CITY OF LAUREL

BIKEWAY MASTER PLAN

Adopted – September 2009
Updated March 2016
Updated April 2026

DRAFT

PREFACE

In recognition of the City of Laurel's increasingly mobile population, its many retail offerings, and expansive public park system, the City established a vision to provide a safe and viable means for pedestrians and cyclists to safely and easily navigate City streets. Based on this vision, City Staff were directed to develop a Bikeway Master Plan that builds new bikeways and utilizes existing roadways in a shared manner to accommodate bicyclists the same way that existing sidewalk repair and augmentation programs aid pedestrians. Therefore, with the opportunity to see this vision fulfilled, the draft of the Bikeway Master Plan was presented to the citizens for public comment in summer 2009. Later in September 2009, the Mayor and City Council of Laurel officially approved and adopted the "City of Laurel Bikeway Master Plan." While the Plan involves modifying many of the City's streets, Fourth Street, which connects the City's two most used parks, served as the beginning path for the Plan.

Through the years of implementation, there is now a total of approximately seven (7) lane miles of bikeways in the City. The Cherry Lane Bikeway project is under grant agreement with the Maryland Department of Transportation (MDOT) Bikeway Program. Future bikeways will occur as budgets permit. The adopted Bikeway Master Plan will be an adjunct to the City's Master Plan, the Capital Improvement Program (CIP), and will be part of the Adequate Public Facilities review for all future developments.

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1. Introduction - What is a Bikeway Plan?

A bikeway plan, at its core, consists of establishing and maintaining infrastructure and the culture for the bicycling mode of transportation, much like the city's roadway network for cars or the system of sidewalks and crosswalks for pedestrians. A bikeway is any street, trail, or shared-use path that has been designated for allowing and accommodating bicyclists. The infrastructure serves as a means of safe and efficient transportation and parking for cyclists. The goal of this bikeway plan is to provide a roadmap and design guide for implementing this infrastructure within the City of Laurel to allow bicyclists in any neighborhood to safely and comfortably reach any other City neighborhood as well as reach any City park, school or retail core area. Criteria for selected bikeways are outlined with a mathematical approach to maximizing travel efficiency and user safety. Design guidelines and policy recommendations are also addressed.

2. Why Having One?

Laurel is a dense city with a population estimated near 30,000 residents occupying a total area of approximately 4.8 square miles. Despite this growth, it remains a city rich in public amenities, including over 200 acres of parkland, two city pools, and multiple public/private schools, in addition to multiple commercial and retail centers. Given Laurel's compact nature, its small width, and the central location of many destinations (parks, core retail), it is an ideal candidate for integrating bikeways into its transportation infrastructure. Many destination-based bike trips within the city can still be completed in under 15 minutes, a timeline that often proves faster than driving, depending on prevailing traffic congestion.

From a traffic capacity perspective, incorporating bikeways is far more efficient than perpetually expanding roadways. Excess vehicle capacity from roadway widening projects is quickly consumed by new upstream developments or by motorists seeking the most efficient route, leading to a rapid return of pre-existing traffic congestion levels. However, bike lanes require significantly less asphalt and right-of-way than vehicle lanes. Furthermore, bicycle parking is highly efficient: a single standard vehicle parking space (9 ft. by 20 ft.) can accommodate parking for 10 bicycles.

The establishment of a dedicated and safe bikeway network would lead to increased cycling and a substantive reduction in traffic congestion both within and surrounding the City of Laurel. While approximately one-third (35%) of all car trips in the United States are less than two miles, only about 1% of all trips utilize a bicycle (FHWA, 2021). Congestion is directly related to vehicle volume, but this relationship is highly non-linear. Highway capacity analysis demonstrates that once traffic volume nears a critical threshold, each additional vehicle creates a disproportionately greater impact on delays. In an urban environment characterized by closely spaced intersections and traffic signals, even a slight reduction in vehicle volume achieved by shifting short car trips to bikes can prevent traffic volumes from reaching this critical level, thus drastically mitigating the onset of massive delays versus minor slowdowns. Figure 1 shows the nominal relationship between vehicle volume and congestion/delay.

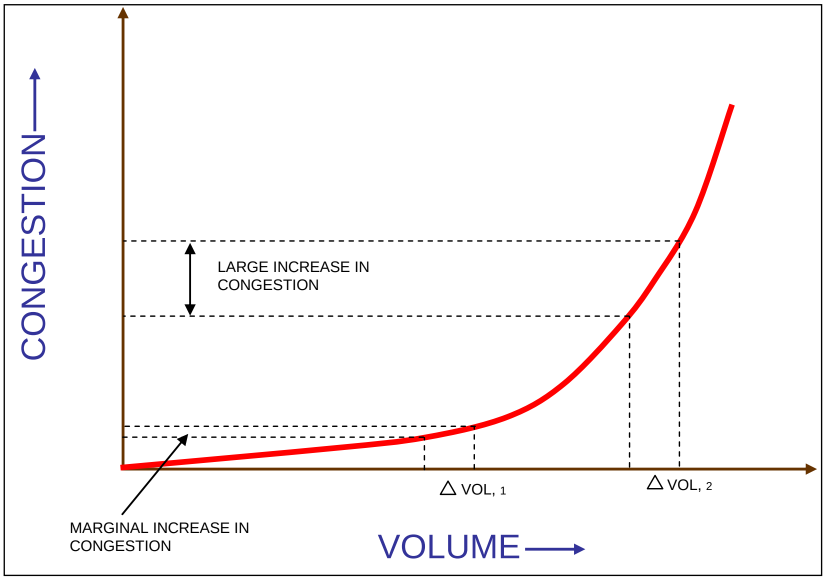


Figure 1: Illustration showing the effect of incremental vehicle volume on congestion.

As shown in the figure above, additional vehicles (□ vol_1) result in only marginal increases in congestion when overall volume is low, but at higher volumes, the same number of additional vehicles (□ vol_2) result in a much higher increase in congestion (delay). Once traffic volume reaches a critical level, *taking these added vehicles off roadways by providing biking as an alternative* can prevent massive delays to motorists.

Finally, biking is far healthier and cheaper than driving. Biking requires no fossil fuel or other external energy generation. It results in no air/noise pollution. The cost of bike ownership (initial purchase, fuel, repair costs and insurance) is negligible compared to passenger vehicles.

In sum, a bikeway plan provides:

- A safe and efficient connection between neighborhoods and Laurel's numerous City parks and other public facilities or retail.
- A continuous link with other surrounding jurisdictions' existing or planned bikeways.
- Efficient use of existing infrastructure and right-of-way to maximize vehicle (car and bike) capacity.
- A reduction in vehicle traffic congestion.
- A reduction in air and noise pollution.
- A healthier, fitter populace.
- An opportunity for more personal interaction among neighbors.

3. Bikeway Infrastructure Elements and Design Guidelines

A Bikeway Transportation Plan provides guidelines for development of infrastructure network that allows bikers to move safely and efficiently from point A to point B, much like sidewalk for pedestrians or paved roads for vehicles. The Guide for Development of Bicycle Facilities by the American Association of State Highway Transportation Officials (AASHTO) provides the technical foundation for designing bike facilities. Other jurisdictions, locally and nationwide, have published *Best Practices* and *Lessons Learned* reports that provide additional support information. Also utilized in the development of the Bikeway Plan is the City's database of road characteristics, which include vehicle speed and average daily traffic volume.

The main infrastructure elements of a Bikeway infrastructure are:

3.1 Off-roadway paths or trails

Multiple-use trails accommodate several user types such as pedestrians, bicyclists, skaters, etc., and are physically separated from vehicular traffic. Off-roadway trails surround Gude Lake, for example.

3.2 Hiker/Biker Trail

A hiker/biker trail is a trail that runs parallel with a street and is part of the street's right-of-way. The infrastructure can be a stand-alone bike/pedestrian path, similar to the one along the east side of Van Dusen Road, south of the Fire Station. See Figure 2. Typically, 10 feet in width, as opposed to standard 4' wide pedestrian paths, these paths can accommodate pedestrians and bicyclists simultaneously. The paths are usually separated from the roadway by a median, as shown in Figure 2.

