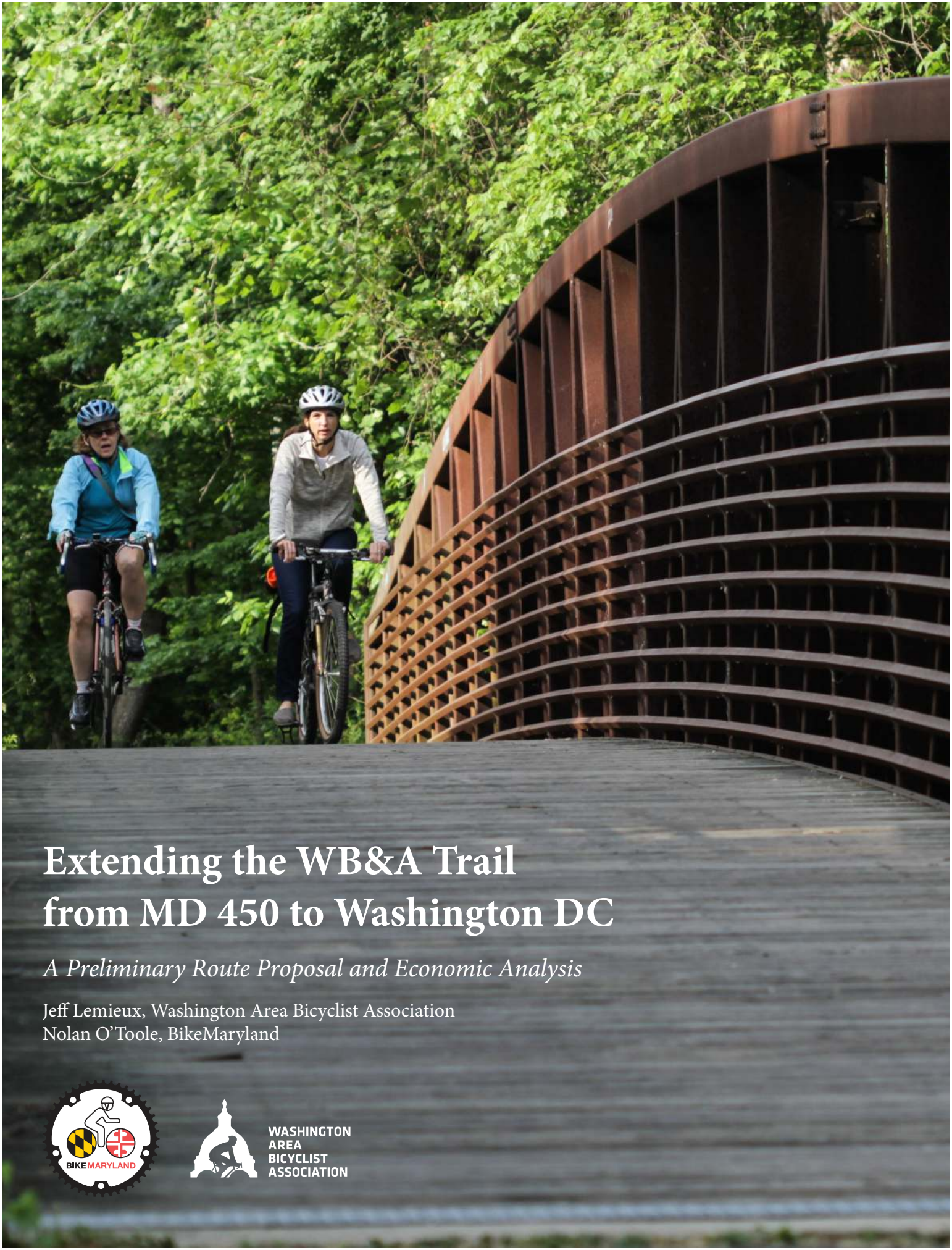

Extending the WB&A Trail from MD 450 to Washington DC

A Preliminary Route Proposal and Economic Analysis

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WASHINGTON AREA BICYCLIST ASSOCIATION

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Cover photo by Leah L. Jones.

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A Preliminary Route Proposal and Economic Analysis

The Washington Baltimore & Annapolis trail (WB&A) is a paved multi-use trail that runs from Route 450 in Prince George's county to the Patuxent River at the border of Prince George's and Anne Arundel counties. Efforts are underway to extend the WB&A trail north-eastward over the Patuxent River and toward the Thurgood Marshall Baltimore-Washington International Airport.

This report provides a preliminary analysis of extending the current WB&A trail in the opposite direction: southwestward to connect with the Anacostia Riverwalk Trail (ART) at the Washington DC border. By 2016, the ART will be a continuous trail system connecting the Washington DC riverfront with the extensive Anacostia Tributary Trail system in northern Prince George's county. Extending the WB&A trail to the ART at the Maryland/Washington DC border would provide analogous trail connectivity for a large area of central Prince George's county.

Building the WB&A Prince George's Trail Extension to DC will require some significant street rebuilding and several sections of new trail, expanded sidewalks and sidepaths. Construction would include curb and lane realignment, guard rail removal, crosswalk rebuilding, trail building (including bridges), signage, and traffic calming and restriping on adjacent roads.

Property Tax Assessment, 2015

» **Good** Bike Trail Access (Riverdale Park): . . . . . **$995,179** per acre.
» **Poor** Bike Trail Access (East Riverdale): . . . . . **$907,599** per acre.

However, property values in the Prince George's neighborhoods we studied that have good trail access are considerably higher than those in similarly constructed "carlocked" neighborhoods with poor bike access. We estimate that even if property values near the proposed WB&A Trail Extension to DC increased by only a few percentage points due to the trail amenity, the trail's construction costs could pay for themselves via additional tax revenue very quickly.

First, we propose a basic route for the trail extension, including a separated and protected sidepath along MD route 704 (Martin Luther King Highway), new bike lanes along residential streets and a short protected sidepath along Landover Road in sections of Landover MD, and a new multi-use trail along Beaverdam Creek near Cheverly MD (see Figure 1). Construction would require cooperation between the Maryland National Capital Parks and Planning Commission (MNCPPC), which would probably be responsible for the multi-use trail and sidepath sections, the Prince George's County Department of Public Works and Transportation, which would likely be responsible for bike lanes on any county roads and maintenance, and the Maryland State Highway Administration (SHA), which controls numbered state roads such as Maryland Route 704 (MLK Highway) and Route 202 (Landover Road).

