expansion joints such as finger-type joints, that can cause steering difficulties.
- *Intersection Conditions*—A high proportion of bicycle crashes occur at intersections. Facilities should be selected so as to minimize the number of crossings, or intersections should be improved to reduce crossing conflicts. At-grade intersections on high-volume (or high-speed) roadways and mid-block crossings should be analyzed with bicyclists' needs in mind to determine the most appropriate crossing design treatments.
- *Costs/Funding*—Facility selection normally will involve a cost analysis of alternatives. Funding availability can limit the alternatives; however, it is very important that a lack of funds not result in a poorly designed or constructed facility. The decision to implement a bikeway plan should be made with a conscious, long-term commitment to a proper level of

maintenance. When funding is limited, emphasis should be given to low-cost improvements such as bicycle parking, removal of barriers and obstructions to bicycle travel, and roadway improvements. Facility selection should seek to maximize user benefits per dollar funded.

- *State and Local Laws and Ordinances*—Bicycle programs must reflect state and local laws and ordinances. Bicycle facilities must not encourage or require bicyclists to operate in a manner that is inconsistent with these laws and ordinances.

DESIGN OF BICYCLE FACILITIES

Bike Lane Widths

Figure 3 shows four typical locations for bike lanes in relation to the roadway, as a means to describe their width requirements. For roadways with no curb and gutter, the minimum width of a bike lane should be 4 feet (1.2 m). If parking is permitted, as in Figure 3(1), the bike lane should be placed between the parking area and the travel lane and have a minimum width of 5 feet (1.5 m). Where parking is permitted but a parking stripe or stalls are not utilized, the shared area should be a minimum of 11 feet (3.3 m) without a curb face and 12 feet (3.6 m) adjacent to a curb face as shown in Figure 3(2). If the parking volume is substantial or turnover is high, an additional 1 to 2 feet (0.3 to 0.6 m) of width is desirable.

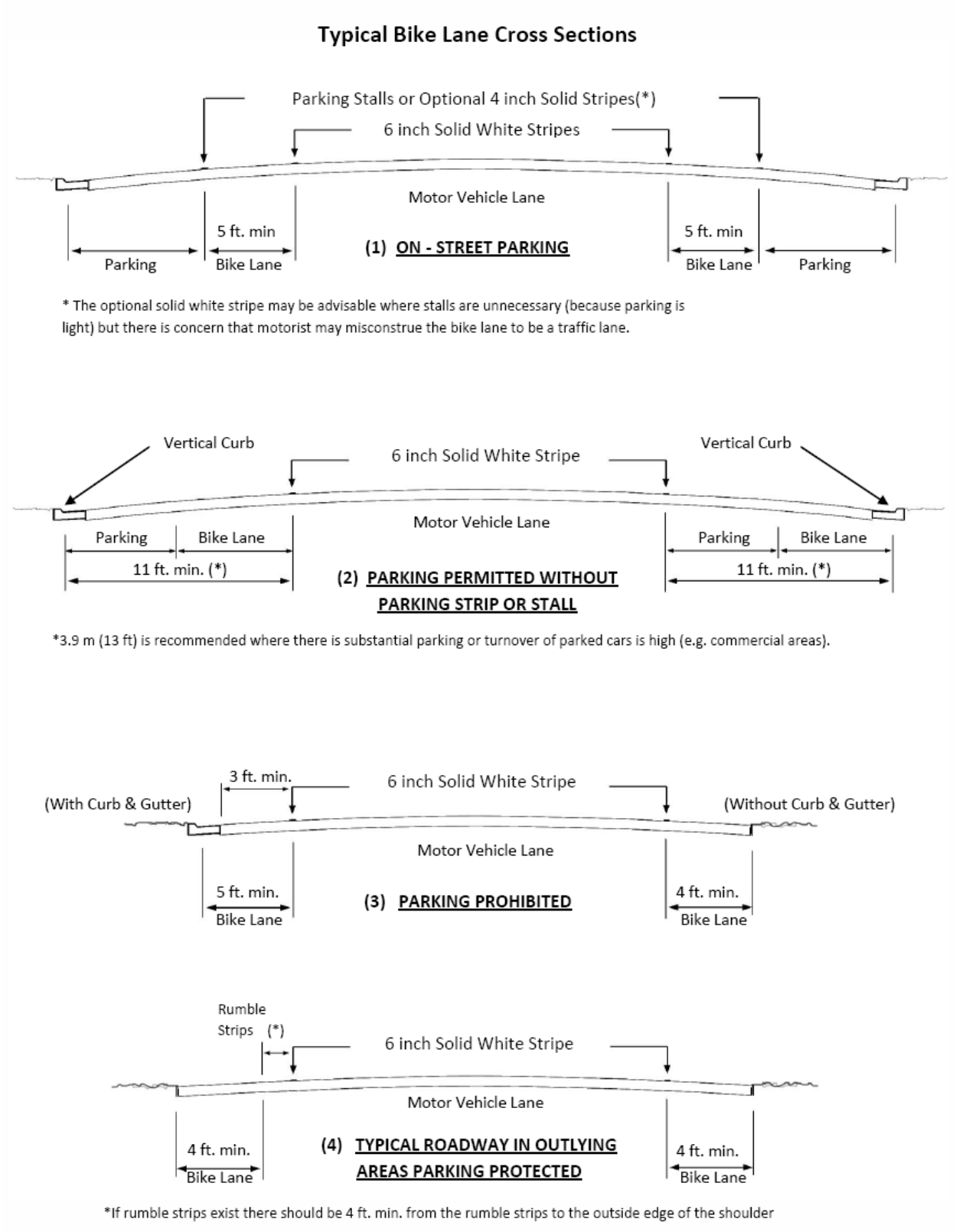


FIGURE 2 – TYPICAL BIKE LANES IN RELATION TO ROADWAY
(SOURCE: AASHTO Guide for the Development of Bicycle Facilities)

Bike Lane Location

Bike lanes should never be placed between the parking lane and curb. Bike lanes between the curb and parking lane can create a variety of obstacles for bicyclists: opening car doors and poor visibility at intersections and driveways and they prohibit bicyclists from making left turns. Figure 3(3) depicts a bike lane along the outer portion of an urban curbed street where parking is prohibited. The recommended width of a bike lane is 5 feet (1.5m) from the face of a curb or guardrail to the bike lane stripe. This 5-foot (1.5-m) width should be sufficient in cases where a 1-2 foot (0.3-0.6 m) wide concrete gutter pan exists, given that a minimum of 3 feet (0.9 m) of rideable surface is provided, and the longitudinal joint between the gutter pan and pavement surface is smooth. The width of the gutter pan should not be included in the measurement of the rideable or usable surface, with the possible exception of situations where an extra wide, smoothly paved gutter pan that is 4 feet (1.2 m) wide is used as a bike lane. If the joint is not smooth, then 4 feet (1.2m) of rideable surface should be provided.