Figure 2: Photo of Side Path on Van Dusen Road

For long stretches of uninterrupted travel, side paths are safer than riding in the street. However, at intersections with streets, the offset distance of the side path can put a bicyclist out of a turning motorist's field of vision. See Figure 3 for example.

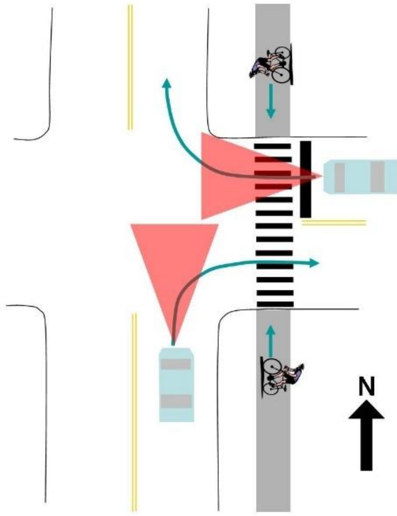
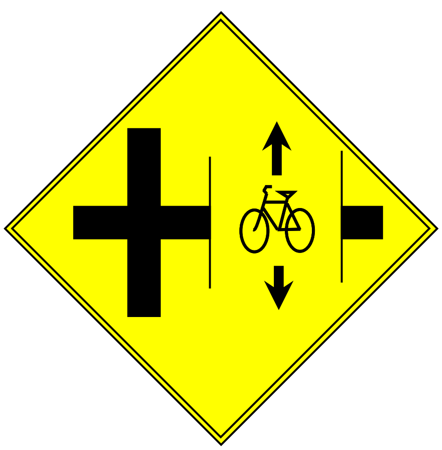


Figure 3: Illustration of potential conflicts with turning vehicles and bicyclists on side paths.

As shown in Figure 3, a northbound motorist turning right may not see a bicyclist on their passenger side, because the bicyclist isn't in the direct field of vision. The same is true for the westbound turning driver, who is more concerned with on-coming vehicles on their left. Because of this inherent flaw at intersections, side paths should be discouraged where possible and should be limited to long stretches of busy streets that have few side streets or driveways.

One way to mitigate the problem of using hiker/biker trail at intersections is to modify curb geometry at the intersection to have sharper turns. The sharper turns force slower right-turn movements, enabling a better chance of seeing a nearby parallel bicyclist. Another method is to install the side paths as close to the curb face as possible, so that cyclists are more likely to be in drivers' field of vision. Still another method of drawing a motorist's attention is to install large high-visibility crosswalks at these intersections and incorporate signage such as the type shown in Figure 4.



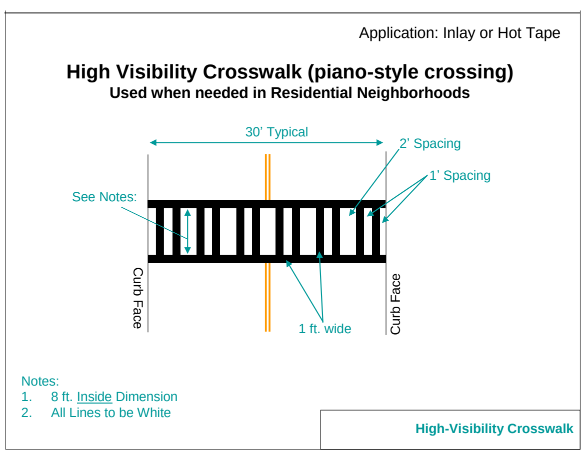


Figure 4: Side path Signage and Laurel-standard high-visibility crosswalk

3.3 Striped Bike Lanes

Striped in-roadway bike lanes are more common than paths, particularly in urban areas where right-of-way is limited. Bike Lanes utilize existing infrastructure (i.e. roads) in a shared manner for both cars and bikes. For roadways that are wide enough, striping-out designated Bike Lanes is a simple cost-effective method for installing designated bike-only infrastructure. A bike-only lane marking is shown in Figure 5.

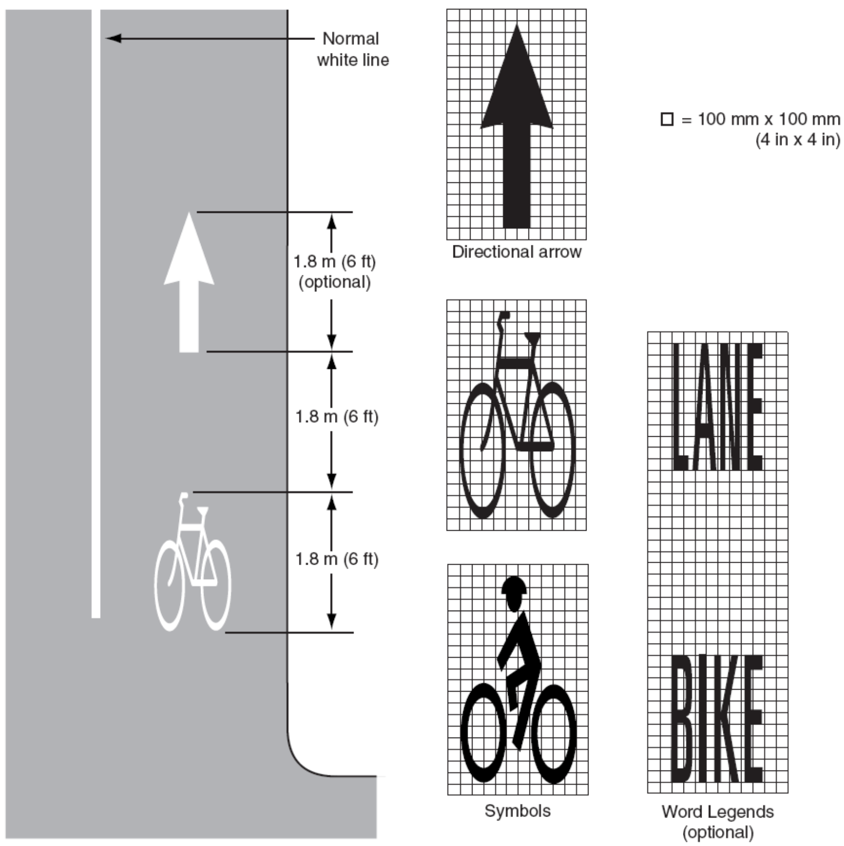


Figure 5: Standard Bike Lane pavement markings. (Source: MUTCD, Ch. 9).

Bike lanes should be a minimum of five (5) feet in width from a curb face to the solid lane divider. Because a bike lane usually encompasses a concrete gutter pan, regular street-sweeping is needed to ensure safe travel. Moving or parked vehicles are prohibited from bike lanes. Striped bike lanes provide a visual separation between vehicle traffic and bike traffic. In addition, striping an existing roadway for a bike-lane narrows the travel way for vehicles, which has a traffic-calming effect on the road segment, resulting in lower average vehicle speeds.

Stripped bike lanes are feasible on travel lanes that are a minimum of 16 feet wide in each direction with no side-street parking. However, travel lanes are not always wide enough for a bike lane, because the road is simply not wide enough or because on-street parking cannot be removed. In these instances, there are other measures available for marking a roadway.

3.4. Combined Biking/Parking Lane

Many residential roadways have wide lanes that allow on-street parking, but it only gets utilized during special occasions. In order to maintain the ability to park yet still provide a safe travel lane for cyclists, this extra roadway width can be striped as a shared parking/biking lane. This can be done simply by striping a solid white line 7 to 8 feet from the edge of pavement on both sides for biking and the occasional parked car. An example of this type of striping is on Brooklyn Bridge Road, between Dorset Road and Patuxent Road, as shown in Figure 6.

