

Section 3: Alternatives Analysis

Opportunities and constraints within each segment alternative were identified based on the findings of the existing conditions through desktop and field reviews. The alternatives analysis was developed using the following criteria and data;





- assessment of potential land-use
- environmental impacts
- connectivity
- user comfort
- easement acquisitions
- access to surrounding communities
- directness of the desired north/south travel

Based on the preliminary analysis segments (A1,A2,B1,B2,C1,C2,D1,D2,D3,D4,D5,D6) were identified as potentially feasible and were analyzed further to determine the preferred alternatives and additional actions. This study ultimately considered over 13 miles of potential pathways or bicycle facilities. See the Segment Alternatives Matrix (presented on the pages that follow) for the overall analysis of each segment. See page 4 for a map of the proposed routes.

SEGMENT ALTERNATIVES	DESCRIPTION	ENVIRONMENTAL ISSUES	OPPORTUNITIES	CONSTRAINTS	LENGTH (mi)	PRELIMINARY COST
A1	<p>On– Road Bikeway along Streets in Allview Estates This potential on–road bike route from the sewer line connection at Stevens Forest Road to the Patuxent Branch Trail, following Beechwood Drive, Amherst Avenue, Allview Drive, Shaker Drive, Seneca Drive, and existing CA pathways.</p>	No potential impacts are expected.	<ul style="list-style-type: none"> Route is supported by Draft Howard County Bike Plan Utilizes existing CA pathways, connecting direct to the Patuxent Branch Trail Utilizes low volume streets On–road facilities allow for quick implementation Utilizes existing County right–of–way 	<ul style="list-style-type: none"> Route is indirect (2.2 miles compared to C2/B2, both of which are 1.5/1.1 miles) and involves steep topography, reducing it’s practical viability as a bicycle route Bicyclists will be required to share the road with mo–torists, which is less comfortable for casual cyclists Route would require multiple directional signs and pavement markings to ensure pathway users do not get lost in the Allview neighborhood Route is different in character to existing Patuxent Branch Trail Multiple unsignalized pathway/roadway intersections Lack of sidewalks along this route decreases pedestrian safety 	<p>Proposed pathway = 0.00 Existing pathway = 0.60 On–road facility = 1.62 Total Length = 2.22</p>	<p>Approximately \$364,000* (\$31/lf)</p> <p>*Estimate includes design and construction</p>
A2	<p>Spur Connection along Stevens Forest Road from Broken Land Parkway to the Intersection with Sewer Line This potential on–road facility corridor follows Stevens Forest Road from the Sewer Line intersection to Broken Land Parkway – a spur trail that would be necessary if Routes B1 and C1 were selected.</p>	No potential impacts are expected.	<ul style="list-style-type: none"> Route is supported by Draft Howard County Bike Plan Utilizes existing County right–of–way Utilizes low volume streets On–road facilities allow for quick implementation Allows for access to surrounding properties Connects to existing bike lane; east of Broken Land Parkway on Stevens Forest Road 	<ul style="list-style-type: none"> Route is indirect Limited right–of–way for pathway along the side of the road – on–road bike lane may be feasible Route is different in character to existing Patuxent Branch Trail 	<p>Proposed pathway = 0.00 Existing pathway = 0.00 On–road facility = 0.40 Total Length = 0.40</p>	<p>Approximately \$40,000* (\$19/lf)</p> <p>*Estimate includes design and construction</p>
B1	<p>Shared–Use Pathway along Broken Land Parkway from Little Patuxent Parkway to Stevens Forest Road This potential shared–use pathway follows Broken Land Parkway from the intersection of the future Downtown Columbia Trail at Little Patuxent Parkway to the intersection at Stevens Forest Road, crossing at grade at intersections with Hickory Ridge Road and Columbia Pike (US 29).</p>	Will also require environmental permitting. However, because this pathway would be located along an existing roadway, environmental impact will be minimal.	<ul style="list-style-type: none"> Routes are supported by Connecting Columbia and DRAFT Howard County Bike Plan Direct N/S route from downtown Columbia, comparable to C2 (1.5 miles compared to A1 which is 2.2 miles) Utilizes existing County right–of–way Allows for access to other roads and routes such as Hickory Ridge Road Pathway in this location would solve long–standing travel issues (pedestrians and bicyclists already attempt to cross here) and provide another east–west connection across US 29 for non–motorized users 	<ul style="list-style-type: none"> Route does not directly connect to the heart of Downtown Columbia, rather to the western edge Only feasible location for pathway through the interchange is the center median without reconstructing Broken Land Parkway Bridge over US 29 User experience would be negatively impacted by high speeds, and high volumes of traffic Center median design would require at least two at–grade crossings of Broken Land Parkway. Would require significant alterations to intersections at Hickory Ridge Road and Stevens Forest Road to ensure user safety 	<p>Proposed pathway = 1.42 Existing pathway = 0.00 On–road facility = 0.00 Total Length = 1.42</p>	<p>Approximately \$1,481,000* (\$198/lf)</p> <p>*Estimate includes design and construction</p>
B2	<p>Shared–Use Pathway along Broken Land Parkway from Stevens Forest Road to the Patuxent Branch Trail This potential shared–use pathway follows Broken Land Parkway from Stevens Forest Road to the northern most end of the Patuxent Branch Trail, crossing at grade with two Cradlerock Way intersections and the Lakeview Offices driveways.</p>	Will also require environmental permitting. However, because this pathway would be located along an existing roadway, environmental impact will be minimal.	<ul style="list-style-type: none"> Routes are supported by Connecting Columbia and DRAFT Howard County Bike Plan Direct N/S route from downtown Columbia, comparable to C1 (0.9 miles compared to D1+D2 which is 1.9 miles) Uses existing County right–of–way A portion of path has already been built on each side of Broken Land connecting to Lake Elkhorn Allows potential for access to other roads and properties such as Cradlerock Way and office complexes along the west side of Broken Land Creates potential to connect to the Park and Ride by extending the pathway to the south 	<ul style="list-style-type: none"> Feasibility would require cross section of Broken Land Parkway from 6 to 4 lanes Traffic study would need to be completed Multiple conflict locations where path would cross side streets and driveways User experience would be negatively impacted by high speeds and high volumes of traffic 	<p>Proposed pathway = 1.10 Existing pathway = 0.00 On–road facility = 0.00 Total Length = 1.10</p>	<p>Approximately \$1,782,000* (\$313/lf)</p> <p>*Estimate includes design and construction</p>

