

# NEWPORT RIVER TRAIL FEASIBILITY STUDY

June 2020





# NEWPORT RIVER TRAIL FEASIBILITY STUDY

Prepared for the  
Town of Newport, Delaware

In association with  
Delaware Greenways  
New Castle County Executive's Office  
New Castle County Department of Land Use  
New Castle County Department of Public Works  
Harvey, Hanna & Associates, Inc.

Additional funding provided by  
Delaware Bicycle Council

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*Cover:  
Artist's rendering courtesy of  
Harvey Hanna & Associates, Inc.*

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FEASIBILITY STUDY**

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## INTRODUCTION

The desire to connect downtown Newport to the Wilmington Riverfront by trail has been envisioned for many years. With the completion of the Jack A. Markell Trail, this connection moved one step closer to reality.

The Jack A. Markell Trail, now commonly known as the “JAM Trail,” serves as a critical spine in the local and regional trail network. Connecting the cities of Wilmington and New Castle, the trail extends approximately seven miles along portions of the abandoned New Castle Industrial Track rail line. This iconic trail not only provides critical connections to popular destinations including the Wilmington Riverfront, the DuPont Environmental Education Center (DEEC), the Christina River, and historic New Castle, but also provides a viable transportation alternative for commuters to downtown Wilmington. After several initial phases were constructed through various funding sources, the final connection was completed in 2018. This last phase included a signature bridge across the Christina River and an elevated boardwalk through the Russell W. Peterson Wildlife Refuge to the DEEC and Wilmington Riverfront. Recent pedestrian and bicycle counts along the trail highlight the tremendous success of the trail and the potential for thousands of users to utilize a future spur to downtown Newport: the Newport River Trail.

The Newport River Trail aims to build upon a growing trend to form private and public partnerships for planning and funding transportation infrastructure projects. In the pre-planning stages of this project, the project team recognized that bringing local developers, landowners, and public entities to the table would be critical for this project to move forward with the understanding that traditional government funding may not be sufficient to build and maintain a project of this magnitude. Both private and public entities can experience financial benefits of the trail including increased employment,

redevelopment, construction spending, real estate taxes, bicycle tourism, eco-tourism, and potential for property value increases. Most critically for this project, the trail will enhance the anticipated mixed-use redevelopment of downtown Newport. Shared long-term maintenance responsibilities will also be a critical component of the public / private relationship for the successful development of the Newport River Trail.

On a broader connectivity scale, the Newport River Trail will provide a direct connection to the East Coast Greenway via the JAM Trail. The East Coast Greenway is a walking and bicycling route stretching 3,000 miles from Maine to Florida. It is designed to transform the communities it connects through active and healthy lifestyles, sustainable transportation, community engagement, climate resilience, tourism, and more. Although not anticipated to be part of the main East Coast Greenway route, the Newport River Trail will meet the objectives of the Greenway to offer a safe place for bicyclists, walkers, runners, and more — of all ages and abilities — to commute, exercise, and visit new destinations.

Delaware Greenways included the Newport River Trail within the Future Trails of Northern Delaware effort to re-define the way trails are developed in Delaware. Further promotion of the Newport River Trail has been identified as part of New Castle County’s Connecting Communities Initiative. According to the County, “Connecting Communities is a collaborative effort to build new trail and pathway connections between places where people live, work and recreate. These connections will improve safety for walkers and bikers, provide new transportation options and support public health.”

***Funding for this study was provided by the Delaware Bicycle Council through a Cycling Innovation Grant, as well as by the Town of Newport.***

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### Purpose of the study

The purpose of the study is to address the feasibility of a trail connection between the Town of Newport and the JAM Trail. Connecting the recently completed JAM Trail to the Town of Newport will provide a low-stress transportation and recreational alternative to access highly populated areas in New Castle County including the Town of Newport, the Wilmington Riverfront, and historic New Castle. The creation of this trail will continue to enhance Delaware's trail network for both transportation and recreation use. The connections will provide access to parks, open space, river viewsheds, and wildlife areas.

Additionally, the trail connection will provide direct access for a larger population to the DEEC, further contributing to the mission of the Alliance for Watershed Education “to provide education and recreational opportunities that inspire personal conservation action, improve water quality, strengthen community ties, and increase access to trails and waterways.” (William Penn Foundation).

This trail link poses significant challenges such as an alignment along the Christina River, traversing over and through tidal and non-tidal wetlands, potential impacts to private industrial property, existing in-service rail lines, and major utility clearance requirements.

The National Environmental Policy Act of 1969 (NEPA) requires that formal environmental documentation be prepared when Federal funds are used for any undertaking that may affect the environment. A project of this size will almost certainly require Federal funding. This document is a precursor to the NEPA process and does not include necessary elements for environmental approval. The Recommended Alignment section provides an overview of next steps, including completion of environmental documentation, to proceed with the project.

### Project advisory committee

To guide the course of the study, an advisory committee was composed of the following organizations:

- Town of Newport (lead agency)
- Delaware Greenways
- New Castle County Executive's Office
- New Castle County Department of Public Works
- New Castle County Department of Land Use
- Harvey, Hanna & Associates, Inc.



**Figure 1.** Amtrak access road.



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### Stakeholder meetings

The advisory committee met twice during the course of the study. The first meeting was held on March 11, 2019 at the Wilmington office of project consultant Whitman, Requardt & Associates, LLP (WRA). This kickoff meeting was held to provide an overview of the project's goals and to discuss initial findings. The attendees indicated their organizations' reasons why this project should move forward. In general, it was agreed that the Newport River Trail will not only provide an important transportation and recreational route between Wilmington and Newport, it will serve a significant economic development purpose as well.

Preliminary discussions with Harvey, Hanna & Associates, Inc. (HHA) prior to this meeting indicated their willingness to allow the use of privately-owned property within the industrial park and along the river as a means to connect Newport to the JAM Trail. It was noted that the Amtrak operates an access road within the right of way of their Northeast Corridor (see Figure 1), which is adjacent to the anticipated trail alignment. A small portion of the access road utilizes property owned by HDC, Inc. (an affiliate of HHA) near the I-95 bridge. Based on prior experience working with Amtrak, the advisory committee agreed that constructing a trail within their right of way is likely not feasible and is not considered as an alternative in this study.