Figure 6: Brooklyn Bridge Road, with shoulders striped for parking

Cyclists would use these shared lanes as they would a bike-only lane, but in the infrequent presence of parked cars they would utilize the vehicle-travel portion of the roadway. The road is signed as a Bike Route (see section 3.6), with no other bike lane signage or pavement markings. A side benefit to this striping is the appearance of a narrow vehicle travel lane, which often translates into reduced overall traffic speeds.

3.5 Signage: "Bike May Use Full Lane"

Roadside signage is also used to provide information to motorists and bicyclists about the way a roadway is designated.

Legally, bicyclists may always use full lanes on residential roads, but they are encouraged to ride on the right side of a lane. However, this sign designation is for special circumstances where the lane width is too narrow to accommodate both vehicles and bikes. This sign location is along 7th Street in Old Town Laurel, where there is on-street parking that reduces the usable travel lane width to approximately 10 feet for both vehicles and bikes.

3.6 Signage: "Bike Route" (with optional destination and direction marker)

This signage designates a travel way as a preferred road for bike users. Optionally, the sign can have a destination marker and/or directional marker, as shown. The AASHTO Guide for the Development of Bike Facilities recommends spacing the signs at 500 meters.

3.7 "Share the Road" Signage

Many roads have a travel lane that is extra wide (but not wide enough for a striped bike lane). These roads that are designated as preferred bike routes can be signed as such and include "Share the Road" signage to reinforce the message that the signed travel-way is available to both vehicles and bikes. Two lane roads that are 30' (Laurel City Code minimum road width) and have no parking are excellent candidates.

3.8 Sharrows

"Sharrows" are shared-lane pavement markings. Where there is on-street parallel parking, sharrows help reduce crashes with doors opening on parked cars, by guiding bicyclists to the proper location away from the reach of a swinging card door. The center of the sharrow marking must be at least 11 feet from the curb face. This will provide a bicyclist who rides in the center of the sharrow enough clearance if a parked car door were to open suddenly.

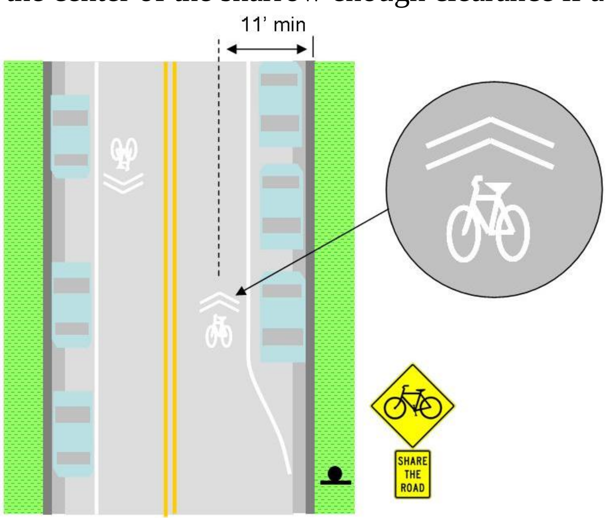


Figure 7: Sharrow Pavement Markings

4. Other Design Guidelines

4.1 Stormwater Drain Grates

Another aspect of utilizing infrastructure is the proper handling of storm-water grates. Storm-water grates are found on the curbside of roads, where bicycle lanes are striped. Older grates have wide grooves that can catch bike tires. Any designated bike route must avoid streets with these types of storm-water grates or replace the grate covers with newer, safer styles (see Figure 8).

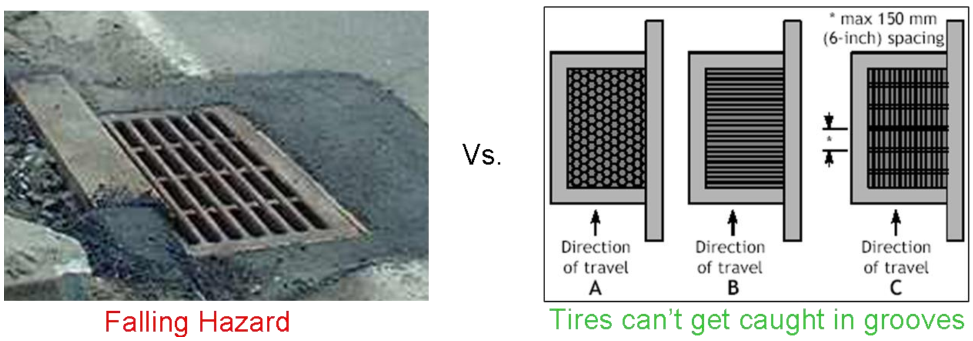


Figure 8: Example of dangerous stormwater grate and improved version

4.2 Bike Racks

A standard hoop rack shape allows for locking both wheels and/or frame to the rack. Each inverted "U" can accommodate 2 bicycles. New bike racks in City Parks will also require a concrete pad to bolt/secure them. Bike racks should be positioned in secure, visible and well-lit areas. Spacing between inverted-"U" racks should be 36" minimum.

As an alternative to standard hoop racks, the city can commission a contest for local artists to design a customized Laurel bike rack that can be installed at City Parks.

4.3 Traffic Calming

Vehicle speed plays a large role in bicyclists' level of comfort on shared- use roads and on-street dedicated bike lanes. One way to reduce vehicle speeds on roadways is through traffic calming. Traffic calming involves physical changes to the roadway to make speed and aggressive driving difficult or impossible. There are two types of geometric changes to a roadway to slow down vehicles' vertical changes, such as speed bumps and speed humps; and horizontal changes such as lane constrictions and traffic circles. The City of Laurel has enacted traffic calming measures on several neighborhood collector roads. Horizontal measures include:

1. Traffic circles (see Figure 10),
2. Chicanes,
3. Chokers,
4. Bump-outs
5. Center-island medians.

An illustration of chicanes, chokers and center-island medians is shown in Figure 9. A bulb-out is similar to a choker, but is much smaller and is applied at intersections instead of at mid-block.

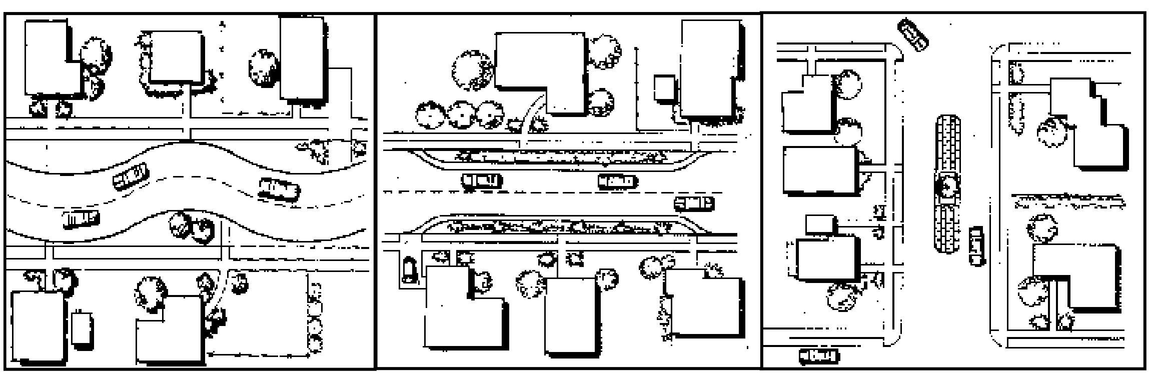


Figure 9: Schematic of Chicane, Choker, and Center-island median, respectively. (Source: Institute of Traffic Engineers)

Of these traffic calming devices, the City of Laurel has constructed, or has planned for near-term construction, all of the above-listed measures except for *chicanes*. Studies have shown that traffic calming encourages pedestrian and bicyclist travel (Clarke and Dornfeld, FHWA, 1994).

Figure 10: Traffic Circle at Intersection of Montrose Ave and Harrison Dr.

5. Roadway Segment Data and Bicycle Level of Service (BLOS)

Seventeen (17) roads have been designated as potential Bikeways. These roads were chosen to connect neighborhoods with parks, commercial centers, and other neighborhoods in a way that maximizes BLOS and avoids traveling on State-maintained roadways that have high vehicle volumes and speeds, along with narrow lanes.

