FEASIBILITY STUDY

Uptown/Downtown Shared Pathway Havre de Grace

Spring, 2025

Executive Summary

This report is intended to assess the feasibility and advance consideration of a shared use pathway in Havre de Grace connecting the uptown and downtown communities.

- Evaluation criteria for potential pathway alignments include safety and user experience; directness of the route and connectivity to points of interest along the route; property and environmental impacts, and cost and constructibility.
- The study area was separated into three areas and segments with unique alternatives. These three studied areas align with the segments identified in this feasibility study.
- The estimated cost range of the **3.8 mile** pathway is **$7.0 to $12.0** million in 2024 dollars. This includes a 50% contingency budget as design developments continue and further construction details are known. It is estimated that **$1.2** million will be needed for preliminary and final engineering, environmental permitting, and construction management.
- The study recommends that the best path forward may be:
  - Advance design to the 30% preliminary engineering phase for area 2 only, including topographic and property line survey. The purpose of this work is to clearly establish potential property impacts for an off-street pathway, begin informal discussions with property owners on their willingness to dedicate easements for the project, and to further assess the efforts required to build an off-street alignment between Oak Tree Drive and the Bulle Rock roundabout.
  - Future development approvals in the corridor should be conditioned on right-of-way dedication for the construction of the pathway.
  - Continuing to work with Harford County and the State Highway Administration on improvements for bicyclists and pedestrians to cross US 40 at Lewis Lane and Ohio/Otsego Streets.

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1. Purpose of Report

The purpose of this report is to document the existing conditions, develop and assess alternative alignments, and to determine a "path forward" to create a shared use pathway that connects downtown Havre de Grace to the uptown communities in the Chapel Road corridor. Accompanying this narrative report is a set of concept-level engineering plans based on desktop review of existing conditions, limited field inspection, and input from stakeholders. Issues for further evaluation during final design are identified in the discussion of the preferred alternative. While not specifically intended to satisfy all requirements of an action under the National Environmental Policy Act (NEPA), this document does meet the basic purposes of defining a project purpose and need, establishing evaluation criteria, identifying reasonable alternatives, receiving public and agency input on those alternatives, screening and evaluating the alternatives, and selecting a preferred alternative.

1.1 Project Purpose and Need

This report aims to create a shared-use pathway connecting downtown Havre de Grace to the uptown communities in the Chapel Road corridor. The project will enhance connectivity in Harford County, Maryland, by evaluating various alternatives and selecting a preferred option. The City of Havre de Grace, with its rich history and vibrant waterfront community, has been shaped by significant events like the establishment of the Baltimore, Wilmington, and Philadelphia railroad tracks, the Susquehanna and Tidewater canal, and the introduction of passenger steamboat service to Baltimore in 1836. This report includes concept-level engineering plans based on desktop reviews, limited field inspections, and stakeholder input, identifying issues for further evaluation during the final design phase.

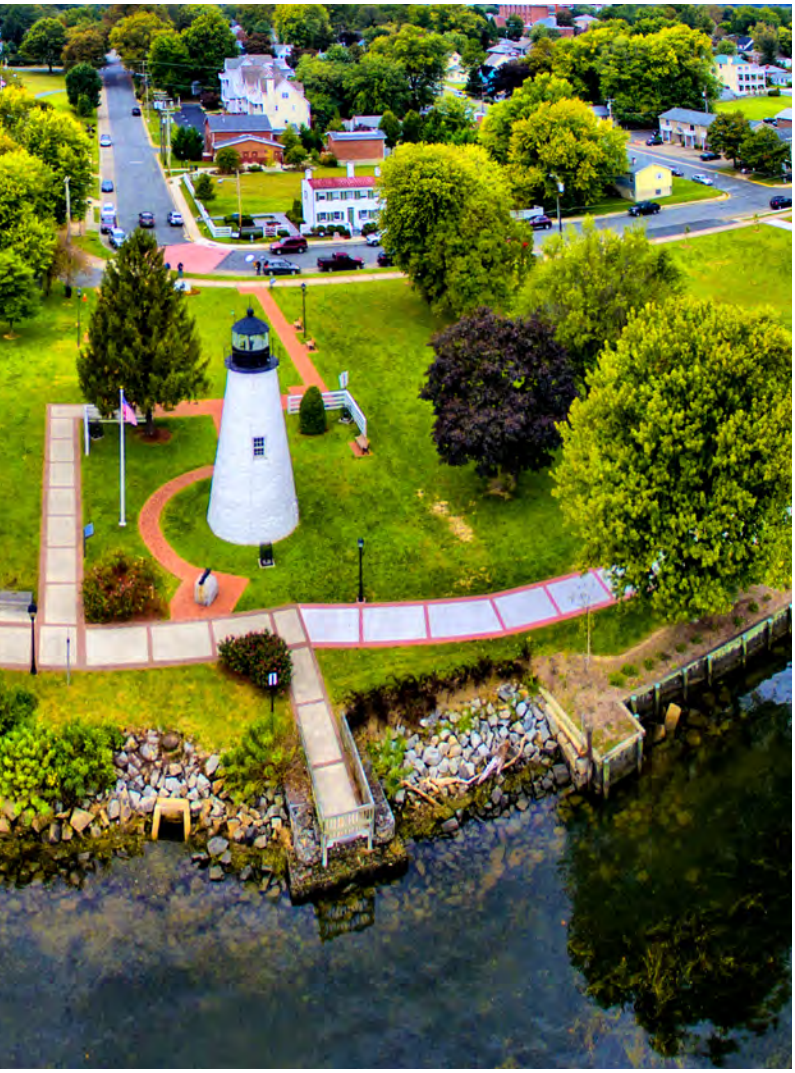
A key element from the published 2025 comprehensive plan is advocating for the creation of pathways and parks, which will encourage year-round outdoor activities. These green spaces enhance the quality of life for residents and visitors. The centrally located Havre de Grace Middle and High school complex and Havre de Grace Elementary school contribute to a cohesive community fabric.

1. Purpose of Report

Whether in established neighborhoods or emerging ones, walkable connections are essential. The plan encourages pedestrian-friendly pathways throughout the city, fostering community cohesion and offering non-automotive transportation options to residents and visitors.

Havre de Grace aims to continue to be a hub for art, culture, and history. The City's convergence with road, rail, and canal systems place it at the crossroads of national history. Havre de Grace is part of significant bike routes, including the September 11th National Memorial Trail and the East Coast Greenway, to name a few. The expansive historic district is a treasure trove of architectural heritage, integral to the city's identity.

In summary, the City of Havre de Grace strives to be a harmonious blend of history, art, culture, connectivity, and sustainability.



1.2 Evaluation Criteria

Critical to this feasibility study is to identify those segments that can best meet the design criteria (grade, curve radii, etc. as described in Section 3) and evaluation criteria which are based on the City's goals and plans.

Safety and User Experience

Is the alignment segment suitable to users of all ages and abilities through separation from auto traffic? Are vertical grades comfortable? Does the segment provide scenic views and access to natural environmental features?

Directness and Connectivity

Does the alignment segment provide a reasonably direct connection between (MD-155) Level Road and Revolution Street? Does the segment provide connections to other points of interest and community facilities?

Property and Environmental Impacts

Is there sufficient right-of-way (ROW) along the adjacent roadway or does the alignment necessitate the acquisition of private property? Can the property impacts be minimized or mitigated to the satisfaction of the affected property owner? Are there environmental impacts that would require mitigation (reforestation, stream restoration, etc.)?

Cost and Constructability

Are there significant obstacles to be overcome on the alignment that would drive the cost higher (bridges and retaining walls, utility relocation)?

Figure 1: East Coast Greenway Route Image
Source: www.greenway.org

2. Corridor Description

This section describes the potential pathway corridor in terms of its land uses, demographics, environmental, and transportation conditions.

2.1 Land Use and Demographics

According to the 2020 U.S. Census, Havre de Grace is home to approximately 16,759 residents. Notably, 19.3% of the population falls within the 65-and-older age group, highlighting the City's attraction and retention to an aging population. However, it is essential to acknowledge that Havre de Grace faces socioeconomic challenges. The City experiences a disproportionately high poverty rate compared to Harford County. Although this rate has gradually decreased since the 2004 comprehensive plan, it currently stands at 12.0%. Despite these statistics, Havre de Grace is poised for growth. Anticipated residential developments will contribute to an expanding population.

Shared Use Pathway as Part of the Lower Susquehanna Heritage Greenway

To the north of Havre de Grace lies Susquehanna State Park, a pristine expanse of open space. Meanwhile, the vast portions of the Oakington Peninsula to the south have been thoughtfully acquired by Harford County's Department of Parks and Recreation. Amid this scenic backdrop, the Lower Susquehanna Heritage Greenway (LSHG) has emerged as a visionary initiative. The LSHG envisions a network of pathways, enhanced public access, and preservation tools that beckon both residents and visitors to explore the region.

Just north of Havre de Grace, the Vulcan Materials Company operates a massive hard rock quarry. This quarry extracts and transports crushed stone via highways and water routes.

Interestingly, despite its proximity to the City, the quarry falls under Harford County's jurisdiction. Recently, a hiking pathway was unveiled in spring 2022 around the perimeter of the Vulcan quarry. This pathway serves a crucial purpose: it bridges a significant gap within the LSHG, connecting downtown Havre de Grace to the northern pathways of the LSHG and the extensive 199-mile Mason-Dixon Trail system.

Havre de Grace's land use reflects its historical significance, demographic diversity, and forward-thinking approach to urban planning. As the city continues to evolve, growth with community cohesion remains a priority.

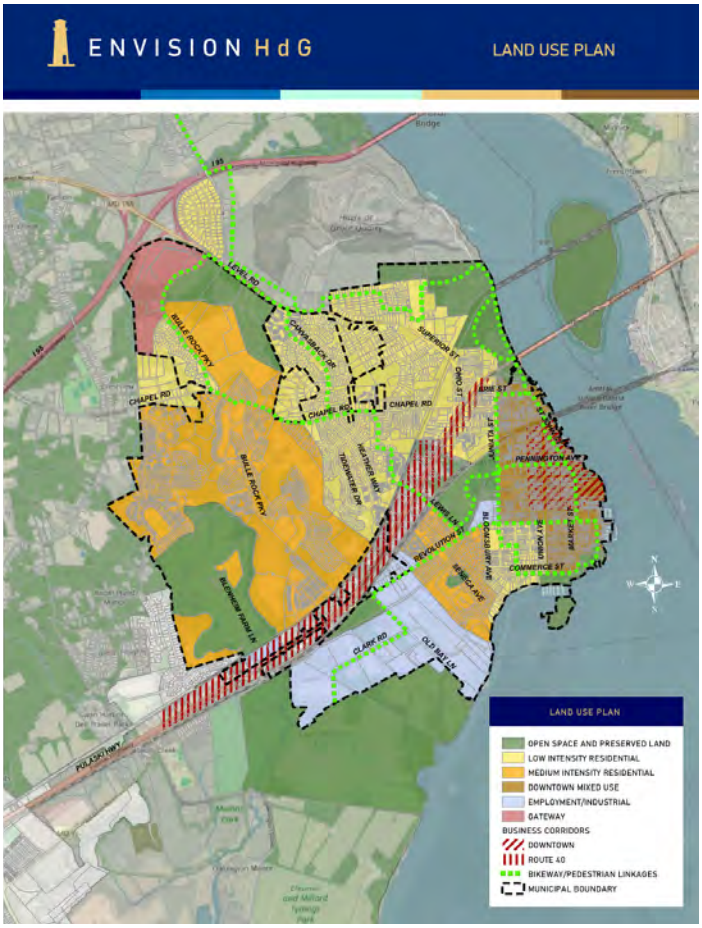


Figure 2: Land Use Plan Havre de Grace Comprehensive Plan 2025
Source: City of Havre de Grace

As shown by Figure 2, the proposed shared use path runs primarily along medium density residential land uses comprised of single-family detached and attached with 5-7 dwellings per acre. Low density consists of single-family detached with 2-4 dwelling units per acre.