Second, we analyzed current property values in several communities within the general region proposed for the WB&A trail extension in central Prince George's county, as well as property values in northern Prince George's communities with (and without) nearby bike access to the Anacostia Tributary trail system and other bike facilities (see Table 1).

Average 2015 property assessment values in communities with good bike facility access ($218,491) were approximately

Figure 1. Proposed WB&A Trail Extension Sections from Prince George's County to Washington DC.

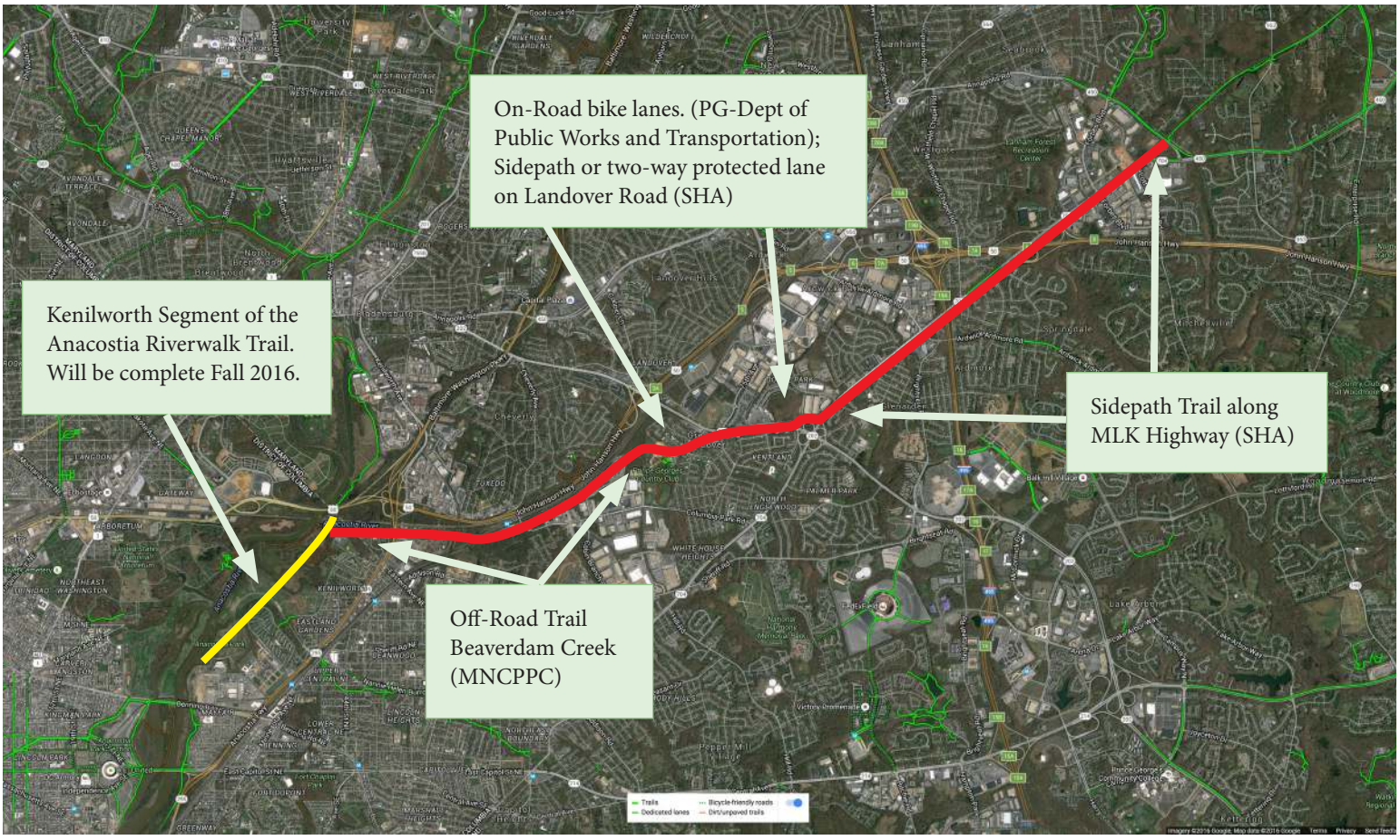


Table 1. Assessment Values, Lot Sizes, Value Per Acre, Six Prince George's County Communities (2015).

	Number of Properties	Total Property Value	Average Property Value	Average Lot Size	Value Per Acre
All Communities	11,263	$2,170,308,486	$192,694	0.18	$1,080,133
Good Bike Trail Access	5958	$1,301,767,856	$218,491	0.18	$1,210,981
Within 200m of Bike Facility	2679	$597,504,152	$223,033	0.17	$1,279,641
Outside 200m of Bike Facility	3279	$704,263,704	$214,780	0.19	$1,158,254
Poor or No Bike Trail Access	5305	$868,540,630	$163,721	0.18	$929,589
Within 200m of Bike Facility	3211	$682,980,018	$212,700	0.17	$1,244,100
Outside 200m of Bike Facility	8052	$1,487,328,468	$184,715	0.18	$1,018,493
Good Bike Trail Access					
Hyattsville	4177	$903,649,960	$216,339	0.16	$1,337,152
Edmonston	417	$105,047,666	$251,913	0.25	$1,003,531
Riverdale Park	1364	$293,070,230	$214,861	0.22	$995,179
Poor or No Bike Trail Access					
Woodlawn	1839	$303,286,100	$164,919	0.17	$980,985
East Riverdale	2901	$474,998,330	$163,736	0.18	$907,599
Landover Hills	565	$90,256,200	$159,745	0.18	$886,551

Source: PG Atlas, data accessed June and July 2015, calculations by the authors.

Note: We excluded properties valued more than $1.5 million, less than $50,000, or on more than 3 acres.

33 percent higher than those with poor access ($163,721). Average lot sizes were slightly higher in communities with good access (+2.4%) so average property values per acre were about 30 percent higher than in communities with poor access ($1,210,981 vs. $929,589).

Overall, properties within 200 meters of a bike facility in the six communities were valued 15 percent higher than those outside 200 meters ($212,700 vs. $184,515). However, properties within 200 meters of a bike facility had lower average lot sizes (-6%), so average values per acre were about 22 percent higher for properties within 200 meters. Of course, having a property within 200 meters of a bike facility is correlated with being in a community with good bike access. Within communities with good bike access, properties within 200 meters of a bike facility were valued about 4 percent higher than those outside 200 meters ($223,033 vs. $214,789). But since lot sizes were smaller among properties within 200 meters, the difference in value per acre was more than 10 percent ($1,279,641 vs. $1,158,254).