BLOS is a method of quantifying the “bike-friendliness” of a particular road. It is not a measure of congestion/capacity like vehicular level of service, but rather it endeavors to determine a cyclist’s comfort level. BLOS grades roads on an A-F scale, similar to vehicle LOS, with an “A” being the safest roadway to ride on, and F being the least comfortable.
BLOS is based on 5 factors:

1. Vehicle Speeds,
2. Vehicle Volumes
3. Shoulder/Bike-Lane Width
4. Pavement Conditions
5. Percent of vehicular traffic that consists of Heavy Vehicles

The two largest factors are vehicles volumes and paved shoulder width. BLOS is a tool to determine the most desirable route connecting communities with neighboring destinations, such as parks, schools, or commercial districts. It can further be used to find, quantify and prioritize deficiencies in a bikeway network. See the following table for BLOS and other roadway information such as Average Daily Traffic (ADT) for the designated bikeway road segments

Table 1: Bike Plan Road Segment Data

Road or Road Segment	BLOS*	Roadway Width	On-Street Parking Allowed	ADT	Shoulder Type and Width
8th Street & St. Mary's Place	B	36'	Both Sides	4,000	None
9th Street	A	24'	Both Sides	2,000	None
Cherry Lane (Van Dusen Road to Route 1)	C	70'	No	20,000	None
Dorset Road	B	36'	Both sides	<2,000	None
Brooklyn Bridge Road	B	40'	Yes	4,200	paved
Harrison Drive	A	44'	Both Sides	900	None
Laurelton Drive	A	36'	Both Sides	900	None
Main Street	C	40'	Both sides	9,700	None
Marshall Ave	A	36'	No	<2,000	None
Sandy Spring Road	C	34' to 42'	Variable	9,600	Paved
Staggers Road	A	36'	Yes	<2,000	None
West Street	C	24'	Both Sides	<2,000	None
Cypress Street (Oxford Drive to Westmeath Drive	C	36' to 42'	Both Sides	4,000	None
Westmeath Drive & Laurel Park Drive	C	24'	Both Sides	3,500	None
White way	A	36'	One side	900	None

5.1 Calculating BLOS

See the following figure for BLOS calculation methodology.

$$BLOS = 0.507 \ln(Vol_{15}/L_n) + 0.199\, SP_t(1+10.38HV)^2 + 7.066(1/PR_5)^2 - 0.005\, W_e^2 + 0.760$$

where:

Vol_{15} = volume of directional traffic in 15 minutes = $(ADT * D * K_d) / (4 * PHF)$

ADT = Average Daily Traffic on the segment

D = Directional Factor

K_d = Peak to Daily Factor

PHF = Peak Hour Factor

L_n = number of directional through lanes

SP_t = effective speed limit = $1.1199 \ln(SP_p-20) + 0.8103$, where SP_p is the posted speed limit

HV = percentage of heavy vehicles (as defined in the 1994 Highway Capacity Manual)

PR_5 = FHWA's 5-point pavement surface condition rating (5=best)

W_e = average effective width of outside through lane:

$W_e = W_v - (10' * OSPA)$ where $W_l = 0$

$W_e = W_v + W_l (1 - 2 * OSPA)$ where $W_l > 0$ & $W_{ps} = 0$

$W_e = W_v + W_l - 2 (10' * OSPA)$ where $W_l > 0$, $W_{ps} > 0$, and a bike lane exists.

W_t = total width of outside lane (and shoulder) pavement

OSPA = fraction of segment with occupied on-street parking

W_l = width of paving between outside lane stripe and edge of pavement

W_{ps} = width of pavement striped for on-street parking

W_v = effective width as a function of traffic volume

$W_v = W_t$ if ADT>4000 veh/day

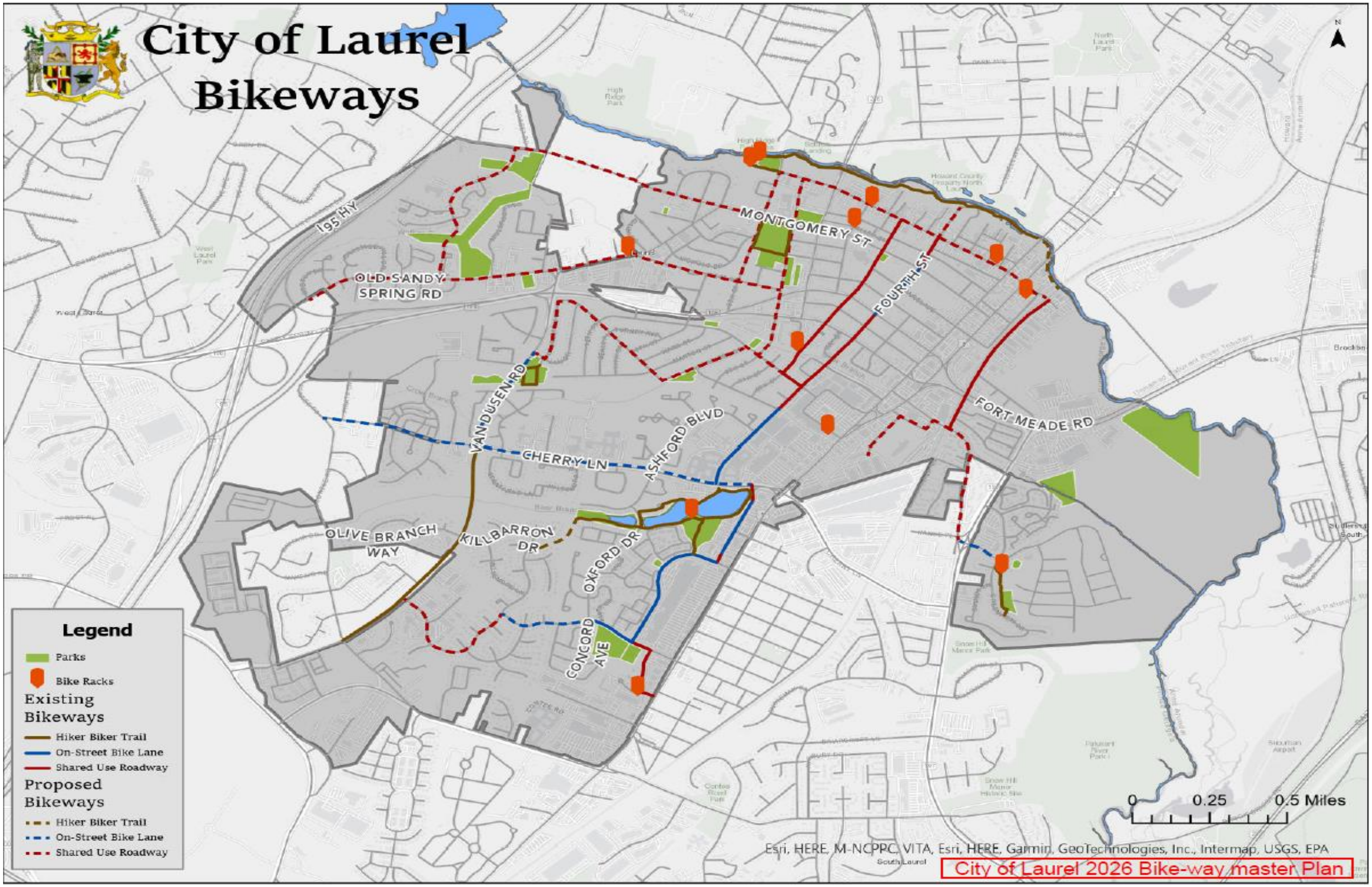
$W_v = W_t (2 - (ADT/4000))$ if ADT<4000 and road is undivided and unstriped.