2. Corridor Description

2.2 Community Facilities

Community facilities can serve as potential trip generators for a trail. Havre de Grace's middle and high school are located along Lewis Lane. Additional school sport and recreational facilities are located on the other side of the school, including a small half-mile section of multi-use pathway that comes out at N Juniata Street near City Hall. Also along Lewis Lane is the Havre de Grace Senior Activity Center, which is for all ages, hosting recreational programs and senior activities through the Office on Aging, and after school care through the Boys and Girls Club. Further north along Juniata Street is the McLhinney Park and North Park area and southeast is Millard Tydings Memorial Park. With access to the Chesapeake Bay, local parks, and walkable streets, Havre de Grace provides a quaint, small-town feel that also caters to festivals and street events.

Havre de Grace's middle school and high school complex is a 57-acre site located between Lewis Lane and Juniata Street adjacent to the AMTRAK rail line. The site is well-designed with pathways connecting though the middle of the property. Facilities include 4 baseball/softball diamonds, 4 basketball courts, 8 tennis courts, 3 multi-purpose playing fields, and a football stadium complex.

Chapel Road Park located west of Bulle Rock Parkway at Earlton Road and Chapel Road is a large 67-acre park with multi-use playing fields and paved walking pathway for users of all ages. This regional park is approximately 0.8 miles from Bulle Rock Parkway and Chapel Road intersection.

Pathway Connectivity and Future Goals

Long-term trails planning aims to link private pathways with publicly accessible ones. The goal of this project is to create interconnectivity for pedestrians and bicyclists throughout Havre de Grace. Bulle Rock Parkway plays a central role in this vision. However, improvements are necessary to accommodate increased traffic volume and ensure safe pedestrian access to adjoining neighborhoods.

Notable Bikeways

- The **September 11th National Memorial Trail** is a 1,500 mile multi-use route that links the World Trade Center, the Pentagon, and the Flight 93 Memorial. This trail was federally designated by Congress in 2021.
- The **East Coast Greenway** is a walking and biking route stretching 3,000 miles from Maine to Florida. In 2020, the East Coast Greenway hosted 50 million bike rides, runs, and walks. The route travels through 25 cities and 450 communities. The Greenway at a glance strives connect the nation's most populated corridor, connect people, and invest in a healthy, sustainable future.

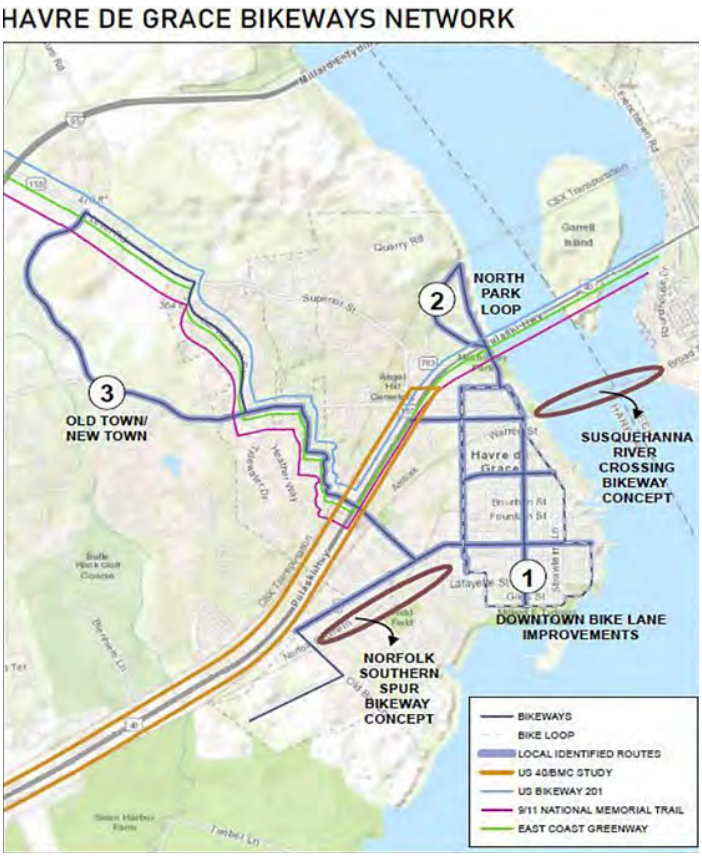


Figure 3. Bikeways from the 202 5 Comprehensive Plan Havre de Grace
Source: https://havredegracemd.gov/app/uploads/2023/06/Work-Session-9-and-10-Transportation_-A-Focus-on-Multimodal-Options.pdf

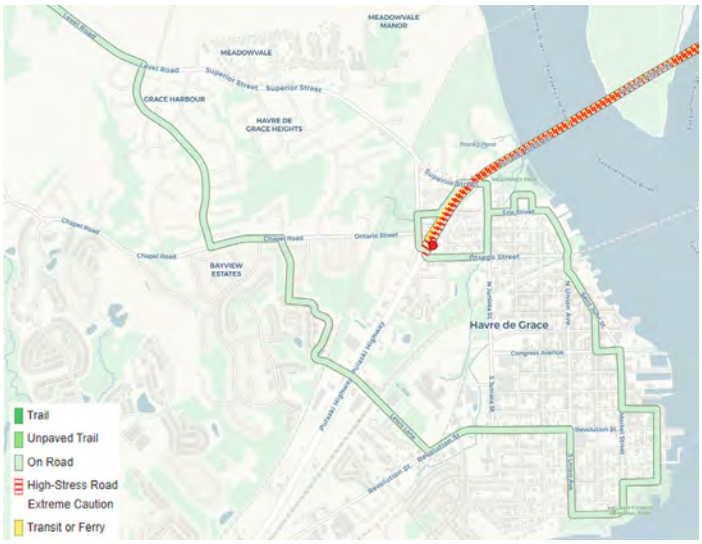


Figure 4: East Coast Greenway Havre de Grace Map
Source: https://greenway.org/route-map

2. Corridor Description

2.3 Transportation Facilities

Bulle Rock Parkway

Bulle Rock is a 2 lane major roadway, starting at Level Road (MD-155) running south until the intersection with Chapel Road. The posted speed limit is 35 mph with an Average Daily Traffic (AADT) of 2,832. No sidewalk or bike lanes are present along Bulle Rock Parkway. No utility poles run along either side of the roadway. A few sections of roadway have guardrails present.

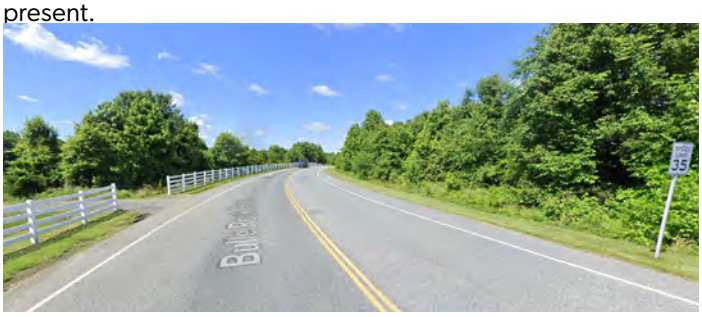


Figure 5: Bulle Rock Parkway looking north
Source: Google Maps

Chapel Road/Ontario Street

Chapel Road runs east-west and intersects with Bulle Rock Parkway and Tydings Road to the east. The posted speed limit is 25 mph and there is an AADT of 3,152. Chapel Road has sections of sidewalk on certain sections of road. Utility poles are noted to be running along the south side of the roadway where the majority of sidewalk is present.

Figure 6: Chapel Road at Tidewater looking west
Source: Google Maps

Figure 7: Chapel road at Dusk View Drive looking east
Source: Google Maps

Heather Way

Heather Way runs through a primarily residential area with an approximate width of 35 feet. Sidewalk runs along both sides of the roadway and some stop controlled intersections are present. The posted speed limit is 25 mph. No overhead utilities run along the roadway. Some street lights are present. Residents utilize the roadway for parking.

Figure 8: Heather Way at Tidewater Drive looking north
Source: Google Maps

Brian Garth

Brian Garth runs through a primarily residential area and is approximately 28 feet wide. There is no posted speed limit. A sidewalk runs along 90% of the roadway, with a sidewalk gap present adjacent to a water detention area. Some street lighting is present and no overhead utilities run along the roadway. Residents utilize the roadway for parking.

Figure 9: Brian Garth Way at Water Retention Area (left) looking west
Source: Google Maps

2. Corridor Description

Lewis Lane

Lewis Lane is a City-owned road from Lori Lane to Revolution Street. The roadway width varies from 22 to 40 feet. The posted speed limit is 20 and 25 mph and the roadway has an AADT of 5,150. Lewis Lane is adjacent to a middle and high school. Sidewalk runs along partial sections of the roadway. Lewis Lane has one at grade railroad crossing west of Pulaski Highway. Another grade separated railroad crossing for the Amtrak rail is present east of Pulaski Highway.

Figure 10: Lewis Lane at Lori Lane looking west
Source: Google Maps

Figure 11: Lewis Lane north of Revolution Street looking north
Source: Google Maps

Figure 12: Lewis Lane looking north at AMTRAK crossing. This bridge may be replaced as part of the Amtrak Susquehanna River Bridge Project. Source: Google Maps

Figure 13: At intersection on Revolution Street looking north to Lewis Lane
Source: Google Maps

Revolution Street (MD-7A)

Revolution Street (MD-7A) is owned by the Maryland State Highway Administration, and is a major thoroughfare into the historic downtown. The posted speed limit is 35 mph and the roadway has an AADT of 11,240. This section of roadway is primarily lined with commercial businesses. One at-grade rail spur crossing is present near Lewis Lane. A fire station is located on the north side of the roadway.

Figure 14: Revolution Street at Lewis Lane looking east
Source: Google Maps

Figure 15: On Revolution Street looking east at Bloomsbury Avenue
Source: Google Maps

2. Corridor Description

Bicycle Level of Traffic Stress

The Level of Traffic Stress (LTS), a metric for comfort level for bicyclists on a roadway, calculated by factors including vehicle AADT, posted vehicle speed, number of traveling lanes, and bicycling facilities, among other factors, is graded by a 0-5 scale, 0 being the least stressful (for all ages) and 5 for where bikes are prohibited.

Bicycle Level of Traffic Stress Description

LTS	Target Audience	Bicycle Facility Types
0	All ages and abilities	Rail-trails, shared-use paths
1	Almost everyone	Protected bikeways, sidepaths
2	Interested but concerned	Bike lanes, bike boulevards
3	Enthused and confident	Bike lanes, shared lanes, shoulders
4	Strong and fearless	No bike facility or bike lane on a major roadway
5	Bicycle Access Prohibited	Bicycle access is prohibited by managing roadway agency

Level of Traffic Stress Based on ADT and MPH

Number of Lanes	Effective ADT	Prevailing Speed						
		<20mph	25mph	30mph	35mph	40mph	45mph	50+mph
Unlaned 2-way street (No centerline)	0-750	1	1	2	2	3	3	3
	751-1500	1	1	2	3	3	3	4
	1501-3000	2	2	2	3	4	4	4
	3000+	2	3	3	3	4	4	4
1 thru lane per direction (1-way, 1 lane street or 2-way street with centerline	0-750	1	1	2	2	3	3	3
	751-1500	2	2	2	3	3	3	4
	1501-3000	2	3	3	3	4	4	4
	3000+	3	3	3	4	4	4	4
2 thru lanes per direction	0-8000	3	3	3	3	4	4	4
	8001+	3	3	4	4	4	4	4
3+ thru lanes per direction	Any	3	3	4	4	4	4	4

Effective ADT = ADT for two-way roads. Effective ADT – 1.5' ADT for one-way roads

Maryland Department of Transportation, MDOT LTS Metadata Methodology

https://www.mdot.maryland.gov/OPCP/MDOT_LTS_Metadata_Methodology_Full.pdf#:~:text=Traditionally%2C%20the%20Level%20of%20Traffic,comfort%20with%20various%20bicycle%20users.