SEGMENT ALTERNATIVES	DESCRIPTION	ENVIRONMENTAL ISSUES	OPPORTUNITIES	CONSTRAINTS	LENGTH (mi)	PRELIMINARY COST
C1	<p>Shared–Use Pathway along the Sewer Line between Downtown Columbia and Stevens Forest Road This potential shared–use pathway follows the existing sewer line from the intersection of the future Downtown Columbia Trail at Swift Stream Road to Stevens Forest Road. The segment is runs parallel to the existing sewer line on the west side of Little Patuxent River, crossing at grade with Stevens Forest Road and underneath Columbia Pike (US 29) and Broken Land Parkway.</p>	<p>Located within the 100–year floodplain, will require environmental permitting, however because corridor has already been disturbed by sewer line construction, environmental impact would be minimal. Trail would be designed to create no rise condition for the Little Patuxent River.</p> <p>Located within 0.3 miles of potential low lying areas and may require boardwalks over wetland zones.</p> <p>A portion of the pathway could have a beneficial impact on environmental conditions by restoring a former roadbed and a blocked and failing culvert.</p>	<ul style="list-style-type: none"> • Route is supported by Connecting Columbia and the DRAFT Howard County Bike Plan. • Most direct N/S route from downtown Columbia (0.9 miles to C2/B2 connection compared to 1.4 mile via B1) • Eliminates travel along busy roads, increasing safety and comfort of user • Minimal path/roadway intersections • Scenic views of river and adjacent natural areas • Minimal/gradual topography change • Provides an experience similar to the existing Patuxent Branch Trail • Under–crossings of US 29 and Broken Land Parkway are feasible 	<ul style="list-style-type: none"> • May require some property acquisition, easements, or use agreements near Downtown • Several feeder creek crossings will require bridges or culverts • Similar to other sections of the Patuxent Branch Trail, area is within an open space/stream corridor and not within view of streets or residential areas. 	<p>Proposed pathway = 0.87 Existing pathway = 0.00 On–road facility = 0.00 Total Length = 0.87</p>	<p>Approximately \$749,000* (\$163/lf)</p> <p><small>*Estimate includes design and construction</small></p>
C2	<p>Shared–Use Pathway from Stevens Forest Road to the Patuxent Branch Trail This potential shared–use pathway follows the existing sewer line from Stevens Forest Road to the Patuxent Branch Trail. The segment runs along the west side of the Little Patuxent River and crosses underneath the Stevens Forest Road underpass.</p>	<p>Located within the 100–year floodplain, will require environmental permitting, however because corridor has already been disturbed by sewer line construction, environmental impact would be minimal. Trail would be designed to create no rise condition for the Little Patuxent River.</p> <p>Located within 0.2 miles of potential low lying areas and may require boardwalks over wetland zones.</p> <p>A portion of the pathway could have a beneficial impact on environmental conditions by restoring a former roadbed and a blocked and failing culvert.</p>	<ul style="list-style-type: none"> • Route is supported by Connecting Columbia and the DRAFT Howard County Bike Plan. • Direct N/S route from downtown Columbia, comparable to B2 (1.0 miles compared to A1 which is 1.4 miles) • Eliminates travel along busy roads, increasing safety and comfort of user • Minimal path/roadway intersections • Scenic views of river and adjacent natural areas • Provides an experience similar to the existing Patuxent Branch Trail • Located primarily on CA property within an existing county–controlled easement • Generally, there is minimal/gradual topography change 	<ul style="list-style-type: none"> • Limited access points to surrounding areas (i.e., businesses along Broken Land Parkway) • One hill near Stevens Forest Road underpass would need design mitigation • Proximity to back yards of approximately 10 homes in Allview Estates may create privacy concerns, design may need to mitigate visual access between homes and pathway • Requires bridge connection over Patuxent to connect with existing Patuxent Branch Trail 	<p>Proposed pathway = 1.53 Existing pathway = 0.00 On–road facility = 0.00 Total Length = 1.53</p>	<p>Approximately \$1,621,000* (\$200/lf)</p> <p><small>*Estimate includes design and construction</small></p>