A second advisory committee meeting was held on June 4, 2019 at WRA's office. This meeting served to introduce the design alternatives to the advisory committee. Bike Delaware was also represented. The study team presented concept alignments, structural considerations, and concept level costs of each alternative.

Of primary concern was the significant amount of environmental impacts and the structural requirements required to mitigate resource and right-of-way restrictions. Potential wetland impacts of the blue and orange alignments were discussed. The project team's cursory investigations indicated a mixture of uplands, tidal wetlands, and non-tidal wetlands within the study area. The group discussed the Delaware Department of Natural Resources and Environmental Control's (DNREC's) Wetlands and Subaqueous Lands permit regulations that were encountered during the design of the JAM Trail.

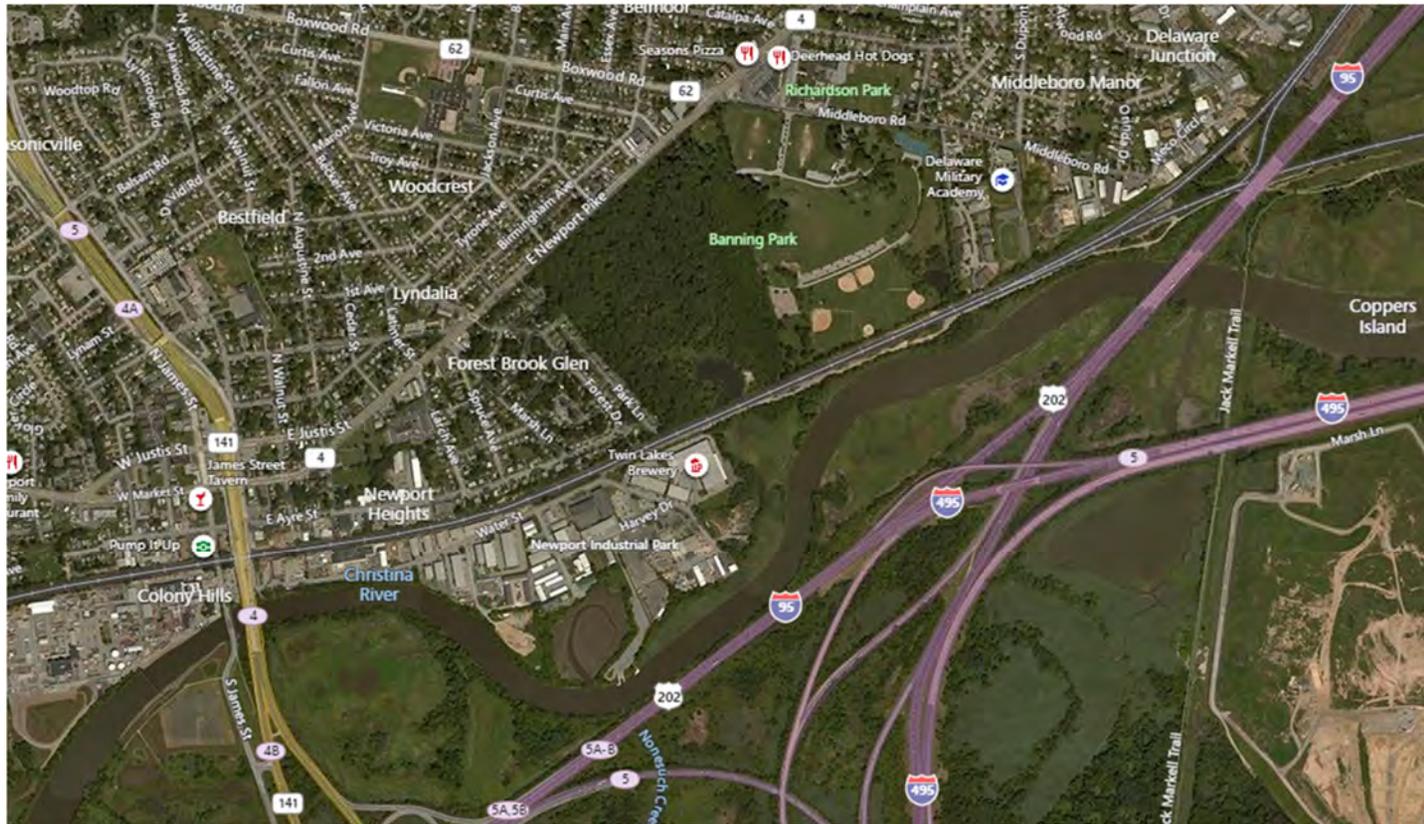
The group highlighted that the orange alignment involves a significant amount of marine structures requiring coordination with adjacent property owners for access, potential extensive DNREC mitigation, and Coast Guard review. All of these factors create an uncertain permitting environment and will likely drive up costs.

The importance of public outreach in the design process and the economic and tourism benefits of the trail were also stressed.

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Figure 2. Overall project study area.



## INVENTORY OF EXISTING CONDITIONS

The study team began the technical aspects of the project by gathering existing information. The limits of the study area are shown in Figure 2.

### Key features

The study area is bounded by significant physical features in the landscape. Immediately adjacent to the proposed alignment, the Christina River flows from west to east. The river is tidal in this area and varies from about 200 to 350 feet in width. Because this portion of the Christina River is navigable, navigation is governed by the U.S. Coast Guard. The documented navigable waterway width is 200 feet.

Further to the south and east, the boundary of the project area is formed by I-95. I-95 was built primarily on fill through the tidal marshes along the Christina in the early 1960s. I-95 and the JAM Trail cross the Christina River at the east end of the study area. The I-95 bridge is more than 20 feet above mean high water (MHW), through its 80-foot spans mean that piers are located within the navigation channel.