2. Corridor Description

From Figure 16 below the subsequent can be understood about the following roadways:

- Bulle Rock Parkway LTS 2
- Chapel Road LTS 2
- Ontario Street LTS 2
- Heather Way LTS 1
- Brian Garth LTS 1
- Lewis Lane LTS 1-4
- Revolution Street LTS 2

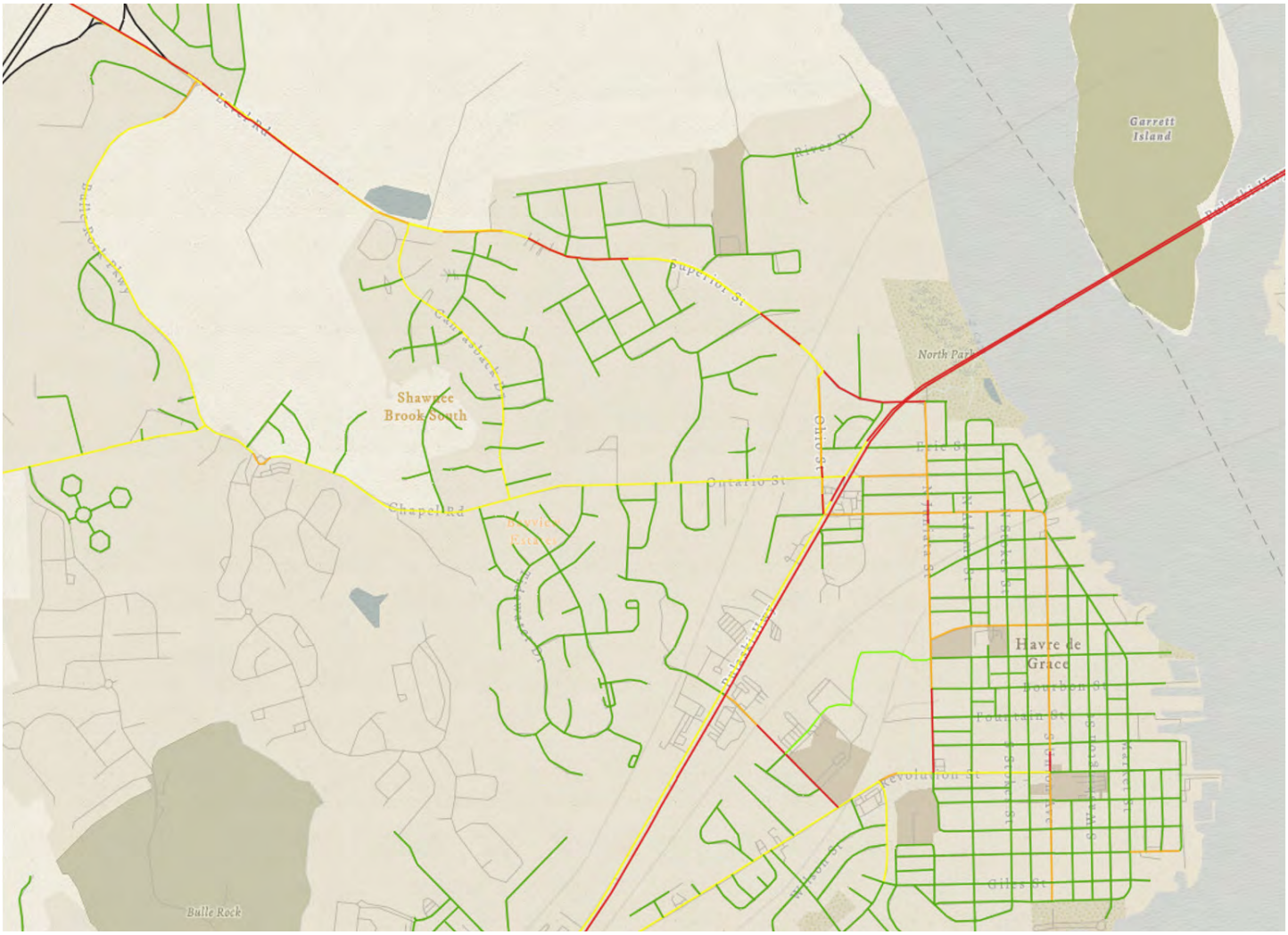


Figure 16: Level of Traffic Stress (LTS)
Source: Maryland Bicycle Level of Traffic Stress (LTS) Web Application (arcgis.com)

2. Corridor Description

2.4 Corridor Environmental Characteristics and Requirements in General

This section describes general environmental characteristics in the study area. Further information on general considerations when planning pathways in environmentally sensitive areas can also be found in the Rails to Pathways Conservancy publication Developing Pathways in Sensitive Areas. This section also describes in general terms the environmental planning and permitting requirements for any type of infrastructure or development project in the corridor.

Surface Waters

East of the proposed alignments is the Havre de Grace waterfront of the Susquehanna River and the Chesapeake Bay. Much of the area's tourism is located here, including some of the City's parks, such as: Concord Point, Millard Tydings Memorial Park, Frank J. Hutchins Memorial Park, David Craig Park, Jean Roberts Park, and North Park/Joe K Loop Trail. These public connections to the waterfront show just how interconnected the surface waters are to the City. The Bay's surface waters are a mix of fresh and saltwater with over 1,500 square miles of wetlands.

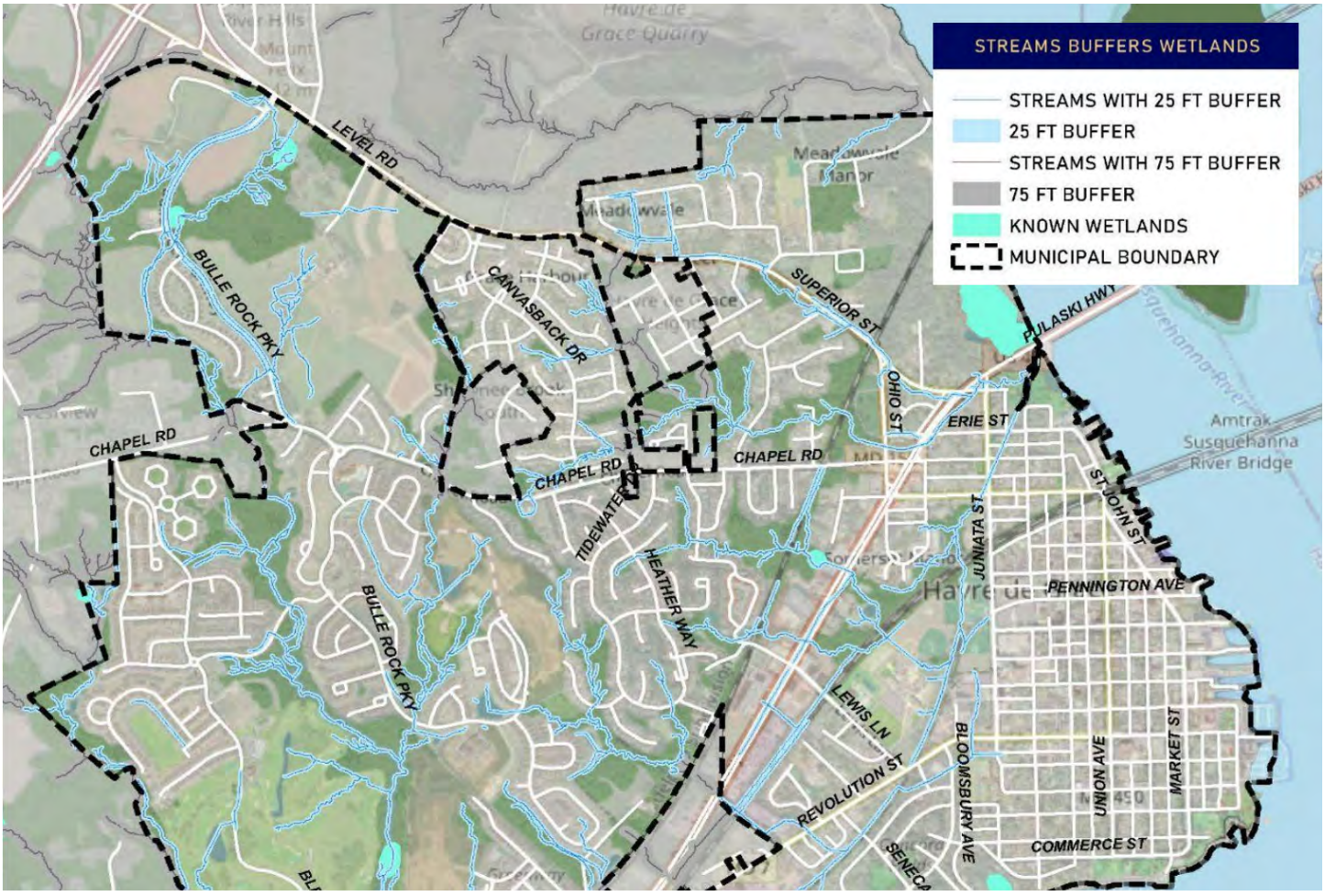


Figure 17: Streams, Wetlands, and buffers Havre de Grace
Source:https://havredegracemd.gov/app/uploads/2023/07/Work-Session-6-Environmental-Resource-Sensitive-Areas.pdf

2. Corridor Description

Forests

No identified forests are present along the proposed alignments. A forest worth noting just north of the alignment in this region is Susquehanna State Park, which is located along the Susquehanna River Valley. The area is heavily forested and rocky, and is home to popular mountain biking trails in Maryland.

Wetlands and Waters of The United States

There are no tidal areas within the study area. Consequently, federal and state regulations pertaining to tidal waters of the U.S. do not apply to the project and are therefore not discussed in this document. The study area does not cross with the Chesapeake Bay Critical Area. There are non-tidal mapped wetlands and streams within and adjacent to the study area.

Floodplains

Along the stream branch of the Gasheys Creek is a floodplain Zone A with a 1% annual chance of flooding. Revolution from Seneca Avenue to Adams is a Flood Zone AE. Flood Zones A and AE refer to low-lying areas close to lakes, ponds, and other large bodies of water. Pathways may be built in flood zones with special measures to prevent washout and limit risk to other properties.

A watershed boundary is the highest elevation surrounding a river or lake and is also known as a drainage divide. Havre de Grace consists of two watershed boundaries. The lower Susquehanna River Watershed (East) of 1,917 acres and the Swan Creek Watershed (West) of 1,851 acres. Streams within the city limits have a 25 foot buffer. Havre de Grace has very few wetland areas.

