College Park Bike Boulevards
Phasing and Implementation Plan

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Introduction

The City of College Park has partnered with Sabra, Wang & Associates, Inc. (SWA) to develop a City-wide Bicycle Boulevard Implementation Plan. Funding for the Plan was provided by the Metropolitan Washington Council of Governments (MWCOG) through their Transportation/Land-Use Connections grant program. The plan includes a prioritized list of streets for retrofitting as Bike Boulevards, an itemized list and location for the infrastructure required for each, as well as an identification of funding sources, establishment of phasing for the planning-design process, and construction cost estimates for each candidate street.

What are Bike Boulevards?

Bike Boulevards are streets configured to promote safe and convenient cycling, while still permitting vehicle traffic. They are typically constructed along roadways that are too narrow to safely install dedicated bike lanes, meaning the travel lanes are shared space for both vehicle and cyclists. Bike Boulevards are signed and marked for cyclist safety, convenience and wayfinding. Accordingly, they require streets that are low vehicle volume and are engineered to have low speeds, if needed. In addition, bike boulevards prioritize and emphasize safe and convenient cycling through roadway and intersection treatments that reduce cycling delay, and incorporate bike-specific pavement markings and wayfinding signage. Benefits to cyclists from Bike Boulevards include:

- Providing low-volume and low speed routes that are welcoming to a broad range of cycling abilities.
- Reducing travel time and increasing safety for cyclists by providing cyclists with the right-of-way at intersections.
- Designating routes that direct cyclists to cross major arterials at controlled intersections.
- Increasing visibility and branding of cycling as an alternative to driving

Why Bike Boulevards?

A network of safe and comfortable bike boulevards will also address a large segment of the potential cycling population that is uncomfortable with taking the lane in heavy traffic or even riding in unprotected bike lanes along fast-moving cars. This “interested but concerned” segment of the population constitutes the largest percentage of potential cyclists; and local roads are generally not designed to accommodate them. A network of well-marked and well-signed routes with low volume and low speeds that reduce or eliminate dangerous cycling conditions will encourage cyclists not served by current traditional design standards.

A fully-built network of bicycle boulevards to supplement the City’s existing trail and bike lane network will support sustainable redevelopment and foster the City’s ability to focus density at desired locations. It will also minimize traffic congestion and leverage primary generators like the University and the Metro, without having to develop expensive new road infrastructure. While we have some significant gaps in our sidewalk network, College Park generally has a compact walkable grid structure of streets and a robust trail system to accommodate many short trips that would be inefficient by passenger car. However to fully leverage this infrastructure and the City’s densifying land uses, a finer network of

bicycle-friendly streets is needed to reduce passenger vehicle demand on the City's roads. Bike Boulevards will serve this purpose where streets are too narrow for dedicated and/or protected bike lanes. Future demands from the Purple Line and a new bike share system, along with pending development of University properties are going to drive even more demand for cycling for short trips.

A well-designed network of Bike Boulevards will generally have:

- Efficient and safe low-volume cycling facilities for all user abilities.
- Engineering to discourage non-local traffic
- Traffic control that allows for safe crossing of major roads
- Minimal impact on surrounding traffic patterns
- Traffic calming measures to maintain low residential vehicle speeds
- Wayfinding signs for destinations and attractions
- Unique aesthetics that inform cyclists of desired routes and inform drivers that the roadway is a cycling priority route.

General Elements of a Bike Boulevard

Figure 1: Bike Boulevard Pavement Marking

The following are infrastructure elements that are typically found along a bike boulevard:

- *Wayfinding Signage:* Wayfinding signs provide directional and distance information for local destinations or attractions. Examples would include large shopping centers, Metro stations, campus entrances, trail heads, or regional parks.
- *Road Markings:* Bike Boulevard markings are more robust than sharrows or markings found in bike lanes. They are typically twice as large to convey the same sense of roadway ownership as that of vehicles.
- *Cyclist Progression:* Progression of cyclist movement means minimizing stopping delay due to traffic control. Stop sign removal is the main component of minimizing this delay; however incorporating bike signals and bike detection/actuation are other ways to minimize cyclist delay at signalized intersections.
- *Vehicle speed control:* Where vehicle speeds are too high for cyclists to comfortably share space, traffic calming must be designed into the routes. This as the ancillary benefit of making the streets safer for pedestrians, too. Examples of traffic calming found on bike boulevards are mini-roundabouts, 15 mph speed humps, and bump outs – all of which the City currently employs on local streets to some degree. Where stop signs are removed, we

Figure 2: Bike wayfinding sign

recommend replacing them with traffic calming devices[1]. We recommend bumpouts where curbside parking is allowed – as this also reduces pedestrian crossing width – and speed humps where no curbside parking is available. However, prior to replacing the removed stop signs with traffic calming along streets that are currently low-speed, we recommend a spot speed study to determine if speeds have increased.

- *Vehicle volume control:* Controlling the number of vehicles that use streets designated as bike boulevards is critical for cyclist comfort and usability. Diverters, Semi diverters, and one-way street conversions are examples of ways to control the volume on a local street. Fortunately, many of College Park's local roads carry very low volumes.
- *Banners* (optional): Pole-mounted banners are often used by cities to convey that a certain area is special – be it an arts district, or a downtown business district or a main street. Similarly, bike boulevards can have unique branding to highlight both a street's designation as a bike friendly route and a jurisdiction's commitment to cycling in general.

Figure 3: Signing to restrict vehicles

Finally, a non-infrastructure based component of a bike boulevard network is community outreach and education. Tools such as on-line and static maps (and mobile apps) that shows bike infrastructure and low-stress routes provide necessary information to residents and visitors so that they can take advantage of the local bike facilities and see how they can reach close-in destinations and adjoin trail systems safely and conveniently.

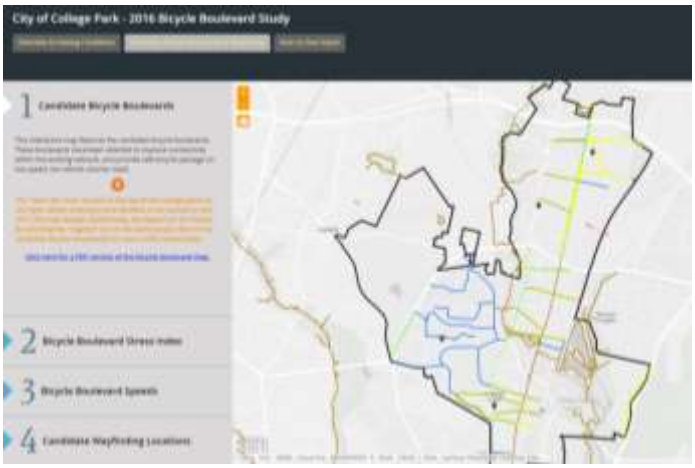


Figure 4: On-line map showing bike boulevards, trails and bike lanes

Recommended Streets for Conversion to Bike Boulevards

Determining candidate streets for bike boulevards started with identifying all neighborhood collector roads – roads that provide direct access from anywhere in a neighborhood to US 1 and/or the Trolley Trail. Identified streets were restricted to City-owned streets, with the exception of Rhode Island Ave and Metzerott Road. Candidates for bike boulevards will generally have the following characteristics:

[1] Most stop signs on neighborhood roads appear to be placed for speed control and not necessary for the purpose of traffic congestion management.

- Local street or low-volume collector.
- Not a primary transit or truck route.
- Traffic signals or all-way stops at major intersections.
- Connects to trails.
- Connects neighborhoods directly to key destinations.
- Low vehicle volume and low vehicle speeds are desired, but could be engineered to have these attributes if needed.

Streets that did not provide controlled access across major roads were eliminated as candidates for further consideration. Adjacent parallel streets that provided redundant connections were also not included. Next, we eliminated high-volume streets where no parallel road existed to which traffic could be diverted. From the remaining streets, only those that connected to trails, bike lanes, or local and regional destinations were considered[2]. This process yielded the following 17 City streets listed in Table 1 as those recommended for conversion to Bike Boulevards.