Third, we sampled property assessment values adjacent to the proposed trail, particularly in Landover, Glenarden, Springdale, and other Prince George's communities. Assuming that property values increased by only 2% when the trail was completed, we estimate that property tax revenues from the region would increase by $3 million over the first five years (see Table 2). Assuming property value enhancements in the trail region increased gradually to 4% over the 20 year horizon, we estimate the direct fiscal benefits of the trail would be nearly $7 million over the first ten years, and more than $16 million over the first twenty years.

Table 2. Estimated Fiscal Payback, Assuming 2% (Year 1) to 4% (Year 20) Valuation Increase

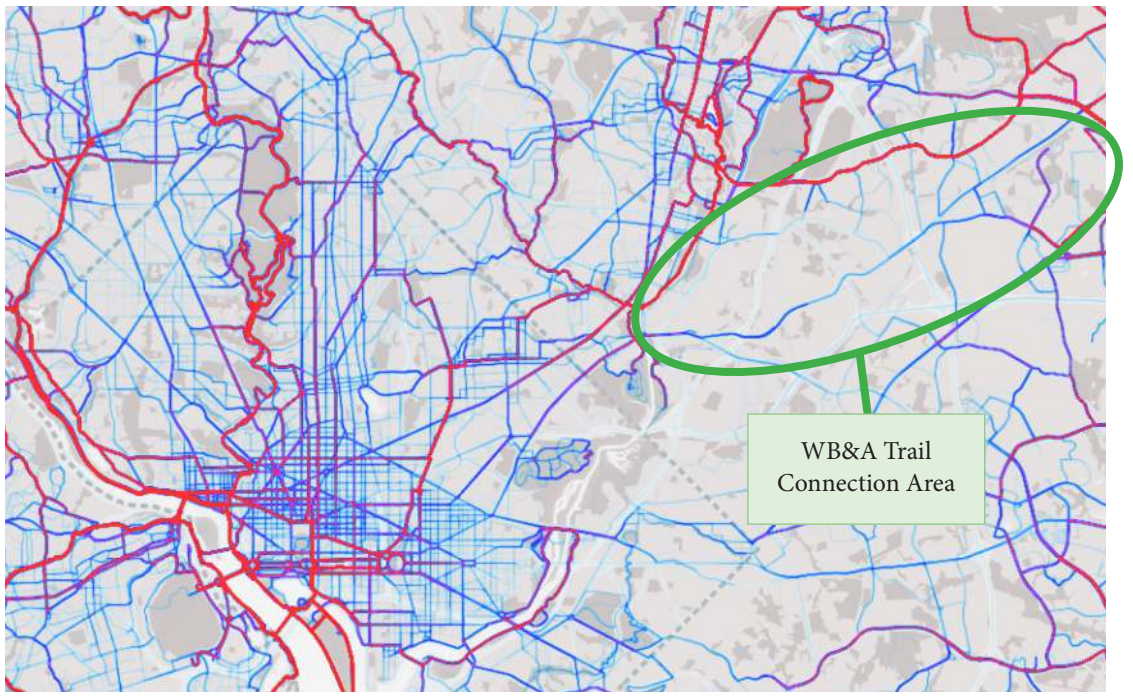
	Properties Affected	Avg. Valuation Increase	Tax Rate	Property Tax Revenue (in millions of dollars)			
				Year 1	**First 5 years**	**First 10 years**	**First 20 years**
Landover	4,432	$2,702	1.30%	0.2	0.9	2	4.7
Springdale-Ardmore	816	$4,262	1.30%	*	0.3	0.6	1.4
Glenarden	2,272	$3,922	1.30%	0.1	0.7	1.5	3.5
Westgate-Carsondale	474	$3,463	1.30%	*	0.1	0.3	0.6
Glenn Dale	953	$5,138	1.30%	0.1	0.4	0.8	1.9
Mitchellville	383	$4,899	1.30%	*	0.1	0.3	0.7
Bowie	2,035	$4,274	1.30%	0.1	0.6	1.4	3.4
Total	**11,364**			**0.6**	**3**	**6.8**	**16.3**

Sources: Based on data from the PG Atlas and U.S. Census Bureau, 2009-2013 Five-Year American Community Survey; calculations by the authors.

Note: * = less than .05 million ($50,000)

The following sections sketch our preliminary route proposal to connect the WB&A trail with the ART at the Maryland-Washington DC border, explain our analysis of property tax valuations in nearby Prince George's county neighborhoods with good trail access (the "haves") vs. similarly built carlocked neighborhoods with poor or no trail access (the "have nots"), and illustrate the direct fiscal payback potential of connecting the WB&A trail system from Prince George's county to Washington DC.

Figure 2. Bicycling Heatmap (from Strava)



Note: Strava heatmaps are available at **waba.org/WBAheatmap**. Importantly, Strava heatmaps are generated by riders with sufficient income to use a global positioning system (GPS) navigation device or a GPS-enabled smart phone, and sufficient interest in recording their riding habits that they take the time to record them. Thus, the heatmaps likely reflect the patterns of higher-income and sport-recreational riders more than those of everyday bike commuters and utility cyclists, and bike riders with lower incomes. Nevertheless, the heatmaps clearly show where cyclists generally tend to ride and where they do not.

Proposed WB&A Trail Extension Route to DC

The gap between the WB&A trail in Maryland and Washington DC is apparent in heat maps of DC bike riding and commuting patterns (see Figure 2). The heat map traces the ride patterns of cyclists using a ride tracking application called Strava. Figure 2 shows extensive bike traffic in northern Prince George's county, along the Anacostia Tributary Trails from Hyattsville through College Park and Greenbelt, and northward and eastward from Beltsville to Bowie. The WB&A trail is easily identified, running from Bowie southwestward toward Washington DC, but terminating at MD Route 450. However, there is very little continuing bike traffic between the current WB&A trail and Washington DC. Of course, this is because there are no trails and few safe, lower-speed roads within that gap. This gap would be filled by our proposed WB&A trail extension to Washington DC, creating a safe through connection for local bike riders, bike commuters headed for employment centers in DC and Bowie, and touring cyclists riding from the Washington area toward Baltimore and Annopolis.

