

Appendices

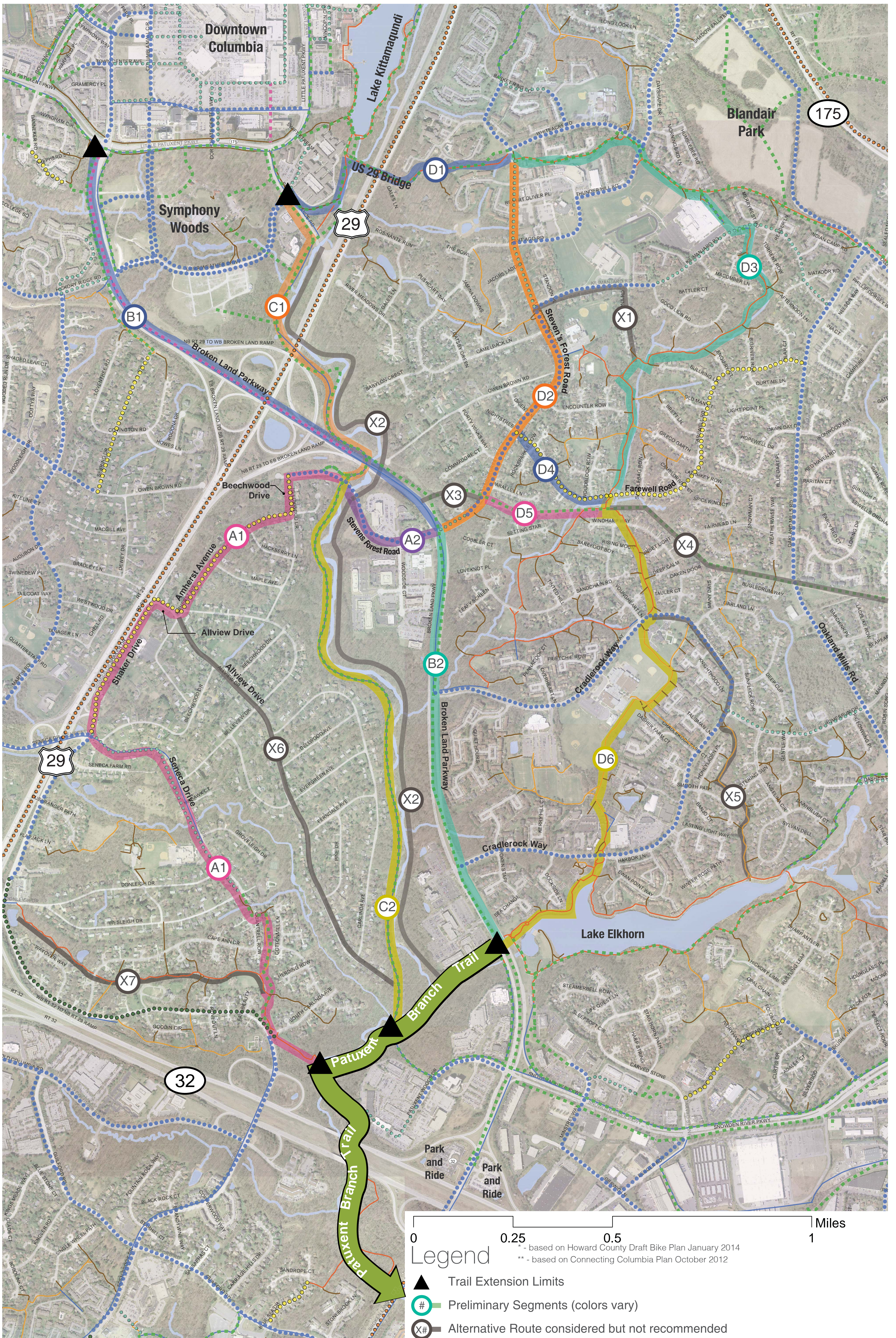
Appendix A

- Segment Alternative Map – Aerial
- Segment Alternative Map – Environmental Features
- Segment Alternative Map – Topography
- Segment Alternative Map – Property Ownership
- Segment Alternative Map – Historic Features