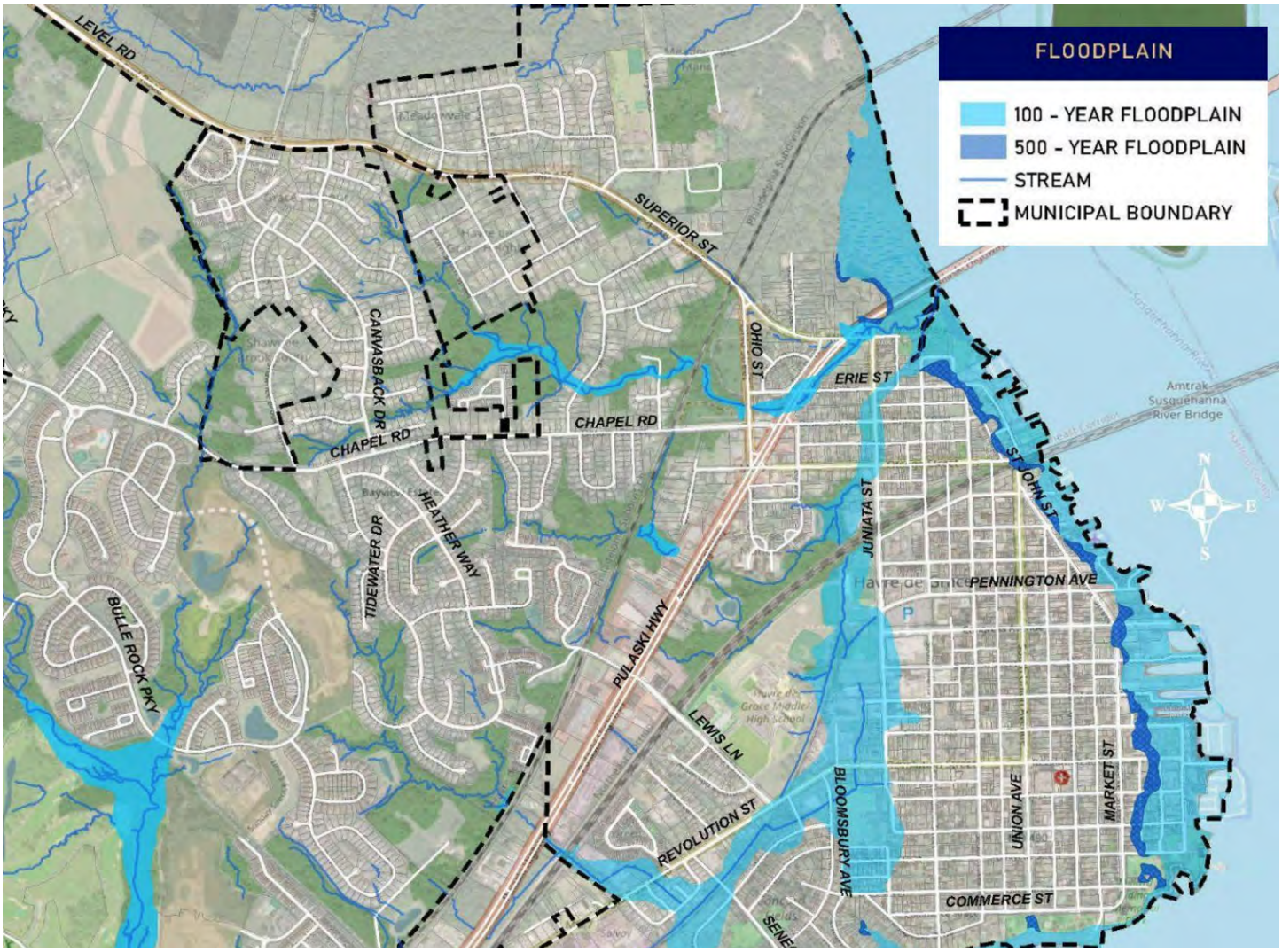


Figure 18: Floodplain Havre de Grace
Source: https://havredegracemd.gov/app/uploads/2023/07/Work-Session-6-Environmental-Resource-Sensitive-Areas.pdf

3. Overview of Bicycle/Pedestrian Facility Design

3.1 Bicycle/Pedestrian Facility Design

There are five types of bicycle facilities typically used: off-street or shared use paths, protected bike lanes, striped bike lanes, bike-on-shoulder, and "sharrows." This section describes each and if/how they might be suitable for the study area, considerations used when applying those facilities, and design standards used in developing the concept plans.

Off-Street Pathway/Shared-Use Path

Off-street pathways or shared-use pathways are bicycle- and pedestrian-specific transportation corridors. Pathways are ideally 10 to 12-ft wide to accommodate bidirectional walking and bicycling, with 2-ft wide grass shoulder areas. Adjacent to roadways, they are called side paths and typically require at least a 5-ft landscaped buffer from the roadway. An off-street pathway or shared use path most clearly aligns with the purpose and need for the project.

Protected Bike Lane

Bike lanes are "protected" when they provide physical separation between motor vehicles and bicycles. One-way protected bike lanes are usually at least 5-ft wide and two-way lanes are 8 to 10-ft wide, with at least a 2-ft wide buffer with delineators such as flex posts (as shown here), parking stops, precast curbs, planter boxes, or "armadillos."

Bike Lane

Bike lanes are roadway lanes that provide designated space for people bicycling but do not provide any physical separation or protection between motor vehicles and bicycles. Bike lanes are typically 5 to 6-ft wide. If 7-ft or more is available, a buffer should be provided, instead of a very wide bike lane, to discourage driving or parking in the bike lane.

Paved Shoulder

Paved shoulders are a paved space beyond the edge line of a roadway's travel lanes. They provide space for bicycling outside the usual path of motor vehicles, but also provide clear space (a "recovery area") for motorists and accommodate drainage and emergency stopping. Paved shoulders would not meet the purpose and need test of being buffered from traffic and provide a safe experience for users of all ages and abilities.

Sharrow

Short for "shared lane arrow," a sharrow is a road marking used to indicate a shared lane environment for bicycles and motor vehicles. The purpose of a sharrow is to guide bicyclists to the safest position on the road while reminding drivers to share the road with cyclists. Sharrows are typically marked with a bicycle symbol and two chevrons painted on the pavement. They are often used on roads that are too narrow for dedicated bike lanes, helping to reduce conflicts between cyclists and motorists by promoting awareness and encouraging safe passing distances.

3. Overview of Bicycle/Pedestrian Facility Design

3.2 General Design Requirements and Assumptions

In general, the feasibility study assumes that the pathway will follow the design guidance and standards in the following documents. At the feasibility study level, the most generous standards are used; however, as design progresses it often becomes necessary to deviate from the standards in response to localized conditions such as right-of-way constraints, topography, utilities, etc.

- Bicycle Policy & Design Guidelines Maryland State Highway Administration, 2013
- Guide for the Development of Bicycle Facilities American Association of State Highway and Transportation Officials (AASHTO), 1999
- Designing Sidewalks and Pathways for Access: Part II of II: Best Practices Design Guide, Federal Highway Administration (FHWA), 2001
- Maryland Manual Uniform Traffic Control Devices
- Design assumptions and deviations specific to this project are described below.

Pathway Geometry

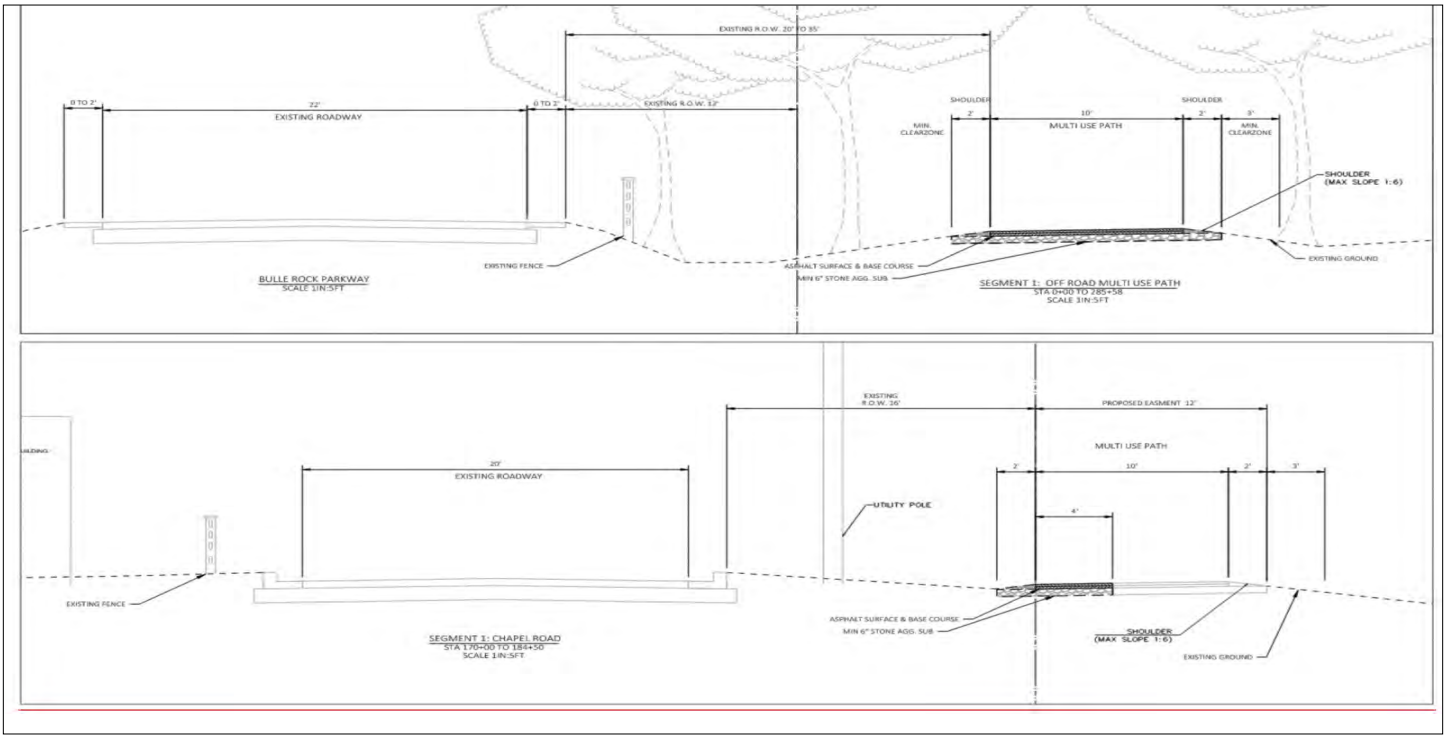
Curves and longitudinal slope will generally follow the adjacent roadway, with deviations as needed to match topography and reduce impacts to trees, utilities, monument signs, and other features. Horizontal curves not associated with the roadway alignment generally have a minimum radius of 60-ft, corresponding to a design speed of 12 miles per hour.

Design Speed and Curve Radius

As a shared use path for both pedestrians and bicycle riders of all ages and abilities, the project is to be designed for bicycle users traveling at 12 mph. As such, the minimum curve radius is planned at 36'. Curve radii smaller than recommended may be used due to narrow right-of-way, topography, or other considerations. Standard curve warning signs and pavement markings should be installed.

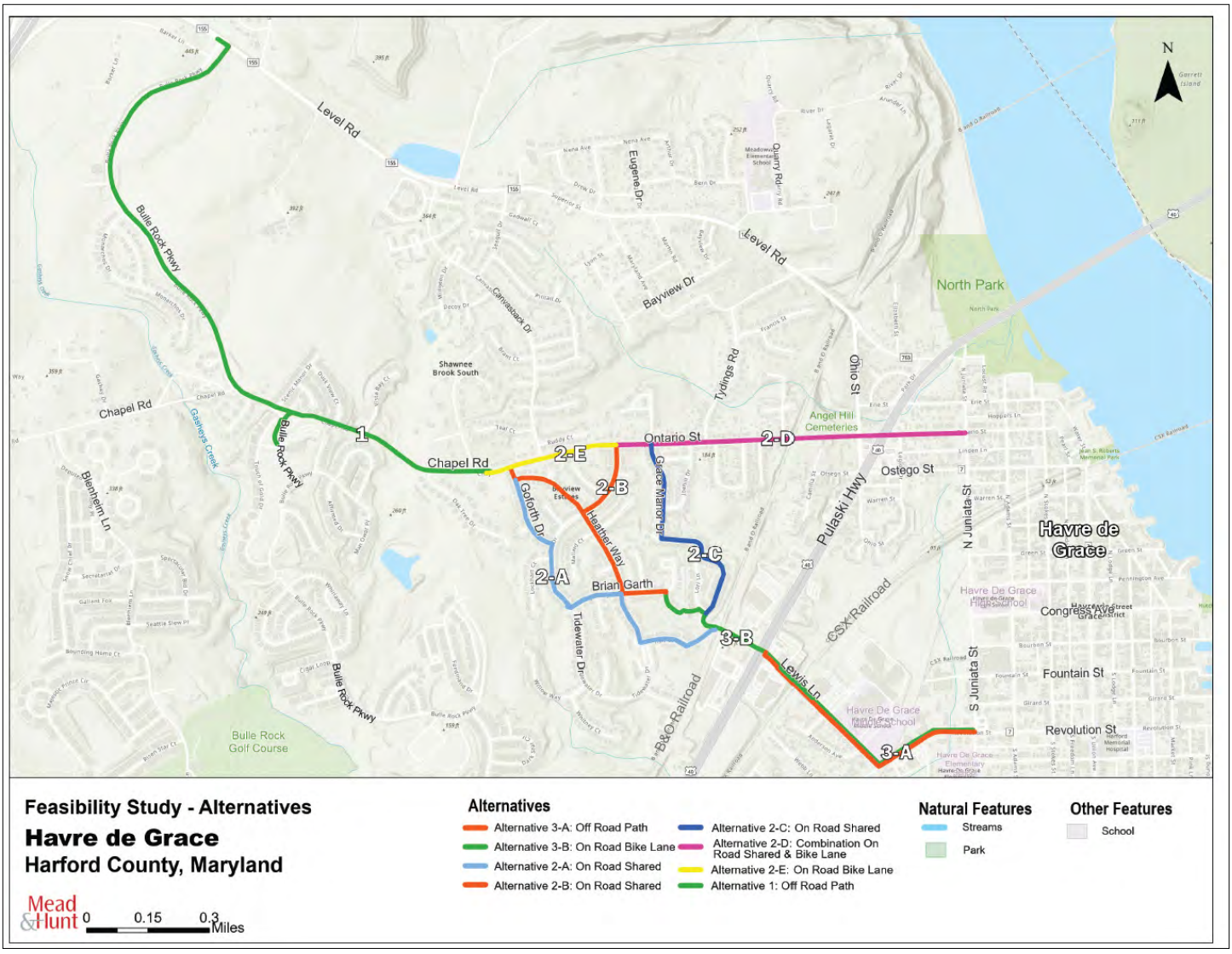
Typical Section (Pathway Width)

The preferred pathway width is a minimum 10' wide asphalt pathway (8' min and 12' preferred) with a maximum cross slope of 2% when that is feasible without significant environmental disruption. A minimum 5' clear zone on each side of the pathway is ideal with a 2 ft gravel shoulder at a 3 to 1 slope.