Table 1: Recommended Bike Boulevard Locations[3]

Road Name	Length (mi)	From	To
Calvert Road	0.57	US 1	Metro Station
Lackawanna St	0.45	Metro Station	Rhode Island Ave service road - east side
Edgewood Rd	1.48	US 1	52nd Place
Guilford Rd	0.46	US 1	Metro Station
Hollywood Rd	0.35	US 1	Rhode Island Ave service road - east side
Rhode Isand Ave Service Rd - East	0.63	Muskogee St	Delaware Place
College Ave	0.53	US 1	Columbia Ave
Lakeland Rd	0.53	US 1	Rhode Island Ave
Berwyn House Rd	0.32	US 1	Rhode Island Ave
Rhode Isand Ave Service Rd - West	0.90	Muskogee St	Blackfoot Rd
Fox St	0.35	US 1	Rhode Island Ave
Berwyn Rd	0.54	US 1	Potomac Ave
Narragansett Pkwy	0.36	Lackawanna	Edgewood Rd
Metzerott Rd	0.07	US 1	Paint Branch Trail
Guilford Dr	0.86	Knox Rd	US 1
Knox Rd	0.74	Guilford Drive	Dartmouth Ave
Edmonston Rd	0.75	Charlton Ave	Old Calvert Rd

Some of these proposed streets have available roadways wide enough for striping dedicated bike facilities (e.g. bike lanes or buffered bike lanes). Specifically, Berwyn House Road, Lakeland Ave, and Edgewood Road westbound from Rhode Island Ave to US 1 are wide enough for dedicated bike lanes. As

[2] The potential for a local street o be a candidate for a bike boulevard can change over time, as development creates new local attractions or as traffic control at major intersections changes.

[3] In subsequent tables and in the data analyses, four of these streets are divided up into smaller segments, when there is large change in volume and/or roadway width. For example, while the Edgewood Road bike boulevard extends from 52nd place to US 1, it has significantly higher volumes west of Rhode Island Ave than east of it; and therefore is analyzed separately.

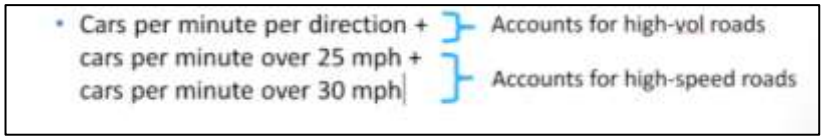
discussed in the subsequent "Design Alternatives" portion of the report, we recommend that these streets be marked for dedicated bike facilities and not as shared-space bike boulevards.

Appendix A shows a map of all of the proposed bike boulevards and how they connect with existing trails and bike lanes, as well as key destinations. Additionally, **Appendix B** provides details of the construction elements comprising each bike boulevard, showing new infrastructure needed (signs, markings, traffic calming, and stop sign removal) and their locations. Specific destinations for the proposed wayfinding signs are also shown in Appendix B. Based on the plans, the quantity of each infrastructure element for each bike boulevard is outlined in the "construction cost" section of this report.

Engineering Needs and Bike Boulevard Stress Index

As mentioned previously, low speeds and low local traffic are a requirement for bike boulevards. To determine which candidate streets needed speed control or vehicle volume reduction, we obtained all AM peak, PM peak hour and daily volumes for each candidate street and also conducted spot speed studies along each street. Vehicle speeds were collected at locations as far from stop signs and speed bumps as possible to obtain free flow travel speed. About 50 data points were collected for each candidate street. Speed data was collected in dry conditions, during weekday peak commuting hours in late February and early March when both the University and County public schools were in session. The average speed, percent over 25 mph and percent over 30 mph were tabulated. These data were used to determine where speeds and/or vehicle volume was too high.

To estimate the overall cycling comfort level, a stress index was developed that quantitatively evaluates the influence of vehicle speed and volume on each street where space will be shared with cyclists. The stress index is based on two factors: 1) the number of expected vehicles a cyclist will encounter on a given bike trip; and 2) the number of *speeding* vehicles that a cyclist will encounter during a single trip. To construct the index, we estimated that a typical trip on any single bike boulevard will last about two minutes – based on average biking speeds and the fact that most boulevards are only about ½ mile long. Accordingly, the stress index was developed to measure the maximum number of vehicles and speeding vehicles a cyclist would encounter, *per minute*. To determine this, AM and PM peak hour volumes, per direction, as well as results from the spot-speed tests were combined to create a stress index that is simply the number of cars per minute per direction plus the number of cars per minute that exceed 25 mph plus the number of cars per minute exceeding 30 mph[4]. As shown in the graphic, this measure assumes that both a high-volume and/or a high-speed, low-volume road would be stressful to cyclists, and therefore would need additional engineering to mitigate excessive speeds or volume.



[4] This stress index intentionally double-counts cars traveling in excess of 30mph, because these speeds are far more likely to result in serious injury or death than 25 mph speeds.

Table 2 shows the volume and speed data collected for each street, as well as its corresponding cycling stress index level. Streets having a stress index level under 2.0 were considered low stress roads with both low vehicle speeds and low vehicle volumes. Stress index levels from 2.0 to 3.0 were considered to have some stress, either due to moderate volumes or higher instances of speeding. Stress index levels from 3.0 to 4.5 were considered stressful, due to either large volumes or high instances of speeding, while levels exceeding 4.5 were considered uncomfortably stressful due to high volumes and high speeds. Roads with a stress level index over 3.0 would be expected to see few cyclists, without first reducing vehicle volume and/or speeds. It is these streets that we recommend additional engineering measures prior to signing and marking for a bike boulevard.

Table 2: Traffic volume, Speed Profiles, and Cycling Stress Index

Candidate Street	ADT*	Cars per minute per direction in the peak commuting hour	Average Speed	% over 25mph	% over 30mph	Stress level
Calvert Road	1150	1.9	22	14.0%	0.0%	**2.2**
Lackawanna St	500	0.4	23	25.3%	3.6%	**0.5**
Edgewood Rd, east of Rhode Island	1500	0.8	23	14.6%	0.0%	**0.9**
Rhode Isand Ave Service Rd - West	1000	0.8	24	36.2%	4.3%	**1.1**
Guilford Rd	1150	0.4	22	17.0%	0.0%	**0.5**
Hollywood Rd	1950	1	22	17.0%	2.3%	**1.2**
Fox St	700	0.6	21	6.4%	0.0%	**0.6**
Rhode Isand Ave Service Rd - East	1000	0.8	26	58.7%	13.0%	**1.4**
College Ave	2950	1.9	21	4.0%	0.0%	**2.0**
Berwyn Rd	2900	1.9	26	51.9%	5.8%	**3.0**
Lakeland Rd	1950	1.5	24	34.9%	0.0%	**2.0**
Narragansett Pkwy	2000	1.3	25	44.2%	12.8%	**2.0**
Berwyn House Rd	2000	1.3	23	16.3%	0.0%	**1.5**
Metzerott Rd	0	0	0	0.0%	0.0%	**0.0**
Guilford Dr	3700	2.3	24	38.2%	4.5%	**3.3**
Guilford Dr, west of Hartwick	6350	3.8	25	34.5%	6.9%	**5.4**
Knox Rd, west of US 1	8350	3.8	23	25.3%	2.3%	**4.8**
Knox Rd, east of US 1	4550	1.7	23	19.0%	3.4%	**2.1**
Edgewood Rd, west of Rhode Island	7400	5.8	26	45.2%	10.8%	**9.0**
Edmonston Rd	3000	1.9	33	97.9%	62.5%	**4.9**

*Average Daily Traffic (both directions combined)

Based on the speed data and the stress index evaluation, it is recommended that the Bike Boulevards (and partial streets), shown in Blue and green in Table 2, need no further traffic calming, while additional traffic calming is needed on the following streets prior to their consideration as bike boulevards:

1. *Knox Road, west of US 1:*
    - Knox Road provides a direct connection between the trolley trail and existing and under-construction student housing. However, west of Route 1 the vehicle volumes are uncomfortably high, while speeds are moderate. Additional traffic calming will help mitigate speeds. Knox Road is approximately 32' with a steep uphill grade heading west from US 1. Striping a westbound bike lane is recommended along this segment, which would narrow the travel lanes to 10' in each direction (the parking on the south side of Knox would remain, but would be 7' wide). Cyclists heading eastbound would be much more likely to be able to main speeds similar to vehicles because the eastbound direction has a steep downhill grade.
2. *Guilford Drive, west of US 1:*
    - Guilford Drive provides a direct connection between South Campus and the trolley trail (via Guilford Rd). However, west of Route 1 the vehicle volumes and speeds are uncomfortably high. Additionally, westbound Guilford Drive has a steep uphill grade, making the sharing of roadway space difficult for cyclists. The eastbound and westbound travel lanes along Guilford Drive are about 20' wide and separated by a large median. It is recommended that the westbound travel lane be evaluated for parking removal, with the parking lane converted to a buffered westbound bike lane, with the following dimensions: 11' westbound travel lane, 3' buffer and 6' bike lane. Cyclists heading eastbound would be much more likely to be able to main speeds similar to vehicles because the eastbound direction has a steep downhill grade.
3. *Westbound Edgewood Road, west of Rhode Island Ave:*
    - Edgewood Road, west of Rhode Island Ave has high traffic volumes in the westbound direction (about 30% higher than the eastbound direction). However, the westbound travel lane is 24' which include parking; therefore, a 6' dedicated westbound bike lane is recommended, while the eastbound direction (which is only 20' wide with parking) is signed and marked as a bike boulevard.
4. *Edmonston Road:*
    - Edmonston Road has only moderate volume, but the speeds along it are very high for a residential neighborhood. Accordingly, traffic