Appendix B

- Preliminary Opinion of Probable Cost

FINAL—October 2014



Patuxent Branch Trail Extension Study Segment Alternatives



May 2014

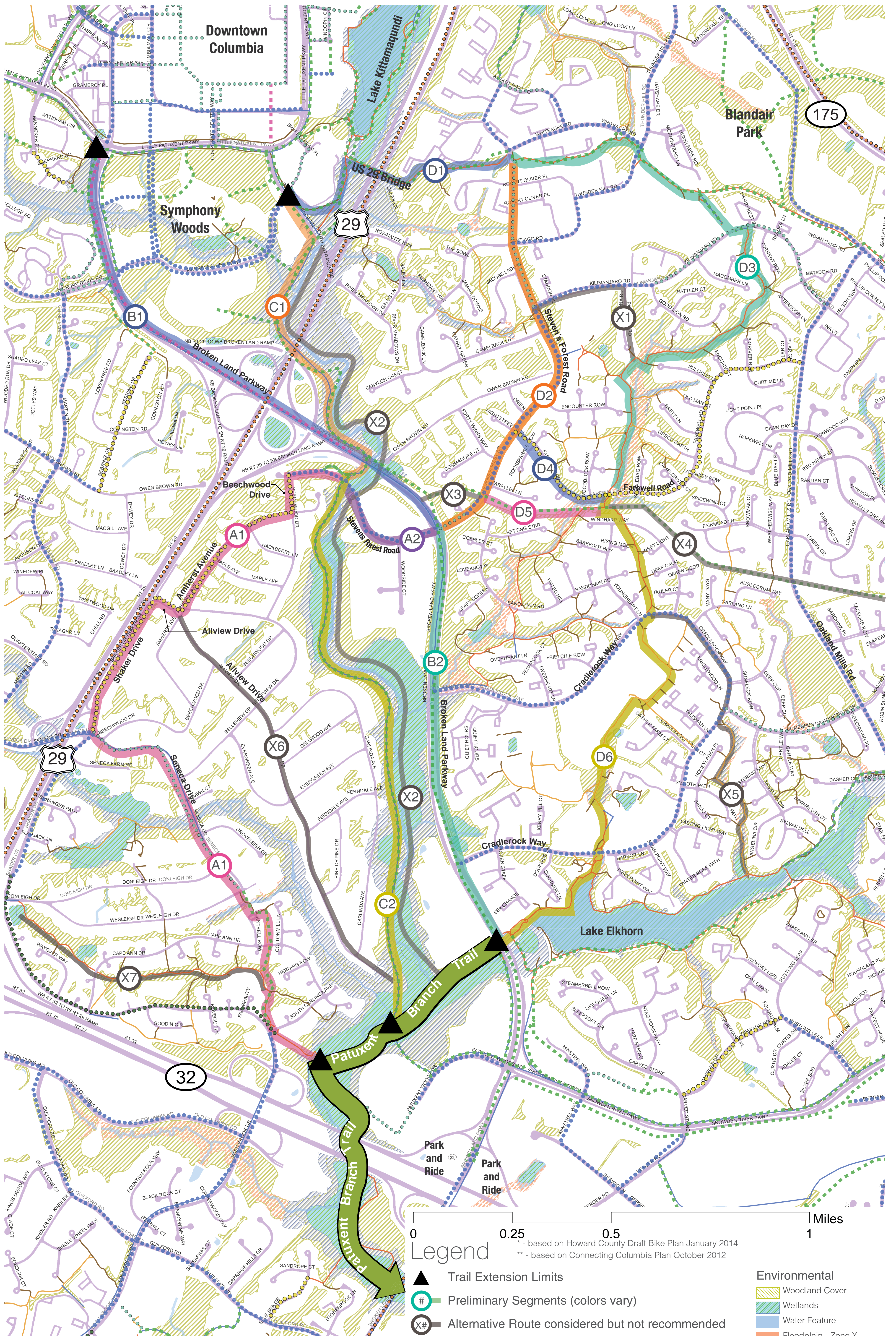
0 0.25 0.5 1 Miles

Legend

- ▲ Trail Extension Limits
- # Preliminary Segments (colors vary)
- X# Alternative Route considered but not recommended

On Road Recommendations*	Off Road Recommendations*
●●●● Neighborhood Green Ways	●●●● Cycletrack 2 way
●●●● Bike Lane	●●●● Shared-Use Path
— Colored Bike Lane	— Existing HC and CA Trails**
●●●● Paved and Striped Shoulder	— Primary
●●●● Shared Roadway	— Secondary
●●●● Sharrow	— Tertiary
	— Recommended Pathways**
	— Primary/Secondary

* - based on Howard County Draft Bike Plan January 2014
 ** - based on Connecting Columbia Plan October 2012



Patuxent Branch Trail Extension Study Segment Alternatives - Environmental

May 2014

0 0.25 0.5 1 Miles

* - based on Howard County Draft Bike Plan January 2014
 ** - based on Connecting Columbia Plan October 2012