Our proposal for the route of the WB&A trail extension starts at the current terminus at Route 450 (Annapolis Road). The North Section of the trail would cross Annapolis Road (new crosswalk needed), run along Lottsford Vista Road for a brief stretch, and then extend southwestward on the northwest side of MD Route 704 (MLK Highway) as a sidepath or protected two-way bike lane to Route 202 (Landover Road).

The Landover trail sections would follow Route 704 alongside and north of the cloverleaf interchange at Route 202, and then would continue along the north side of Route 202 (Landover Road) to Pinebrook Ave. The trail would cross Route 202 at Pinebrook Ave and take neighborhood streets to Country Club Road, where the off-road multi-use trail begins alongside Beaverdam Creek.

The Beaverdam Creek trail section would connect Landover with the Cheverly Metrorail station, running through or alongside industrial areas, and then continue along Beaverdam Creek over the freight rail lines, under Route 295, until finally connecting with the ART near the Kenilworth Aquatic Gardens. Of course, planners and engineers may find alternative, better routing than those we propose. However, our basic route plan illustrates the concept and basic features of the route.

Fig. 3. Route of WB&A Trail Extension Along MD 704 to the Beltway (I495).

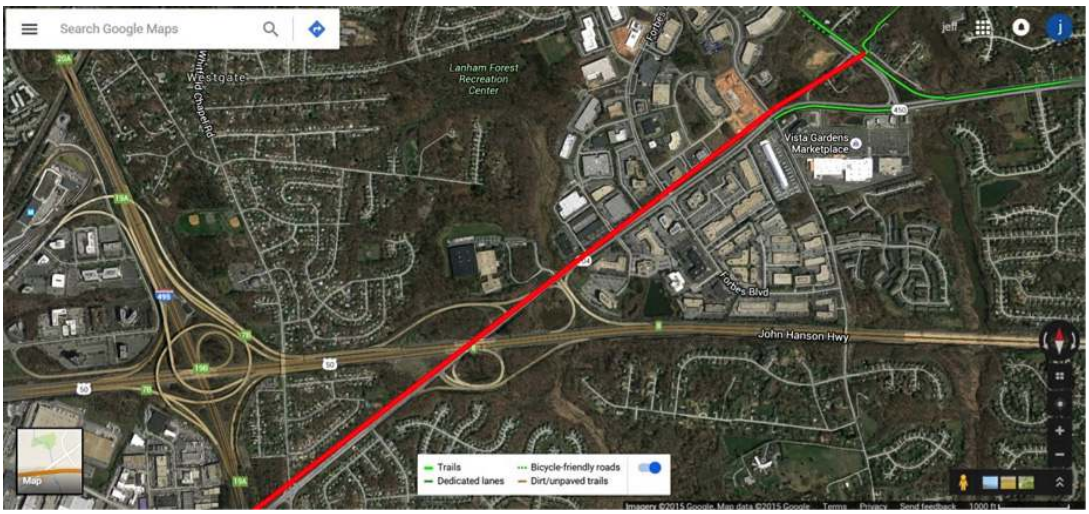


Fig 4. MD Route 704 Between Route 450 and Route 50.

Fig 5. Route 50 Underpass.

Fig 6. Route 704 Between Route 50 and Beltway (I-495).

Fig 7. Beltway (I-495) Overpass.

North Section – Route 704 Sidepath from Route 450 to the Beltway

Figure 3 shows the proposed WB&A trail route between its current terminus at Route 450 and the Beltway. In this region, Route 704 is currently configured mostly as a six-lane highway, but with crossings and stoplights. The trail could be constructed as a separated sidepath along the northwest side of the road or as a protected two-way bike lane within the roadway, using one of the current travel lanes (see Figure 4). In some cases, the trail could switch from sidepath to protected bike lane as needed. Since the road is currently designed for extremely high vehicle speeds, the protection features in any in-roadway bike lane sections would have to be substantial, such as a jersey wall.

At several places in the North Section, intersection features should be rebuilt, squaring off high-speed ramps so that the trail users can safely cross. The acceleration lane for the Route 50 westbound ramp would have to be calmed substantially or redesigned to allow a safe crossing. At the Route 50 underpass, we believe there would be sufficient clearance for the trail to run on the outside of the support columns (see Figure 5).

At several points in North Section, guard rails would have to be removed to make room for the trail (see Figure 6). A grassy median with trees could be a much more attractive way of protecting the sidepath. To cross the beltway (I495) bridge, the travel lanes would need to be shifted to the south so that the two-way bike lane would have sufficient space. Jersey wall protection would be needed on the bridge (see Figure 7). Inside the beltway, intersection improvements would be desirable to calm speeds, particularly for turning traffic crossing the trail (see Figure 8).

Fig. 8. MD Route 704 Typical Streetscape Inside the Beltway.