Since bicyclists usually tend to ride a distance of 32-40 inches (0.8-1.0 m) from a curb face, it is very important that the pavement surface in this zone be smooth and free of structures. Drain inlets and utility covers that extend into this area may cause bicyclists to swerve, and effectively reduce the usable width of the lane. Where these structures exist, the bike lane width may need to be adjusted accordingly. Figure 3(4) depicts a bike lane on a roadway in an outlying area without curbs and gutters. This location is in an undeveloped area where infrequent parking is handled off the pavement. Bike lanes should be located within the limits of the paved shoulder at the outside edge. Bike lanes may have a minimum width of 4 feet (1.2 m), where the area beyond the paved shoulder can provide additional maneuvering width. A width of 5 feet (1.5 m) or greater is preferable and additional widths are desirable where substantial truck traffic is present, or where motor vehicle speeds exceed 50 mph (80 km/h).

A bike lane should be delineated from the motor vehicle travel lanes with a 6-inch (150-mm) solid white line. Some jurisdictions have used an 8-inch (200-mm) line for added distinction. An additional 4-inch (100-mm) solid white line can be placed between the parking lane and the bike lane (see Figure 4). This second line will encourage parking closer to the curb, providing added separation from motor vehicles and, where parking is light, it can discourage motorists from using the bike lane as a through travel lane.

Bike Lane Surface Conditions

Bike lanes should be provided with adequate drainage to prevent ponding, washouts, debris accumulation and other potentially hazardous situations for bicyclists. The drainage grates should be bicycle-safe. When an immediate replacement of an incompatible grate is not possible, a temporary correction of welding thin metal straps across the grates perpendicular to the drainage slots at 4-inch (100-mm) center-to-center spacing should be considered. A smooth riding surface should be provided and utility covers should be adjusted flush with the surface. Raised pavement markings and raised barriers can cause steering difficulties for bicyclists and should not be used to delineate bicycle lanes.

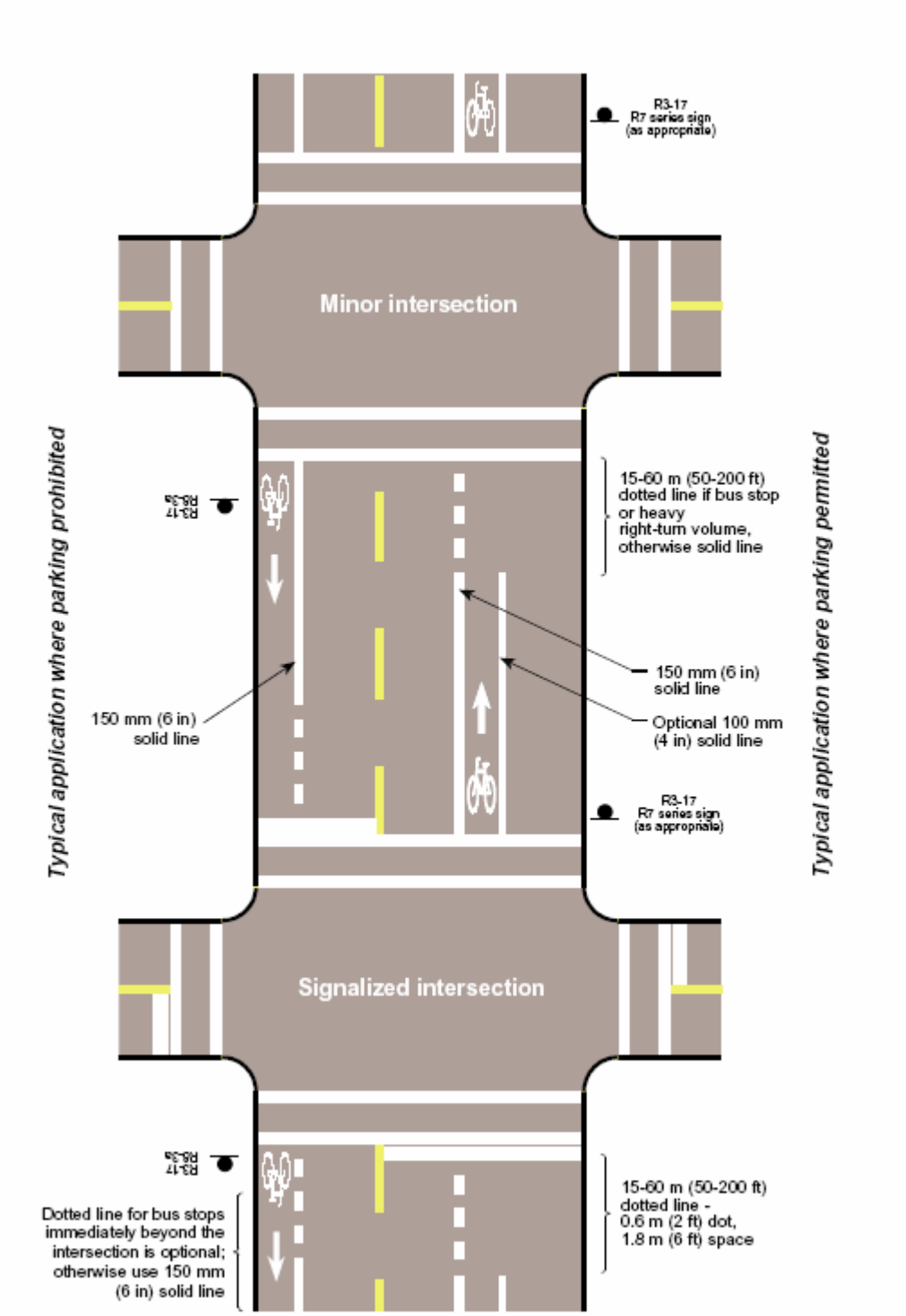


FIGURE 3: TYPICAL PAVEMENT MARKINGS FOR BIKE LANE ON TWO LANE STREET

(SOURCE: AASHTO Guide for the Development of Bicycle Facilities)

Bike Lanes at Intersections

A few basic principles come into play when designing bike lanes at street intersections. First, the path for cyclists should be direct, logical and close to the path of motor vehicle traffic. Bicycles should proceed through the intersection as pedestrians only in rare cases. Secondly, bicyclists should be visible and their movements should be predictable. Third, bike lanes should be carried to a marked crosswalk or a point where turning vehicles would normally cross them, and then resume at the other side of the intersection.