Legend

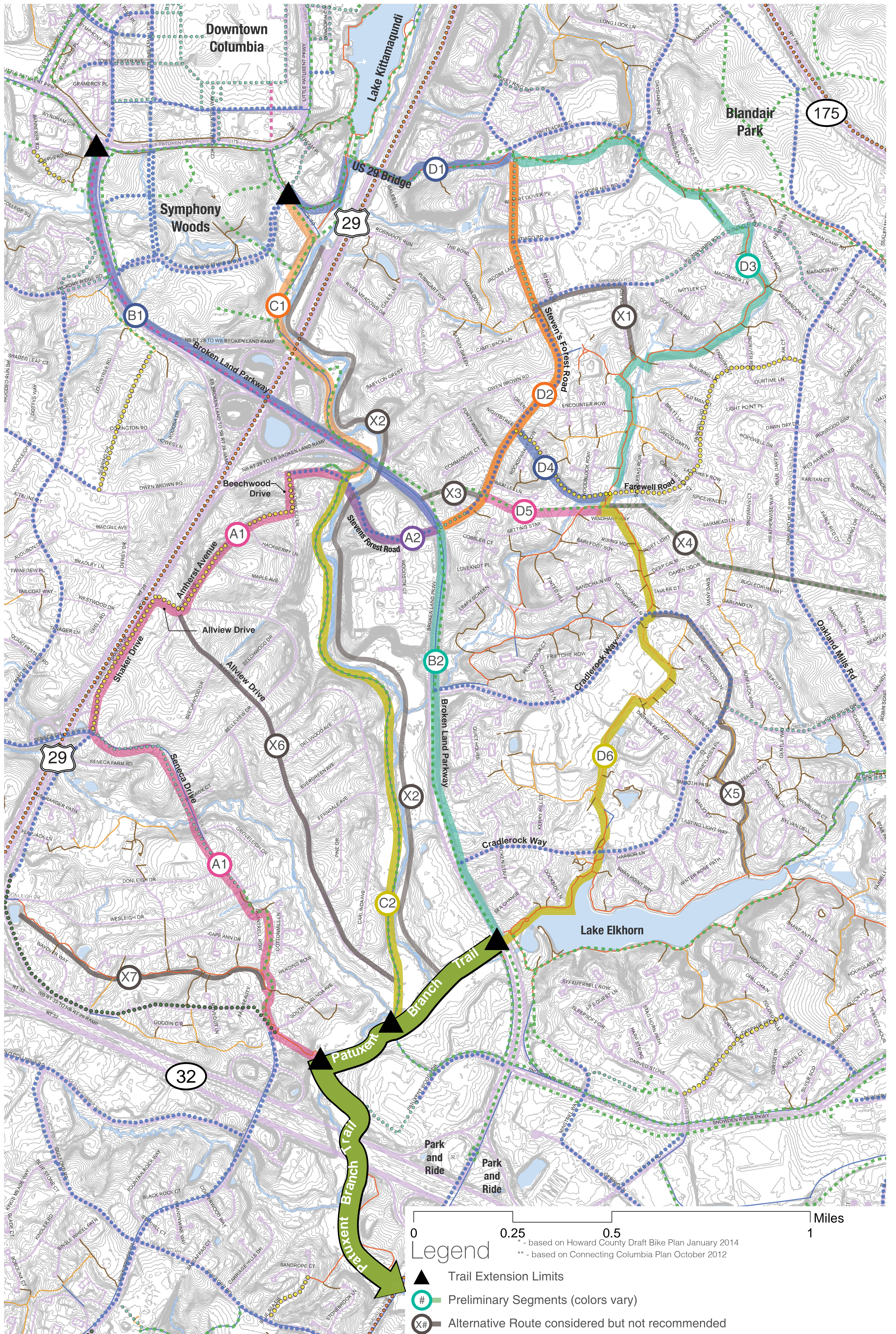
- ▲ Trail Extension Limits
- # Preliminary Segments (colors vary)
- X# Alternative Route considered but not recommended

<p>On Road Recommendations*</p> <ul style="list-style-type: none"> ●●●● Neighborhood Green Ways ●●●● Bike Lane — Colored Bike Lane — Paved and Striped Shoulder ●●●● Shared Roadway ●●●● Sharrow 	<p>Off Road Recommendations*</p> <ul style="list-style-type: none"> — Cycletrack 2 way — Shared-Use Path <p>Existing HC and CA Trails**</p> <ul style="list-style-type: none"> — Primary — Secondary — Tertiary <p>Recommended Pathways**</p> <ul style="list-style-type: none"> — Primary/Secondary
---	---

Environmental

- Woodland Cover
- Wetlands
- Water Feature
- Floodplain - Zone X
- Floodplain - Zone AE