Fig. 9. Central Section – Landover MD Area

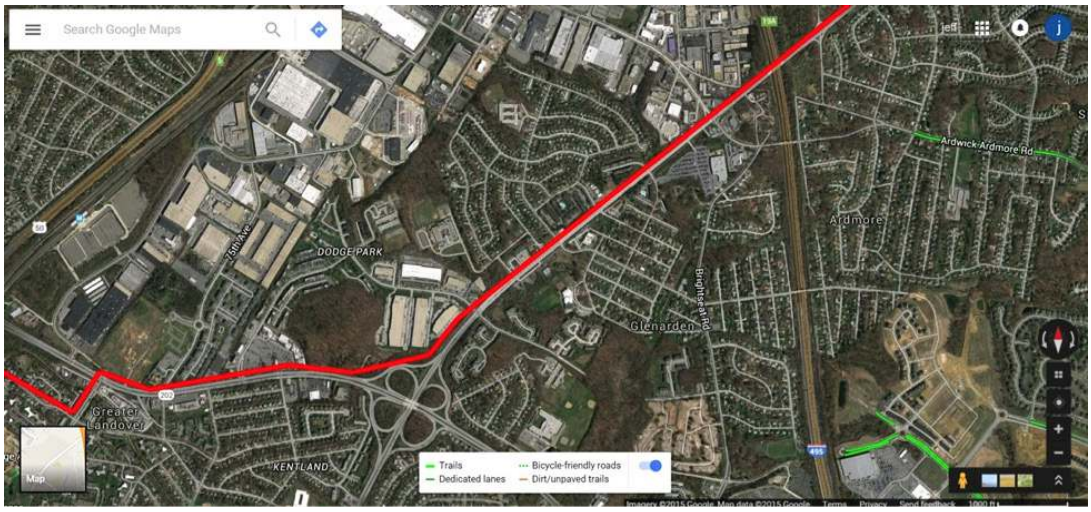


Fig. 10. Landover Road

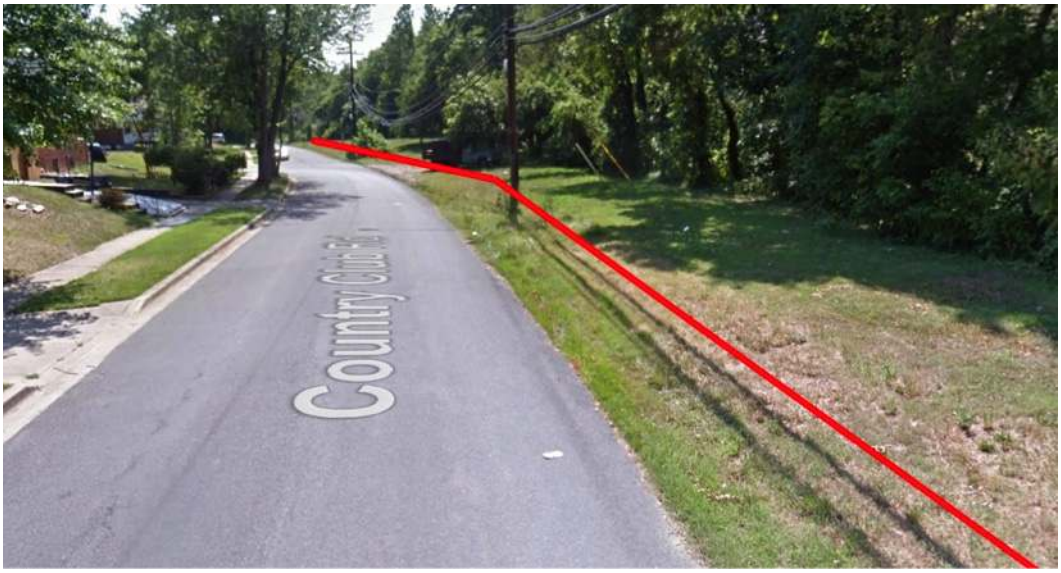
Fig. 11. Landover Road Area Detail.

Landover Road Section and Neighborhood Streets

The WB&A trail extension would go around the cloverleaf at the intersection of Routes 704 and 202, and continue on the north side of Landover Road (see Figure 9). Again, several intersections, guard rails, and business access ramps would need minor reconfigurations to improve the safety of trail users at crossings, particularly to slow the speeds of right-turning traffic by squaring off corners and highlighting crosswalks (see Figure 10).

Under our proposal, the trail would cross Landover Road at Pinebrook Ave and enter a residential neighborhood (see Figure 11). The trail would turn west on Hawthorne Street and south at Country Club Road (see Figure 12). On these low-traffic residential streets, the trail could simply be marked with pavement markings or expanded sidewalk sections. On-road sections could be feasible as long as they were well marked to facilitate easy navigation for touring cyclists unfamiliar with the local area.

Fig. 12. Country Club Road.



Beaverdam Creek Section

The proposed WB&A trail extension to DC between Landover and the ART would mostly consist of a multi-use trail along Beaverdam Creek (see Figure 13). Construction would likely require bridges and boardwalks, including bridges over the freight rail tracks and an underpass beneath Kenilworth Ave.

The first section of off-road trail would connect Country Club Road in Landover with the Industrial area along Columbia Park Road. The trail could extend down Beaverdam Creek or be routed on road in the industrial park. Near the Cheverly Metro station, the trail would probably run on or alongside Columbia Park Road, which would need either an expanded sidewalk or a road diet, which would convert the four-lane road section into a three lane road with a center turn lane to make room for a protected two-way bike lane (see Figure 14).

After the Cheverly Metro station, the trail would bridge over the freight rail tracks, through another industrial area, and under the Baltimore-Washington Parkway before ending at the Anacostia Riverwalk Trail.

Fig. 13. Beaverdam Creek Sections Between Landover and the Anacostia Riverwalk Trail

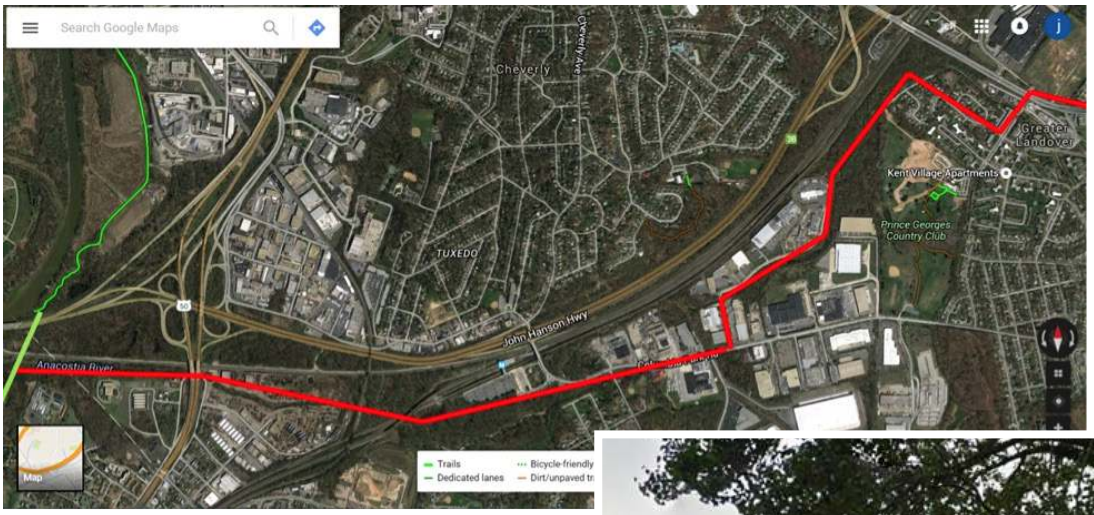


Fig. 14. Columbia Park Road.

Property Valuations in Communities with Good vs. Poor Bike Trail Access

The "Haves" vs. the "Have-Nots"

We evaluated the fiscal returns (property assessments per acre) for several communities in northern Prince George's county, three with "good" bike trail access, and three with "poor" access:

The "Haves:" Good Trail Access	The "Have-Nots:" Poor Trail Access
Hyattsville	Landover Hills
Riverdale Park	East Riverdale
Edmonston	Woodlawn

Tax data for each community and for the six-community dataset as a whole are shown above in Table 1.