Bicycle Level of Service ranges associated with level of service (LOS) designations:

BLOS Score Range	≤ 1.50	1.51-2.50	2.51-3.50	3.51-4.50	4.51-5.50	> 5.50
LOS Level or Grade	A	B	C	D	E	F

6. Laurel Bike Map

The following page shows the map of the existing and proposed City of Laurel Bikeways. This map illustrates which roadways are designated as Bikeways and the types of the proposed bikeway. The map is based on the locations of neighborhoods, parks, retail/commercial cores in conjunction with City BLOS data. Only roads that are under the jurisdiction of the City of Laurel can be modified by the City. The City has no jurisdiction over County Roads such as Contee Road, Brooklyn Bridge Road or State Roads such as US 1 or MD 198.


City of Laurel
Bikeways
195 HY
OLD SANDY SPRING RD
MONTGOMERY ST
FOURTH ST
VAN DUSEN RD
ASHFORD BLVD
CHERRY LN
FORT MEADE RD
OLIVE BRANCH WAY
KILLBARRON DR
OXFORD DR
CONCORD AVE
Legend
Parks
Bike Racks
Existing Bikeways
Hiker Biker Trail
On-Street Bike Lane
Shared Use Roadway
Proposed Bikeways
Hiker Biker Trail
On-Street Bike Lane
Shared Use Roadway
0 0.25 0.5 Miles
Esri, HERE, M-NCPPC, VITA, Esri, HERE, Garmin, GeoTechnologies, Inc., Intermap, USGS, EPA
City of Laurel 2026 Bike-way master Plan

7. Proposed Laurel Roads as Bikeways

The following is a brief description of each road segment along with an illustration showing how each roadway segment would be signed/re-striped.

8th Street & St. Mary's Place

8th street is 36 feet wide with low vehicle volume. On-street parking is allowed on both sides. 8th street destinations include McCullough Park, Emancipation Park (with access to Laurel Library), as well as Pallotti High School and St. Mary's of the Mills Elementary School. 8th Street also connects Old Town to the Laurel Hills and Fairlawn neighborhoods. 8th Street can be signed as a bike route, with sharrows marked on the roadway to indicate a safe bicycling position away from parked cars.

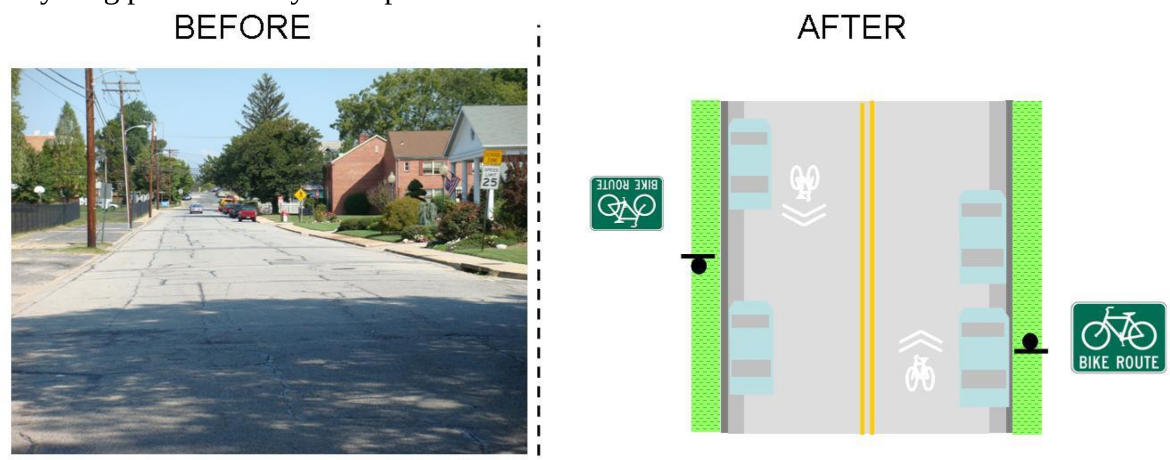


Figure 10: Before and After Signage/Striping Improvements for 8th St.

9th Street

9th Street is 24 feet wide with very low vehicle volume. Parking is limited to one side and is used moderately. Because of the ample available roadway and low number of vehicles, 9th Street is a suitable north/south route that connects West Street to Riverfront Park and to McCullough Park. 9th Street is unstriped and should remain so, with only signage indicating that it is a designated bike route.

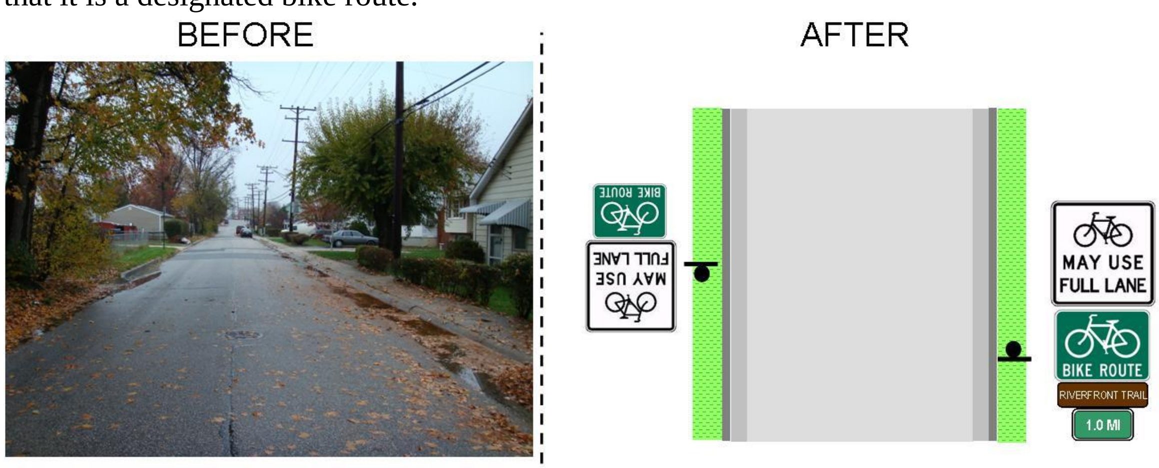


Figure 11: Before and After Signage/Striping Improvements for 9th St.

Wellington Trail

The large neighborhoods of the Wellington development do not have direct access to the City's most popular park, despite being adjacent to it. The proposed Wellington Trail would provide a direct walkable/bikeable connection from the Wellington Development to Granville Gude Park and Lake and "Restaurant Row" on Laurel Place. For many Wellington residents, utilizing the trail would provide quicker access to these amenities than driving/parking at the Lake. This also has the added benefit of reducing traffic congestion on local roads.

Figure 12: Illustration of asphalt sidewalk location to connect Wellington to Gude Lake.

Re-designing Cherry Lane from Van Dusen to US. Route 1

Cherry Lane from Van Dusen to US. Route 1 would be a critical component in Laurel's Bikeway Plan, because it connects the two main north/south routes Route 1 and Van Dusen Road. While Cherry Lane is an attractive tree-lined road with sidewalks on both sides, for it to reach its true potential as an ideal urban boulevard that leads to a City Center, all traditional transportation modes driving, walking, and biking should be accommodated. Fortunately, Cherry Lane has ample right of way and is vastly over-designed for vehicle traffic. Cherry Lane has 6 lanes of traffic to accommodate an average daily traffic of about 20,000. As a point of reference, MD 198 on the west side of Van Dusen carries twice that volume on only 4 travel lanes. It is unlikely that even with future development, Cherry Lane will exceed 30,000 vehicles. Therefore, the outer lane on each side of Cherry Lane can be re-designated, at minimal cost, as a bike-only lane. This will result in negligible changes in level of service to vehicles.