Park and Ride

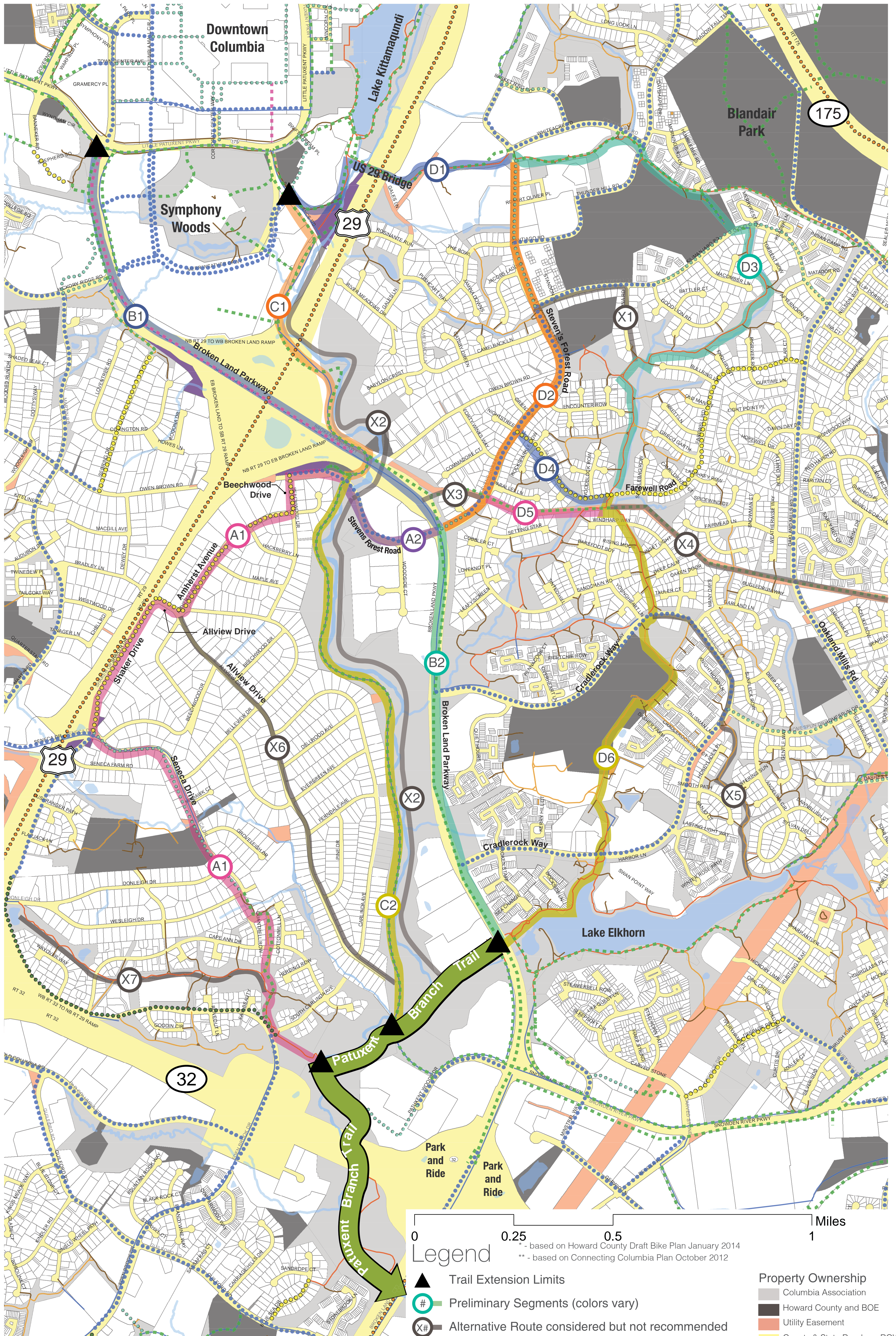


Patuxent Branch Trail Extension Study Segment Alternatives - Topography

Trail Extension Limits
 Preliminary Segments (colors vary)
 Alternative Route considered but not recommended

On Road Recommendations*
 Neighborhood Green Ways
 Bike Lane
 Colored Bike Lane
 Paved and Striped Shoulder
 Shared Roadway
 Sharrow

Off Road Recommendations*
 Cycletrack 2 way
 Shared-Use Path
Existing HC and CA Trails**
 Primary
 Secondary
 Tertiary
Recommended Pathways**
 Primary/Secondary