Boundary definitions were based on Google maps. We gathered property assessments for all properties with the boundaries of each community, using the tax data provided by PG Atlas. Data were gathered in blocks of 100 properties at a time; duplicates were identified using tax ID numbers. Our focus was on typical residential properties; we excluded properties with assessments greater than $3 million, less than $50,000, and on more than 3 acres.

While our main objective was to compare valuations between communities with good trail access to those without, we also compared property tax assessment valuations among properties within 200 meters of a Google-marked bike lane or trail. To identify properties within 200 meters, we used a mapping tool and created 200 meter circles to approximate the distance. For example, Figure 15 shows the Google boundaries for Riverdale Park, with bike trails and

lanes marked in green. Areas with 200 meters of a bike trail are shown with red lines. Figure 16 illustrates the mapping technique used to separate the data within each community into properties within 200 meters of a bike facility and those outside 200 meters, and then gather data inside and outside of those 200 meter boundaries from PG Atlas.

Fig. 15. Riverdale Park Boundaries

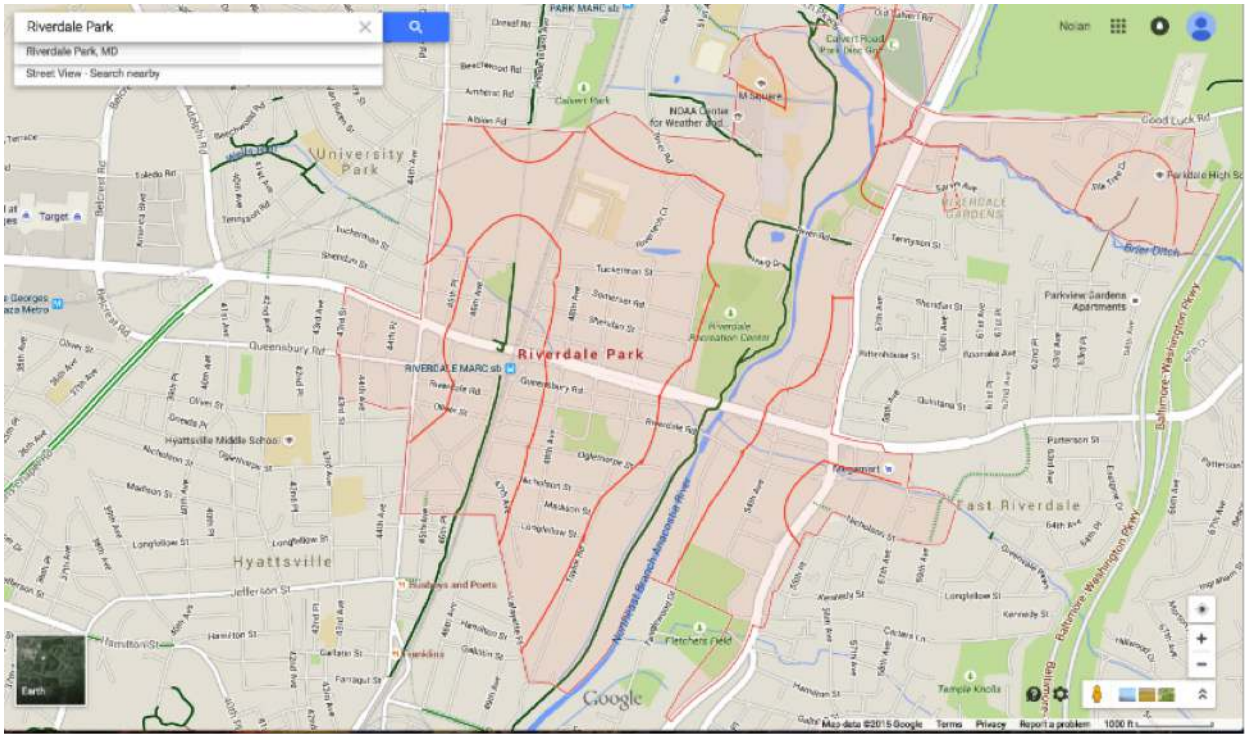


Fig. 16. Approximating Properties Within 200 Meters of a Google-Identified Bike Trail or Lane.

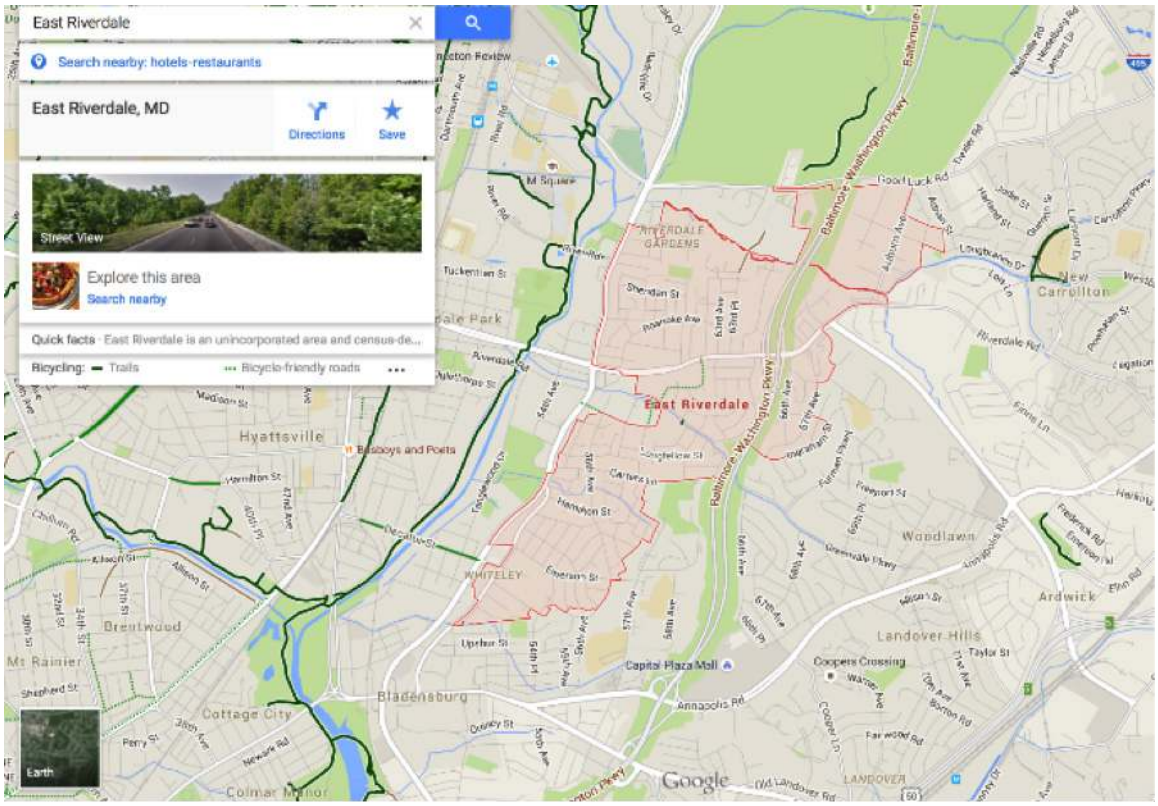
A Tale of Two Adjacent Communities: Riverdale Park and East Riverdale