The highway was built as close as possible to the river; at some locations the right of way is separated from the

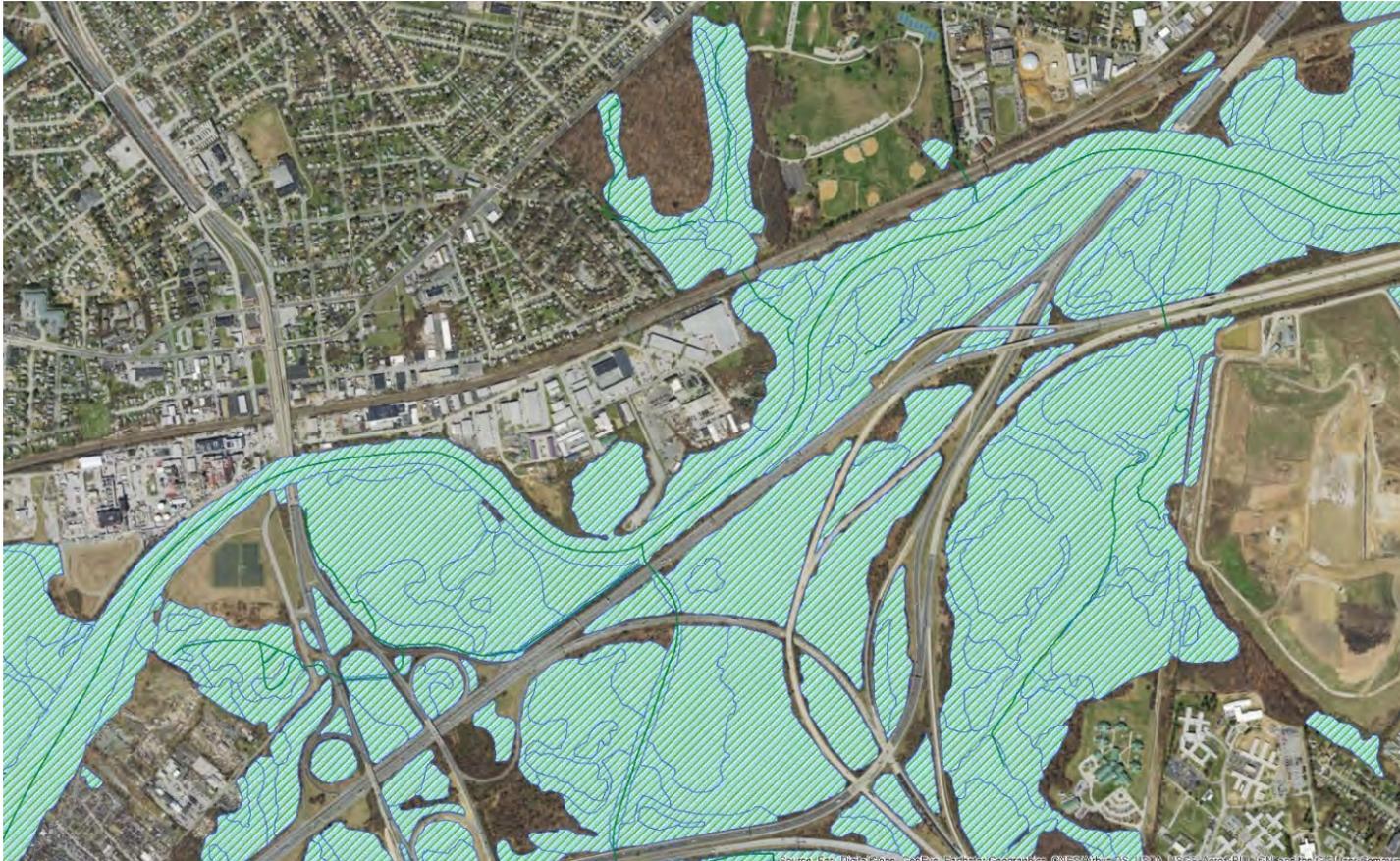
water by only about 30 feet of steep, wooded slope. Tidal marsh occupies those areas where there is greater separation between the road and the river.

The northern boundary of the study area is formed by Amtrak's Northeast Corridor regional rail line and Norfolk Southern's Shellpot Secondary freight line. An access road follows the tracks along the southern edge of the rail, weaving between properties owned by Amtrak and HDC, Inc. (an affiliate of HHA). The rail lines serve as a major physical barrier separating the town of Newport from access to the Christina River and the potential Newport River Trail alignment.

To the west, a large bend in the river encloses the Newport Industrial Park, which is made up of several privately-owned parcels as well as Town of Newport public property including a street network, a large lagoon, and tidal marshlands. The state's Newport Boat Ramp is located in this area. The western edge of the study area is bookended by the Route 141 overpass and the South James Street bridge over the Christina River. South James Street runs north-south and provides vehicular and pedestrian access to downtown Newport. Beyond the South James Street bridge, heavy industrial land uses are immediately adjacent to the north bank of the river.

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**Figure 3.** Statewide wetland mapping indicates both tidal and non-tidal wetlands within the project area.  
(Source: SWMP 2007 Wetlands, Delaware Department of Natural Resources and Environmental Control)



## Wetlands

Given the topography of the study area, there are extensive tidal and non-tidal wetlands located within the area and along the proposed trail alignments. See Figures 3, 4, and 5. In Delaware, tidal wetlands fall under the jurisdiction of DNREC and the U.S. Army Corps of Engineers (USACE). Non-tidal wetlands fall under the jurisdiction of USACE only.

For the purpose of this study, tidal wetland boundaries were identified using DNREC wetland mapping. No detailed wetland delineation was performed. Based on initial research, the following permitting/mitigation requirements will likely apply for tidal wetlands, which form the majority of wetlands in the area:

- DNREC and USACE jurisdiction
- DNREC Wetlands and Subaqueous Lands Permit for permanent “shading” impacts beneath a boardwalk, likely require mitigation
- USACE Nationwide Permit (NWP) 14 (Linear Transportation Projects)
- Mitigation will likely not be required for the USACE for spanning tidal emergent wetlands

The following permitting/mitigation requirements will likely apply to non-tidal wetlands:

- USACE jurisdiction only
- USACE NWP 14; NWP 23 (Categorical Exclusion) would apply if a National Environmental Policy Act (NEPA) document is required, which is likely
- Any non-tidal impacts would be a permanent “conversion” impact if forest is removed and the wetland becomes emergent, thus requiring mitigation for impacts greater than 1/10 acre; an at-grade trail through wetlands would also be a permanent impact requiring mitigation

The following approach to environmental mitigation is anticipated:

- If credits from a private mitigation bank are not available, then onsite or offsite mitigation would be required.
- Depending on cost and benefit, mitigation could be avoided by spanning all non-tidal wetlands and replanting trees in forested wetlands to a minimum 20-foot clearing width.