Bike lane striping should not be installed across any pedestrian crosswalks, and, in most cases, should not continue through any street intersections. If there are no painted crosswalks, the bike lane striping should stop at the near side cross street property line extended and then resume at the far side property line extended. The only exception to this caveat might be the extension of dotted guidelines through particularly complex intersections or multi-lane roundabouts. The same bike lane striping criteria apply whether parking is permitted or prohibited in the vicinity of the intersection. At signalized or stop-controlled intersections with right-turning motor vehicles, the solid striping to the approach should be replaced with a broken line with 2-foot (0.6-m) dots and 6-foot (1.8-m) spaces. The length of the broken line section is usually 50 feet to 200 feet (15 m to 60 m). Since there are usually small volumes of right-turning motor vehicles at non-signalized minor intersections with no stop controls, solid bike lane striping can continue all the way to the crosswalk on the near side of the intersection. However, if there is a bus stop or high right-turn volume, the 6-inch (150-mm) solid line should be replaced with a broken line with 2-foot (0.6-m) dots and 6-foot (1.8-m) spaces for the length of the bus stop. The bike lane striping should resume at the outside line of the crosswalk on the far side of the intersection. (See Figure 4) If a bus stop is located on a far side of the intersection rather than on a near side approach, the solid white line can also be replaced with a broken line for a distance of at least 80 feet (24 m) from the crosswalk on the far side of the intersection. Figure 4 illustrates typical bike lane striping at intersections without bus stops, at intersections with near side bus stops (right-hand side of the figure) and at intersections with far side bus stops (left-hand side of the figure). At T-intersections with no painted crosswalks, the bike lane striping on the side across from the T-intersection should continue through the intersection area with no break. If there are painted crosswalks, the bike lane striping on the side across from the T-intersection should be discontinued only at the crosswalks. (See Figure 5).

Bike Lanes and Turning Lanes

Bike lanes sometimes complicate bicycle and motor vehicle turning movements at intersections. Because they encourage bicyclists to keep to the right and motorists to keep to the left, both operators are somewhat discouraged from merging in advance of turns. Thus, some bicyclists may begin left turns from the right-side bike lane and some motorists may begin right turns from the left of the bike lane. Both maneuvers are contrary to established rules of the road and may result in conflicts; however, these can be lessened by signing and striping. At intersections, bicyclists proceeding straight through and motorists turning right must cross paths. Striping and signing configurations, which encourage crossings in advance of the intersection, in a merging fashion, are preferable to those that force the crossing in the immediate vicinity of the intersection. To a lesser extent, the same is true for left-turning bicyclists; however, in this

maneuver, most vehicle codes allow the bicyclist the option of making either a "vehicular style" left turn (where the bicyclist merges leftward to the same lane used for motor vehicle left turns) or a "pedestrian style" left turn (where the bicyclist proceeds straight through the intersection, turns left at the far side, then proceeds across the intersection again on the cross street). (See Figure 6.)

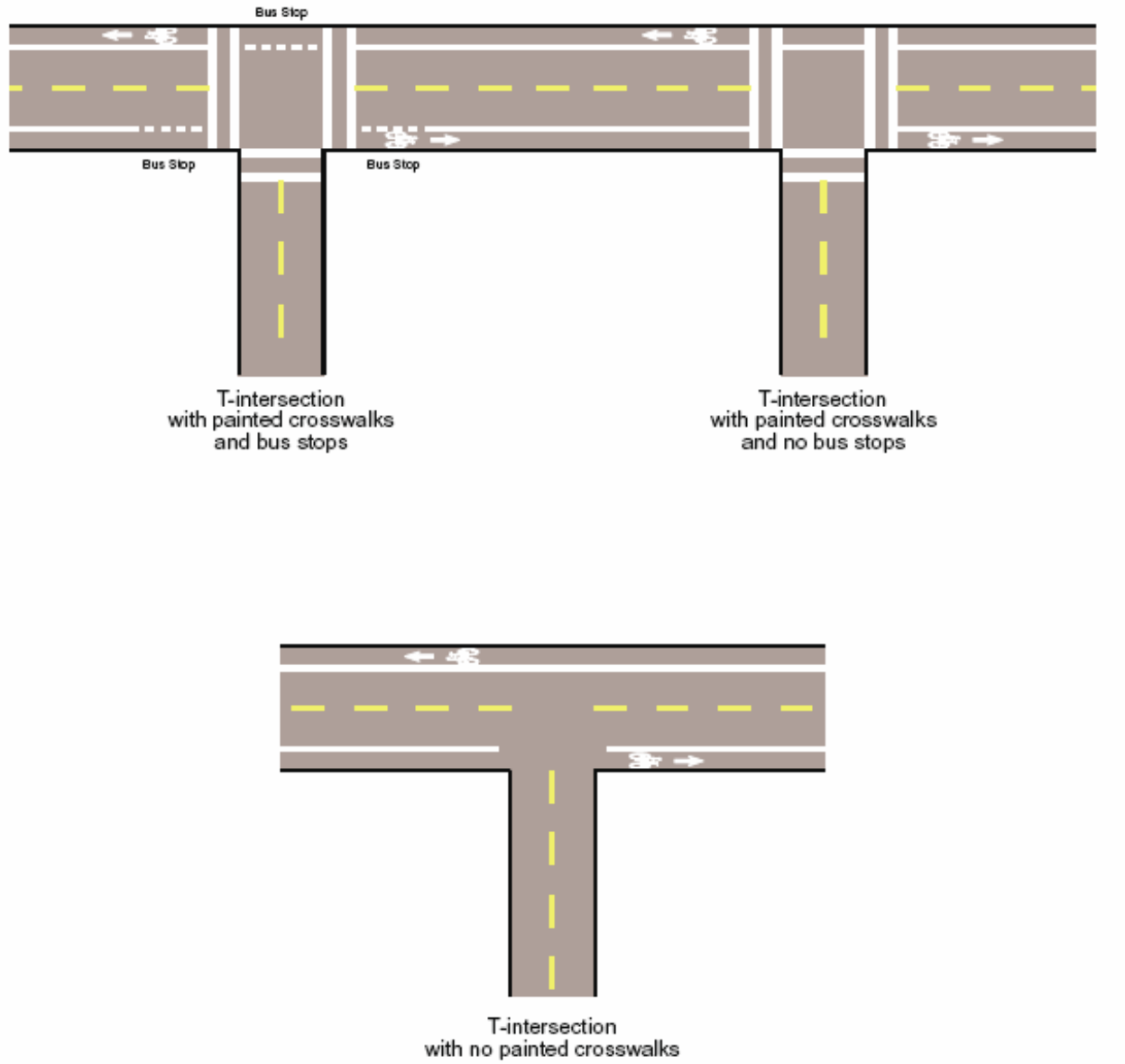


FIGURE 4: TYPICAL BIKE LANE STRIPING AT T-INTERSECTION
(SOURCE: AASHTO Guide for the Development of Bicycle Facilities)