Patuxent Branch Trail Extension Study

Segment Alternatives - Property Ownership



May 2014

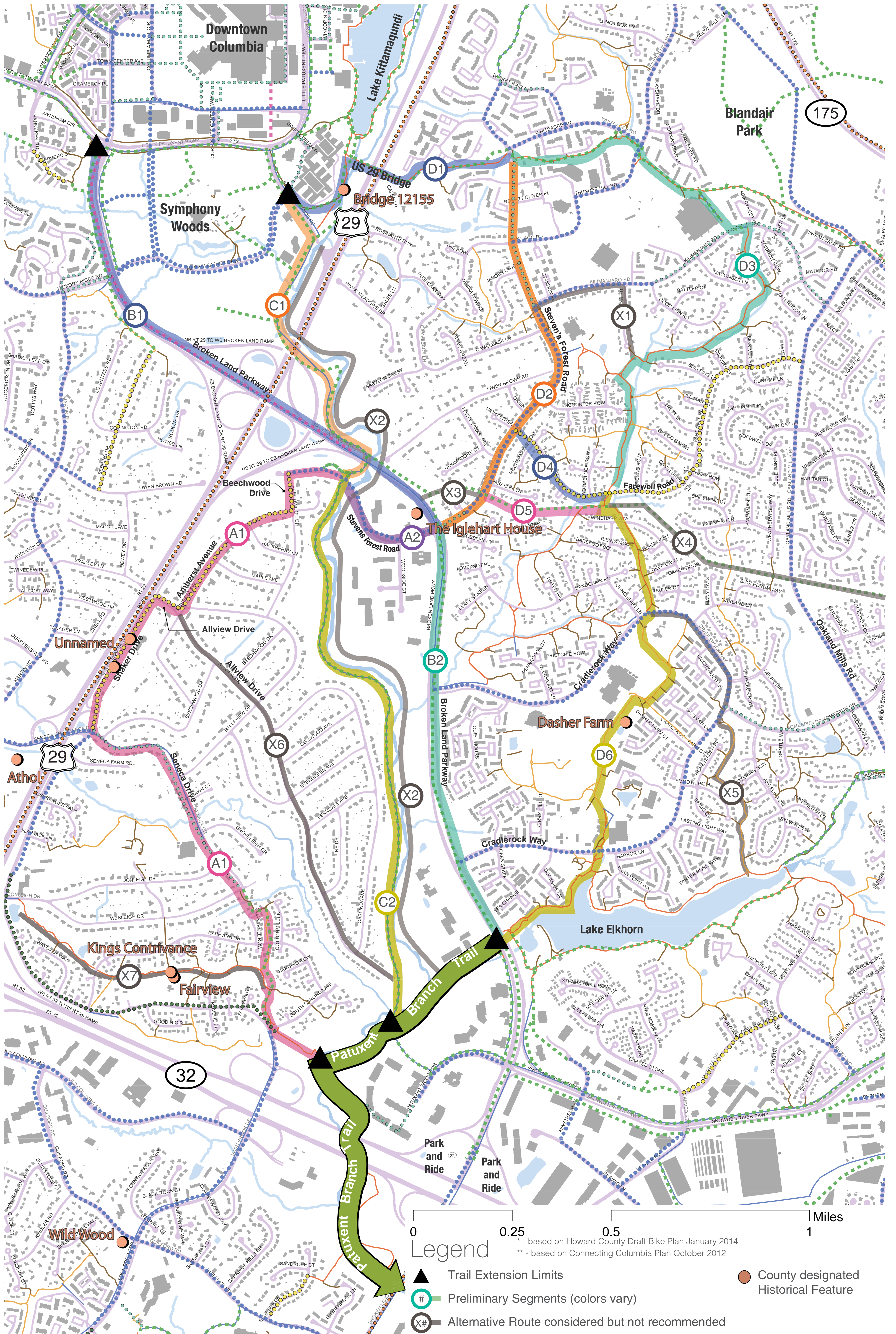
0 0.25 0.5 1 Miles

Legend

- ▲ Trail Extension Limits
- # Preliminary Segments (colors vary)
- X# Alternative Route considered but not recommended

<p>On Road Recommendations*</p> <ul style="list-style-type: none"> ●●●● Neighborhood Green Ways ●●●● Bike Lane — Colored Bike Lane ●●●● Paved and Striped Shoulder ●●●● Shared Roadway ●●●● Sharrow 	<p>Off Road Recommendations*</p> <ul style="list-style-type: none"> ●●●● Cycletrack 2 way ●●●● Shared-Use Path <p>Existing HC and CA Trails**</p> <ul style="list-style-type: none"> — Primary — Secondary — Tertiary <p>Recommended Pathways**</p> <ul style="list-style-type: none"> — Primary/Secondary 	<p>Property Ownership</p> <ul style="list-style-type: none"> ■ Columbia Association ■ Howard County and BOE ■ Utility Easement ■ County & State Roadway ROW ■ Private
--	---	---

* - based on Howard County Draft Bike Plan January 2014
 ** - based on Connecting Columbia Plan October 2012



Patuxent Branch Trail Extension Study Segment Alternatives



May 2014



Downtown Columbia Patuxent Branch Trail Extension

Preliminary Opinion of Probable Cost

Howard County, Maryland

May 2014

Segment A1 (11680 lf/2.21 mi)

Item No.	Item	Qty	Units	Unit Price	Subtotal Cost	Total Cost
1	Pathway Widening [6 to 10-ft width] includes: 4 to 6" excavation, installation of asphalt and base for shoulder, and 2" overlay across entire pathway	3120	lf	\$ 57.00	\$ 177,900.00	
2	Shared Lane Markings [thermoplastic pavement symbols]	4950	lf	\$ 3.00	\$ 14,900.00	
3	Bike Lanes [thermoplastic stripping & symbols]	460	lf	\$ 11.00	\$ 5,100.00	
4	Share-the-Road Signage [informational/warning]	3150	Each	\$ 3.00	\$ 9,500.00	
5	Intersection Improvements [Minor] includes: non-signalized, raised crossing, pavement markings, curb ramps, signage, drainage culvert	2	Each	\$ 26,000.00	\$ 52,000.00	
					Item Subtotal	\$ 207,400.00
6	Drainage and E&S (Low - 5%)	1	Lump Sum	\$	10,370.00	
7	Maintenance of Traffic (Low - 5%)	1	Lump Sum	\$	10,370.00	
8	Utility Modifications (Low - 5%)	1	Lump Sum	\$	10,370.00	
9	Mobilization (Low - 5%)	1	Lump Sum	\$	10,370.00	
10	Project Approvals & Permitting (Low - 5%)	1	Lump Sum	\$	10,370.00	
					Alternative A1 Subtotal	\$ 259,300.00
					Construction Contingency (25%)	\$ 64,900.00
					Design & Planning Cost (15%)	\$ 38,900.00
					Alternative A1 Total	\$ 363,100.00
					cost/lf	\$ 31.09

Segment A2 (2100 lf/0.40 mi)