SEGMENT ALTERNATIVES	DESCRIPTION	ENVIRONMENTAL ISSUES	OPPORTUNITIES	CONSTRAINTS	LENGTH (mi)	PRELIMINARY COST
 Series	Overall Analysis of Routing Options using Existing/New Paths on the East Side of US 29/Broken Land Parkway The D Series of Routes use a combination of existing CA pathways and potentially new pathways on the east side of US 29 and Broken Land Parkway. Individual segments are described in more detail below. This provides an overall analysis of their viability to meet overall project objectives of a direct transportation route for bicyclists and pedestrians from Downtown Columbia to the Patuxent Branch Trail.	Minimal environmental impacts are expected; however, environmental permitting may be required in locations where there is limited space to widen the existing trails along the stream buffer.	<ul style="list-style-type: none"> • Routes are supported by Connecting Columbia and DRAFT Howard County Bike Plan • Utilizes existing County and CA right-of-way • Allows for access to surrounding properties such as Lake Elkhorn, Owen Brown Community Center, and Blandair Park 	<ul style="list-style-type: none"> • Route is the least direct of all the alternatives and is impractical as a transportation route (approximately 4.0 miles compared to B1/B2 which is 2.5 miles, and C1/C2 which is 2.4 miles) • Route includes steep topography, reducing its viability as a bicycle route • Route would require multiple directional signs and pavement markings to ensure pathway users do not get lost • Route includes multiple unsignalized roadway crossings and mid-block crossings. 	Total Length (D1+D3+D6)= 3.94	<p>Approximately \$1,992,000*</p> <p><small>*Estimate includes design and construction; total is an approximate sum of D1+D3+D6</small></p>
	Utilization of Existing Pathways and future Downtown Columbia pathway along the bicycle and pedestrian bridge over US 29 This potential on-road facility corridor follows the future 10-foot wide Downtown Columbia Pathway from the intersection at South Entrance Road to the intersection at Stevens Forest Road. This segment utilizes the bicycle and pedestrian bridge over US 29.	No potential impacts expected.	<ul style="list-style-type: none"> • Route is supported by Connecting Columbia; the US 29 bicycle and pedestrian bridge is currently being studied/analyzed for potential improvements (Capital Project B3863) • Allows for access to surrounding trails and amenities • Eliminates travel along busy roads, increasing safety and comfort of user • Utilizes existing HC and CA pathways/right-of-way • Utilizes the future (10 ft. wide) Downtown Columbia Trail 	<ul style="list-style-type: none"> • Route (D1+D2) is indirect (1.9 miles compared to C1/B1 which are 0.9/1.5 miles) • Route includes severe steep topography, reducing its viability as a bicycle route 	Proposed pathway = 0.00 Existing pathway = 0.76 On-road facility = 0.00 Total Length = 0.76*	<p>Approximately \$41,000*</p> <p>(\$10/lf)</p> <p><small>*Estimate includes design and construction; total accounts for the minor intersection improvement only; no pathway widening is needed due to the future construction of the (10 ft wide) Downtown Columbia Pathway</small></p>
	On-Road Bikeway along Stevens Forest Road This potential on-road bike route follows Stevens Forest Road from Whiteacre Road to the intersection at Broken Land Parkway.	No potential impacts expected.	<ul style="list-style-type: none"> • Route is supported by the Draft Howard County Bike Plan • Allows for access to surrounding trails and amenities • Utilizes 0.5 miles of existing bike lanes • Utilizes existing County right-of-way • On-road facilities allow for quick implementation 	<ul style="list-style-type: none"> • Route (D1+D2) is indirect (1.9 miles compared to C1/B1, both of which are 0.9/1.5 miles) • Route includes multiple unsignalized roadway crossings; increases travel time • Route is different in character to existing Patuxent Branch Trail 	Proposed pathway = 0.00 Existing pathway = 0.00 On-road facility = 1.14 Total Length = 1.14	<p>Approximately \$27,000*</p> <p>(\$8/lf)</p> <p><small>*Estimate includes design and construction; total excludes 0.5 miles of existing bike lanes</small></p>
	Utilization of Existing Pathways within the Village of Oakland Mills This potential pathway widening corridor follows of the future Downtown Columbia Trail (2,900 ft) and existing CA pathways (6,000 ft) from Stevens Forest Road to Farewell Road.	Minimal environmental impacts are expected; however, environmental permitting may be required in locations where there is limited space to widen the existing trails along the stream buffer.	<ul style="list-style-type: none"> • Route is supported by Connecting Columbia • Allows for access to surrounding trails and amenities • Utilizes existing CA and County pathways/right-of-way • Eliminates travel along busy roads, increasing safety and comfort of user 	<ul style="list-style-type: none"> • Route (D1+D3+D5) is indirect (2.73 miles compared to C1/B1, both of which are 0.9/1.5 miles) • Route includes multiple unsignalized roadway crossings; increases travel time • Route includes steep topography, reducing its viability as a bicycle route 	Proposed pathway = 0 Existing pathway = 1.69 On-road facility = 0.00 Total Length = 1.69*	<p>Approximately \$844,000*</p> <p>(141/lf)</p> <p><small>*Estimate includes design and construction; total excludes the 0.5 miles that consists of the future (10ft wide) Downtown Columbia Pathway</small></p>