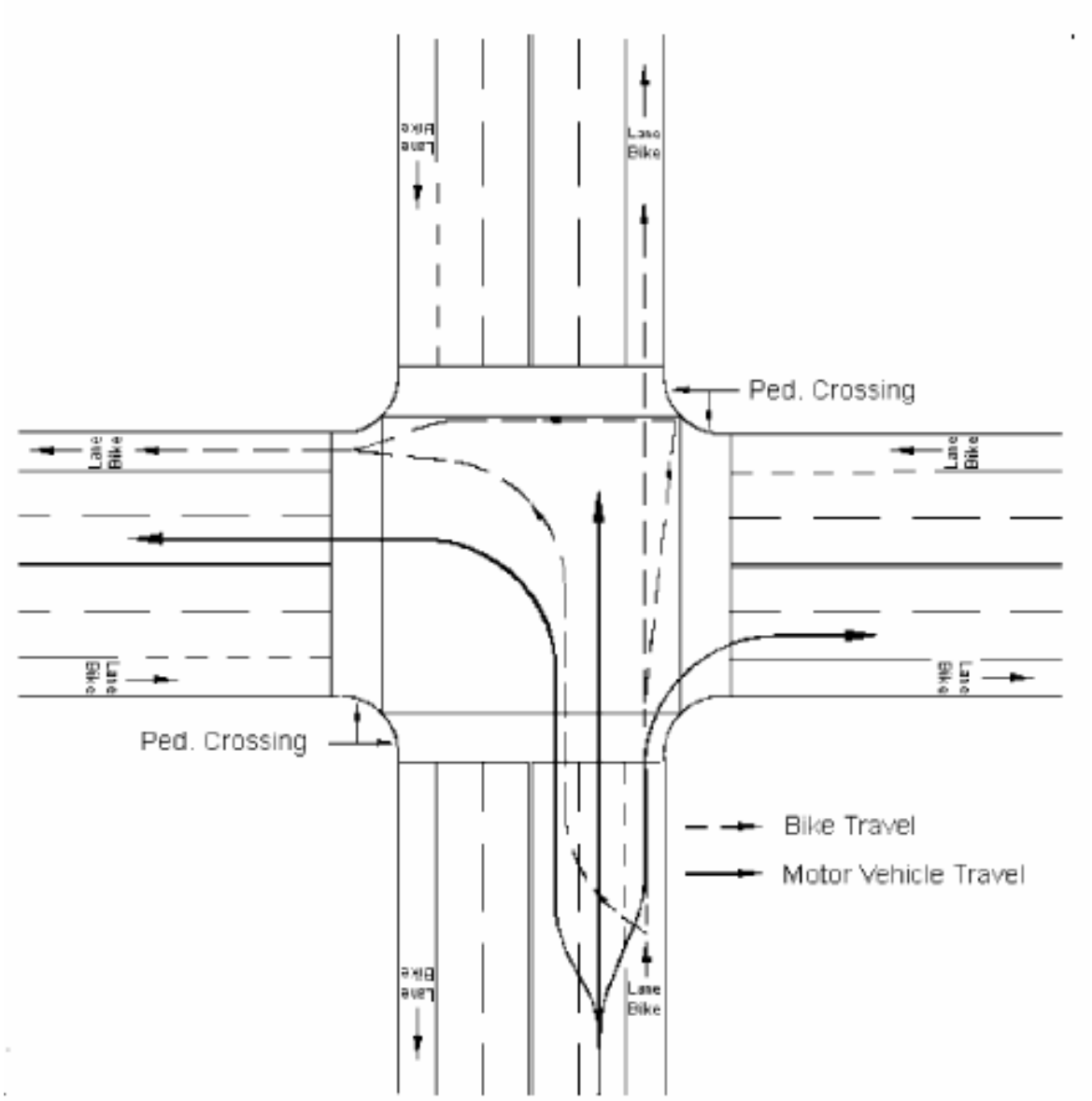


FIGURE 5: TYPICAL BICYCLE AND AUTO MOVEMENTS AT MAJOR INTERSECTIONS
(SOURCE: AASHTO Guide for the Development of Bicycle Facilities)

Pavement Marking

Figure 7 presents optional treatments for pavement markings where a bike lane approaches a motorist right-turn-only lane (or lanes). Where there are numerous left-turning bicyclists, a separate turning lane can also be considered. The design of bike lanes should also include appropriate signing at intersections to warn of conflicts. General guidance for pavement marking of bike lanes is contained in the MUTCD 2. The approach shoulder width should be provided through the intersection, where feasible, to accommodate right-turning bicyclists or bicyclists who prefer to use crosswalks to negotiate the intersection. Intersections with throat widening at

approaches that provide an exclusive left-turn bay can also provide an exclusive right-turn lane for motor vehicles. In those cases where throat widening has reduced the available pavement width below the minimum requirements for bike lane operation and it is not possible to widen the pavement, the bike lane striping should be discontinued following a regulatory sign. Bicyclists proceeding straight through the intersection should be directed to merge with motor vehicle traffic to cross the intersection. (See Figure 8.) Where sufficient width exists, a separate through bike lane should be placed to the right of the through lane as shown in Figure 7.

Bike Lane Symbols

On streets that do not have separate bicycle lanes, but are designated as "Signed-Shared Routes", signs should be placed every ¼ mile, at every turn and at all signalized intersections. Figure 9 illustrates one possible sign and the spacing.

A bike lane should be painted with standard pavement symbols to inform bicyclists and motorists of the presence of the bike lane. The standard pavement symbols are one of two bicycle symbols (or the words "BIKE LANE") and a directional arrow. (See Figure 10.) These symbols should be painted on the far side of each intersection. (See Figure 11) Additional stencils may be placed on long, uninterrupted sections of roadway. All pavement markings are to be white and reflectorized. The Preferential Lane Symbol ("diamond") previously used as a pavement marking and on signs to show preferential use by different classes of vehicles should no longer be used for bikeways, due to the confusion with the use of the diamond for High Occupant Vehicle (HOV) lanes, and the misinterpretation of the diamond as a two-way arrow. These symbols should be eliminated through normal maintenance practices.

Railroad Crossings

Railroad-highway grade crossings should ideally be at a right angle to the rails. This can be accomplished either as a separate path or a widened shoulder, as shown in Figure 12. As the angle of the crossing deviates from this ideal crossing angle, the potential for a bicyclist's front wheel to be trapped in the flangeway increases, which can lead to a loss of steering control. If the crossing angle is less than approximately 45 degrees, an additional paved shoulder of sufficient width should be provided to permit the bicyclist to cross the track at a safer angle, preferably perpendicularly. Where this is not possible, and where train speeds are low, commercially available compressible flangeway fillers may enhance bicyclist operation. It is also important that the roadway approach be at the same elevation as the rails. Consideration should be given to the crossing surface materials and to the flangeway depth and width. Rubber or concrete crossing materials are longer lasting than wood or asphalt and require less maintenance. Warning signs and pavement markings should be installed in accordance with the MUTCD2.