Item No.	Item	Qty	Units	Unit Price	Subtotal Cost	Total Cost
1	Bike Lanes [thermoplastic stripping & symbols]	2100	lf	\$ 11.00	\$ 23,100.00	
					Item Subtotal	\$ 23,100.00
2	Drainage and E&S (Low - 2%)	1	Lump Sum	\$	462.00	
3	Maintenance of Traffic (Low - 5%)	1	Lump Sum	\$	1,155.00	
4	Utility Modifications (Low - 5%)	1	Lump Sum	\$	1,155.00	
5	Mobilization (Low - 5%)	1	Lump Sum	\$	1,155.00	
6	Project Approvals & Permitting (Low - 5%)	1	Lump Sum	\$	1,155.00	
					Alternative A2 Subtotal	\$ 28,200.00
					Construction Contingency (25%)	\$ 7,100.00
					Design & Planning Cost (15%)	\$ 4,300.00
					Alternative A2 Total	\$ 39,600.00
					cost/lf	\$ 18.86

Segment B1 (7500 lf/1.42 mi)

Item No.	Item	Qty	Units	Unit Price	Subtotal Cost	Total Cost
1	Asphalt Surface Pathway [10' width] includes: 2" surface course, 2" asphalt base course, 6" aggregate base course, 10" excavation, and 6" slope stabilization	7500	lf	\$ 70.00	\$ 525,000.00	
2	Supplemental Features includes: retaining walls, signing	3750	lf	\$ 15.00	\$ 56,300.00	
4	Intersection Improvements [Major] includes: signalized, pedestrian signal, push buttons, signage, pavement markings, curb ramps, drainage culvert	2	Each	\$ 48,000.00	\$ 96,000.00	
5	Intersection Improvements [Minor] includes: non-signalized, raised crossing, pavement markings, curb ramps, signage, drainage culvert	2	Each	\$ 26,000.00	\$ 52,000.00	
					Item Subtotal	\$ 729,300.00
6	Drainage and E&S (Moderate - 10%)	1	Lump Sum	\$	72,930.00	
7	Maintenance of Traffic (Moderate - 10%)	1	Lump Sum	\$	72,930.00	
8	Utility Modifications (Moderate - 10%)	1	Lump Sum	\$	72,930.00	
9	Mobilization (Low - 5%)	1	Lump Sum	\$	36,465.00	
10	Project Approvals & Permitting (Low - 5%)	1	Lump Sum	\$	36,465.00	
					Alternative B1 Subtotal	\$ 1,021,100.00
					Construction Contingency (25%)	\$ 255,300.00
					Design & Planning Cost (20%)	\$ 204,300.00
					Alternative B1 Total	\$ 1,480,700.00
					cost/lf	\$ 197.43

Segment B2 (5700 lf/1.08 mi)

Item No.	Item	Qty	Units	Unit Price	Subtotal Cost	Total Cost
1	Asphalt Surface Pathway [10' width] includes: 2" surface course, 2" asphalt base course, 6" aggregate base course, 10" excavation, and 6" slope stabilization	5700	lf	\$ 70.00	\$ 399,000.00	
2	Supplemental Features includes: retaining walls, signing	2850	lf	\$ 15.00	\$ 42,800.00	
3	Road Diet [removal of lane-southbound side] includes: concrete sidewalk excavation, asphalt excavation, removal and replacement of curb and gutter, sign relocation	5700	lf	\$ 60.00	\$ 342,000.00	
4	Intersection Improvements [Major] includes: signalized, pedestrian signal, push buttons, signage, pavement markings, curb ramps, drainage culvert	1	Each	\$ 48,000.00	\$ 48,000.00	
5	Intersection Improvements [Minor] includes: non-signalized, raised crossing, pavement markings, curb ramps, signage, drainage culvert	3	Each	\$ 26,000.00	\$ 78,000.00	
					Item Subtotal	\$ 909,800.00
6	Drainage and E&S (Moderate - 10%)	1	Lump Sum	\$	45,490.00	
7	Maintenance of Traffic (Moderate - 10%)	1	Lump Sum	\$	45,490.00	
8	Utility Modifications (Moderate - 10%)	1	Lump Sum	\$	90,980.00	
9	Mobilization (Low - 5%)	1	Lump Sum	\$	45,490.00	
10	Project Approvals & Permitting (Moderate - 10%)	1	Lump Sum	\$	90,980.00	
					Alternative B2 Subtotal	\$ 1,228,300.00
					Construction Contingency (25%)	\$ 307,100.00
					Design & Planning Cost (20%)	\$ 245,700.00
					Alternative B2 Total	\$ 1,781,100.00
					cost/lf	\$ 312.47