It should be noted that wetlands were evaluated in a cursory manner, appropriate to the early planning stage of this study. A formal wetland delineation will need to be performed prior to design.

**Figure 4.** Tidal wetlands and riparian buffer width vary within the project area.



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### Flood areas

According to Flood Insurance Rate Maps published by the Federal Emergency Management Agency (see Figure 6), nearly the entire blue alignment falls within a Special Flood Hazard Area. Special Flood Hazard Areas are “subject to inundation by the 1% annual chance flood event. The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year.” Along this portion of the Christina River, FEMA defines the surface of the base flood at an elevation of nine feet above sea level.

Portions of the yellow alignment fall within the 0.2% chance flood (500-year flood) with the majority of the alignment outside of the FEMA flood area.

Construction of a trail in these areas will require New Castle County floodplain permits confirming that the project will not result in an increase in flood elevation.

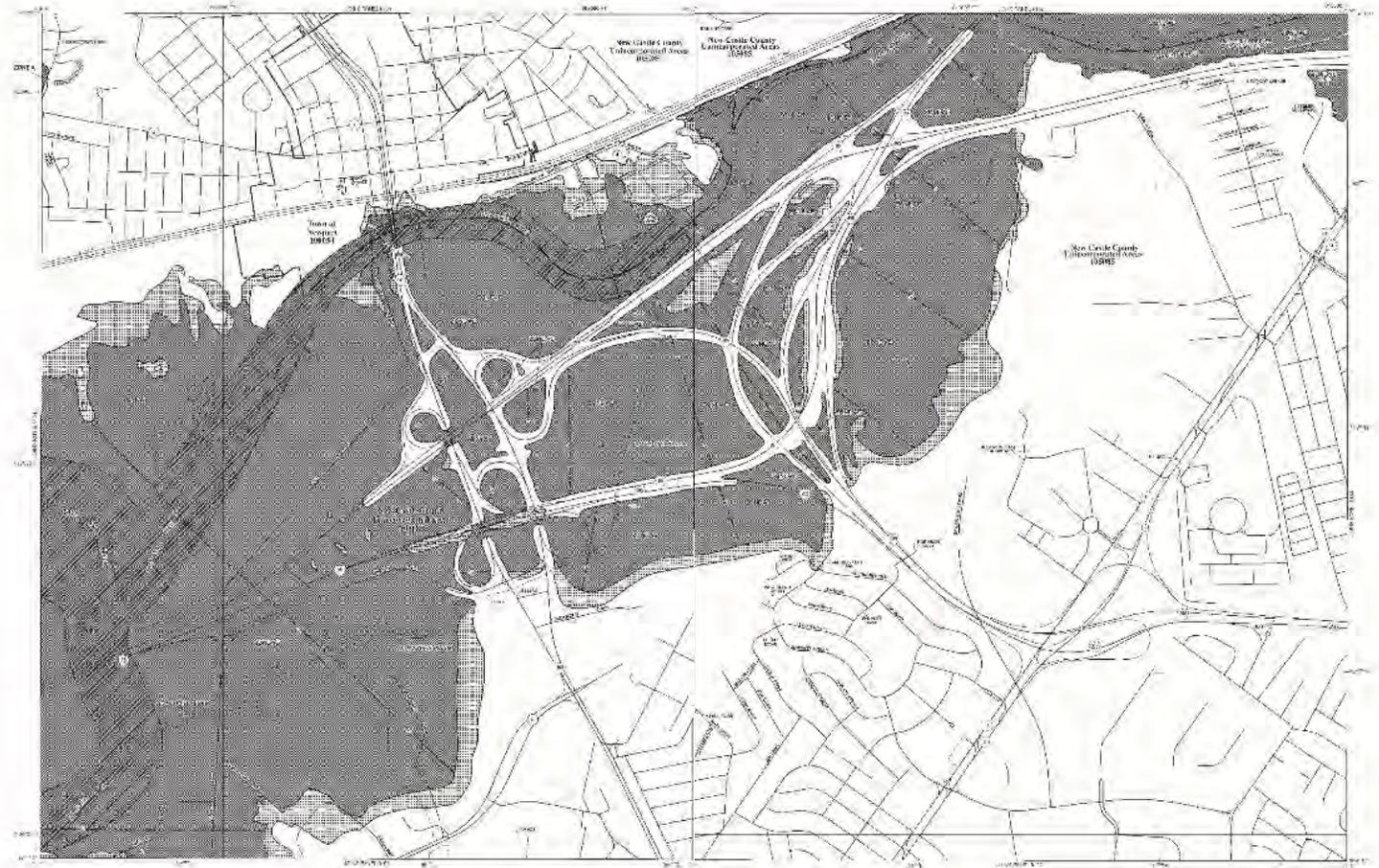
### Land use

Land use in the study area is dominated by the Christina River, previously described roads and railroads, and the developed industrial park. See Figure 7.

**Figure 5.** Railroad culvert and unnamed tributary to the Christina River along the blue alignment.



**Figure 6.** Project area floodplain mapping.  
(Source: FEMA Flood Insurance Rate Maps)



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**Figure 7.** Limited right of way between industrial land and the active right of way of Amtrak's Northeast Corridor.



### Utilities

New Castle County owns and maintains the Christina River Force Main (CRFM), an underground sanitary sewer main varying between 72 and 78 inches in diameter, within the study area. This line runs west-to-east roughly paralleling the Amtrak right of way. The force main is located within an existing utility easement through both privately-owned and public property. The nearly 50-year-old CRFM carries wastewater from a sizable percentage of New Castle County and has no backup, so it cannot be taken out of service. The size, age, and importance of this line indicate that it should be avoided during trail construction. See Figures 8 and 9.

New Castle County has requested a 20-foot minimum offset from the CRFM for boardwalk or elevated structures. This offset may be reduced or eliminated where the trail is proposed to be placed at grade and there is sufficient cover over the line. Due to the significance of the facility, the JAM Trail crosses the CRFM on a long-span bridge and extensive monitoring was required during construction. Similar monitoring is anticipated to be required for the Newport River Trail.

The extent of additional utilities located within the study area is unknown at this time. Further investigation should occur during concept development to identify potential utility conflicts.