4. Alignment Alternatives

To develop alignment alternatives, the corridor is divided into 3 segments. Individual segments following natural features and property lines were then identified and assessed based on the evaluation criteria listed in Section 1.2



Every alignment alternative in the corridor has challenges. Some alternatives require significant ROW acquisition, other alternatives would require significant land disturbance to achieve a pathway that has suitable grades or curves to meet design requirements and be comfortable for users of all ages and abilities. Some alignments would require construction in the floodplain, or across regulated streams and wetlands. The maps included indicate some of the challenges associated with each of the alternatives.

4. Alignment Alternatives Removed from Consideration

Alignments Removed from Consideration

Ontario Street

Ontario Street from N Juniata Street to Chapel Road has a posted speed limit of 25 mph, roadway width of approximately 24-ft, and there is one railroad crossing. Ontario Street has no existing sidewalks on the north and south sides of the roadway with grades greater than 8% from Chapel Heights Drive to Ohio Street. Construction of bike and pedestrian facilities in the form of shoulder widening, sidewalk, or an off-road multi-use path would require significant grading, relocation of utility poles, mailboxes, removal of trees, and reconstruction of driveways. Additionally, all residential units along Ontario Street would require easements to allow for shoulder widening to accomodate installation of 5-ft bike lanes on each side or a single multi-use path on either side of Ontario. Overall, the construction cost for this alternative would be significantly greater than other alternatives.

Figure 19: Ontario Street looking east
Source: Google Maps

Figure 20: Ontario Street looking west at Rail Road Tracks
Source: Google Maps

Lewis Lane

Lewis Lane from Grace Manor Drive to Lori Lane is approximately 20-ft wide with a posted speed limit of 25 mph. Sidewalk runs along both sides of the roadway.

Figure 21: Lewis Lane near Lori Lane looking east
Source: Google Maps

Grace Manor Drive

Grace Manor Drive from Lewis Lane to Chapel Road is approximately 26-ft wide with a posted speed limit of 25 mph. Grace Manor Drive has some traffic calming medians.

Figure 22: Grace Manor Drive looking south
Source: Google Maps

4. Alignment Alternatives Removed from Consideration

Goforth Drive/Tidewater Drive/Kathryn Way/Heather Way/Hall Court

This series of roadways make up an alternative that presents many twists and turns down different streets. The roadways have posted speed limits of 25 mph and variable typical sections between 30-ft and 35-ft with on-street parking provided throughout. Additional wayfinding and pavement markings would be recommended to be installed with this alternative. Hall Court is a dead end with parking along the roadway. As shown by Figure 28, tree clearing, grading, and easements would be required for a 400-ft section of multi-use path to be constructed to connect Hall Court to Lewis Lane. This alternative would limit the additional residential neighborhood connections on the north side of Chapel Road.

Figure 26: Heather Way looking north
Source: Google Maps

Figure 23: Goforth Drive looking north
Source: Google Maps

Figure 27: Hall Court looking south
Source: Google Maps

Figure 24: Tidewater Drive looking north
Source: Google Maps

Figure 28: Lewis Lane looking north towards Hall Court
Source: Google Maps

Figure 25: Kathryn Way looking west
Source: Google Maps

4. Alignment Alternatives Evaluated

Segment 1: A Tranquil Path Along Bulle Rock Parkway

Beginning at Level Road (MD-155) and traveling south then east, the preferred iteration of Segment 1 is one leg that runs along Bulle Rock Parkway until the roadway intersects with Chapel Road. Segment 1 would consist of a 10-ft wide paved path that is 20 to 30-ft east of the roadway, allowing for a fully separated and vegetated buffer. By doing this, the path can utilize existing drainage ditches installed along the roadway and minimize grading. The undeveloped area to the east of Bulle Rock Parkway would allow for a vegetation buffer to remain and be expanded on. This would result in a path with less distraction, road noise, and increased safety, with the potential to feel like a "walk in the woods". This would serve as a green gateway for users of the US Bikeway 201, 9/11 National Memorial Pathway, and East Coast Greenway, allowing for users to enjoy minimal street crossings and greener, developed scenery. The path would also allow for connections to existing neighborhoods and future subdivision developments. At the end of the segment, the 10-ft wide path would end where an already existing 4-ft wide paved path runs along the north side of Chapel Road.

The preferred alignment for Segment 1 commences at Level Road (MD-155) and gracefully follows a southward trajectory, eventually curving eastward. The typical section would be a 10-ft wide paved path, thoughtfully positioned approximately 20 to 30-ft east of Bulle Rock Parkway. This placement allows for a fully separated buffer from the roadway while allowing natural vegetation to survive. In addition, the placement of the path allows for the existing drainage ditch along the roadway to remain in place, thus reducing the amount of overall grading for the project. This in return helps reduce the overall construction cost.

Installing signage or art installations along the path can allow for further cultural growth.

This green gateway would allow for users to appreciate the reduced road noise, reduced street crossings, and community connectivity. Users of the Bikeway 201, 9/11 National Memorial Pathway, and the East Coast Greenway would be able to utilize a safer and more green passage through Havre de Grace.

Continuing on, the segment ends where an existing 4-ft wide off road path currently exists.

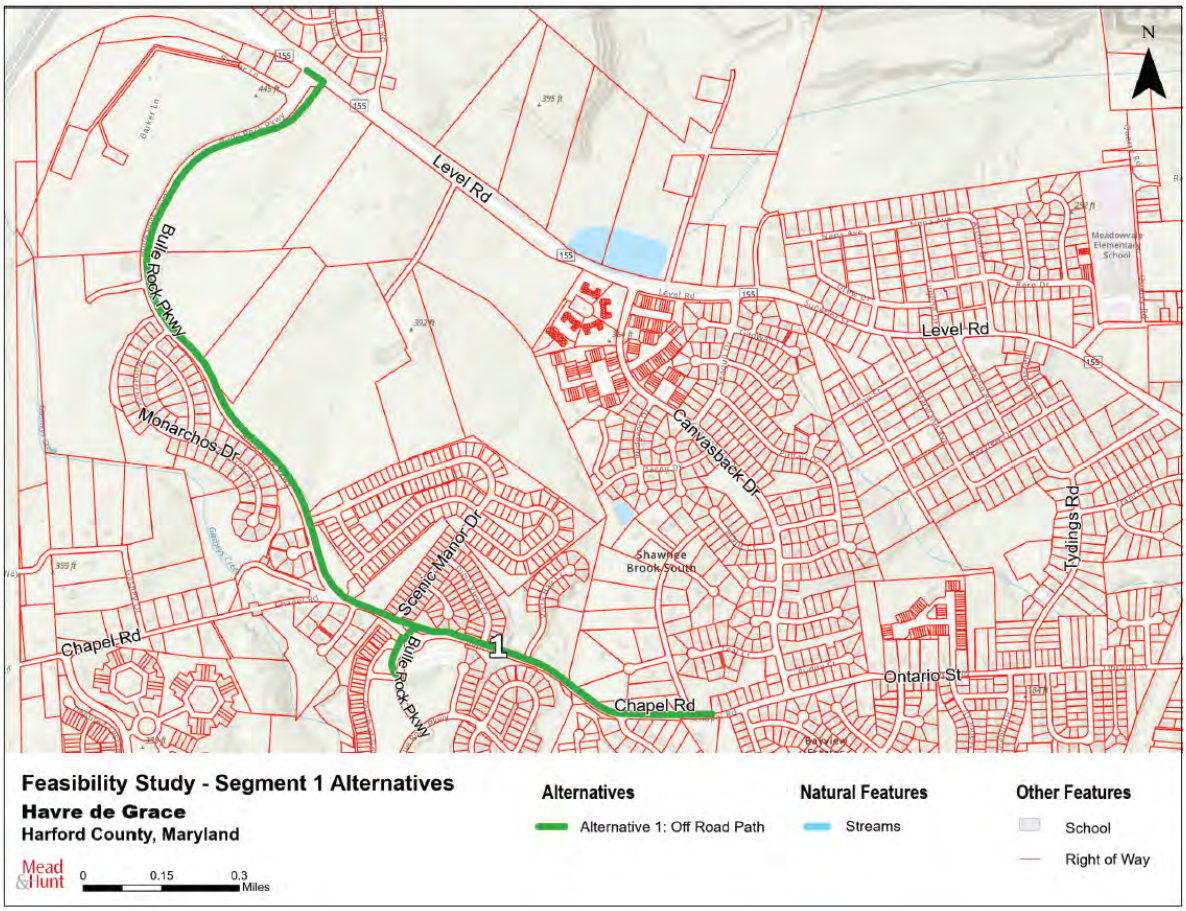


Figure 29: Segment 1 Alternatives

4. Alignment Alternatives Evaluated

Segment 2: A Community Connection to Chapel Road

This Segment would consist of two Alignments 2-B and 2-E running through a residential area. Consideration was taken into minimizing right-of-way impacts and utilizing the existing roadway, reducing construction costs.

Alignment 2-B consists of Goforth Drive, Heather Way, Brian Garth, and Tidewater Drive. This alignment would utilize the wide residential streets with slow travel speeds, which would promote easy access to the other pathway and City connections. This alignment would consist of a shared roadway with signage and pavement markings, which would provide alternative bikeable roadways and additional connectivity.

Alignment 2-E consists of Chapel Road from Oak Tree Drive to Tidewater Drive. The typical section for this alignment would be a standard 4-5ft wide marked bike lane with no buffer, in addition to installation of sidewalk from Oak Tree to Goforth on the north side of Chapel Roadway. Crosswalks would be installed and updated to be in compliance. This sidewalk connection gives non-biking pedestrians continued connection to more subdivisions and an off-road alternative.

This alternative includes options to widen the sidewalk. This does not create a more favorable surface for cyclists and would significantly increase the construction cost when compared to signage and pavement marking.