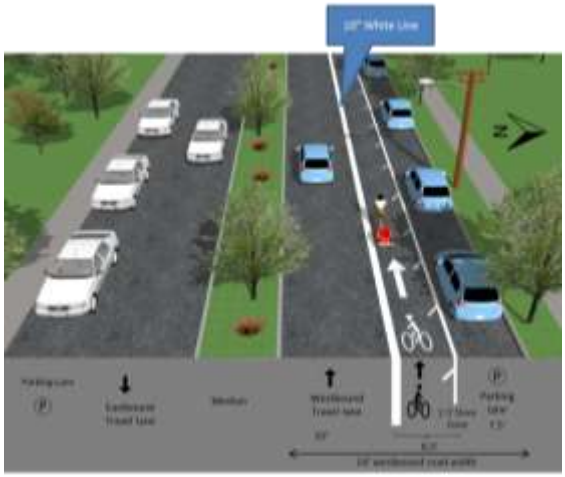


Figure 5: Edgewood Rd between Rhode Island and US 1

calming is recommended along this roadway, in addition, to where it is proposed to replace stop signs.

Additional Design Alternatives for Higher-Quality Facilities

As discussed in the prior section, if roadway width allows for bike lanes in lieu of shared-space bike boulevards, the former offer higher-quality cycling infrastructure and should be installed – particularly since they generally have equivalent construction costs. In addition to the four bike lanes proposed in the previous section, we identified three additional proposed bike boulevard streets that are candidates for re-striping for bike lanes instead of bike boulevards. These streets were selected based on a review of roadway widths along the proposed bike boulevards, and other more qualitative factors.

1. *College Ave:* the intersection of College Ave and Route 1 is the northern edge of Downtown College Park, with substantial commercial development and the main pedestrian entrance to campus. This area sees the greatest non-vehiclular activity along Route 1. Accordingly, there is an opportunity to leverage this activity to create a world-class bike facility along College Ave from Route 1 to the Trolley Trail. Removing parking along the north side of College Ave for this segment creates sufficient space for a two-way protected bike facility along the south side of the street, while maintaining two-way travel. Existing Parking along the north side would have to be removed or relocated. We recommend conducting a parking study for these four blocks to determine utilization rates and turnover. Additionally, we recommend conducting a parking occupancy study for adjacent blocks to determine the amount of available unused curbside parking spaces.

2. *Rhode Island Ave/MD 193/Greenbelt Rd Intersection:* This intersection has been identified as a barrier to cycling, because of the narrow bike lanes and the difficulty in crossing MD 193 and Greenbelt Road. To make these adjacent intersections safer for cyclists, we recommend restriping the existing bike lanes along Rhode Island Ave from Greenbelt Road to Edgewood Road to provide buffered bike lanes. This is county-owned right-of-way and their permission is needed. Additionally, we recommend incorporating “no turn on red” restrictions at the intersection of MD 193 and Rhode Island Ave (maintained by SHA). Finally, we recommend providing center-median buffers that replace left turn lanes along Greenbelt Road through the intersection of Rhode Island Ave to break up the crossing with pedestrian/bike refuge islands. This intersection is also maintained by the State and would require their coordination; however,

we believe that the turning traffic volumes at this intersection support the removal of the left turn lanes – which would allow for their replacement with center medians.

3. *Lakeland Rd & Berwyn House Rd bike lane couplet:* In lieu of bike boulevards on both of these streets, we recommend restriping the existing roadway on Lakeland Ave to provide buffered eastbound bike lane on the south side and restriping the existing roadway on Berwyn House Rd to provide a dedicated westbound bike lane on the north side. No curbside parking is removed for this installation.

Appendix C shows conceptual drawings, renderings and typical sections for each of the three design alternatives listed above, as well as the Edgewood Road westbound bike lane alternative.

Public / Stakeholder Outreach & Feedback

The public outreach for this study was conducted through meetings and a project website. Two separate meetings were held; a private stakeholder meeting where fellow government entities were invited and a second open to the general public. Each meeting followed the same format, opening with a presentation, followed by a question and answer session, and closed with an opportunity for attendees to review boards and ask questions one-on-one. Additionally, large roll-out maps showing the proposed bike boulevard layouts (appendix B) and the proposed design alternatives (appendix C) were both displayed for attendees to mark up with their comments. The meetings were advertised via flyer that was distributed on local listservs, the City website, Prince Georges County planning staff, and the Prince Georges Chapter of the Washington Area Bike Association listserv.

Stakeholders included:

- Maryland State Highway Administration
- Prince George's County Department of Public Works
- Prince George's County Park and Planning
- University of Maryland Department of Transportation Services
- City of College Park Department of Public Works
- City of College Park Planning
- Metropolitan Washington Council of Governments
- Local business owners
- College Park residents

The ***presentation*** consisted of:

- Explaining bike boulevards
- Why they are applicable to College Park
- The methodology of the study
- What types of infrastructure make up a bike boulevard
- College Park streets that are candidates for a bike boulevard

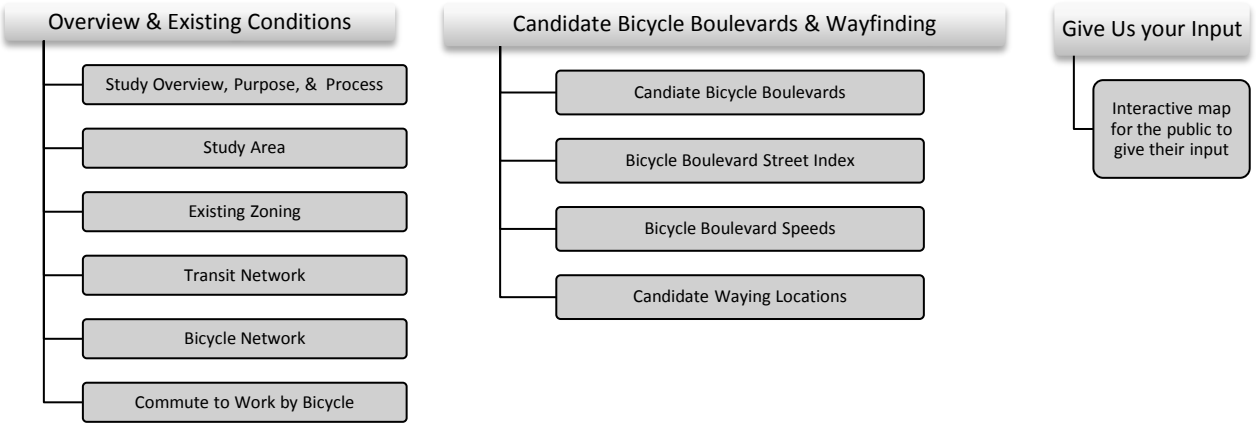
- The importance of and how to brand the bike boulevard network and to educate the public
- Other design alternatives for bike facilities

Topics of the ***informational boards*** presented at the charrette included:

- Percentage of population who commute to work by bicycle shown by block group in and adjacent to the study area
- Existing and proposed bicycle network in and adjacent to the study area
- Proposed locations of wayfinding signs in and adjacent to the study area
- The bicycle stress index of existing bike facilities within the study area

Feedback provided by stakeholders were generally positive, noting that the proposed bike boulevards appeared to connect multi-jurisdictional bike facilities – trail heads, county bike lanes, municipal facilities, as well as metro stations and Campus access points. Specific comments from the meeting are captured in **Appendix D-1**. In addition to the meeting, an ***interactive website*** was developed and available publicly. Created in the ArcGIS Online platform, the public is able to view the data collected for the study as well as candidate boulevards in map format, zooming in and out to specific location and clicking on map elements for more specific information.