**Figure 8.** Christina River Force Main along the north bank of the river.



Figure 9. Approximate location of the Christina River Force Main, shown in purple.



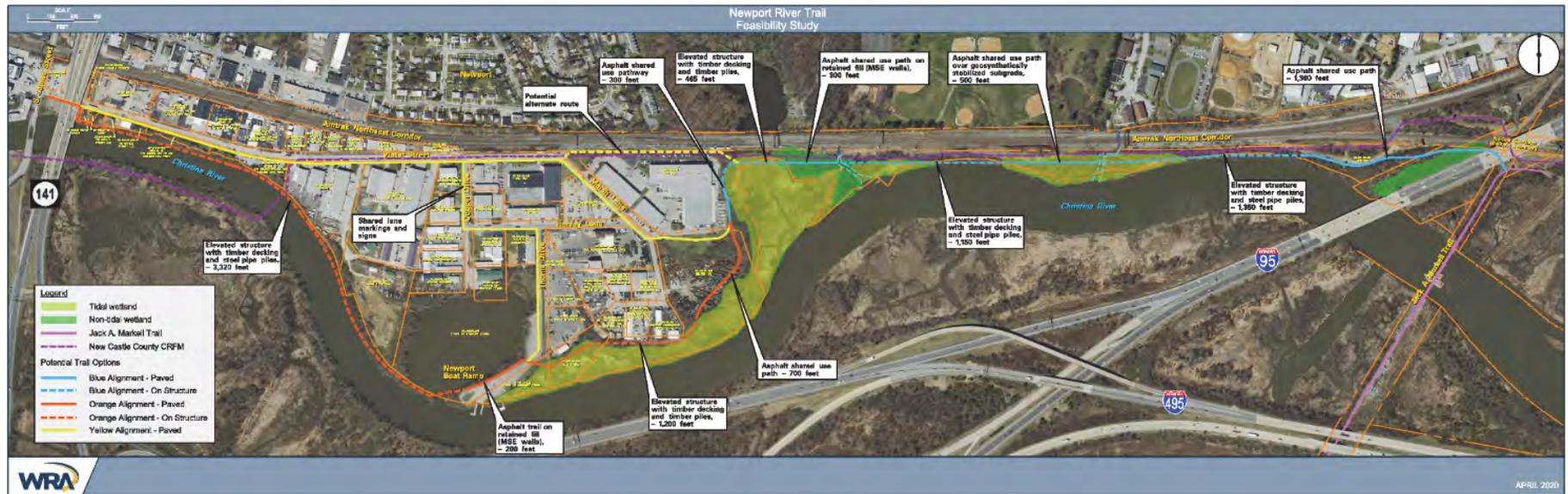
## ALTERNATIVES CONSIDERED

### General design considerations

Alignments considered for the Newport River Trail are illustrated in Figure 10. Each alignment was assumed to consist of a ten-foot-wide paved trail for consistency with previously constructed trail connections. Design would comply with the AASHTO *Guide for the Development of Bicycle Facilities*, Fourth Edition (2012). On bridges and boardwalks, the surface would widen to 14 feet clear between railings to account for a two-foot lateral clearance between the trail edge and any obstructions. This dimension is consistent with the JAM Trail boardwalks and bridges, though a reduction may be considered during the design process to reduce costs. Further discussion related to structure types and load requirements is discussed later in this section of the report.

Profile grades are generally governed by the requirements of the Americans with Disabilities Act (ADA). In urban and suburban contexts, the most commonly referenced application of ADA is the Americans with Disabilities Act Accessibility Guidelines, or ADAAG, published by the U.S. Access Board. However, there is disagreement among professionals on which guidelines constitute compliance with the ADA with respect to trails. Some guidance, such as the Accessibility Guidelines for Outdoor Developed Areas (also developed by the Access Board), allows for steeper accessible routes than ADAAG over short distances. For this feasibility study, the most restrictive scenario is assumed: a maximum profile grade of five percent. This grade does not require landing areas and is generally preferred by Delaware's Architectural Accessibility Board. In final design, consideration should be given to the pros and cons of providing steeper grades as needed and the effect on overall environmental impacts.

Figure 10. Overall project area with all alignment alternatives.



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### Blue alignment

The blue alignment, shown in Figure 11, is the most critical segment of the trail. There are no other reasonable options for making the one-mile connection between the JAM Trail and the Newport Industrial Park due to limited available land, Christina River Force Main offset requirements, and avoidance of impacts to railroad operations.

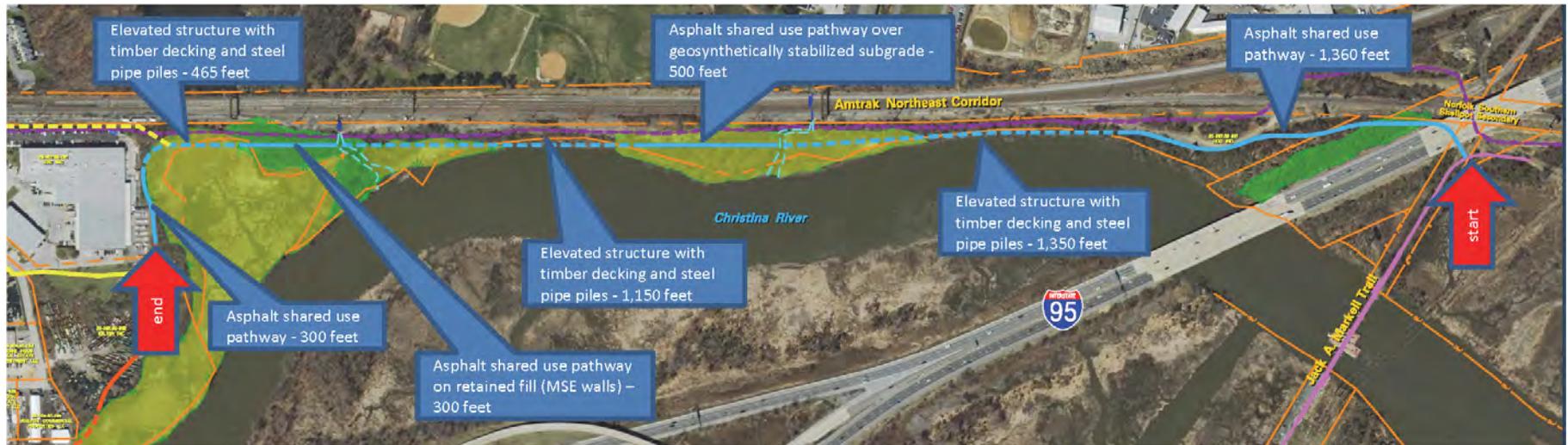
From the east, the blue alignment ties into the JAM Trail just north of the timber arch bridge crossing the Christina River. Beginning at this location, the blue alignment consists of a paved shared-use path about 1,360 feet long passing under I-95 and following the Amtrak access road through HHA/HDC-owned property.