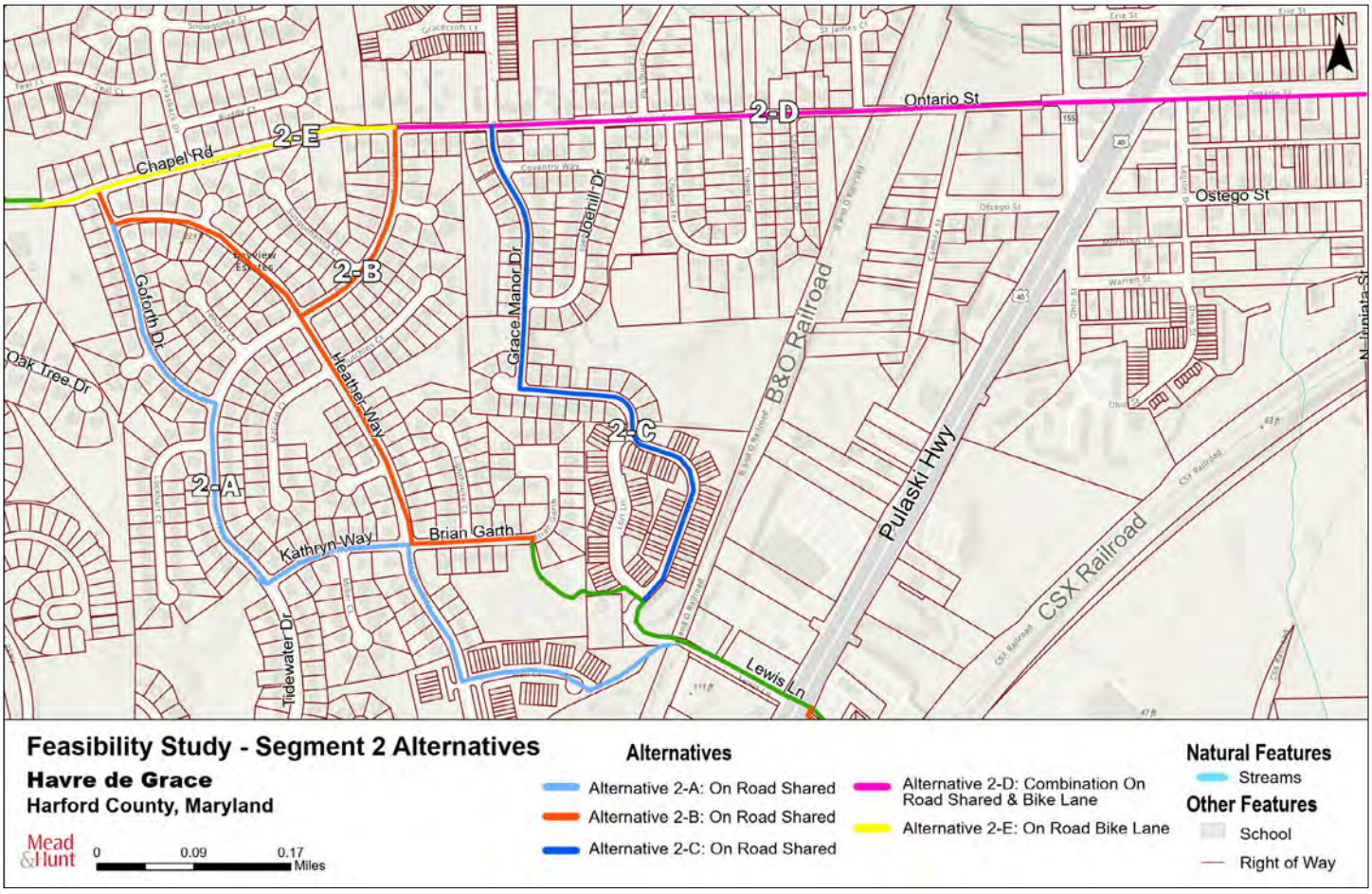


Figure 30: Segment 2 Alternatives

4. Alignment Alternatives Evaluated

Segment 3: Pulaski Highway to Revolution Street

This Segment allows for the completed connection from "Uptown" to "Downtown" segments of Havre de Grace.

Alignment 3-A runs from Pulaski Highway on Lewis Lane to Revolution Street, then on Revolution Street to S Juniata Street. This alignments typical section is a standard 5-ft bike lane and allows for utilizing existing roadway infrastructure, lowering construction costs and right-of-way acquisition. Installation could include signage, wayfinding, and pavement marking. Defining the driving lane and bike lanes will allow for traffic calming. Adding the bike lane creates a buffer for the sidewalk.

Alignment 3-B can be considered in two parts. The first park runs from Brian Garth along Lewis Lane to Pulaski Highway. The typical section would be a 10 foot wide off road path. Existing concrete sidewalk would be removed and replaced with asphalt to create a smoother riding surface.

Both of these alternatives further expand on the existing off road path that runs through the school property to Lewis Lane, connecting neighborhoods to schools. From there, Revolution Street (MD-7A) on road bike lanes connect to the slower streets of the City's downtown.

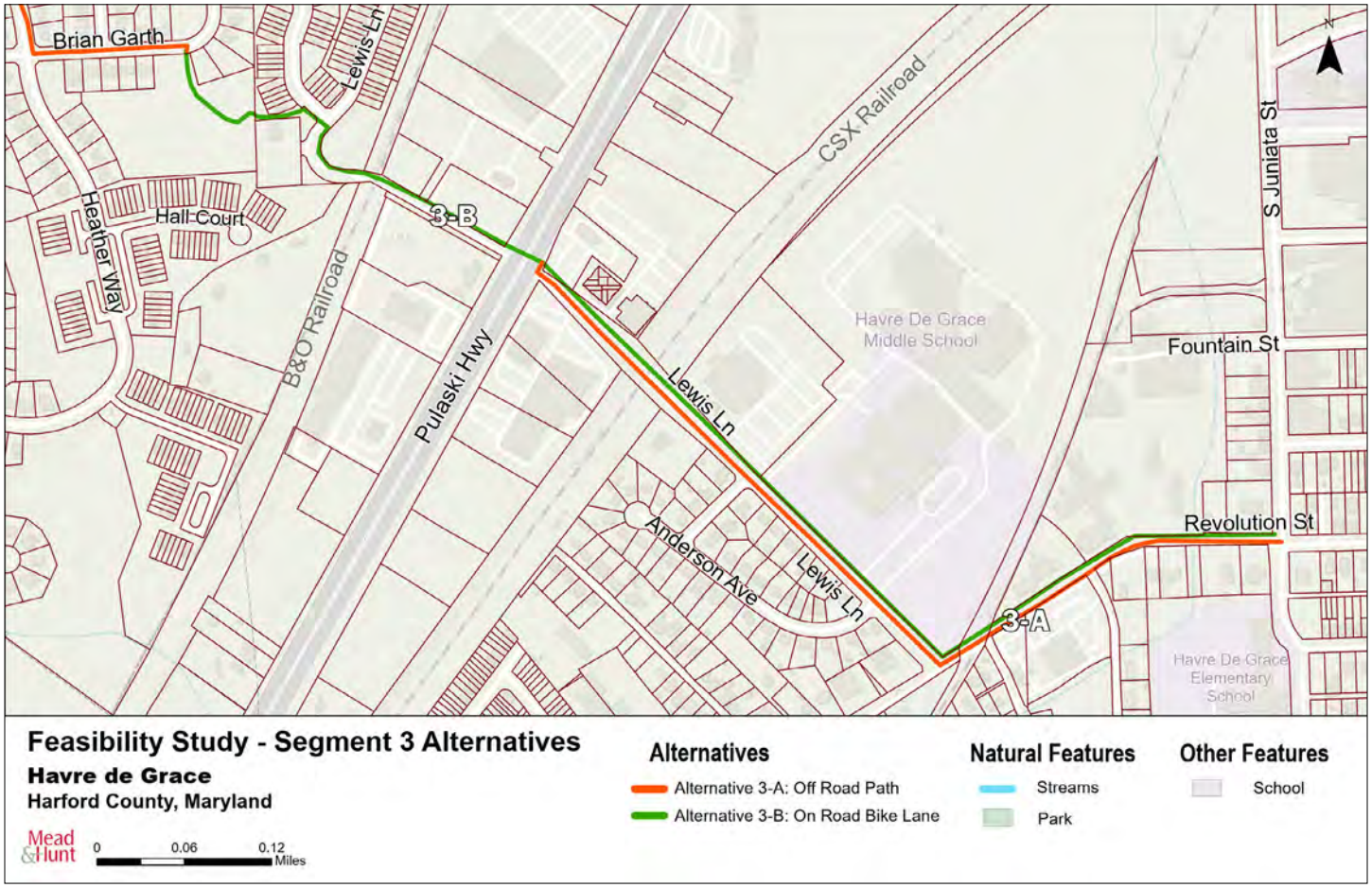


Figure 31: Segment 3 Alternatives

4. Alignment Alternatives Evaluated

Environmental Effects of Recommended Alternatives

Every infrastructure project has near-term construction impacts and long-term impacts. The U.S. Council on Environmental Quality regulations describe the following hierarchy to address those impacts:

- Avoid an impact by not taking a certain action or parts of an action.
- Minimize an impact by limiting the degree or magnitude of the action and its implementation.
- Rectify an impact by repairing, rehabilitating, or restoring the affected environment.
- Reduce or eliminate an impact over time, through preservation and maintenance operations during the life of the action.
- Compensate for an impact by replacing or providing substitute resources or environments.

To identify and assess the potential impacts of the preferred alternative, a desktop analysis was conducted with readily available public datasets, along with limited windshield surveys and field walks with the project team. A 100-ft study area, centered over the proposed pathway alignment, was defined as the area of maximum potential effect. At future design stages, field surveys and additional data collection will be necessary to refine and/or enhance the information presented below. Based on the desktop analysis, it appears that the following regulations are likely to be triggered:

- **Stormwater Management.** Any land disturbance greater than 5,000 square-ft must mitigate both the quantity and quality impacts of additional impervious surface. Compliance is managed by the City of Havre de Grace and it is assumed that the requirements for stormwater management will be triggered.
- **Forest Conservation.** Construction of the segment along Chapel Road between Go Forth Way and the Bulle Rock roundabout may exceed the one-acre tree clearing threshold at which Forest Conservation Act is triggered. In addition to the general requirements, there is a forest conservation easement associated with the Scenic Manor Subdivision between Vista Bay Court and the unnamed stream just east thereof. The easement will need to be amended and a suitable one-for-one replacement identified. It appears that there are several forested areas within the subdivision or adjacent subdivisions that are not encumbered but which could be.
- **Streams, Wetlands, and Waters of the United States.** The recommended alignment does not encroach upon wetlands; however, along Chapel Road just east of Vista Bay Court, there is a crossing of an unnamed stream. Due to the topography, final design of the trail may be able to prevent necessary mitigation measures due to land disturbance. This is a short crossing and it is recommended that a separate bicycle and pedestrian bridge be accommodated here.

5. Evaluation & Recommended Alignment

Recommended Alignment

The corridor is broken down into 3 segments starting from Level Road (MD-155) and progressing to S Juniata Street, connecting the "Downtown" historic core to the "Uptown" residential communities.