The website presented the following information:



The *Give Us Your Input* section of the website proved to be a productive tool to solicit comments from the public, especially from those that were unable to attend the meetings. Selecting from six topics, the public was able to add a point to the map where their comment was applicable. The six topics included: suggested bicycle rack, suggested bike share location, suggested bicycle lane, suggested wayfinding sign, reported challenging area, and comment on a bicycle boulevard. This section of the website was open for feedback between 4/18/2016 and 5/24/2016.

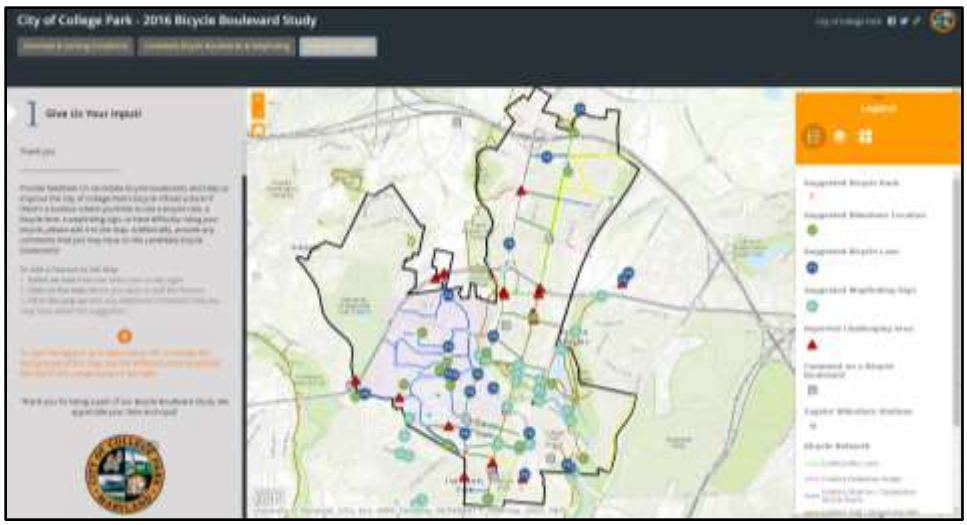


Figure 6: Screen Capture of on-line map-based public input website

While individual comments and precise locations for desired infrastructure are shown in **Appendix D-2**, the following tally shows the overall number of comments received by category:

- 3 locations suggested for new bike racks
- 0 suggested locations for new bike share stations
- 21 locations suggested for new bike lanes
- 27 locations suggested for new wayfinding signs
- 24 areas reported as challenging for cyclists
- 13 general comments

Construction Costs

Most of the infrastructure elements associated with bike boulevards are signs and over-sized bike markings – these are relatively low-cost items. However, the primary cost in all cases is the traditional traffic calming measures that replace the stops signs (that were originally installed typically as speed-control). After removing a stop sign, we would recommend doing a spot speed study to see if speeding is present, prior to implementing any new traffic calming in its place. If travel speeds are generally low, then traffic calming need not be applied to replace the removed stop signs. Some streets that currently have high speeds would need traffic calming irrespectively. Based on the planning of bike boulevard elements laid out in Appendix B, the construction costs are provided in Table 3. Construction costs vary for each proposed bike boulevard from as low as $650 to as high as $20,000.

Table 3: Construction costs for each candidate Bike Boulevard

Bike Boulevard	From	To	Number of Infrastructure Elements and Unit Cost							Total cost for each bike boulevard
			New Wayfinding Sign	New Pavement Marking	Removed Stop Sign	Yield Sign	New Bumpout	New speed hump	New Mini-roundabout	
			$75	$250	$10	$50	$1,000	$2,000	$10,000	
Calvert Road	US 1	Metro Station	4	5	2	0	0	2	0	**$5,570**
Lackawanna St	Metro Station	Rhode Island Ave service road - east side	1	6	4	0	2	0	0	**$3,615**
Edgewood Rd, east of Rhode Island	Rhode Island Ave	52nd Place	2	5	4	0	2	1	1	**$15,440**
Edgewood Rd, west of Rhode Island	US 1	Rhode Island Ave	2	4	0	0	0	2	0	**$5,150**
Rhode Isand Ave Service Rd - West	Muskogee St	Blackfoot Rd	2	11	0	4	0	0	0	**$3,100**
Guilford Rd	US 1	Metro Station	5	10	6	0	4	2	0	**$10,935**
Hollywood Rd	US 1	Rhode Island Ave service road - east side	3	5	2	1	2	0	0	**$3,545**
Fox St	US 1	Rhode Island Ave	1	4	2	1	2	0	0	**$3,145**
Rhode Isand Ave Service Rd - East	Muskogee St	Delaware Pl	4	10	0	4	0	0	0	**$3,000**
College Ave	US 1	Columbia Ave	6	10	8	0	3	7	0	**$20,030**
Berwyn Rd	US 1	Potomac Ave	4	7	6	0	0	5	0	**$12,110**
Lakeland Rd	US 1	51st Ave	6	7	6	0	3	3	0	**$11,260**
Narragansett Pkwy	Lackawanna	Edgewood Rd	0	6	1	0	0	0	0	**$1,510**
Berwyn House Rd	US 1	Rhode Island Ave	5	4	0	0	0	0	0	**$1,375**
Metzerott Rd	US 1	Paint Branch Trail	2	2	0	0	0	0	0	**$650**
Guilford Dr, East	Hartwick Rd	US 1	1	4	1	0	2	2	0	**$7,085**
Guilford Dr, West	Knox Rd	Hartwick Rd	0	2	1	0	2	2	0	**$6,510**
Knox Rd, West of US 1	Guilford Drive	US 1	1	4	0	0	0	0	0	**$1,075**
Knox Rd, East of US 1	US 1	Dartmouth Ave	5	9	6	0	0	8	0	**$18,685**
Edmonston Rd	Charlton Ave	Old Calvert Rd	0	9	5	0	0	7	0	**$16,300**

To fund all of the bike boulevards, including *all* traffic calming elements is approximately $150,000 in total.

Costs for Design Alternatives

Several design alternatives were recommended that installed bike lanes instead of shared-space bike boulevards:

1. Knox Road, west of US 1:
2. Guilford Drive, west of US 1:
3. Westbound Edgewood Road, west of Rhode Island Ave:
4. College Ave two-way bike lanes
5. Lakeland Rd & Berwyn House Rd bike lane couplet

Because these designs consist only of re-striping existing roadways, they will be generally the same cost as the bike boulevard installation. These designs would require grinding /removing existing line striping, but would also not require the same level of traffic calming.

Funding Sources

Funding for projects can often be an obstacle to implementation. In addition to using local funds, there are several state/federal grant programs that offer monetary support for implementing the recommended bicycle facilities in this study. The following funding sources have been identified as applicable and potential grant program.

Transportation Alternatives Program (TAP). This program is administered and supported by the Maryland State Highway Administration, with reimbursement from the Federal Highway Administration, for the purpose of funding projects that enhance the cultural, aesthetic, historic, and environmental aspects of the State's intermodal transportation system. The program is set up to sub-allocate fifty percent of the funding directly to local Metropolitan Planning Organization's whom are the responsible reviewers of proposed projects within their jurisdiction. Recommendations under this study would be eligible as they meet the requirements of 1) related to surface transportation, and 2) meet at least one of the nine qualifying TAP categories, which the recommendations of this study fall under two of the nine; the planning and design, rehabilitation or construction of on and off road trail facilities for bike/pedestrian facilities and other non-motorized forms of transportation and infrastructure projects that will provide safe routes for non-drivers. Additionally, the recommendations in this report meet Maryland-specific requirements including: the project must be open to the public and benefit all Marylanders as oppose to a specific individual or group, it must maintain a reasonable duration of the intended public use, be located within a publicly-owned right-of-way or on a right-of-way encumbered with a permanent easement held by a state agency or the sponsoring government agency, and comply with ADA, NEPA, and all other applicable state and federal regulations. Project sponsors are responsible for design, management, construction, implementation, and permits as well as a minimum of 20% of all project costs.
Website: SHA's Transportation Alternatives Program

Maryland Bikeways Program. Supported and administered by the Maryland Department of Transportation, the goal of the program is to fill in the gaps in Maryland's bike network to support bikeshare programs. An eligible project meets one of the following criteria: 1) located substantially within the Priority Funding Area (PFA) and/or located within three miles of a rail transit station or major bus transit hub, 2) provide or enhance bicycle access along any gap identified in the Statewide Trails Plan "A Greener Way to Go", and/or 3) identified as a transportation priority in a County's most recent annual priority letter submitted to MDOT. The recommendations under this study will certainly meet the first criterion as it is located within a PFA and is within three miles of a transit station. In addition to meeting eligibility, MDOT has identified target areas for prioritizing funding to submitted projects; this study area falls within their identified target areas. The local match requirements are a) zero percent for priority minor retrofit, b) twenty percent for other priority projects, and c) fifty percent for non-priority projects. The match may include cash or in-kind services contributing to the project such as expenditures up to twenty-four months prior to a Bikeways project award.
This program may be the best fit for funding the recommendations under this study.
Website: MDOT's Bikeways Program