Where the river curves close to the Amtrak right of way, the steep bank requires two segments elevated over the river on steel pipe pile structures with timber decking. Two segments, about 1,350 feet and 1,150 feet in length, will each cross tidal wetlands and an unnamed tributary to the river. Between these segments, the alignment may be built at grade on geosynthetically stabilized subgrade for approximately 500 feet.

Once over the tributaries, the pathway can be constructed on fill retained by mechanically-stabilized earth (MSE) for approximately 300 feet through non-tidal wetlands and on timber decking and a steel pipe pile elevated structure for approximately 465 feet through tidal wetlands.

Turning 90 degrees to the south, the final 300 feet of the blue alignment consists of an at-grade shared-use pathway built on uplands through privately-owned property between the tidal wetlands and an industrial area. If the yellow alignment is routed north of 405 Marsh Lane as described in the following section, this 300-foot section would not be needed.

Figure 11. Blue alignment.



### Yellow alignment

The yellow alignment, shown in Figure 12, is also approximately one mile long and provides a direct connection from the blue alignment at the east edge of the industrial park to downtown Newport at South James Street. This location, at the intersection of South James Street and Water Street, is the location of a proposed SEPTA regional rail station. The yellow alignment is proposed to be a separate shared-use pathway, likely ten feet wide, off the edge of existing streets within the industrial park.

From the east, the yellow alignment ties into the blue alignment and makes a turn to the west for a length of approximately 550 feet between the HDC, Inc. and Kelter, Inc. properties. An alternative route, shown as a dashed line in Figure 12, would take the yellow alignment along (but just outside) and Amtrak right of way to Marsh Lane.

The alignment crosses Marsh Lane to avoid the perpendicular parking on the north side, crosses Harvey Drive and several industrial access driveways along Marsh Road to the south side of Water Street for approximately 765 feet.

Heading to the west, the alignment follows Water Street for approximately 3,400 feet crossing several more driveways and one local roadway, Cooper Drive.

The Newport Boat Ramp along the Christina River, owned and managed by the State of Delaware Department of Natural Resources & Environmental Control (DNREC), is an important destination in this area. For that reason, the yellow alignment also includes shared-use pavement markings (“sharrows”) and signing to connect Water Street to the boat ramp via Copper Drive, Harvey Drive, and Thom’s Drive.

Figure 12. Yellow alignment.



### Orange alignment

The orange alignment, shown in Figure 13, is approximately 1.25 miles long and also provides a connection between the blue alignment and downtown Newport at South James Street.

The orange alignment would consist of a trail alignment along the north bank of the Christina River. This option would involve building the trail through two privately owned parcels, both of which were likely industrial in the past. Wetland mapping also indicates the presence of a large tidal wetland encompassing one of the commercial parcels.

Similar to the blue alignment, this option would present a pleasing viewshed, with scenic views of the Christina River. There would also be no driveway crossings conflicting with trail users along this option. However, due to the combination of extensive right-of-way impacts, wetland impacts, structural considerations, and potential environmental mitigation, this option would pose some significant challenges.

While this alignment may provide the lowest-stress connection, the Town of Newport has indicated that the costs and impacts may exceed the benefits. The orange alignment may be better suited for implementation during future redevelopment of industrial park properties.

Figure 13. Orange alignment.



### Structural design considerations

Due to limited right of way, steep topography, adjacent land uses, and utility offset requirements, the trail will require significant structures. The following types of elevated structure applications and components were considered and evaluated for cost effectiveness, minimizing impacts to the environment, ease of construction, and ability to hold up to a marine environment.

*Mechanically Stabilized Earth (MSE) walls:* MSE is soil constructed with artificial reinforcing. MSE walls provide a lower-cost method for bridge approaches or elevated trail sections where fill can be placed in lieu of providing an elevated structure. Wire-faced walls filled with visible stone were provided for the approaches to the signature Christina River bridge on the JAM Trail. These MSE walls were relatively inexpensive, easy to construct, and fit in well with the natural environment.

*Glued Laminated Timber (glulam) construction:* A glulam is made with multiple layers of solid wood lumber bonded together with high-strength adhesive to form a single structural unit. Glulam construction offers superior strength and stiffness over dimensional lumber, which increases the material span length and further reduces the number of piers required. See Figure 14.

**Figure 14.** Glulam bridge construction method for signature Christina River bridge on the Jack A. Markell Trail.



*Structural decking:* Structural decking means that the trail surface serves as an actual structural element rather than being applied on top of the structure. This approach provides a greater load capacity and requires fewer and/or smaller structural beams for support. Structural decking is generally a closed application, restricting drainage or light passage. Alternatively, structural decking may be fitted with timber planks to provide a wearing surface and the appearance of a traditional plank deck.

*Traditional plank decking:* Traditional plank decking was also considered for ease of construction and to allow light and water passage. Traditional plank decking requires more and/or larger beams within the cross section to support the span of the thinner decking material. See Figure 15.

**Figure 15.** Traditional plank decking construction to allow drainage.



*Prestressed Concrete PCEF Bulb-Tee Beams:* Prestressed concrete I-beams feature high tensile wires or cables embedded in the bottom flange of the beams that are stretched (stressed, or tensioned) prior to casting and curing of the concrete. The bulb-tee allows for a long span length and is resistant to water deterioration in marine environments. See Figure 16.

**Figure 16.** Prestressed Concrete PCEF Bulb Tee prestressed beam bridge construction method.



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*Substructure types:* Steel pipe piles bents with concrete caps are driven steel piles supporting a reinforced concrete pile cap. Steel pipe piles are ideal for in-water construction to allow for variable lengths where depth of pile requirements may vary due to unknown soil conditions or where ice loads or vessel collision resistance is required. Steel pipe bents with concrete caps also allow for longer span construction and increased loading. As shown in Figure 17, similar construction was utilized for the approach ramp structure to the DEEC on the JAM Trail.