Figure 17 shows the Google boundaries for the community of East Riverdale. East Riverdale is separated from the bike trails and lanes available to residents of nearby Riverdale Park by a six-lane highway, MD Route 201 (Kenilworth Ave.). East Riverdale is also hemmed in by the Baltimore Washington Parkway, which creates a barrier between sections of the community.

Riverdale Park is burgeoning neighborhood with a lively farmer's market, a craft beer vendor inside a convenience store, a weekly blues jam, and easy walking and bike access to the new Hyattsville Arts district and a revitalized Route 1, which has several new restaurants. At the north periphery of the community, a trendy Whole Foods development is being built.

Meanwhile, East Riverdale has been designated as a Transforming Neighborhoods Initiative community, which "face[s] significant economic, health, public safety and educational challenges." [4] Median housing values are more than $30,000 higher in Riverdale Park ($246,200) than in East Riverdale

Fig. 17. East Riverdale Boundaries



[4] For more information on Transforming Neighborhoods Initiative in Prince George's county, see *princegeorgescountymd.gov/sites/ExecutiveBranch/CommunityEngagement/TransformingNeighborhoods/Pages/default.aspx*

($215,500), and assessments are about $50,000 higher ($215,800 in Riverdale Park vs. $163,700 in East Riverdale). Riverdale Park's valuation per acre ($995,000) is nearly 10 percent higher than East Riverdale's ($908,000).

However, Table 3 shows that houses in East Riverdale are actually newer and larger than those in Riverdale Park, although average lot sizes are slightly higher in Riverdale Park (.22 acre) than East Riverdale (.18 acre). Houses in East Riverdale have more rooms (median of 6 rooms vs. 5 rooms in Riverdale Park). East Riverdale has more single-family homes (55%) than Riverdale Park (52%), and fewer buildings with larger numbers of housing units (1% with 20 or more units) compared with Riverdale Park (19%). The comparison data on the housing characteristics and demographics of households in East Riverdale and Riverdale come from the U.S. Census American Community Survey (ACS).

The demographic characteristics of the residents in Riverdale Park and East Riverdale are similar, with approximately half of the residents of Hispanic of Latino heritage (48% in Riverdale Park vs. 53% in East Riverdale). Riverdale Park has a commuter rail station with some pre-WWII homes and cottages nearby, although the commercial area around it seemed relatively lifeless and contained several abandoned buildings until recently. On balance, looking at individual street views of East Riverdale's and Riverdale Park's housing stocks, it is certainly not obvious that East Riverdale would have dramatically lower housing values.

We believe the main reason Riverdale Park is being revitalized while East Riverdale has struggled economically goes back to basic community design. East Riverdale forces residents to drive everywhere – there is no safe place to bike or walk, either for recreation or for commuting and utility, outside the neighborhoods. East Riverdale residents can't easily walk to the market or ride their bikes to work.

Meanwhile, Riverdale Park residents have many more options. As younger residents who are not particularly attached to driving look for affordable housing, Riverdale Park is a more attractive option. The new restaurants and musicians and food trucks and craft beer vendors are then attracted to the neighborhood, creating an upward cycle of renovation.

Table 3. Comparing Two Adjacent Neighborhoods

	Riverdale Park City *(Good Trail Access)*		**East Riverdale CDP** *(Poor Trail Access)*	
	N	%	N	%
Total housing units (ACS)	**2,163**	**100%**	**4,761**	**100%**
1-unit, detached	1,132	52%	2,627	55%
5 to 9 units	397	18%	1,144	24%
20 or more units	416	19%	68	1%
Built 1960 to 1969	461	21%	1,270	27%
Built 1950 to 1959	278	13%	1,382	29%
Built 1940 to 1949	216	10%	840	18%
Built 1939 or earlier	788	36%	203	4%
Median rooms	5		6	
1 bedroom	333	15%	602	13%
2 bedrooms	726	34%	1,515	32%
3 bedrooms	586	27%	1,400	29%
4 bedrooms	245	11%	731	15%
Occupied housing units (ACS)	2,000	100%	4,411	100%
Owner-occupied	896	45%	2,364	54%
Moved in 2010 or later	368	18%	1,008	23%
Moved in 2000 to 2009	1,073	54%	2,221	50%
Moved in 1990 to 1999	210	11%	604	14%
No vehicles available	436	22%	557	13%
1 vehicle available	659	33%	1,610	36%
2 vehicles available	653	33%	1,365	31%
3 or more vehicles available	252	13%	879	20%
Total population (ACS)	**7,021**	**100%**	**15,721**	**100%**
White	4,542	65%	7,971	51%
Black or African American	1,780	25%	5,730	36%
Hispanic or Latino (of any race)	3,360	48%	8,256	53%
Median age (years)	28.3		29.3	
Median Value (ACS)	$246,200		$215,500	
Average Assessment (PGAtlas)	$214,861		$163,736	
Assessment per Acre*	$995,179		$907,599	
Average Lot Size (Acres per lot)*	0.22		0.18	

Sources: Based on data from the PG Atlas and U.S. Census Bureau, 2009-2013 Five-Year American Community Survey (ACS).
Note: CDP = Census Defined Place.
*Data from PGAtlas; calculations by the authors.

Simulating Property Tax Valuations and Revenues

To simulate the fiscal impact of building the WB&A trail extension to DC, we assumed a small fraction of the increase in housing values shown in our analysis of the "haves" vs. the "have-nots" would apply to several communities near the new trail. Specifically, we looked at housing valuations in communities near the new trails, estimated the numbers of properties likely to be positively affected by the trail amenity, and assumed a 2% percent increase in valuations, increasing to 4% over twenty years.