SEGMENT ALTERNATIVES	DESCRIPTION	ENVIRONMENTAL ISSUES	OPPORTUNITIES	CONSTRAINTS	LENGTH (mi)	PRELIMINARY COST
D4	<p>On-Road Bikeway along Farewell Drive This potential on-road bike route follows Farewell Road from the existing pathway midblock intersection to Stevens Forest Road.</p>	No potential impacts expected.	<ul style="list-style-type: none"> Route is supported by the Draft Howard County Bike Plan Allows for access to surrounding trails and amenities Utilizes low volume street On-road facilities allow for quick implementation Utilizes existing County right-of-way 	<ul style="list-style-type: none"> Route (D1+D3+D4) is indirect (2.8 miles compared to C1/B1, both of which are 0.9/1.5 miles) Bicyclists will be required to share the road with motorists, which is less comfortable for casual cyclists Route is different in character to existing Patuxent Branch Trail 	<p>Proposed pathway = 0.00 Existing pathway = 0.00 On-road facility = 0.32 Total Length = 0.32</p>	<p>Approximately \$9,000* (\$6/lf)</p> <p><small>*Estimate includes design and construction</small></p>
D5	<p>Shared-Use Pathway along the BG&E utility easement This potential shared-use pathway follows the existing BGE utility alignment from the existing pathway (south of Farewell Road) to Stevens Forest Road.</p>	Minimal environmental impact because the corridor has already been disturbed by the utility line construction (BG&E ROW); however may require some minor clearing of trees/vegetation.	<ul style="list-style-type: none"> Route is supported by the Draft Howard County Bike Plan Sustains the character of the existing CA pathways Eliminates travel along busy roads, increasing safety and comfort of user 	<ul style="list-style-type: none"> Route (D1+D3+D5) is indirect (2.73 miles compared to C1/B1, both of which are 0.9/1.5 miles) Requires potential acquisition of BG&E right-of-way Requires bridge connection over Patuxent tributary to connect to existing pathways Proximity to back yards of approximately 12 homes in Owen Brown communities may create privacy concerns, design may need to mitigate visual access between homes and pathway 	<p>Proposed pathway = 0.28 Existing pathway = 0.00 On-road facility = 0.00 Total Length = 0.28</p>	<p>Approximately \$405,000* (\$270/lf)</p> <p><small>*Estimate includes design and construction</small></p>
D6	<p>Utilization of Existing Pathways within the Village of Owen Brown This potential pathway widening corridor follows of the existing CA pathways from Farewell Road, passing the Owen Brown Village Center and Lake Elkhorn, to the Patuxent Branch Trail.</p>	Minimal environmental impacts are expected; however, environmental permitting may be required in locations where there is limited space to widen the existing trails between the stream buffer and private properties.	<ul style="list-style-type: none"> Route is supported by Connecting Columbia Allows for access to surrounding trails and amenities Utilizes existing CA and County pathways/right-of-way Eliminates travel along busy roads, increasing safety and comfort of user 	<ul style="list-style-type: none"> Route is indirect (1.6 miles compared to C2/B2, both of which are 1.5/1.1 miles) Multiple unsignalized pathway/roadway intersections Feasibility is dependent on space available to widen pathway between stream corridors and private properties; may require property acquisition Route includes steep topography, reducing its viability as a bicycle route 	<p>Proposed pathway = 0.00 Existing pathway = 1.6 On-road facility = 0.00 Total Length = 1.6</p>	<p>Approximately \$1,107,000* (\$131/lf)</p> <p><small>*Estimate includes design and construction</small></p>