Downtown Columbia Patuxent Branch Trail Extension

Preliminary Opinion of Probable Cost

Howard County, Maryland

May 2014

Segment C1 (4600 lf/0.87 mi)						
Item No.	Item	Qty	Units	Unit Price	Subtotal Cost	Total Cost
1	Asphalt Surface Pathway [10' width] includes: 2" surface course, 2" asphalt base course, 6" aggregate base course, 10" excavation, and 6" slope stabilization, landscaping	4600	lf	\$ 70.00	\$ 322,000.00	
2	Supplemental Features includes: retaining walls, signing, landscaping	2300	lf	\$ 15.00	\$ 34,500.00	
3	Intersection Improvements [Minor] includes: non-signalized, raised crossing, pavement markings, curb ramps, signage, drainage culvert	1	Each	\$ 26,000.00	\$ 26,000.00	
					Item Subtotal	\$ 382,500.00
4	Drainage and E&S (Moderate - 10%)	1	Lump Sum	\$	38,250.00	
5	Maintenance of Traffic (Low - 5%)	1	Lump Sum	\$	19,125.00	
6	Utility Modifications (Low - 5%)	1	Lump Sum	\$	19,125.00	
7	Mobilization (Low - 5%)	1	Lump Sum	\$	19,125.00	
8	Project Approvals & Permitting (Moderate - 10%)	1	Lump Sum	\$	38,250.00	
					Alternative C1 Subtotal	\$ 516,400.00
					Construction Contingency (25%)	\$ 129,100.00
					Design & Planning Cost (20%)	\$ 103,300.00
					Alternative C1 Total	\$ 748,800.00
					cost/lf	\$ 162.78
Segment C2 (8100 lf/1.53mi)						
Item No.	Item	Qty	Units	Unit Price	Subtotal Cost	Total Cost
1	Asphalt Surface Pathway [10' width] includes: 2" surface course, 2" asphalt base course, 6" aggregate base course, 10" excavation, and 6" slope stabilization, landscaping	8100	lf	\$ 70.00	\$ 567,000.00	
2	Supplemental Features includes: retaining walls, signing	4050	lf	\$ 15.00	\$ 60,800.00	
3	Pedestrian Bridge (major stream crossing) - [80' span covered] (14' width) ¹	2	Each	\$ 100,000.00	\$ 200,000.00	
					Item Subtotal	\$ 827,800.00
4	Drainage and E&S (Moderate - 10%)	1	Lump Sum	\$	82,780.00	
5	Maintenance of Traffic (Low - 5%)	1	Lump Sum	\$	41,390.00	
6	Utility Modifications (Low - 5%)	1	Lump Sum	\$	41,390.00	
7	Mobilization (Low - 5%)	1	Lump Sum	\$	41,390.00	
8	Project Approvals & Permitting (Moderate - 10%)	1	Lump Sum	\$	82,780.00	
					Alternative C2 Subtotal	\$ 1,117,600.00
					Construction Contingency (25%)	\$ 279,400.00
					Design & Planning Cost (20%)	\$ 223,600.00
					Alternative C2 Total	\$ 1,620,600.00
					cost/lf	\$ 200.07
1 - Preliminary 14' wide Pedestrian Bridge Cost Data provided by Excel Bridge Manufacturing Company (80' span covered = \$105,000, 80' span uncovered = \$50,000) [delivered only]						
Segment D1 (4000 lf/0.76 mi)						
Item No.	Item	Qty	Units	Unit Price	Subtotal Cost	Total Cost
1	Intersection Improvements [Minor] includes: non-signalized, raised crossing, pavement markings, curb ramps, signage, drainage culvert	1	Each	\$ 26,000.00	\$ 26,000.00	
					Item Subtotal	\$ 26,000.00
2	Drainage and E&S (Low - 2%)	1	Lump Sum	\$	520.00	
3	Maintenance of Traffic (Low - 2%)	1	Lump Sum	\$	520.00	
4	Utility Modifications (Low - 2%)	1	Lump Sum	\$	520.00	
5	Mobilization (Low - 2%)	1	Lump Sum	\$	520.00	
6	Project Approvals & Permitting (Moderate - 2%)	1	Lump Sum	\$	520.00	
					Alternative D1 Subtotal	\$ 28,600.00
					Construction Contingency (25%)	\$ 7,200.00
					Design & Planning Cost (15%)	\$ 4,300.00
					Alternative D1 Total	\$ 40,100.00
					cost/lf	\$ 10.03
Segment D2 (6000 lf/1.14 mi)						
Item No.	Item	Qty	Units	Unit Price	Subtotal Cost	Total Cost
1	Shared Lane Markings [thermoplastic pavement symbols]	2700	lf	\$ 3.00	\$ 8,100.00	
2	Bike Lanes [thermoplastic striping & symbols]	660	lf	\$ 11.00	\$ 7,300.00	
					Item Subtotal	\$ 15,400.00
3	Drainage and E&S (Low - 2%)	1	Lump Sum	\$	308.00	
4	Maintenance of Traffic (Low - 5%)	1	Lump Sum	\$	770.00	
5	Utility Modifications (Low - 5%)	1	Lump Sum	\$	770.00	
6	Mobilization (Low - 5%)	1	Lump Sum	\$	770.00	
7	Project Approvals & Permitting (Low - 5%)	1	Lump Sum	\$	770.00	
					Alternative D2 Subtotal	\$ 18,800.00
					Construction Contingency (25%)	\$ 4,700.00
					Design & Planning Cost (15%)	\$ 2,900.00
					Alternative D2 Total	\$ 26,400.00
					cost/lf	\$ 7.86
Segment D3 (8900 lf/1.69 mi)						
Item No.	Item	Qty	Units	Unit Price	Subtotal Cost	Total Cost
1	Intersection Improvements [Minor] includes: non-signalized, raised crossing, pavement markings, curb ramps, signage, drainage culvert, landscaping	4	Each	\$ 26,000.00	\$ 104,000.00	
2	Pathway Widening [6 to 10-ft width] includes: 4 to 6" excavation, installation of asphalt and base for shoulder, and 2" overlay across entire pathway	6000	lf	\$ 57.00	\$ 342,000.00	
					Item Subtotal	\$ 446,000.00
3	Drainage and E&S (Moderate - 10%)	1	Lump Sum	\$	44,600.00	
4	Maintenance of Traffic (Low - 5%)	1	Lump Sum	\$	22,300.00	
5	Utility Modifications (Low - 5%)	1	Lump Sum	\$	22,300.00	
6	Mobilization (Low - 5%)	1	Lump Sum	\$	22,300.00	
7	Project Approvals & Permitting (Moderate - 10%)	1	Lump Sum	\$	44,600.00	
					Alternative D3 Subtotal	\$ 602,100.00
					Construction Contingency (25%)	\$ 150,600.00
					Design & Planning Cost (15%)	\$ 90,400.00
					Alternative D3 Total	\$ 843,100.00
					cost/lf	\$ 140.52