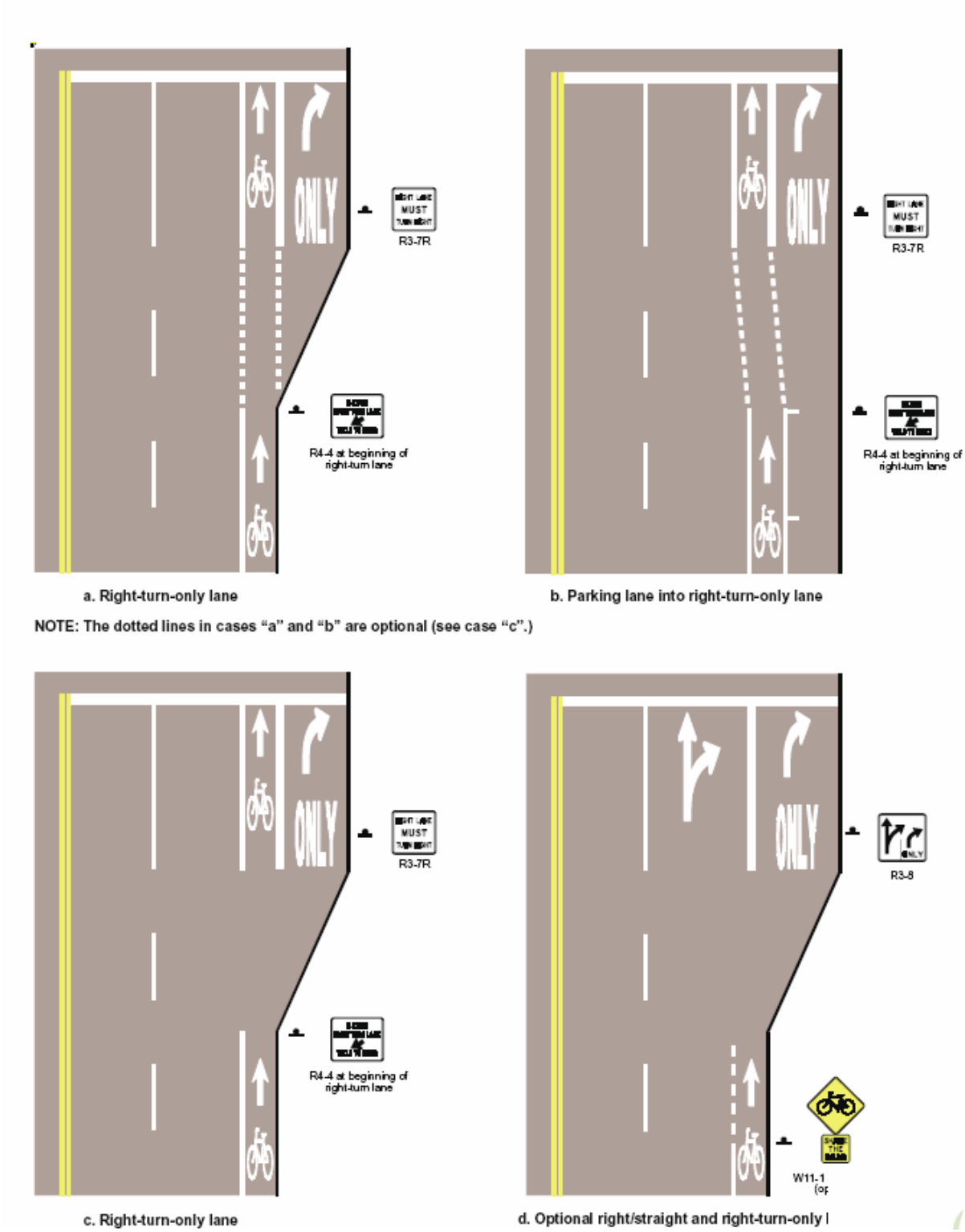


FIGURE 6: BIKE LANES APPROACHING RIGHT-TURN-ONLY LANES
(SOURCE: AASHTO Guide for the Development of Bicycle Facilities)

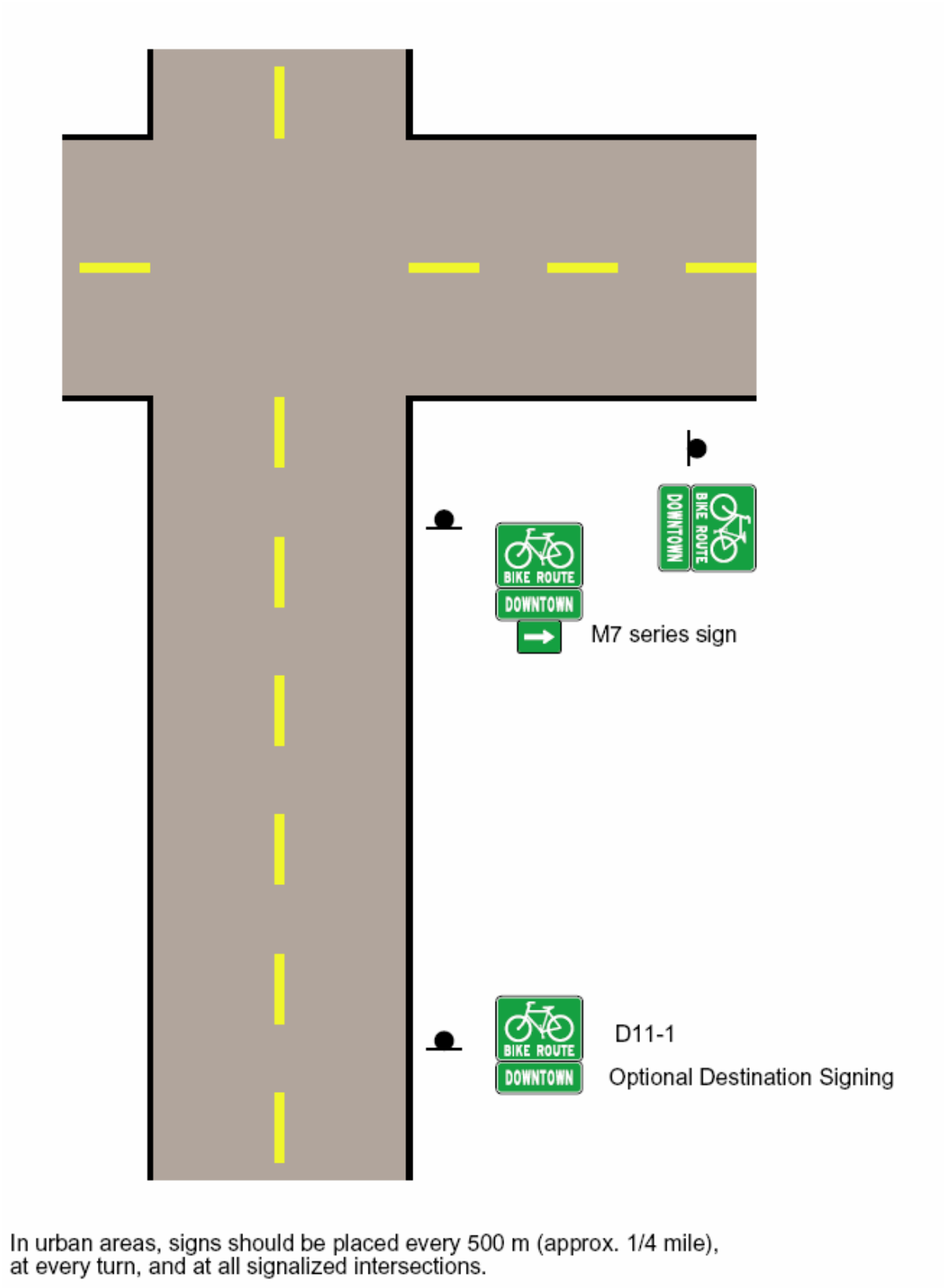


FIGURE 7: TYPICAL SIGNED SHARED ROUTE SIGNING

(SOURCE: AASHTO Guide for the Development of Bicycle Facilities)