Segments Not Recommended

Segments X1-X7 were analyzed and based on the analysis, the segments described below were determined not to be feasible.

Segment Alternative	Description	Feasibility
X1	<i>Considered shared-use path connection from existing CA pathways at Bullring Lane to Pamplona Road and an on-road bike route from the cul-de-sac at Pamplona Road to Kilimanjaro Road.</i>	This segment was not recommended due to the challenges of an existing steep and narrow pathway spur connection onto the Pamplona Road cul-de-sac from the existing spine network.
X2	<i>Considered shared-use path connection, running parallel and to the east of the Little Patuxent River</i>	This segment was not recommended due to the challenges of steep topography, especially in the spaces between the Little Patuxent River and the Hillcroft Executive Park property along Woodside Court. Additionally, extensive woodland clearing would be necessary for a pathway corridor.
X3	<i>Considered shared-use path connection, running along the BG&E utility easement, from Broken Land Parkway to Stevens Forest Road</i>	This segment was not recommended due to the challenges of steep topography.
X4	<i>Considered shared-use path connection, running along the BG&E utility easement, from the existing CA pathways (north of Windharp Way) to Oakland Mills Road.</i>	This segment was not recommended because it extends beyond the project study area and does not serve as a north/south connection from Downtown Columbia and the Patuxent branch Trail.
X5	<i>Considered shared-use path widening connection, running along the existing CA pathways, from Cradlerock Way to Lake Elkhorn.</i>	This segment was not recommended due to the challenges of steep topography. Additionally, this segment does not serve as an optimal connection as direct north/south route.
X6	<i>Considered on-road bike route along Allview Drive, from Amherst Avenue to Carlinda Avenue and a shared-path from Carlinda Avenue to Segment C2</i>	This segment was not recommended due to its challenging topography. Additionally, this bike route is not supported by the Draft Howard Bicycle Master Plan as a recommended bicycle facility.
X7	<i>Considered shared-use path widening connection, running along the existing CA pathways, from Shaker Drive to Segment A1 .</i>	This segment was not recommended because it does not serve as an optimal connection as direct north/south route.

See page 4 for a map of the segment locations.