**Figure 17.** Steel pipe pile bent with concrete cap bridge construction method.



Timber piles were also considered for the structural supports. Timber piles are less expensive and easier to install from above, potentially reducing the need to place equipment in wetlands. However, there are limitations regarding depth and challenges with continuous pile applications.

*Railing and fall protection considerations:* Steel cable railing systems have the advantage of being more transparent and create a feeling of the being connected to nature without barriers. However, these systems are expensive to install and may require specialized maintenance crews to make future repairs. A similar system was used on the JAM Trail and contractor installation costs were higher than anticipated. See Figure 18.

Alternatively, welded wire fabric infill panels similar to those utilized on the loop trail boardwalk at the DEEC are easier to install and more cost effective. See Figure 19 for this type of treatment.

**Figure 19.** Lower cost infill panels alternative for fall protection.



**Figure 18.** Cable style railing on elevated boardwalk along the Jack A. Markell Trail.



## EVALUATION CRITERIA

### Route directness

One of the primary criteria travelers use in choosing a route is anticipated travel time, which is directly related to the directness of the route. The viability of the Newport River Trail, then, depends on how direct it is compared to other alternatives. Although research to determine exactly how far pedestrians and bicyclists are willing to go “out of the way” to reach their destination before choosing another route is inconclusive, it is clear that the most direct connection is preferable to one that is perceived by users as circuitous.

The following list compares the blue/yellow and blue/orange alignment alternatives from end to end, connecting the JAM Trail just north of the I-95 bridge over the Christina River to the intersection of South James Street and Water Street in downtown Newport.

- Straight line distance: 1.8 miles
- Blue/yellow alignment alternative: 2 miles
- Blue/orange alignment alternative: 2.25 miles

For purposes of evaluating the trail length as it relates to travel time, both alignments are comparable, and length does not play a significant role for trail users.

At a speed of 12 miles per hour (not unusual for a commuting bicyclist), both alignment alternatives would take 10-12 minutes. However, the blue/orange alignment alternative has only one potential vehicle conflict point at the Newport boat ramp, whereas the blue/yellow alignment crosses several cross roads and driveways within the industrial park. Although these streets have relatively low traffic volumes and speeds, especially on weekends, this could potentially impact safety and lengthen the travel time during peak hours.

### Resource impacts

The blue and orange alignments are expected to have meaningful impacts to environmental resources. Due to the limited right of way and the need to avoid utility and railroad impacts, the majority of the trail will either be located on an elevated structure directly within the Christina River or through tidal and non-tidal wetlands.

The blue alignment will require approximately 2,965 feet of elevated structure over Christina River and tidal wetlands as well as a small section of paved trail through tidal and non-tidal wetlands. These impacts will most likely require mitigation.

The orange alignment will require approximately 7,485 feet of elevated structure over the Christina River and tidal wetlands, as well as a small segment of paved trail on structural fill over non-tidal wetlands. These impacts will also most likely require mitigation.

For all alignment alternatives it is anticipated that the bridge would be built using best practices to minimize wetland impact and shading, including top-down construction and/or flow-through decking. As noted in previous sections of this report, wetland areas have not been delineated, but are instead based on available GIS mapping and preliminary field review. As such, estimated bridge lengths for these alternatives are approximate.

### User comfort / visibility

All alignments proposed within this study would be fully separated from motor vehicle traffic for their entire length, providing a low-stress facility for all users. The blue alignment does not cross any streets or driveways. The

yellow alternative would require several driveway crossings and potential conflicts with low-speed traffic, including trucks. The orange alignment would be separated from traffic.

As the blue alignment passes under I-95, the trail would parallel the Shellpot Secondary for a short segment. Slow-moving Norfolk Southern freight trains run about twice a day on average. Adequate fencing and lateral separation can be provided to enhance bicyclist and pedestrian safety.

The blue alignment would travel immediately adjacent to I-95 (within the right of way) for a short segment and then follow the north bank of the Christina River until reaching the industrial park. This segment of the trail would provide panoramic river and skyline views. The yellow alignment follows the local roadway network and provides less visual interest through the industrial park.

Once across the lagoon at the Newport boat ramp, the orange alignment continues entirely on structure within and adjacent to the river and provides scenic views of the river for the entire length of the trail.

The majority of the blue alignment along I-95 would be visible to motorists on that highway, which is traveled by more than 76,000 people daily. Although it would be separated by the river, and at a distance of more than 500 feet, visibility would increase during times when I-95 is congested and might build awareness of commuting by bike rather than by car. The most prominent element of the trail to motorists would be the elevated sections of trail within the Christina River.

Glimpses of the blue alignment might also be seen from Amtrak trains, particularly in the winter.

### Property impacts

The blue alignment uses some public rights of way and will have direct and indirect impacts to private property as well. At the JAM Trail junction, the blue alignment would head north continuing under the I-95 overpass within Delaware Department of Transportation (DelDOT) right of way and quickly turn to the west to avoid impacts to the Norfolk Southern right of way. Trail fencing would be required within this section due to its proximity to the active rail. The trail continues at-grade to the west within HHA/HDC-owned property following Amtrak's access road, which is this area is located on HHA/HDC property. The alignment continues to follow the Christina River bank within HHA/HDC property and on elevated structures directly within the river where there is insufficient land for the trail between the railroad right of way and the river. Once past these narrow areas, the alignment makes a turn to the south to follow HHA/HDC property to tie into the yellow or orange alignment. The entire blue alignment along the bank of the Christina River will have direct impacts to private property, requiring acquisition of right of way or easements.

The yellow alignment will connect directly to the blue alignment and follow the northern property line of the parcel owned by Kelter, Inc., which is currently used as container storage for Waste Management. The remainder of the yellow alignment primarily follows the roadway rights of way along Marsh Lane and Water Street, which are locally owned and maintained by the Town of Newport. There will most likely be several private property right of way acquisitions and easements required along the alignment to provide a trail that is fully separated from traffic.