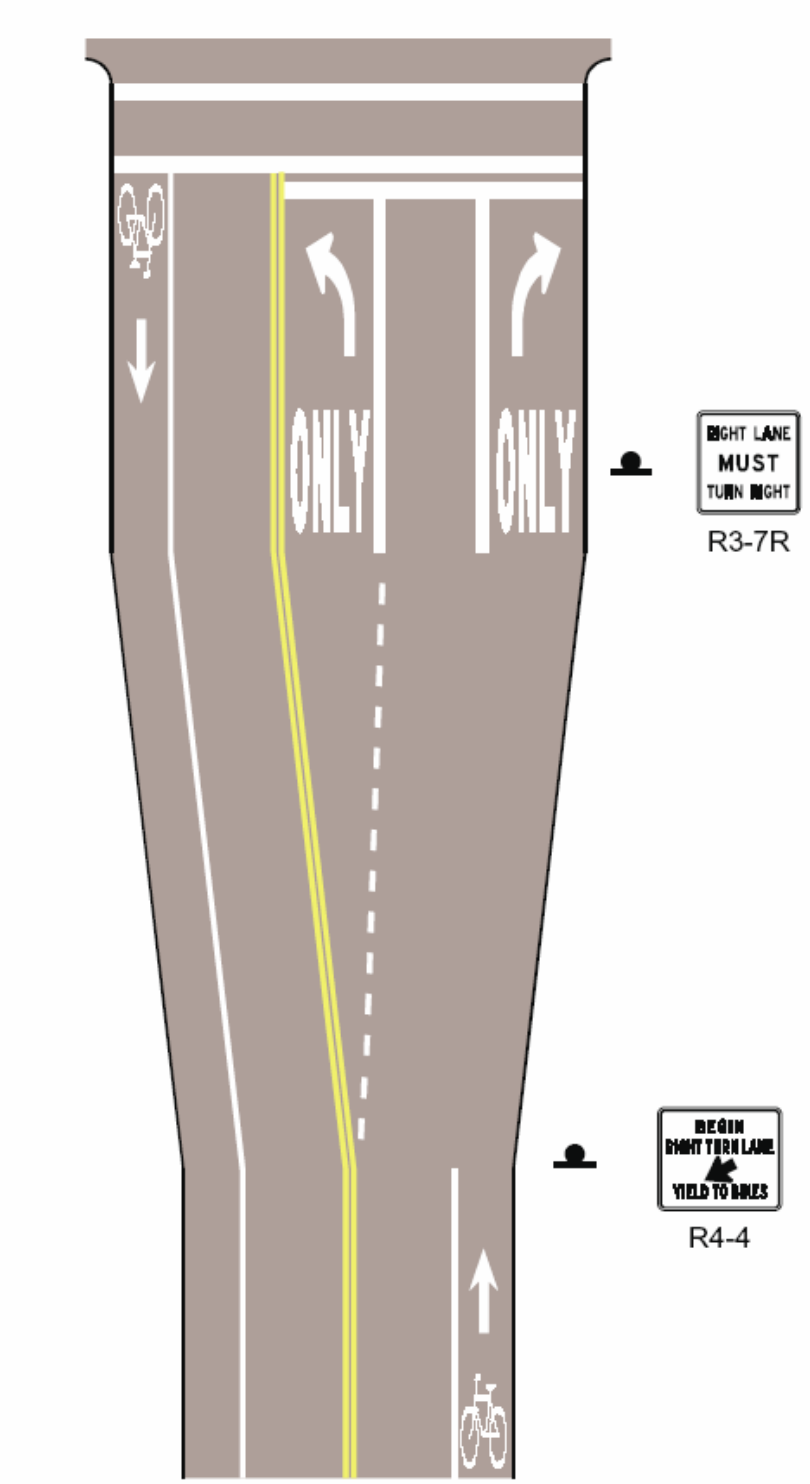


FIGURE 8: BIKE LANE APPROACHING AN INTERSECTION WITH THROAT WIDENING
(SOURCE: AASHTO Guide for the Development of Bicycle Facilities)