***Recreational Trails Program*.** Administered by the State Highway Administration and supported by an 80/20 federal to local match, this program funds community based, motorized and non-motorized recreational trail projects. The trails can be for pedestrian and bicycling paths as well as for specific uses such as in-line skating, cross-country skiing, equestrian use, and four-wheel driving. The program funds not only new construction of trails, but maintenance and restoration of existing trails, purchase or lease

of trail construction equipment, acquisition of easements or property for trails, and implementation of interpretive/education programs to promote intrinsic qualities, safety, and environmental protection. The matching funds must be committed in the local jurisdiction's budget and awards may not exceed $40,000 for new construction and $30,000 for other projects. Preferred programs to be funded include the following characteristics: connect communities with natural/cultural areas or tourism areas (e.g. Scenic Byways, Heritage Areas, Canal Towns); have broad-based community support; complete a missing link in the State Trails Plan; link or complete existing trails; mitigate trail impacts on the natural environment; construction or maintenance accomplished with youth conservation corps or service groups; loop trails that do not connect to a broader network and sidewalk projects are not generally awarded funds.
Website: Recreational Trails Program

Safe Routes to Schools. Administered by the State Highway Administration and supported by an 80/20 federal to local match, this program funds infrastructure and non-infrastructure projects that support safe and sustainable routes for K-8 aged children to walk, roll, or bicycle to school. Projects categorized as safe routes to school must be requested through the larger Transportation Alternatives Program. Eligible project types that overlap with the recommendations under this study include traffic calming and speed reduction improvements, bike/pedestrian crossing improvements, and bicycle parking. This program would be applicable as there are schools with adjacent proposed bike facilities within the study area, such as the facility along Edgewood road adjacent to Hollywood Elementary School and Lakeland Rd that serves Paint Branch Elementary.

Website: Safe Routes to School Program

Prioritization and Phasing of Bike Boulevards

Because annual funding - whether via local funds or through grant programs - is limited, implementation of the bike boulevards is recommend to be conducted in two phases. The first phase would maximize the potential users and have the minimal potential costs. Specifically, first-phase bike boulevards accomplish most, if not all of the following:

- Connect trails with large or dense commercial areas;
- Connect trails with other trails;
- Provide a route that is already low stress, requiring no further engineering to reduce existing speed or volumes;
- Connect trails with highest residential density areas;
- Connect to *major* destination (regional park, metro station)
- Design alternatives that provide bike lanes in lieu of shared-space bike boulevards.

Table 4 below shows that streets that most completely meet these criteria.

Table 4: 1st phase prioritization of bike boulevards

Road Name	Length (mi)	From	To
Calvert Road	0.57	US 1	Metro Station
Lackawann St	0.45	Metro Station	Rhode Island Ave service road - east side
Edgewood Rd	1.48	US 1	52nd Place
Guilford Rd	0.46	US 1	Metro Station
Hollywood Rd	0.35	US 1	Rhode Island Ave service road - east side
Rhode Isand Ave Service Rd - East	0.63	Muskogee St	Delaware Place
College Ave	0.53	US 1	Columbia Ave
Lakeland Ave	0.53	US 1	Rhode Island Ave
Berwyn House Rd	0.32	US 1	Rhode Island Ave

The remaining streets, while still critical to a complete network, require additional costs to address traffic calming or are likely to connect to more moderate-density residential/commercial areas. Table 5 shows the Phase 2 priority streets.

Table 5: 2nd phase prioritization of bike boulevards

Road Name	Length (mi)	From	To
Rhode Isand Ave Service Rd - West	0.90	Muskogee St	Blackfoot Rd
Fox St	0.35	US 1	Rhode Island Ave
Berwyn Rd	0.54	US 1	Potomac Ave
Narragansett Pkwy	0.36	Lackawanna	Edgewood Rd
Metzerott Rd	0.07	US 1	Paint Branch Trail
Guilford Dr	0.86	Knox Rd	US 1
Knox Rd	0.74	Guilford Drive	Dartmouth Ave
Edmonston Rd	0.75	Charlton Ave	Old Calvert Rd

Some of these second-phase streets are already low-stress roadways, but don't offer the breath of connections that are noted in the first tier; but would nonetheless be low-cost upgrades. These include:

- Rhode Island Ave Service Road (west side), from Muskogee St Blackfoot Rd
- Fox Street, from US 1 to Rhode Island Ave
- Berwyn Road, from US 1 to Potomac Ave
- Narragansett Parkway, from Lackawanna to Edgewood Rd
- Metzerott Road, from US 1 to the Paint Branch Trail

Of the remaining 2nd tier streets, Edmonston Road requires traffic calming as its speeds are excessive for residential neighborhoods. Knox Road west of US 1 and Guilford Drive both have high enough

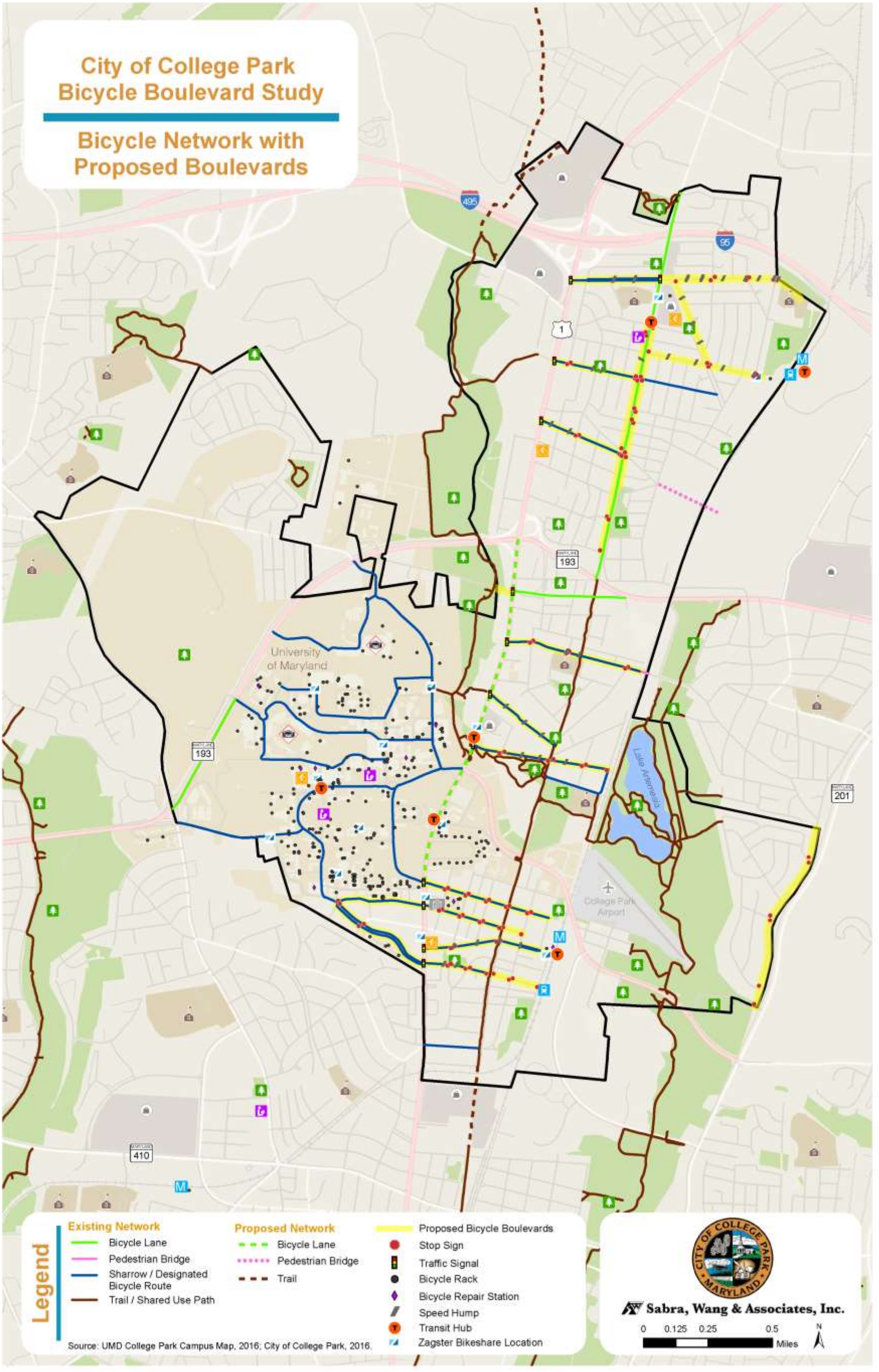
volumes to make cycling uncomfortable; accordingly exploration of converting a curbside parking lane into a dedicated buffered bike lane is recommended. Further parking study would include evaluation of curbside utilization and turnover as well as availability of nearby adjacent curbside space.