Downtown Columbia Patuxent Branch Trail Extension

Preliminary Opinion of Probable Cost

Howard County, Maryland

May 2014

Segment D4 (1700 lf/0.32 mi)

Item No.	Item	Qty	Units	Unit Price	Subtotal Cost	Total Cost
1	Share-the-Road Signage [informational/warning]	1700	Each	\$ 3.00	\$ 5,100.00	
					Item Subtotal	\$ 5,100.00
2	Drainage and E&S (Low - 2%)	1	Lump Sum	\$	102.00	
3	Maintenance of Traffic (Low - 5%)	1	Lump Sum	\$	255.00	
4	Utility Modifications (Low - 5%)	1	Lump Sum	\$	255.00	
5	Mobilization (Low - 5%)	1	Lump Sum	\$	255.00	
6	Project Approvals & Permitting (Low- 5%)	1	Lump Sum	\$	255.00	
					Alternative D4 Subtotal	\$ 6,300.00
					Construction Contingency (25%)	\$ 1,600.00
					Design & Planning Cost (15%)	\$ 1,000.00
					Alternative D4 Total	\$ 8,900.00
					cost/lf	\$ 5.24

Segment D5 (1500 lf/0.28 mi)

Item No.	Item	Qty	Units	Unit Price	Subtotal Cost	Total Cost
1	Asphalt Surface Pathway [10' width] includes: 2" surface course, 2" asphalt base course, 6" aggregate base course, 10" excavation, and 6" slope stabilization, landscaping	1500	lf	\$ 70.00	\$ 105,000.00	
2	Supplemental Features includes: retaining walls, signing	600	lf	\$ 15.00	\$ 9,000.00	
3	Pedestrian Bridge (major stream crossing) - [80' span covered] (14' width) ¹	1	Each	\$ 100,000.00	\$ 100,000.00	
					Item Subtotal	\$ 214,000.00
4	Drainage and E&S (Moderate - 10%)	1	Lump Sum	\$	21,400.00	
5	Maintenance of Traffic (Low - 5%)	1	Lump Sum	\$	10,700.00	
6	Utility Modifications (Low - 5%)	1	Lump Sum	\$	10,700.00	
7	Mobilization (Low - 5%)	1	Lump Sum	\$	10,700.00	
8	Project Approvals & Permitting (Moderate - 10%)	1	Lump Sum	\$	21,400.00	
					Alternative D5 Subtotal	\$ 288,900.00
					Construction Contingency (25%)	\$ 72,300.00
					Design & Planning Cost (15%)	\$ 43,400.00
					Alternative D5 Total	\$ 404,600.00
					cost/lf	\$ 269.73

1 - Preliminary 14' wide Pedestrian Bridge Cost Data provided by Excel Bridge Manufacturing Company (80' span covered = \$105,000, 80' span uncovered = \$50,000) [delivered only]

Segment D6 (8448 lf/1.6 mi)

Item No.	Item	Qty	Units	Unit Price	Subtotal Cost	Total Cost
1	Intersection Improvements [Minor] includes: non-signalized, raised crossing, pavement markings, curb ramps, signage, drainage culvert	4	Each	\$ 26,000.00	\$ 104,000.00	
2	Pathway Widening [6 to 10-ft width] includes: 4 to 6" excavation, insallation of asphalt and base for shoulder, and 2" overlay across entire pathway, landscaping	8448	lf	\$ 57.00	\$ 481,600.00	
					Item Subtotal	\$ 585,600.00
3	Drainage and E&S (Moderate - 10%)	1	Lump Sum	\$	58,560.00	
4	Maintenance of Traffic (Low - 5%)	1	Lump Sum	\$	29,280.00	
5	Utility Modifications (Low - 5%)	1	Lump Sum	\$	29,280.00	
6	Mobilization (Low - 5%)	1	Lump Sum	\$	29,280.00	
7	Project Approvals & Permitting (Moderate - 10%)	1	Lump Sum	\$	58,560.00	
					Alternative D6 Subtotal	\$ 790,600.00
					Construction Contingency (25%)	\$ 197,700.00
					Design & Planning Cost (15%)	\$ 118,600.00
					Alternative D6 Total	\$ 1,106,900.00
					cost/lf	\$ 131.03