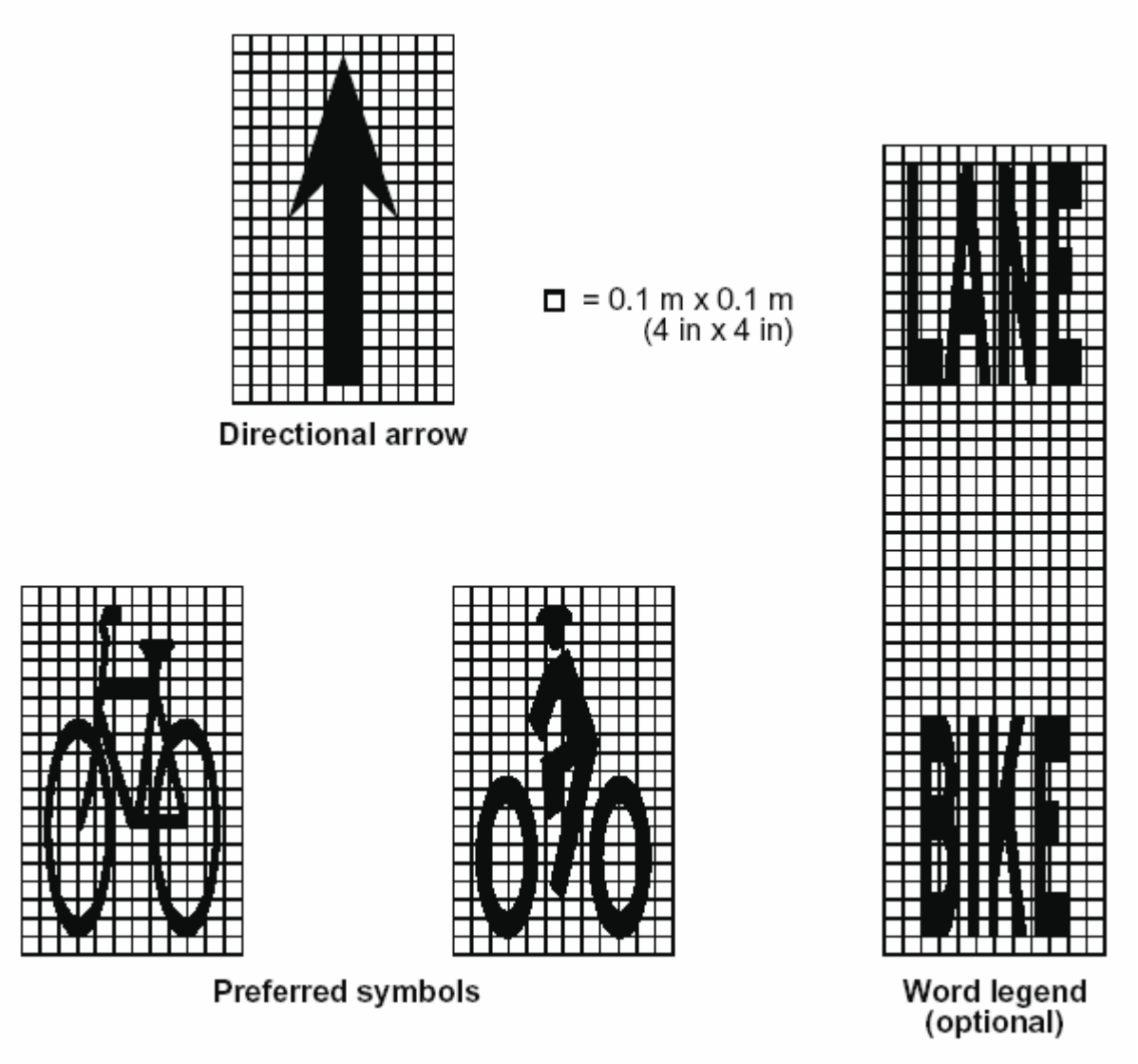


FIGURE 9: TYPICAL BIKE LANE SYMBOLS
(SOURCE: AASHTO Guide for the Development of Bicycle Facilities)

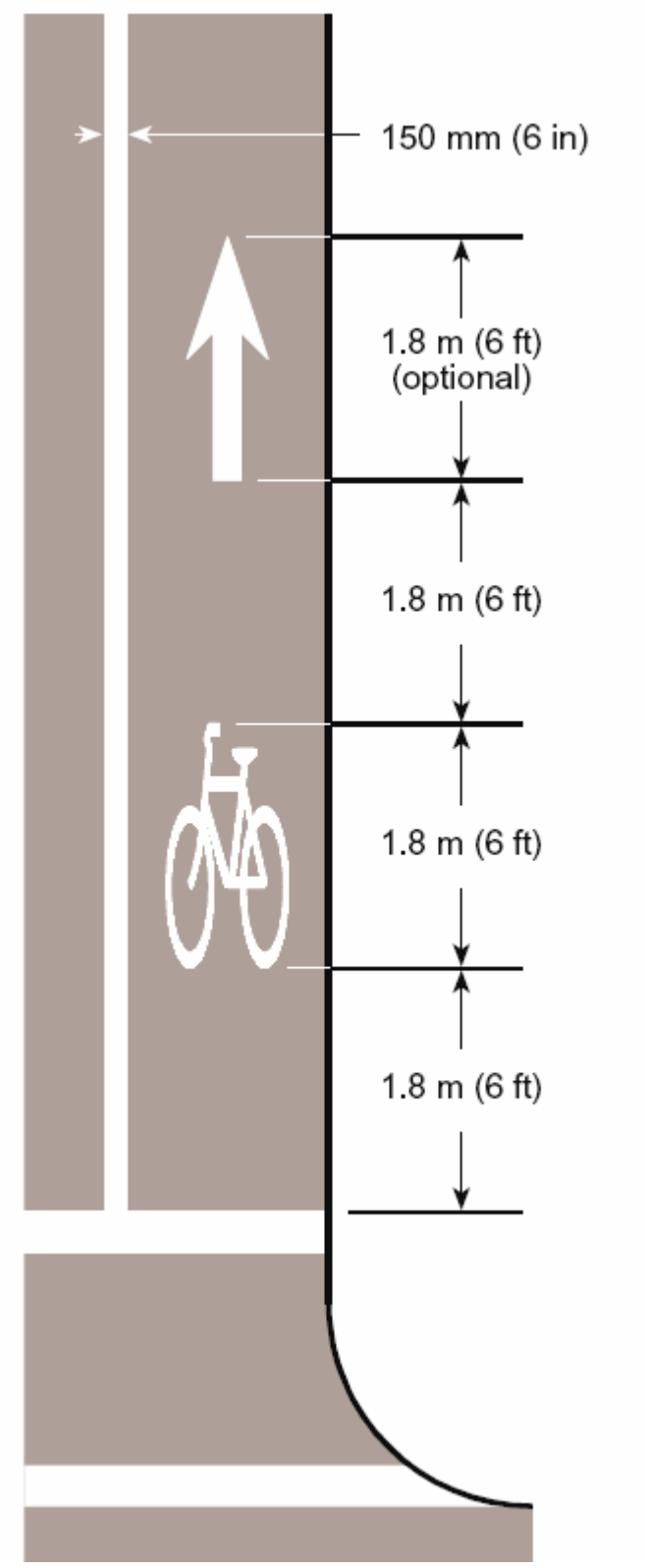


FIGURE 10: TYPICAL BIKE LANE MARKING ON FAR SIDE OF INTERSECTION

(SOURCE: AASHTO Guide for the Development of Bicycle Facilities)