Next Steps

As funding is secured and bike boulevards/lanes are chosen for construction, College Park should create and maintain a bike infrastructure map, using the GIS mapping files developed for this study. The updatable map can be made available online via the City's website, with static maps available at select locations throughout College Park and even in Student Orientation Packages.

Additionally, as the bike boulevards are developed, monitoring of vehicle speeds is recommended to ensure that speeds are sufficiently low for comfortable cycling.

Appendix A: Map of Bike Boulevards (shown in yellow) with existing bike infrastructure



Appendix B: Planview layout of all Bike Boulevard Elements

Due to its size, Appendix B is provided as a separate document that needs to be viewed on a computer or printed out on a plotter, so that plan view details can be seen with proper clarity

Appendix C: Conceptual Design for Alternatives to Select Bike Boulevards

Due to its size, Appendix B is provided as a separate document that needs to be viewed on a computer or printed out on a plotter, so that plan view details can be seen with proper clarity

Appendix D-1: Public Comments from the 4-20-2016 Charrette

Comments on the Recommended Bike Boulevard Streets

Downtown area:

- Please install a bike lane on Guilford west of US 1 – too fast for shared space
- Please include a buffer in your markings of the westbound approach to US 1 on Guilford – there are no sidewalks
- Might be overkill on bike boulevards – consider focusing on 1 to 2 east-west routes that connect Metro and campus.
- Please keep all 4-way stops at trail crossings
- Love the stop sign removal
- Remove sound wall blocking direct progression of trolley trail (note: that this already being done under a different project)
- Question – how can the Metro/MARC crossing be improved?
- Cut back trees at Dartmouth/Guilford for visibility
- Calvert Rd median makes for tight quarters for sharing space

Mid-town area:

- Please signalize Rhode Island Ave and Greenbelt Road
- If Cherokee is signalized, consider turning it into a bike boulevard between US 1 and Rhode Island Ave.
- Consider a pedestrian/bike bridge connecting south end of Autoville Drive to Paint Branch Trail in the northwest quadrant of the intersection of MD 193 and US 1.

Up-town area:

- Improve the connection from Hollywood to Paint Branch Trail. Add pedestrian push button
- Add Protection to the Rhode Island Ave bike lanes
- Frequent pedestrian crossings of US 1 between Hollywood and Fox
- Question: Is there a way to connect Edgewood to the Paint Branch Trail?
    - Answer: 47th Place is a low volume road that provide direct access between Edgewood Road and Paint Branch Trail via Hollywood Road

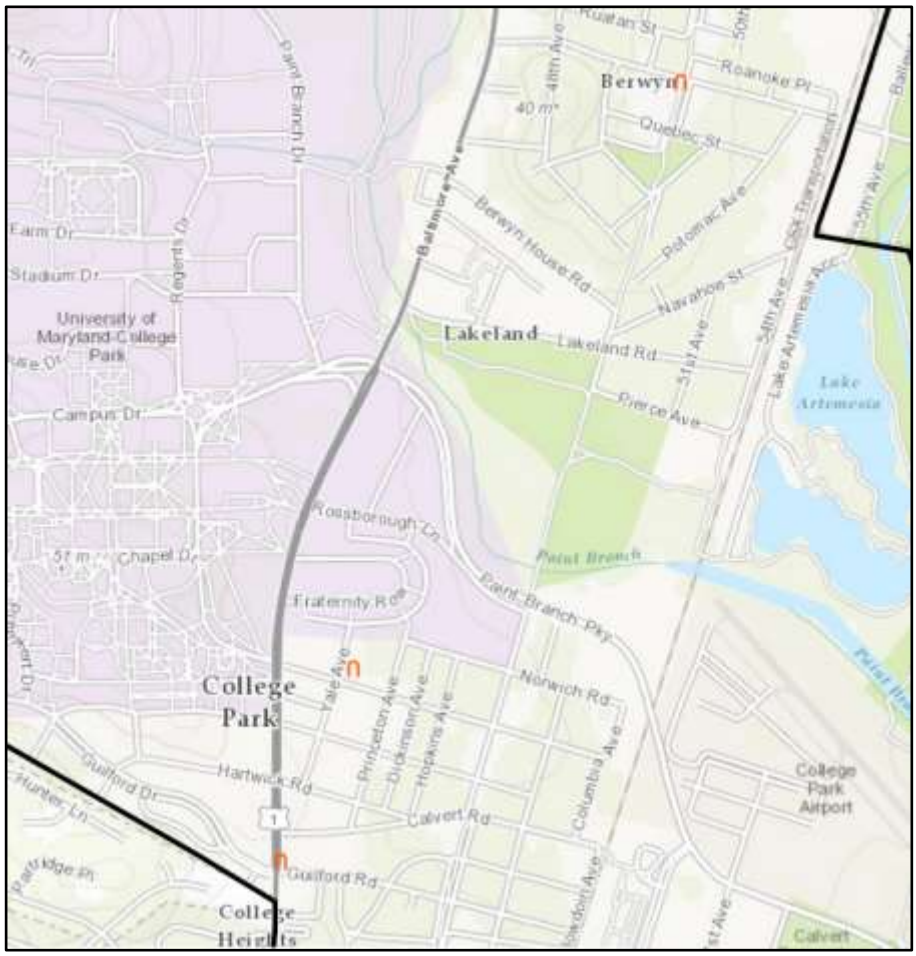
Comments on the Design Options

- *College Ave Design Option:*
    - Supportive comments
    - Add public bike racks along route
    - Add bike boxes and/or bike-only signals to transition across Route 1
    - One comment would like bike lanes on either side (note: not enough space if buffers are included)
- *RIA/MD 193/Greenbelt Rd option:*
    - Provide raised x-walks at RIA/Greenbelt
    - Add pedestrian walk button to cross Greenbelt Rd at RIA/Greenbelt, similar to PB Pkwy trail crossing
    - Add NTOR for WB MD 193
    - Improve quality of existing RIA bike lanes north of MD 193
    - Add pedestrian walk button to cross Rhode Island Ave at RIA/Apache, similar to PB Pkwy trail crossing
- *Lakeland Berwyn House couplet:*
    - Add sharrows on both Lakeland and Berwyn House in the direction that the bike lane is not oriented.
    - Consider contraflow bike lane along Berwyn House (i.e. placed on the south side)
- *Edgewood WB only Bike lanes:*
    - Consider flipping parking a bike lanes (note: insufficient room for door-zone buffer)
    - Like the door zone markings
    - Add signing and marking for EB direction of Edgewood