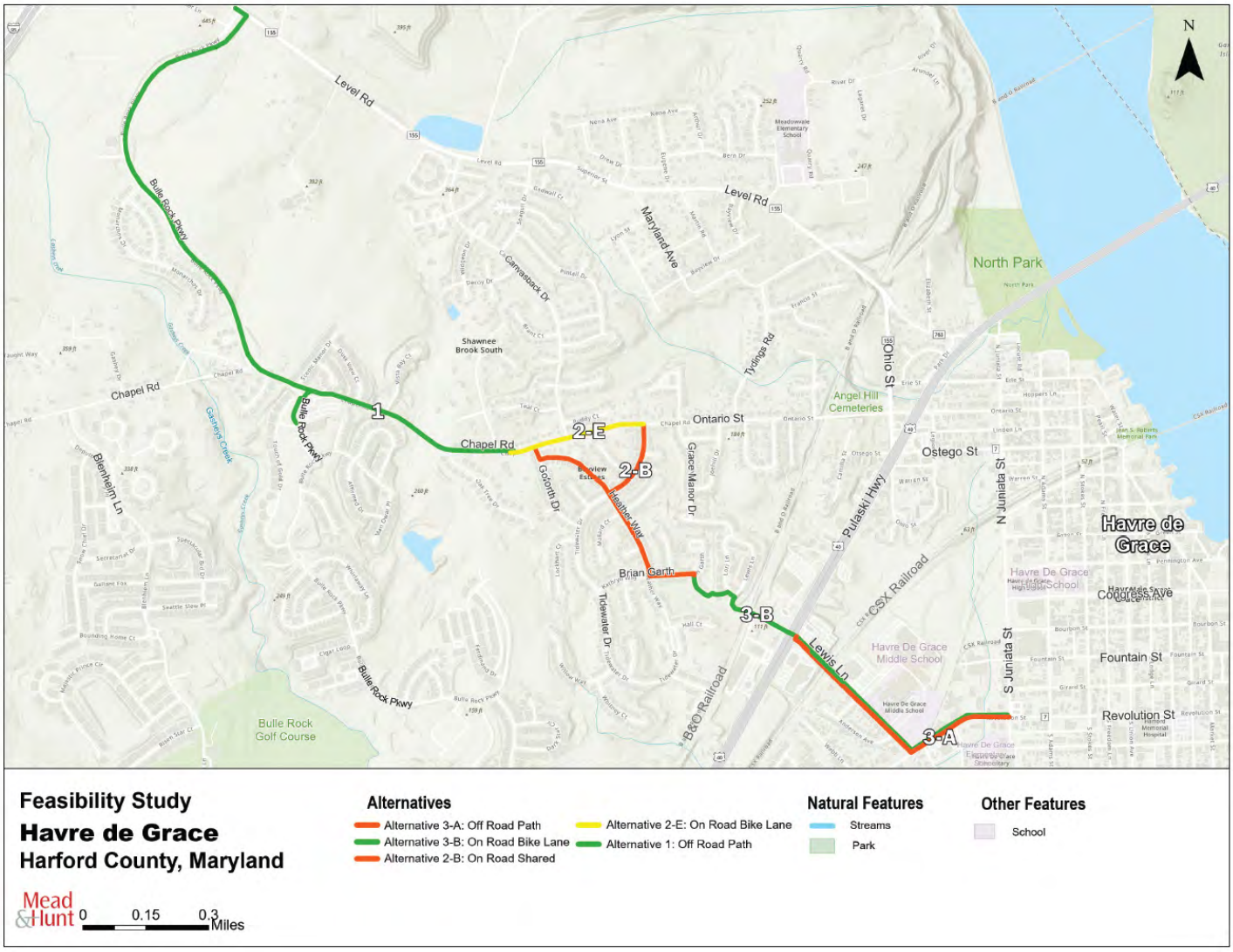


Figure 32: Recommended Alternative

After careful consideration of the opportunities and challenges to create a dedicated bicycle facility west of US 40, it is recommended that a hybrid facility be constructed as shown in Figure 32. Between MD155 (Level Road) and Shawnee Brook Drive, an off-street pathway appears to be viable. Through the Tidewater and Grace Manor subdivisions, bicyclists would need to share the road with vehicles until reaching a greenway between Brian Garth Road and Lewis Lane. At Lewis Lane, a marked and buffered bike lane is feasible across US 40 to Revolution Street; however, a shared use path may also be viable. Additional discussion of the preferred alternative is provided below.

5. Evaluation & Recommended Alignment

The proposed Havre de Grace "Uptown" connection is an incredibly challenging project whether in the form of the recommended alternative alignment or through any of the alternatives considered. Returning to the evaluation criteria for the project, the following findings are offered.

Safety and User Experience

Is the alignment segment suitable to users of all ages and abilities through separation from auto traffic? Are vertical grades comfortable? Does the segment provide scenic views and access to natural environmental features? Is there a location for a trail head and parking?

Finding #1: Achieving full separation from traffic (ie. a shared use pathway or sidepath) is difficult in the existing built environment and should be the top priority when advancing the final alignment, even though full separation does come with its own challenges. Full separation can be achieved for:

- Those portions of Segment 3-A along the high school frontage between Revolution Street and the Amtrak bridge and in the connection from Lewis Lane to Brian Garth along the stormwater pond. It may be possible to achieve full separation along Revolution Street between Lewis Lane and Juniata Street, along existing rail spurs. Further study is required.
- Segment 1 along Chapel Road west of Oak Tree Drive and then along Bulle Rock Parkway to MD 155 Level Road.

Directness and Connectivity

Does the alignment segment provide a reasonably direct connection between (MD-155) Level Road and Revolution Street? Does the segment provide connections to neighborhoods, schools, and points of interest?

Finding #2: The recommended alignment is the most direct and allows for the most community connections to the pathway. Opportunities exist for connections to existing pathways, sidewalks, and future development areas.

Property and Environmental Impacts

Is there sufficient right-of-way along the adjacent roadway or does the alignment necessitate the acquisition of private property? Can the property impacts be minimized or mitigated to the satisfaction of the affected property owner? Are there environmental impacts that would require mitigation (reforestation, stream restoration, etc.)?

Finding #3: To achieve maximum separation from traffic, there are some locations where the acquisition of private property could occur without any material impact to the property owner. Specific examples of property impacts are listed in the table on the next page.

Cost and Constructibility

Are there significant obstacles to be overcome on the alignment that would drive the cost higher (bridges and retaining walls, utility relocation)?

Finding #4: The most difficult and costly construction will be

Segment 1 between Oak Tree Court and Scenic Manor Drive. This ~1000' segment drops ~35' then rises ~40' east to west across an unnamed stream. Approximately 20-ft of tree and brush clearing will be required on the north side of Chapel Road. It is likely that a prefabricated bridge will be needed across the stream, although at one time the City had a culvert widening planned for the stream. If the culvert widening proceeds, then the City should strongly consider sufficient widening to allow for a shared use path to cross it. However, the ideal design would have them separated for safety.

5. Evaluation & Recommended Alignment

Segment	Property	Estimated Impact
3B	911 Revolution Street	4 – 6′ along road frontage
3B	811 Revolution Street	4 – 6′ along road frontage
3B	803 Revolution Street	4 – 6′ along road frontage
3B	801 Revolution Street	4 – 6′ along road frontage
3B	Open Space off Lewis Lane (Havre de Hills HOA)	8′ pathway
3B	Open Space between Lewis Lane and Garth Drive (Bay View HOA)	2 parcels - 8′ pathway for approx. 670 feet
1	Open Space off Teal Court (Grace Harbour HOA)	14 – 18′ along road frontage; may involve utility box relocation
1	Corner of Chapel Road and Shawnee Brooke (Shawnee Brooke (HOA)	14 – 18′ along road frontage
1	1601 Chapel Road	12 – 16′ along road frontage; would require tree removal and fence relocation
1	1604 Algonquin Court	14 – 18′ along rear of property adjacent to Chapel Road, including tree clearing
1	1605 Algonquin Court	14 – 18′ along rear of property adjacent to Chapel Road, including tree clearing
1	Open Space at corner of Vista Bay Court and Scenic Manor Drive	2 parcels on either side of Scenic Manor Drive Depth to be determined, but assume 10 – 12′ along Chapel Road to widen existing asphalt pathway
1	3 subdivision parcels under construction between water tower and Level Road) on east side of Bulle Rock Parkway	To be determined

Appendices/Cost Estimates

Feasibility Study – Havre de Grace Trail (Uptown/Downtown)

Cost Estimates

SHARED-USE PATH CONCEPT COST ESTIMATER Summary: Havre de Grace Uptown						
		Computed By:	AP	Checked By:		
		Date:	10/14/2024	Date:		
	Segment 1 Off Road Path	Segment 2 Shared Roadway	Segment 2 Alt E Standard Bike Lanes	Segment 3 Alt A Standard Bike Lanes	Segment 3 Alt B Off Road Path	
CONSTRUCTION ACTIVITIES	COST	COST	COST	COST	COST	NOTES:
	$1,032,000	$164,000	$3,000	$188,000	$214,000	Subtotal 1
STRUCTURES	COST	COST	COST	COST	COST	NOTES:
	$125,000	$0	$0	$0	$955,000	Subtotal 2
CONTINGENT CATEGORIES	COST	COST	COST	COST	COST	NOTES:
	$683,000	$43,000	$600	$73,000	$421,000	Subtotal 3
CONSTRUCTION COST	COST	COST	COST	COST	COST	NOTES:
	$3,294,000	$370,000	$5,000	$466,000	$2,846,000	Subtotal 4
DESIGN, PERMITTING & CONSTRUCTION MANAGEMENT	COST	COST	COST	COST	COST	NOTES:
	$989,000	$37,000	$2,000	$140,000	$854,000	Subtotal 5
TOTAL SEGMENT COST	COST	COST	COST	COST	COST	
	$6,123,000	$614,000	$10,600	$867,000	$5,290,000	Total Cost

Segment 1: Bulle Rock Parkway

SHARED-USE PATH CONCEPT COST ESTIMATER						
Project: : Havre de Grace Uptown			**Computed By:**	AP	**Checked By:**	
Segment: Segment 1: Bulle Rock Parkway			**Date:**	10/14/2024	**Date:**	
Length (Miles)	1.2					
Width (feet)	10					
Total Linear Ft.	6,242					
Total Square Ft.	62,417				Widen Shoulder	
CONSTRUCTION ACTIVITIES	**Alt A**		**COST PER**	**UNIT**	**COST Alt A**	**NOTES:**
Top Soil (2" Depth)	8,322		$ 17	SY	$141,478	6' Either Side
Soil Stabilization	8,322		$ 7	SY	$58,256	
Asphalt Pavement	62,417		$ 10	SF	$624,168	
ADA Ramps	18		$ 3,700	EA	$66,600	
Concrete Driveway Apron	5		$ 106	SF	$79,500	at every driveway
Concrete Curb and Gutter	360		$ 58	LF	$20,880	
Lane Striping	1,000		$ 2	LF	$2,000	5" Thermoplastic
Crosswalk	514		$ 32	LF	$16,448	
Bollard (Precast Concrete)	1		$ 800	EA	$800	At every road crossing
Refuge Island	2		$ 54	LF	$108	~5' Width
Trail Gateway/Wayside Areas	1		$ 15,500	EA	$15,500	
Bench	2		$ 2,300	EA	$4,600	
Fence	0		$ 58	LF	$0	
Gate	0		$ 4,120	EA	$0	
Traffic Sign	16		$ 52	EA	$832	
Stop Bar	24		$ 22	LF	$528	
Bike Lane Markings	0		$ 26	EA	$0	
Flex Post	0		$ 62	EA	$0	Recommend 10' to 15' On Center
Lighting	0		$ 4,250	EA	$0	At every road crossing
					$1,031,698	**Subtotal 1**
STRUCTURES					**COST**	**NOTES:**
Bridge	1		$ 120,000	LS	$120,000	Engineers Concept Estimate
Boardwalk	40		$ 120	LF	$4,800	
Retaining Wall	0		$ 25	SF	$0	Precast modular block up to 3' Height
					$124,800	**Subtotal 2**
CONTINGENT CATEGORIES					**COST**	**NOTES:**
Mobilitation / MOT	10%	(5% to 20% depending on complexity)			$115,650	Percent of Subtotal 1 & 2
Erosion / Sediment Control	10%	(5% to 10% depending on complexity)			$115,650	Percent of Subtotal 1 & 2
Drainage and SWM	20%	(10% to 30% depending on complexity)			$231,300	
Traffic Markings and Signage	2%	(1% to 5% depending on complexity)			$23,130	Percent of Subtotal 1 & 2
Utilities and Conduit	1%	(1% to 10% depending on complexity)			$11,565	Percent of Subtotal 1 & 2
Landscape Enhancements	15%	(2% to 15% depending on complexity)			$173,475	
Environmental Mitigation	1%	(1% to 15% depending on complexity)			$11,565	
					$682,334	**Subtotal 3**
CONSTRUCTION COST					**COST**	**NOTES:**
Neat Construction Cost					$1,838,831	Sum of Subtotals 1, 2 and 3
Construction Contingency	50%				$919,416	
Escalation	19.4%	(Add 3% per year from 2024 to 2030)			$535,100	
					$3,293,347	**Subtotal 4**
DESIGN, PERMITTING & CONSTRUCTION MANAGEMENT					**COST**	**NOTES:**
Preliminary Design	5.0%	(5% to 10% depending on complexity)			$164,667	
Environmental Permitting	5.0%	(5% to 10% depending on complexity)			$164,667	
Final Design	10.0%	(10% to 15% depending on complexity)			$329,335	
Construction Management	10.0%	(10% to 15% depending on complexity)			$329,335	
					$988,004	**Subtotal 5**
TOTAL SEGMENT COST					**COST**	
					$6,120,183	**Total Cost**
					$5,202,155.27	
					$7,038,210.08	