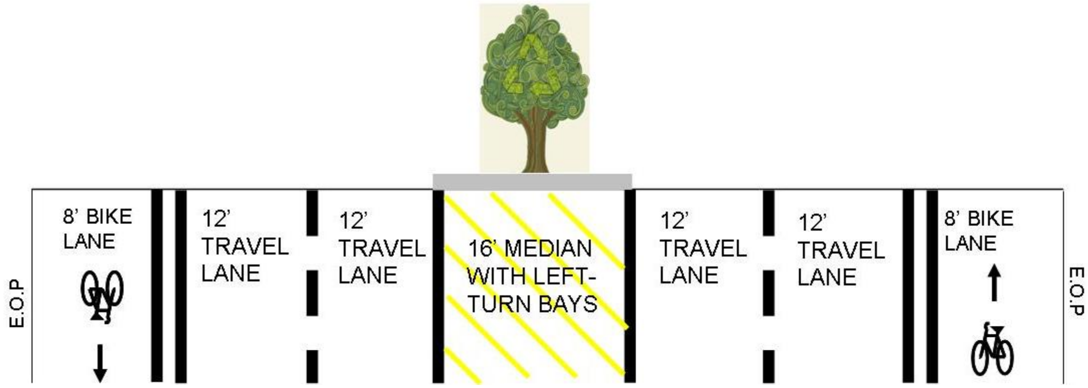


Figure 13: Re-striping Cherry Lane from 6 travel lanes to 4 travel lanes and 2 bike lanes.

Cherry Lane from Contee to Van Dusen

This segment of Bowie Road is a narrow 2-lane roadway, with a rural character. There are no curbs, gutters or shoulders. It currently serves only a handful of large-lot single-family properties, and the vehicle volume is extremely low. Medium-density development has been proposed to access this roadway, which will overwhelm the roadway capacity. This proposed development, if accepted, presents an ideal opportunity to widen the roadway to allow for bike/pedestrian travel along the entire stretch of Cherry Lane from Contee to Van Dusen. The road is currently under the jurisdiction of Prince Georges County, although many properties that abut it are inside the jurisdictional boundaries of the City of Laurel.

Figure 11: Before and After Signage/Striping Improvements for Cherry Lane.

Dorset Road

Dorset Road runs north/south connecting two other local collector roads Brooklyn Bridge Road and Old Sandy Spring Road. Most of Dorset Road is 36 feet wide with parking on both sides. Parking is utilized at approximately 25% to 50%, depending on the block. A small portion of Dorset, from Woodbine Drive to the Brookmill Condominiums, is only 24 feet wide with no parking permitted. The low volume on the road and wide travel widths makes Dorset a suitable north/south bikeway. Scotchtown Elementary School is also located on

Dorset Road. Dorset Road can be striped of parking lanes and marked with sharrows in the travel way for guiding bicyclists.

Figure 14: Before and After Signage/Striping Improvements for Dorset Rd.

Brooklyn Bridge Road and Montgomery Street (8th Street to Dorset Road)

Brooklyn Bridge Road is a low-volume east-west collector connecting the City of Laurel to points West. Brooklyn Bridge is 40 feet wide and is currently striped for an 8' parking/shoulder lane on both sides. This lane is an ideal candidate for a shared parking/biking lane, as on-street parking is utilized sparsely. Brooklyn Bridge Road needs only to be signed for Bike Route designation.

Figure 15: Before and After Signage/Striping Improvements for Brooklyn Bridge Rd.

Brooklyn Bridge Road becomes Montgomery Street as it enters the City of Laurel and crosses over a tributary that feeds the Patuxent River. At this location Brooklyn Bridge narrows to approximately 30 feet across (see photo below), which is the width for the remainder of Montgomery Street until its termination at Route 1.

Figure 16: Transition from wide paved shoulder to narrow shoulder on Brooklyn Bridge Road.

Additional signage is recommended for this to warn motorists and bicyclists that this road segment narrows and that both vehicle types must share the road.

Harrison Drive

Harrison Drive is part of the 3-street travel way, consisting of Laurelton Drive, White Way, and Harrison Drive that allows for east-west travel from Van Dusen Road, through to both 8th and 4th Streets, without having to utilize MD 198. Harrison Drive allows parking on both sides, but is wide and has very low vehicular volume, making it an ideal candidate for biking. Harrison Drive is also the location of the popular and newly renovated Discovery Park.

Figure17: Before and After Signage/Striping Improvements for Harrison Dr.

Laurelton Drive

Laurelton Drive is part of the 3-street travel way, consisting of Laurelton Drive, White Way, and Laurelton Drive that allows for east-west travel from Van Dusen Road, through to both 8th and 4th Streets, without having to utilize MD 198. Laurelton Drive allows parking on both sides, but is wide and has very low vehicular volume, making it an ideal candidate for biking.

Figure 18: Before and After Signage/Striping Improvements for Laurelton Dr.

Main Street

Main Street is 40 feet wide with on-street parking on both sides that is usually near capacity. The on-street parking reduces the travel way to about 14 feet in each direction. Main Street has a low average speed, mainly due to the on-street parking and the many pedestrians crossing locations. Since Main Street is a destination, bike access is essential. The low average vehicle speed allows for bicyclists to ride in the middle of the travel way.

Figure 19: Before and After Signage/Striping Improvements for Main St.

Marshall Ave

Marshall Ave abuts the proposed Hawthorne Place mixed-use development. It is expected that this development will be both a destination and an origin for many cyclists. Marshall Ave is wide enough to accommodate 12 feet travel way and 6-foot striped bike lane in each direction. Alternatively, since the development is a “blank slate” at this point, on-street parking can be maintained while building extra-wide sidewalks to accommodate pedestrians and bicyclists. Biking accommodation must be incorporated into the Developer’s off-site improvements for Marshall Ave.

Figure 20: Before and After Signage/Striping Improvements for Marshall Ave.

Sandy Spring Road

Sandy Spring Road is a variable-width road with moderate volume of just under 10,000 per day. It connects City Hall with several neighborhoods to the west and to Old Town to the east. Where Sandy Spring is wide enough, on-street parking is allowed, however, its use is rare. Roadways with these characteristics are ideal for striping of a dual parking/biking lane. The road will be signed for biking, but no bike-specific road markings will be utilized only a solid white line to separate the travel way with the dual-purpose lane.

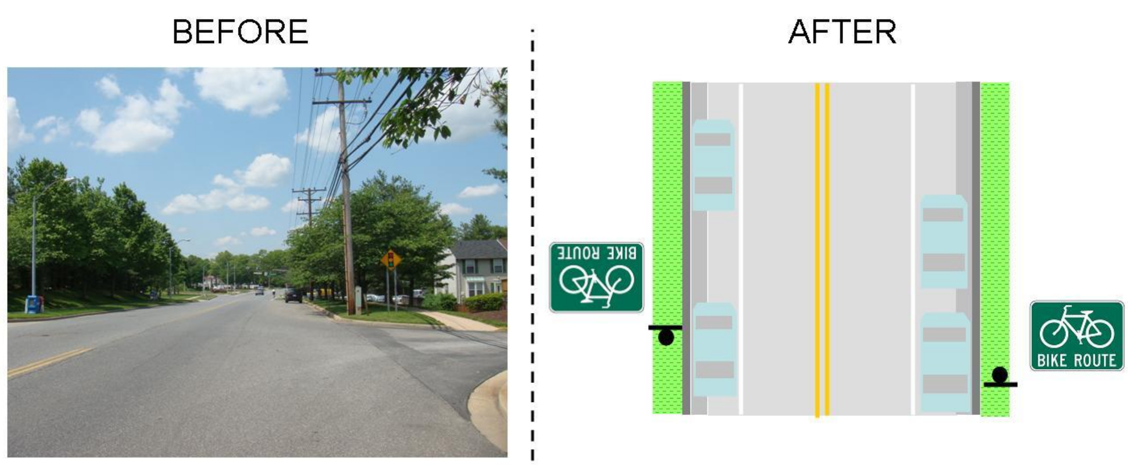


Figure 21: Before and After Signage/Striping Improvements for Sandy Spring Rd.