Appendix D-2: On-line comments received from interactive project website

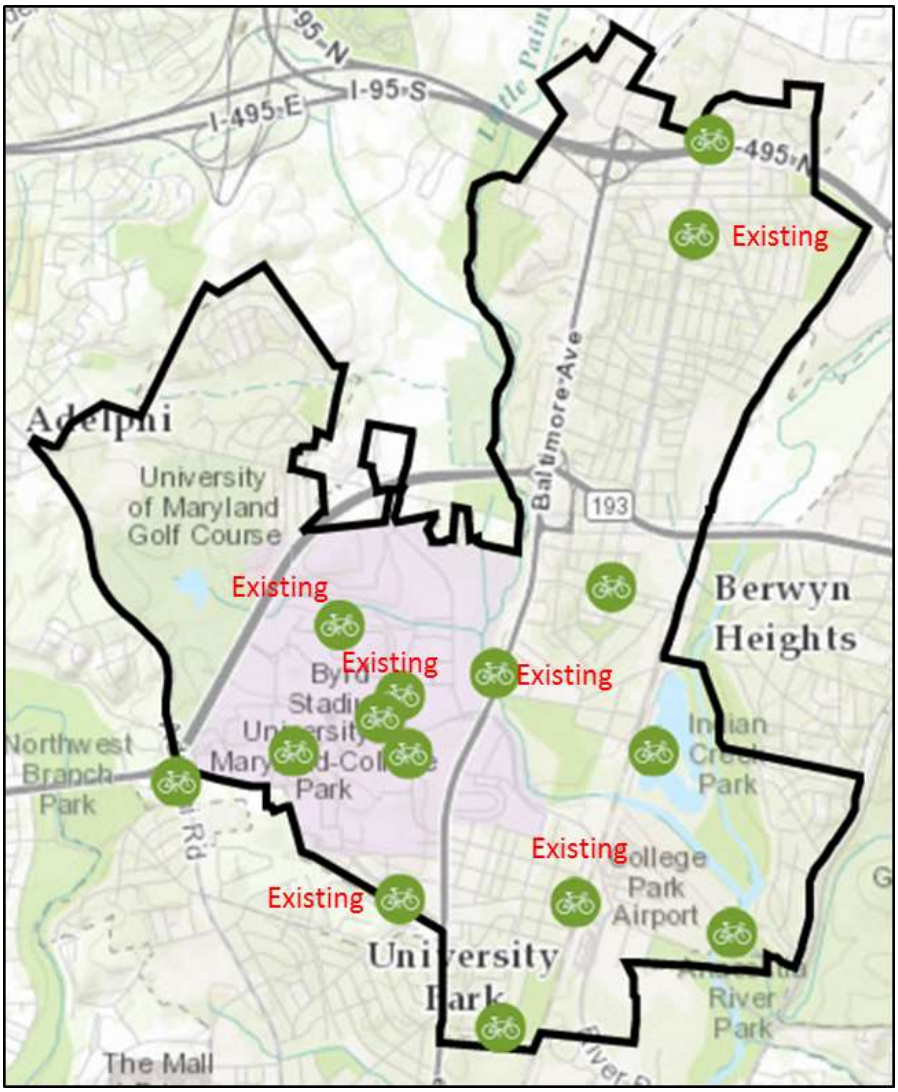
Suggested Locations for new Bicycle Racks

1. Berwyn Road & Rhode Island Avenue (College Park Trolley Trail)
2. US 1 & Guilford Avenue
3. Yale Avenue & College Avenue (St. Andrew's Church)



Suggested Locations for Bicycle Share

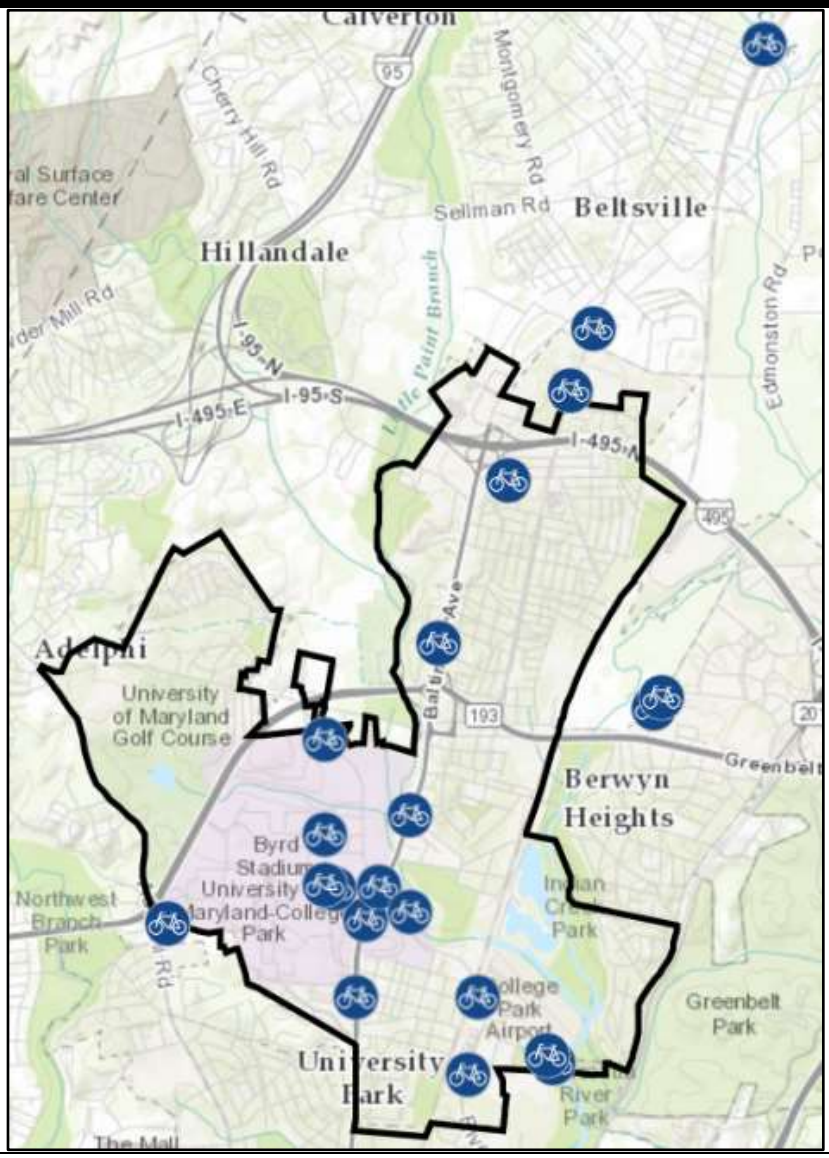
- Southeast corner of Odessa Road & Rhode Island Ave
- At Hollywood Plaza (Existing Location)
- Along the Trolley Trail at Berwyn Rd and Roanoke Pl.
- Along the peninsula in Lake Artemesia; near the pavilion
- At the Park off Old Calvert Rd
- Near the plaza at the Varsity along Route 1 (Existing Location)
- On the wes tside of the College Park Metro station (Existing Location)
- Along the Trolley Trail near Rhode Island Ave at Albion
- On campus - In the complex of the Graduate Student Apartments along Rowalt Dr. (Existing Location)
- On campus – At Main Administration Bldg.
- On campus – at Tawes Hall
- On campus – Along Tulane Drive in Graduate Hills Apartment complex
- On campus – west side of Hornbake Library
- On campus – near Regents Drive Parking Garage (Existing Location)
- On campus – south side of Eppley Recreation Center (Existing Location)



*The College Park Bikeshare program launched midway through the survey window. Several locations suggested by residents in the table above coincide with where bikeshare stations were placed (these locations are labeled “existing”).

Suggested Locations for Bicycle Lane*

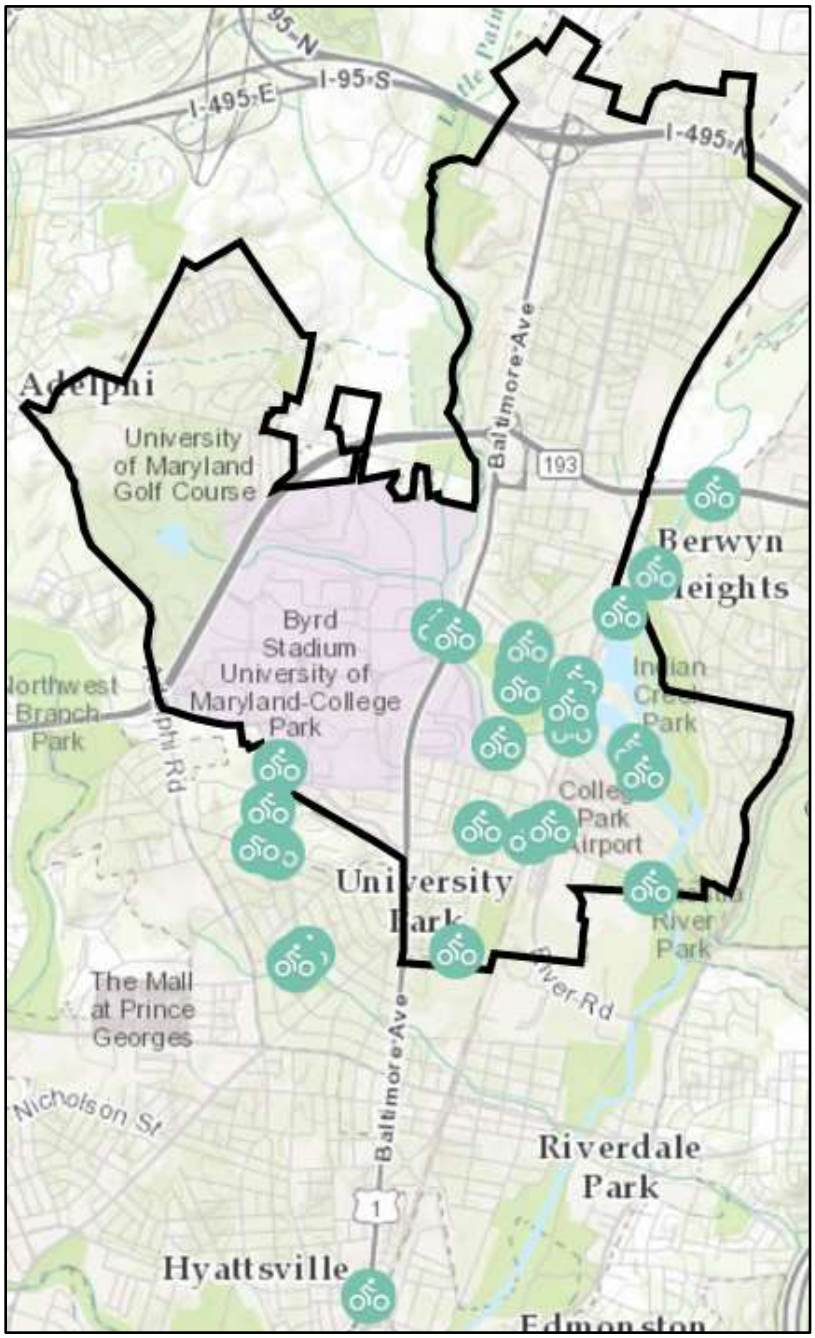
- Paint Branch Drive From Comcast Center to the Metro Station
- Edgewood Road
- US 1 within study area
- *Out of study area* – US 1 north of Greenbelt road
- *Out of study area* - Rhode Island Avenue north of IS-495 - 49th Avenue
- *Out of study area* - Cherrywood Lane north of MD 193
- *On campus* –Campus Drive from Adelphi to "M" Circle
- *On campus* -Regents Drive – "*Regents Avenue is a nightmare for biking"*