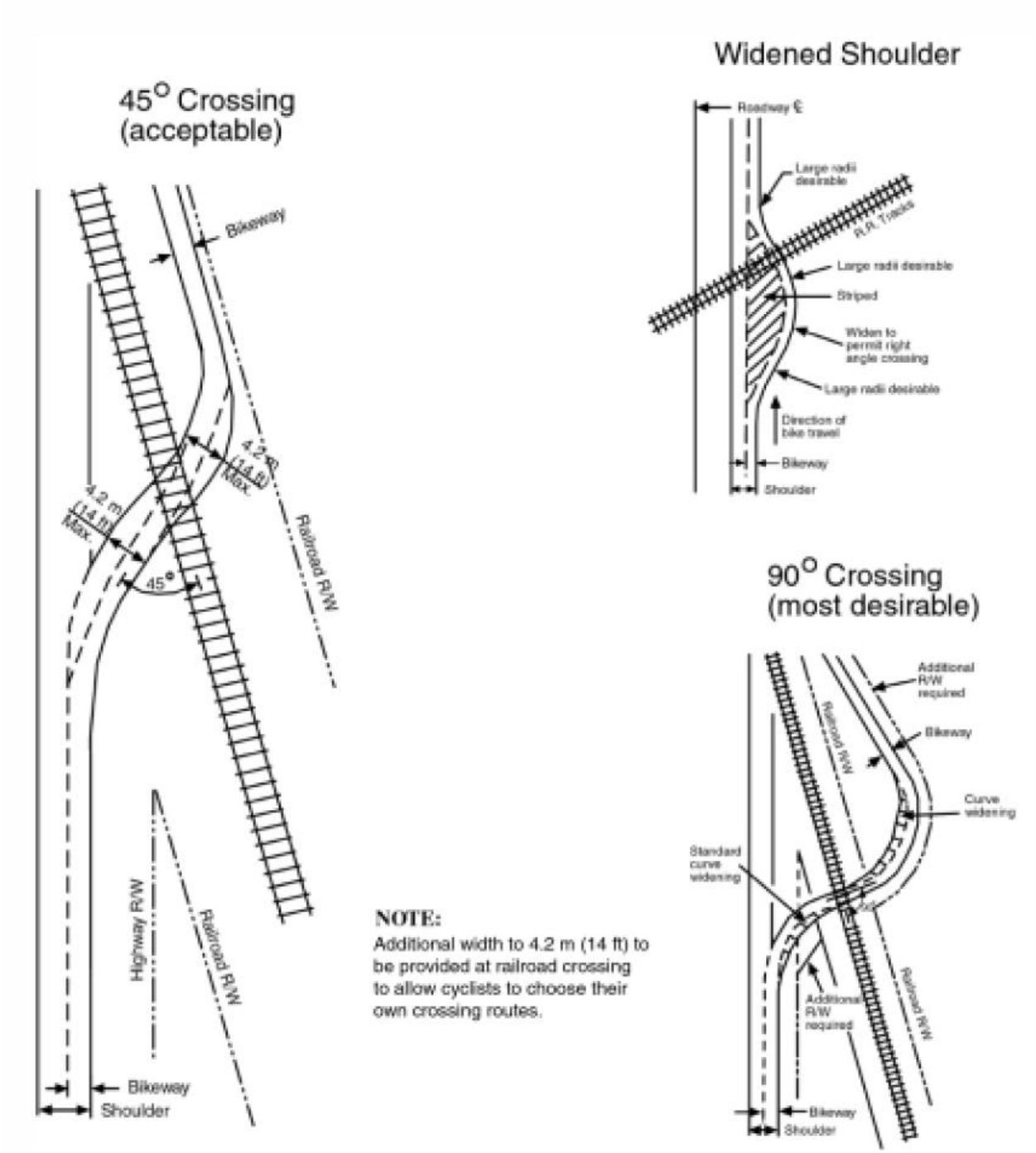


FIGURE 11: RAILROAD CROSSING LAYOUTS
(SOURCE: AASHTO Guide for the Development of Bicycle Facilities)

Figure 12 presents the existing bicycle lanes and Greenway paths that have been created in Germantown along with bicycle lanes recommended by the Metropolitan Planning Organization's Long Range Transportation Plan. It also proposes lanes that will create the network described above.

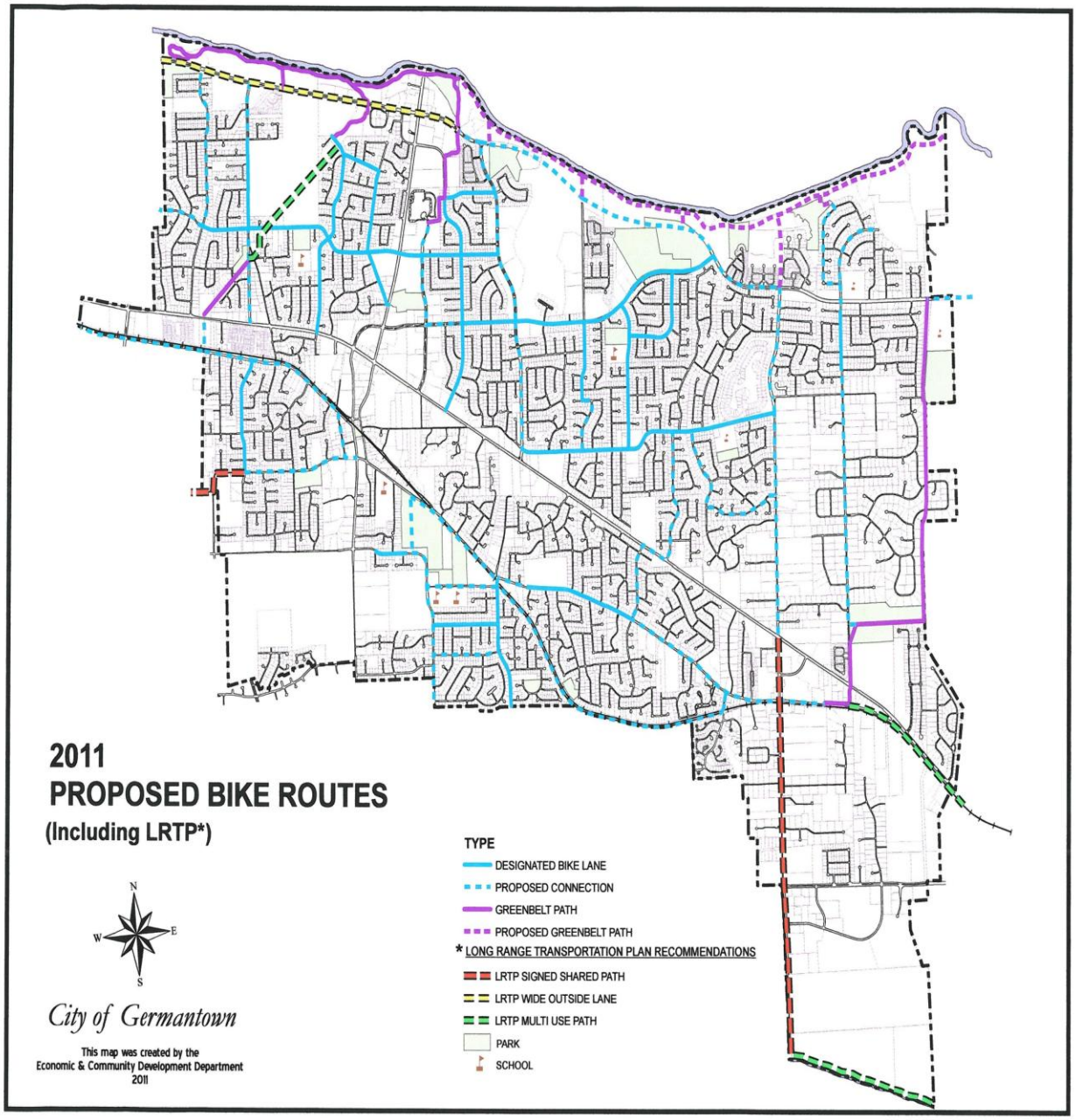


FIGURE 13: SHARED USE PATH

FIGURE 14: SHARED USE PATH

FIGURE 15:
SHARED USE PATH CROSSING A PRIVATE DRIVE

FIGURE 16:
SHARED USE PATH CROSSING A PRIVATE DRIVE

FIGURE 17: BICYCLE LANE AND SIGN

FIGURE 18: BICYCLE LANE AND SIGN