Instead of gathering tax assessment data on every property in the affected area (which is incredibly tedious), we estimated property values using small samples of tax assessments in certain neighborhoods from PG Atlas, and using an average ratio of median housing values from the ACS to actual assessments in neighborhoods where we could compare the data. We gathered data from the ACS for the Landover Census Defined Place (CDP) and the CDPs of Springdale, Glenn Dale and Mitchellville, as well as the cities of Glenarden and Bowie. We directly estimated the number of residences affected for the Westgate-Carsondale area from PG Atlas. To be conservative, we assumed that assessments were 70 percent of the ACS median value in communities where we used the ACS to estimate current valuations.

Table 4 shows our estimates of the properties affected and valuations used to create the fiscal payback scenarios. As shown in Table 2 above, we estimate that the direct tax revenues from being near a trail amenity would grow from about $3 million over the first five years to more than $16 million over the first 20 years. That magnitude of additional county and state revenues would likely be sufficient to pay for the construction of the trail several times over. Once built, the amenity would persist with relatively low maintenance costs long after the trail's construction was financed.

Table 4. Estimated Residential Properties and Assessments Used for Direct Payback Simulation

	Residential Properties	Percent Affected	Properties Affected	Estimated Avg. Valuation	Estimation Used
Landover	8,863	50%	4,432	$135,100	70% of ACS Median
Springdale-Ardmore	816	100%	816	$213,092	Assessment Sample N=199
Glenarden	2,272	100%	2,272	$196,085	Assessment Sample N=98
Westgate-Carsondale	474	100%	474	$173,166	Assessment Sample N=28
Glenn Dale	4,763	20%	953	$256,909	Assessment Sample N=108
Mitchellville	3,828	10%	383	$244,930	70% of ACS Median
Bowie	20,352	10%	2,035	$213,710	70% of ACS Median
Total	41,368		11,364		

Source: Based on data from the PGAtlas and U.S. Census American Community Survey. Calculations by the authors.

Note: Number of residential properties based on ACS, except for Westgate-Carsondale. Landover Census Defined Place (CDP); Springdale CDP; Glenarden city; Westgate-Carsondale estimated from PGAtlas; Glenn Dale CDP; Mitchellville CDP; Bowie city.

Conclusions

We believe that the construction of a connecting trail between the Anacostia Riverwalk Trail system and the current WB&A trail in Prince George's county would be straightforward. Our proposed route plan, or something similar, implies considerable construction costs. Lanes would have to be repurposed, sidepaths built, sidewalks rebuilt, guard rails removed, and so on. The off-road path between Landover and the ART would likely require bridges and boardwalks. Of course, we do not have an estimate of those total construction costs, but it is fair to assume that the WB&A trail extension to DC would likely cost millions of dollars to construct.

However, data on housing valuations from several nearby communities in the county indicate that neighborhoods with bike trail and lane amenities are associated with higher housing values and property tax revenues per acre.

Even assuming a small fraction of these higher observed valuations is due solely to their trails, we estimate that additional tax revenues that resulted from increased property valuations in the communities adjacent to the trail amenity would likely be sufficient to reimburse the county and state for its cost of construction quite quickly.

We encourage Prince George's county to make construction of the WB&A trail extension a high priority. Biking and walking should be a joy throughout our county, and, in some areas, it already is. However, several parts of the county, including the Landover and Glenarden areas though which the proposed WB&A trail would pass, have no bike trails and few places to safely bike or walk.

We hope that this will be the first of many cost-effective, community building, and health giving efforts to improve the quality of life of Prince Georgians by giving us safe places for non-motorized transportation and recreation.

Additional Readings

Hilfer, Susanna. *The Impact of Rail Trails on Nearby Residential Property Values: A Case Study of the Minuteman Bikeway and Lexington, Massachusetts. Friends of the Bruce Freeman Rail Trail*. Salem State University, 18 Dec. 2007. Web. 8 June 2015. This study looked at the effect of a new bike trail on home sale prices. The researcher took a quarter mile buffer zone around the new trail to separate houses close to the trail and those not as close to have two separate independent variables. Then, collected the data for sale prices for houses during the span of 1991 to 1995 both inside and outside of the buffer zone. Finally, they calculated the percentage change in average sale price inside and outside of the buffer zone for each year. The results showed that the average sale price inside the zone dropped one year prior to the trail's opening, but then rose the year it opened and continued the rise during the following years studied in this report. However, outside the buffer zone, there was no trend in data. The researcher suggested that should someone repeat a similar study, they use a wider range of years, a smaller buffer zone, and the assessed property values instead of average sale prices for more data values and the ability to compare the same property's value over time.

Main, Hannah E. *Cost-Benefit Analysis of Building Bicycle Lanes in Truro, Nova Scotia.* Acadia University Library. Acadia University, Mar. 2013. Web. 8 June 2015. This study was performed in a rural town in Canada with the intent to look at the economic, environmental, and health benefits of bicycle commuting. The researcher, therefore, included only on-road bicycle infrastructure with the intent of leaving out recreational riders. First, the researcher estimated the number of people who would be likely to switch from using a motor vehicle to using a bicycle if a there was a new bicycle lane and how many additional kilometers would be traveled by bicycle. She used Statistics Canada census data for the data needed to estimate these figures. The author used Todd Litman's 2009 data on the costs and benefits of bicycle riding and car driving for commuting purposes, in addition to the estimated cost of construction of a bike lane network. The results found that, in a rural town in Canada, the costs of building a bicycle lane network exceeded the economic benefits when only considering commuters.

Racca, David P., and Amardeep Dhanju. *Property Value/Desirability Effects of Bike Paths Adjacent to Residential Areas*. Headwaters Economics. Center for Applied Demography and Research at the University of Delaware, Nov. 2006. Web. 8 June 2015. The authors, researchers from the College of Human Services, Education, and Public Policy at the University of Delaware, performed this study for the Delaware Center for Transportation and the State of Delaware Department of Transportation. They tested their hypothesis that properties within 50 meters of bike paths and trails would have a higher value than houses further away. This study focuses on paths and largely ignored bike lanes of roadways. They used GIS maps with a preference model which looked at location relative to bike paths and housing market transactions in the area. The analyzation showed a positive correlation between proximity to a bike path and property values. In monetary terms, properties within 50 meters of bike paths showed a higher value of $8,800, and even higher when specified variables were controlled. The effect of a bike path within 50 meters accounted for a rise of at least 4 percent of the median latest sale price.

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