*Several locations had multiple requests for bike lanes.

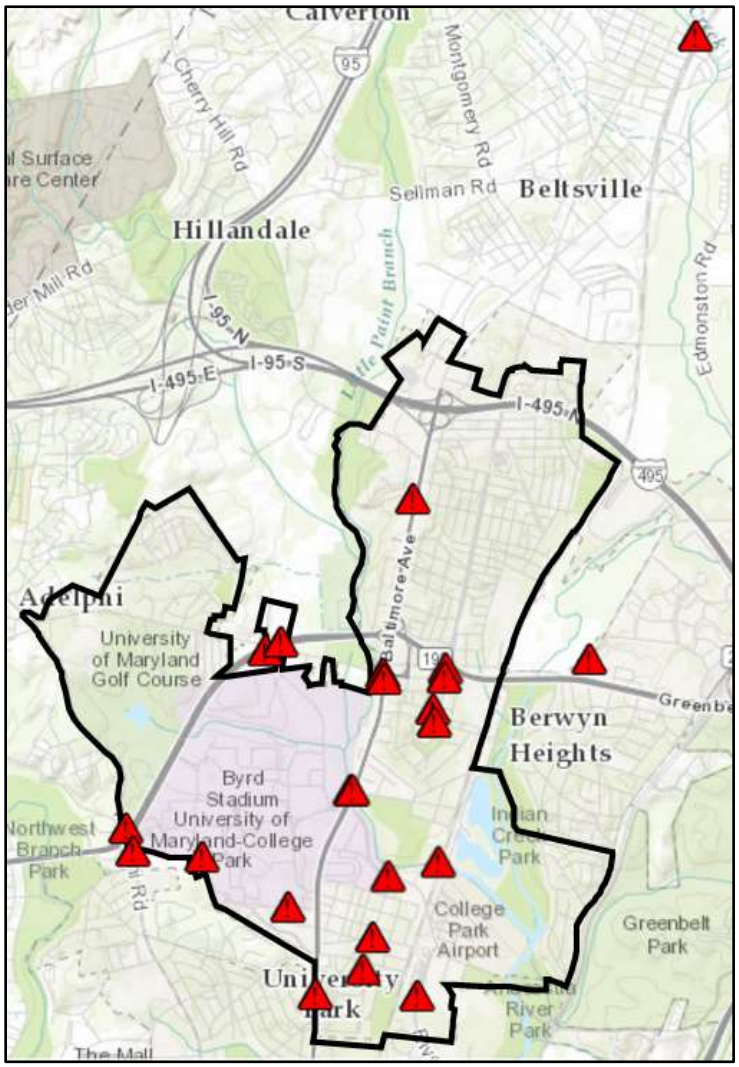
Suggested Locations for Bike Wayfinding Signs

- 57th Ave at Greenbelt – *out of study area*
- Berwyn Road at Indian Creek Trail – *out of study area*
- 55th Ave at Lake Artemisia Trail
- Anacostia Tributary Trail System at bridge – *on campus*
- Anacostia Tributary Trail System/Lakeland Road/US 1
- Rhode Island Ave at Lakeland Road
- Anacostia Tributary Trail System at Paint Branch Trail
- Paint Branch Trail at Paint Branch Parkway
- Paint Branch Trail along section that runs behind the school, to the rail road tracks
- Paint Branch Trail at 54th Ave
- Anacostia Tributary Trail System & NE Branch Trail
- Paint Branch Trail at Paint Branch Parkway
- Rhode Island Ave at Calvert Road
- Calvert Road at Bowdoin Ave
- Anacostia Tributary Trail System at Paint Branch Parkway
- Rhode Island Southern Tip/Albion Road at Trail – *with distances*
- Mowatt Lane at College Park Latter Day Saints – *on campus*
- End of Calverton Drive at Trail - *out of study area*
- Wells Parkway at Chansory Lane – *out of study area*
- Eversfield Drive at Wells Parkway – *out of study area*
- End of Wells Parkway at Town of University Park – *out of study area*
- End of Hyattsville Trolley Trail in Hyattsville – *out of study area*



Reported Challenging Areas

- Discontinuous path from Hollywood Rd to Peru Road across Route 1
- High traffic area along Cherrywood Lane in front of the Giant
- Challenging to cross Greenbelt Road along the Trolley Trail
- Pave parking lot with markers for trails at Berwyn Rd and Roanoke Place
- Narrow sidewalk to cross the bridge along Route 1, just south of Lakeland Rd
- Intersection of Greenbelt Road, Route 1, and Metzerott Rd
- Intersection of University Boulevard southbound and Boteler Lane; at the University Courtyard Apartments
- Intersection of University Boulevard northbound at Paint Branch Drive
- Crossing of Route along trail; south of College Park Fire Station
- Crossing of railroad tracks along Anacostia Tributary Trail; between the Lake and the airport
- Crossing of Paint Branch Parkway along the Anacostia Tributary Trail System
- Crossing of Calvert Rd along the Trolley Trail
- Portion of Trolley Trail between Guilford Road and Fordham Road
- Along River Rd between the American Institute of Physics and parking lot at the Metro Station
- At the intersection of Route 1 and Carleton Terrace
- On campus – Along Knox Rd in front of South Campus Commons
- Adjacent to campus - Roundabout along Campus Drive at Mowatt Lane
- Adjacent to Campus - Channelized right turn from northbound Adelphia Road to eastbound Campus Drive
- Adjacent to campus – University Boulevard at Adelphia Road; "*Crossing this road is a nightmare"*



Additional Comments on Bike Boulevard

- Trolley Trail at Drexel Road and Rhode Island Avenue - *Heavily used by children and dog walkers, not appropriate for high-speed bicyclists.*
- Between Rhode Island Avenue and Dartmouth Avenue and Drexel Road and Amherst Road - *Trail through Calvert Hills, between Calvert Road and Albion. This is the only pedestrian walkway in area, used by children, dog walkers, pedestrians. Fast bike traffic would cause huge problems.*
- Paint Branch Parkway at 52nd Avenue is a tough crossing
- Calvert Drive at Bowdoin Avenue - *Thank you for planning better bicycle access. In addition, sidewalks or another safe option from the College Park Metro throughout the neighborhood is urgently needed, as many of the streets currently have disjointed sidewalks unsafe for pedestrians.*
- Cherry Hill Drive - *Note the Little Paint Branch Trail to the Beltsville Community Center will be located parallel to Cherry Hill Rd and Sellman Rd.*
- Adelphi Road and Campus Drive - *This area of campus drive has a bicycle lane but the signage is not effective. Cars speed regularly more than 10 miles over the speed limit (speed limit signs also inadequate). Maybe adding paint to the bicycle lane would help here.*