Segment 2: Subdivisions

SHARED-USE PATH CONCEPT COST ESTIMATER								
Project: : Havre de Grace Uptown				**Computed By:**		**AP**	**Checked By:**	
Segment: Segment 2: Subdivisions				**Date:**		**10/14/2024**	**Date:**	
Length (Miles)	0.23							
Width (feet)	10							
Total Linear Ft.	1,235	LF						
Total Square Ft.	12,350	SF					**Shared Roadway**	
CONSTRUCTION ACTIVITIES				**COST PER**		**UNIT**	**COST**	**NOTES:**
Top Soil (2" Depth)	1,647			$ 17		SY	$27,994	6' Either Side
Soil Stabilization	1,647			$ 7		SY	$11,527	
Asphalt Pavement	12,350			$ 10		SF	$123,501	5' width Shoulder 184+50 to 201+50
ADA Ramps	0			$ 3,700		EA	$0	
Concrete Driveway Apron	0			$ 106		SF	$0	at every driveway
Concrete Curb and Gutter	0			$ 58		LF	$0	
Lane Striping	0			$ 2		LF	$0	5" Thermoplastic
Crosswalk	0			$ 32		LF	$0	
Bollard (Precast Concrete)	0			$ 800		EA	$0	At every road crossing
Refuge Island	0			$ 54		LF	$0	~5' Width
Trail Gateway/Wayside Areas	0			$ 15,500		EA	$0	
Bench	0			$ 2,300		EA	$0	
Fence	0			$ 58		LF	$0	
Gate	0			$ 4,120		EA	$0	
Traffic Sign	14			$ 52		EA	$728	
Stop Bar	0			$ 22		LF	$0	
Bike Lane Markings	0			$ 26		EA	$0	
Flex Post	0			$ 62		EA	$0	Recommend 10' to 15' On Center
Lighting	0			$ 4,250		EA	$0	At every road crossing
							$163,749	**Subtotal 1**
STRUCTURES							**COST**	**NOTES:**
Bridge	0			$ 120,000		LS	$0	Engineers Concept Estimate
Boardwalk	0			$ -		LS	$0	
Retaining Wall	0			$ 25		SF	$0	Precast modular block up to 3' Height
							$0	**Subtotal 2**
CONTINGENT CATEGORIES							**COST**	**NOTES:**
Mobilitation / MOT	5%	(5% to 20% depending on complexity)					$8,187	Percent of Subtotal 1 & 2
Erosion / Sediment Control	5%	(5% to 10% depending on complexity)					$8,187	Percent of Subtotal 1 & 2
Drainage and SWM	10%	(10% to 30% depending on complexity)					$16,375	
Traffic Markings and Signage	2%	(1% to 5% depending on complexity)					$3,275	Percent of Subtotal 1 & 2
Utilities and Conduit	1%	(1% to 10% depending on complexity)					$1,637	Percent of Subtotal 1 & 2
Landscape Enhancements	2%	(2% to 15% depending on complexity)					$3,275	
Environmental Mitigation	1%	(1% to 15% depending on complexity)					$1,637	
							$42,575	**Subtotal 3**
CONSTRUCTION COST							**COST**	**NOTES:**
Neat Construction Cost							$206,324	Sum of Subtotals 1, 2 and 3
Construction Contingency	50%						$103,162	
Escalation	19.4%	(Add 3% per year from 2024 to 2030)					$60,040	
							$369,527	**Subtotal 4**
DESIGN, PERMITTING & CONSTRUCTION MANAGEMENT							**COST**	**NOTES:**
Preliminary Design	5.0%	(5% to 10% depending on complexity)					$18,476	
Environmental Permitting	5.0%	(5% to 10% depending on complexity)					$18,476	
Final Design	10.0%	(10% to 15% depending on complexity)					$36,953	
Construction Management	10.0%	(10% to 15% depending on complexity)					$36,953	
							$110,858	**Subtotal 5**
TOTAL SEGMENT COST							**COST**	
							$686,709	**Total Cost**

Segment 2-E: Chapel Road

SHARED-USE PATH CONCEPT COST ESTIMATER							
Project: : Havre de Grace Uptown			**Computed By:**		**AP**	**Checked By:**	
Segment: Segment 2-E Chapel Road			**Date:**		**10/14/2024**	**Date:**	
Length (Miles)	2.3						
Width (feet)	0						
Total Linear Ft.		12,100 LF					
Total Square Ft.		0 SF				**Marking & Signage**	
CONSTRUCTION ACTIVITIES			**COST PER**		**UNIT**		**NOTES:**
Top Soil (2" Depth)	0		$ 17		SY	$0	
Soil Stabilization	0		$ 7		SY	$0	
Asphalt Pavement	0		$ 10		SF	$0	
ADA Ramps	0		$ 3,700		EA	$0	
Concrete Driveway Apron	0		$ 106		SF	$0	
Concrete Curb and Gutter	0		$ 58		LF	$0	
Lane Striping	0		$ 2		LF	$0	5" Thermoplastic
Crosswalk	0		$ 32		LF	$0	
Bollard (Precast Concrete)	0		$ 800		EA	$0	
Refuge Island	0		$ 54		LF	$0	
Trail Gateway/Wayside Areas	0		$ 15,500		EA	$0	
Bench	0		$ 2,300		EA	$0	
Fence	0		$ 58		LF	$0	
Gate	0		$ 4,120		EA	$0	
Traffic Sign	8		$ 52		EA	$416	
Stop Bar	48		$ 22		LF	$1,056	
Bike Lane Markings	22		$ 26		EA	$572	
Flex Post	0		$ 62		EA	$0	
Lighting	0		$ 4,250		EA	$0	
						$2,044	**Subtotal 1**
STRUCTURES						**COST**	**NOTES:**
Bridge	0		$ 120,000		LS	$0	Engineers Concept Estimate
Boardwalk	0		$ 120		LF	$0	
Retaining Wall	0		$ 25		SF	$0	Precast modular block up to 3' Height
						$0	**Subtotal 2**
CONTINGENT CATEGORIES						**COST**	**NOTES:**
Mobilitation / MOT	5%	(5% to 20% depending on complexity)				$102	Percent of Subtotal 1 & 2
Erosion / Sediment Control	5%	(5% to 10% depending on complexity)				$102	Percent of Subtotal 1 & 2
Drainage and SWM	10%	(10% to 30% depending on complexity)				$204	
Traffic Markings and Signage	1%	(1% to 5% depending on complexity)				$20	Percent of Subtotal 1 & 2
Utilities and Conduit	1%	(1% to 10% depending on complexity)				$20	Percent of Subtotal 1 & 2
Landscape Enhancements	2%	(2% to 15% depending on complexity)				$41	
Environmental Mitigation	1%	(1% to 15% depending on complexity)				$20	
						$511	**Subtotal 3**
CONSTRUCTION COST						**COST**	**NOTES:**
Neat Construction Cost						$2,555	Sum of Subtotals 1, 2 and 3
Construction Contingency	50%					$1,278	
Escalation	19.4%	(Add 3% per year from 2023 to 2029)				$744	
						$4,576	**Subtotal 4**
DESIGN, PERMITTING & CONSTRUCTION MANAGEMENT						**COST**	**NOTES:**
Preliminary Design	5.0%	(5% to 10% depending on complexity)				$229	
Environmental Permitting	5.0%	(5% to 10% depending on complexity)				$229	
Final Design	10.0%	(10% to 15% depending on complexity)				$458	
Construction Management	10.0%	(10% to 15% depending on complexity)				$458	
						$1,373	**Subtotal 5**
TOTAL SEGMENT COST						**COST**	
						$8,504	**Total Cost**
						$7,228.24	
						$9,779.38	

Segment 3: Lewis Lane & Revolution Street

SHARED-USE PATH CONCEPT COST ESTIMATER

Project:	: Havre de Grace			**Computed By:**	AP	**Checked By:**		
Segment:	Phase 3: Lewis Ln & Revolution St			**Date:**	10/14/2024	**Date:**		
Length (Miles)	0.09							
Width (feet)	10							
Total Linear Ft.	457	LF						
Total Square Ft.	4,569	SF						
						Shared Roadway	Off Road Path	
CONSTRUCTION ACTIVITIES				**COST PER**	**UNIT**	**COST Alt A**	**COST Alt B**	**NOTES:**
Top Soil (2" Depth)	609	609		$ 17	SY	$10,356	$10,356	6' Either Side
Soil Stabilization	609	609		$ 7	SY	$4,264	$4,264	
Asphalt Pavement	4,569	4,569		$ 10	SF	$45,687	$45,687	5' Shoulder
ADA Ramps	8	8		$ 3,700	EA	$29,600	$29,600	
Concrete Driveway Apron	0	0		$ 106	SF	$0	$0	at every driveway
Concrete Curb and Gutter	113	957		$ 58	LF	$6,554	$55,506	
Lane Striping	22,055	9,371		$ 2	LF	$44,110	$18,742	5" Thermoplastic
Crosswalk	559	797		$ 32	LF	$17,888	$25,504	
Bollard (Precast Concrete)	2	2		$ 800	EA	$1,600	$1,600	At every road crossing
Refuge Island	2	0		$ 54	LF	$3,240	$0	
Trail Gateway/Wayside Areas	1	1		$ 15,500	EA	$15,500	$15,500	
Bench	2	2		$ 2,300	EA	$4,600	$4,600	
Fence	0	0		$ 58	LF	$0	$0	
Gate	0	0		$ 4,120	EA	$0	$0	
Traffic Sign	17	17		$ 52	EA	$884	$884	
Stop Bar	48	0		$ 22	LF	$1,056	$0	
Bike Lane Markings	64	45		$ 26	EA	$1,664	$1,170	
Flex Post	0	0		$ 62	EA	$0	$0	
Concrete Sidewalk	0	0		$ 20	SF	$0	$0	
Lighting	0	0		$ 4,250	EA	$0	$0	At every road crossing
						$187,003	$213,413	**Subtotal 1**
STRUCTURES						**COST**	**COST**	**NOTES:**
Bridge	0	1		$ 900,000	LS	$0	$900,000	Pedestrian Bridge over Amtrak
Boardwalk	0	0		$ 120	LF	$0	$0	
Retaining Wall	0	2200		$ 25	SF	$0	$55,000	Precast modular block up to 3' Height
						$0	$955,000	**Subtotal 2**
CONTINGENT CATEGORIES						**COST**	**COST**	**NOTES:**
Mobilitation / MOT	5%	5%	(5% to 20% depending on complexity)			$9,350	$58,421	Percent of Subtotal 1 & 2
Erosion / Sediment Control	5%	5%	(5% to 10% depending on complexity)			$9,350	$58,421	Percent of Subtotal 1 & 2
Drainage and SWM	20%	20%	(10% to 30% depending on complexity)			$37,401	$233,683	
Traffic Markings and Signage	2%	2%	(1% to 5% depending on complexity)			$3,740	$23,368	Percent of Subtotal 1 & 2
Utilities and Conduit	1%	1%	(1% to 10% depending on complexity)			$1,870	$11,684	Percent of Subtotal 1 & 2
Landscape Enhancements	5%	2%	(2% to 15% depending on complexity)			$9,350	$23,368	
Environmental Mitigation	1%	1%	(1% to 15% depending on complexity)			$1,870	$11,684	
						$72,931	$420,629	**Subtotal 3**
CONSTRUCTION COST						**COST**	**COST**	**NOTES:**
Neat Construction Cost						$259,934	$1,589,041	Sum of Subtotals 1, 2 and 3
Construction Contingency	50%					$129,967	$794,521	
Escalation	19.4%		(Add 3% per year from 2023 to 2029)			$75,641	$462,411	
						$465,542	$2,845,973	**Subtotal 4**
DESIGN, PERMITTING & CONSTRUCTION MANAGEMENT						**COST**	**COST**	**NOTES:**
Preliminary Design	5.0%		(5% to 10% depending on complexity)			$23,277	$142,299	
Environmental Permitting	5.0%		(5% to 10% depending on complexity)			$23,277	$142,299	
Final Design	10.0%		(10% to 15% depending on complexity)			$46,554	$284,597	
Construction Management	10.0%		(10% to 15% depending on complexity)			$46,554	$284,597	
						$139,663	$853,792	**Subtotal 5**
TOTAL SEGMENT COST						**COST**	**COST**	
						$865,138	$5,288,807	**Total Cost**
						$735,367.43	$4,495,485.69	
						$994,908.88	$6,082,127.70	

Appendices/Conceptual Plan Set

Feasibility Study – Havre de Grace Trail (Uptown/Downtown)