Staggers Road

Staggers Lane is 36 feet wide and has on-street parking on both sides. Staggers Road will face the new Hawthorne Place development, consisting of high-density residential and ground-level retail. Therefore, on-street parking must be kept. The development is expected to bring bicyclists that utilize Staggers Road to reach Laurel Commons, Gude Lake Park, and the Giant grocery store across from Route 1. As a result, on-street bicycling is important, but can be accommodated safely due to the low vehicle volume anticipated for Staggers Lane. Biking accommodation must be incorporated into the Developer's off-site improvements for Staggers Lane

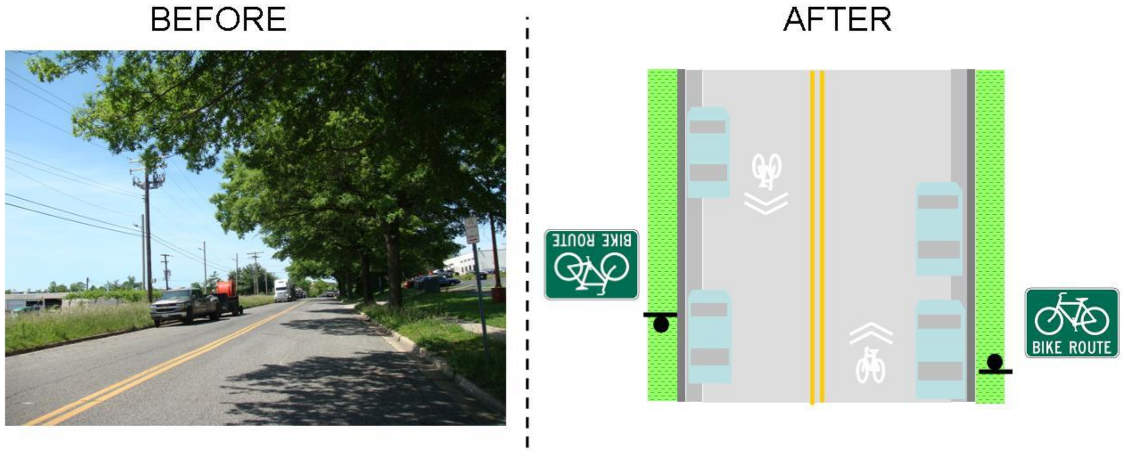


Figure 22: Before and After Signage/Striping Improvements for Staggers Lane

West Street

West Street links City Hall and neighborhoods west to 8th Street and 9th Street, and over to Riverfront Trail. West Street is 24' feet wide but has a very low vehicle volume and sparse on-street parking. These characteristics make it an ideal candidate for biking east/west in Laurel.

Figure 23: Before and After Signage/Striping Improvements for West St.

White Way

White Way is part of the 3-street travel way, consisting of Laurelton, White, and Harrison that allows for east-west travel from Van Dusen Road, through to 8th and 4th streets, without utilizing MD 198. White Way allows parking on both sides, but is wide and has very low vehicular volume, making it an ideal candidate for biking.

Figure 24: Before and After Signage/Striping Improvements for White Way.

Clubhouse Blvd

Despite being striped for two inbound and two outbound lanes, Clubhouse Boulevard is a very low-volume collector road for the Patuxent Greens neighborhood. Clubhouse Boulevard also serves a City Pool and recreational facilities. Because Clubhouse Blvd has excess capacity, it can be re-striped to convert an existing travel lane in to a bike lane. One lane in each direction can be converted to a bike-only lane with no measurable loss in vehicle level of service.

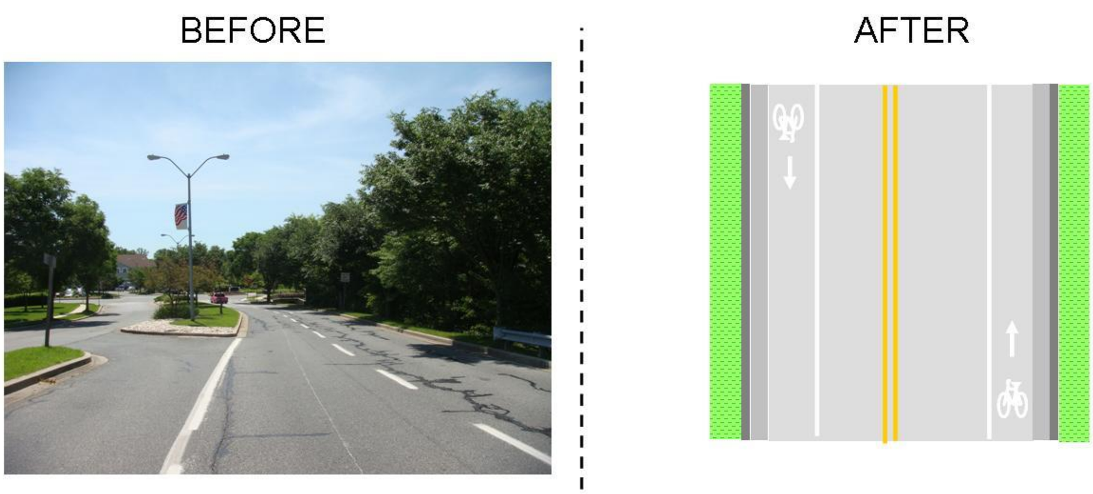


Figure 25: Before and After Signage/Striping Improvements for Clubhouse Blvd.

Bowie Road from MD 197 to Marshall Avenue

Bowie Road is a narrow roadway with moderate volume. It has narrow paved shoulders that vary in width from 1 to 3 feet. While not an ideal bike route, Bowie Road is the only direct connection between Route 1 Corridor and Patuxent Greens neighborhood, as well as the Greenview Drive City Pool and the Business Park. Future redevelopment, if there is any, along Bowie Road should incorporate wider sidewalks (at least 8 feet) on both sides of Bowie Road to accommodate pedestrians and bicyclists. This segment of Bowie Road is currently under the jurisdiction of Prince Georges County but may be turned over to the City in the future.

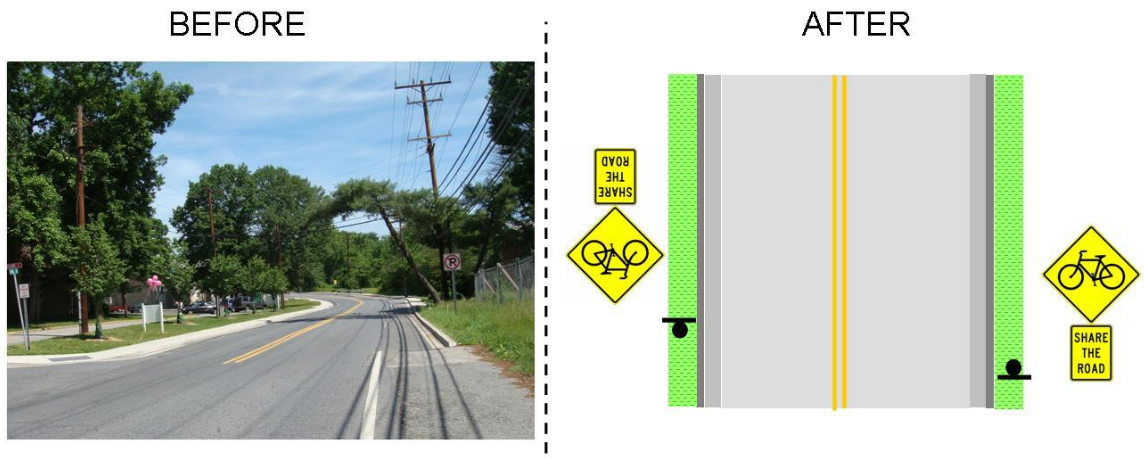


Figure 26: Before and After Signage/Striping Improvements for Bowie Rd.

Cypress Street (Oxford Drive to Westmeath Drive)

Cypress Street represents a strategic opportunity to extend the existing on-street bikeway that currently runs from Mulberry Street to Oxford Drive. Given the consistent right-of-way width of 36 feet, there is sufficient space to continue this infrastructure to the Van Dusen Road Hiker-Biker trail. Utilizing Cypress Street would create a seamless connection between these two existing networks, significantly improving local cycling connections.

BEFORE AFTER

Figure 27: Before and After Striping Improvements for Cypress Street

Westmeath Drive (Cypress Street to Caledon Court) & Laurel Park Drive

Westmeath Drive serves as a critical link to connect the proposed Cypress Street Bikeway through Laurel Park Drive to the existing Hiker/Biker trail on Van Dusen Road. Given the current development of 84 new housing units on Laurel Park Center Drive, this extension is a high-priority candidate for infrastructure investment. With a roadway width of 24 feet, Westmeath Drive can comfortably accommodate a shared-use path to enhance local multi-modal connectivity.

BEFORE AFTER

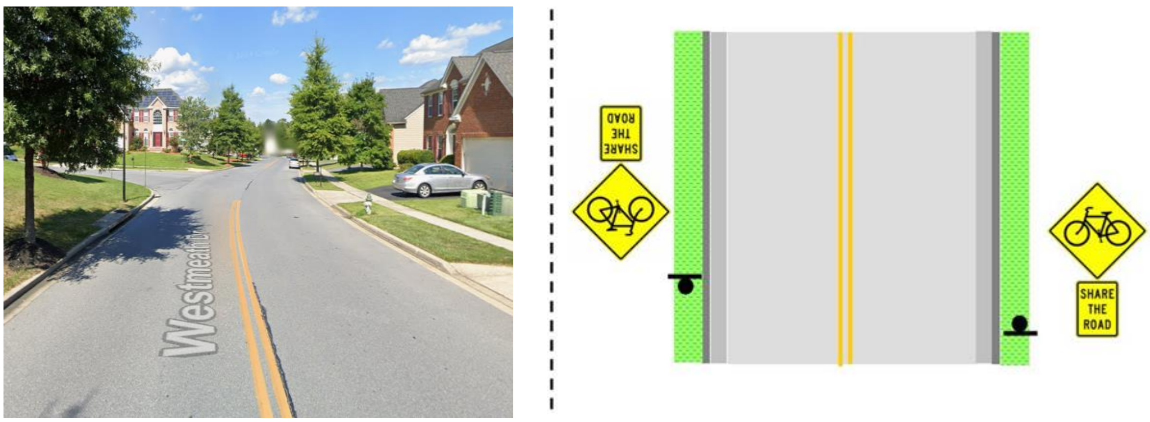


Figure 28: Before and After Signage Improvements for Westmeath Drive & Laurel Park Drive

8. Implementation, Level of Effort and Cost

Implementation costs can be broken down into two sub-costs: up-front infrastructure and continuing maintenance. Up-front capital costs include added signage and striping to existing rights-of-way as well as the cost for new bike paths constructed in City right of way. Maintenance costs include street-sweeping of bike lanes, which the City regularly performs in-house already. Maintenance costs would also include ensuring that all damaged signs and markings are repaired, and paths are cleared.

Another facet to implementing a bike network into existing city streets is user education. Educating and informing vehicle users (both bicyclists and motorists) about the meaning of road signage and proper. Fortunately, this does not have to be a capital-intensive effort, as the City has many low-cost media outlets at its disposal: City website, City Blog, and public hearings along with two local weekly newspapers: the Gazette and the Laurel Leader. A finalized and city-approved Bike Map can be made available at City Hall, community centers and local area bike shops.

Capital costs associated with implementing physical elements of a bike plan are detailed herein:

<u>New Bike Racks:</u>
The cost for a standard inverted U-shaped rack is $200. The cost for a 6’x8’ concrete pad that can accommodate and secure 4 bike racks is about $500. Therefore, for a

new installation of 4 bike racks at a City Park, the cost will be approximately $1,300.00.

Signage
Breakaway signs poles and street signage are about $100 and $200 per unit, respectively. Signs should be placed about every 1/3 mile and at each intersection of two main collector roads, as well as the entry to an off-road bike path.

Street Markings
The cost for thermoplastic stripping is $5.00 per linear foot, and bike symbols is $400.00 for each.

Asphalt Paths (Hiker/Biker Trails)
Asphalt Path cost between $110.00 and $135.00 per Ton.

Because of the limited right-of-way for new construction of separated bike paths, there is a lot of "low-hanging fruit" to be plucked in inexpensive re-striping/re-signing of existing roadways. The signing/re-stripping can go a long way in the development of a complete City-wide Bike Transportation System.

The Bikeway Master Plan should be a part of the City's Capital Improvement Plan (CIP), which dedicates funding for construction and maintenance - much like sidewalk repair and street re-surfacing. In addition, State grants are available for *MDOT Kim Lamphier Bikeway* and for *Safe Routes to Schools*. Further, Federal DOE grants are available for alternative transportation policies that reduce energy demand. These monies are potential sources for funding bikeway-related improvements to existing infrastructure.

9. Bike-related Policy Changes

Whenever underutilized areas of the City are revitalized or redeveloped, part of the Adequate Public Facilities requirement should be the addition/improvement of bike facilities both on-site and off-site. The City of Laurel is currently near full development within its jurisdictional boundaries. Almost all future developments will be in-fill and *re*-development. Future development, regardless of its nature, must consider bicyclists if the City is to have a comprehensive transportation plan for all travel modes. Incorporating hiker/biker paths and on-street bicycling markings is important to this policy and integral to making sure that neighborhoods are interconnected in a macroscopic grid network. Further, having a biking infrastructure in place allows developers to make use of this alternative transportation, thus reducing the vehicular traffic mitigation needs. Just like transit-oriented development reduces vehicle trips to allow for higher-density, so too can incorporating bikeway infrastructure serve as a traffic mitigation tool. However, for the City to encourage biking/walking as alternate means of transportation (and to ask developers to fund improvements), the infrastructure must be planned or in place, and the City must adopt and commit to a formal Bike Transportation Plan.

10. Maryland Bike Law

Under Maryland law, a bicycle is classified as a vehicle, granting the bicyclist the same rights and subjecting them to the same duties as a motor vehicle driver, including obeying all traffic control devices, as detailed in the Maryland Transportation Article, Title 21, Subtitle 12, § 21-1202. Bicyclists are generally required to ride as close to the right side of the road as practicable and safe, but they are explicitly allowed to use the full travel lane when the lane is too narrow to share safely with a vehicle or when traveling at the speed of traffic. Furthermore, motorists must exercise due care and are legally required to pass a bicyclist at a distance of not less than 3 feet for safe clearance, as mandated by § 21-1209 of the same article.

11. Resources

1. **Laurel City Internal Traffic-Count and Road Speed Profile Database** (Current version maintained by City of Laurel Department of Public Works/MDOT SHA Traffic Monitoring System);
2. **AASHTO Guide for the Development of Bicycle Facilities**, 5th Edition (2024);
3. **Manual on Uniform Traffic Control Devices (MUTCD)**, 11th Edition, Part 9 (2023);
4. **AASHTO – A Policy on Geometric Design of Highways and Streets** "The Green Book," 7th Edition (2018) or latest 8th Edition;
5. **"Improving Conditions for Bicycling and Walking – A Best Practices Report"** USDOT, FHWA Reports, January 1998 (Supplemental: FHWA Bikeway Selection Guide, 2019);
6. Landis, Bruce. **"Real-Time Human Perceptions: Toward a Bicycle Level of Service,"** Transportation Research Record 1578 (Washington DC, Transportation Research Board, 1997).
7. Pucher, John and Buehler, Ralph. **"Making Cycling Irresistible: Lessons from the Netherlands, Denmark, and Germany."** Transport Reviews. Vol. 28, No. 4, July 2008.

11.1 Bicycling-related Links

- **MDOT Active Transportation (Cycle Maryland):** https://mdot.maryland.gov/tso/pages/Index.aspx?PageId=25
- **MD-SHA Interactive Bike Map and Information:** https://roads.maryland.gov/mdotsha/pages/Index.aspx?PageId=358
- **Bike Maryland:** https://www.bikemaryland.org/
- **Prince George's County M-NCPPC Trails:** https://www.pgparks.com/640/Trails-Track
- **Washington Area Bicyclist Association (WABA):** https://waba.org/
- **Find a Bicycle Advocate near you:** https://www.bikemaryland.org/resources/advocacy-organizations/