The orange alignment will also have private property impacts that will require easements and/or property acquisitions. The trail begins at the terminus of the blue

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alignment and travels through the Kelter, Inc. property at grade until it hits tidal wetlands, where an elevated structure continues within the private property to the publicly-owned Newport boat ramp. Once over the lagoon, the alignment is entirely on elevated structure within the Christina River. While property acquisitions are not anticipated for this segment, construction easements and coordination with property owners may be required.

### Potential cost range

Potential costs were developed at an early planning level based on available information. The primary cost driver relates to complexity of the alignments in relation to minimizing environmental impacts and meeting the structural design requirements for marine environments. Value engineering may be considered during design to reduce these costs.

#### ***Blue alignment***

- At-grade paved trail connection to the JAM Trail under I-95 overpass
- At-grade paved trail from I-95 along HHA/HDC-owned property
- Boardwalk and open-water spans along the north bank of the Christina River
- Non-construction costs (including professional services, administration, construction services, and contingencies)

**Approximate cost range for the blue alignment:**

**\$18 to 20 million**

#### ***Yellow alignment***

- At-grade paved trail through private property
- Separated shared-use pathway along Marsh Lane
- Separated shared-use pathway along Water Street
- Non-construction costs (including professional services, administration, construction services, and contingencies)

**Approximate cost for the yellow alignment:**

**\$2 million**

#### ***Orange alignment***

- At-grade paved trail
- Elevated structure with timber decking and timber piles through tidal wetlands
- Built-up trail along Newport boat ramp access
- Elevated structure with timber decking and steel pipe piles
- Non-construction costs (including professional services, administration, construction services, and contingencies)

**Approximate cost range for the orange alignment:**

**\$20 to 25 million**

## EVALUATION SUMMARY

The following table provides a summary of the evaluation criteria described above.

Criterion	Blue + yellow alignments	Blue + orange alignments
Length	2 miles (approximate)	2.25 miles (approximate)
Travel time (at 12 mph)	10 minutes	11 minutes
User comfort	Good, potential traffic conflicts within the industrial park	Better, no vehicular conflicts
Opportunities for regional connections	West to Newport, east to Wilmington, south to New Castle	West to Newport, east to Wilmington, south to New Castle; direct connection to future waterfront redevelopment within the industrial park
Private property impacts	The blue alignment primarily utilizes HHA/HDC-owned property Potential for minimal linear impacts to industrial property roadway frontage	The blue alignment primarily utilizes HHA/HDC-owned property The orange alignment may require significant easements and property owner coordination for river access
Natural resource impacts	2,965 feet of elevated structure over Christina River and tidal wetlands 500 feet of paved trail through tidal wetlands 300 feet of paved trail on structural fill over non-tidal wetlands	7,485 feet of elevated structure over Christina River and tidal wetlands 500 feet of paved trail through tidal wetlands 300 feet of paved trail on structural fill over non-tidal wetlands
Approximate cost	\$20 to 22 million	\$38 to 45 million

## RECOMMENDED ALIGNMENT

Based on multiple factors described above, the recommended alternative is a combination of the **blue and yellow alignments**. The blue alignment is expected to provide an enhanced user experience by providing a completely off-road, low-stress pedestrian and bicycle facility with pleasing aesthetic surroundings and access to the natural ecosystems of the Christina River. Among the other benefits, the blue alignment avoids Amtrak right of way and potential impacts to the Christina River Force Main.

The following issues should be considered if the blue and yellow alignments are implemented.

### Design elements

*Concept design process.* The preliminary engineering phase of many projects begins with development of a formal concept design report. The purpose of this report is to confirm design criteria, resolve major design issues, refine the design and costs, complete the environmental document (typically a categorical exclusion evaluation for these types of projects), document decisions made during the scoping process, and otherwise better define the scope so that funds can be obtained for construction. The development of a concept design report is recommended as the first preliminary engineering step for the Newport River Trail. For example, this step would determine whether the main or alternate route for the yellow alignment would be more desirable.

*Railroad coordination.* Although the blue and yellow alternatives were specifically selected to avoid impacts to railroad right of way, coordination may be required to ensure protection of directly adjacent active rail facilities.

Specific lateral clearance and barrier requirements should be identified in concept design. See Figure 20.

**Figure 20.** Blue alignment within DeIDOT right of way under I-95 overpass adjacent to active freight rail. Fencing will be required for separation.



*Lighting and security.* The need for lighting and security elements such as cameras and call boxes would be dependent on the practices of the agency that operates and maintains this portion of the trail. New Castle County, who is responsible for maintenance and operations of portions of the JAM Trail, does not provide lighting or other security features. Security is provided by random police patrols. Other design elements and practices may be appropriate for the trail depending on the agency involved. In any case, the trail design should incorporate elements of Crime Prevention Through Environmental Design (CPTED), such as good sight lines, clear delineation of public and private areas, and ease of maintenance. Amount of use and visibility are both important factors. Lighting and security are especially

important because access to and from the blue alignment of the trail is limited to either end, as described below.

*Trailheads and other amenities.* Public access to the blue alignment of the trail will be available at only two points: The JAM Trail near the Christina River bridge and at the east end of the industrial park. Consideration should be given to trail user services such as bike racks, water, seating, trash cans, and trail counters at these locations. In addition, seating areas, vantage points, wayfinding, and landscape opportunities should be considered along the trail itself.

#### Trail ownership, operations, and maintenance

A number of public agencies have participated in the development of this feasibility study. New Castle County has extensive experience in owning, operating, and maintaining trails. This study recommends that the agencies develop a memorandum of agreement regarding ownership, operations, and maintenance as early as possible to ensure that its provisions will be in place prior to completion of the trail. As an example, sections of the JAM Trail are mostly along DelDOT-owned right of way but are operated and maintained by New Castle County. The participating agencies should also look for partnership opportunities, such as a friends group and/or corporate sponsorship, to provide ongoing maintenance or funding for maintenance activities.

#### Construction funding

New Castle County's "Connecting Communities" initiative has prioritized adding low-stress pathways to build out the bicycle network and spur economic growth within the County. With this plan in place, the County and partnering agencies have been able to secure funding through the William Penn Foundation and provide matching funds to expand the trail network.

Building upon the success of the initiative, the General Assembly allocated \$500,000 in the Fiscal Year 2020 Bond Bill for Capital Improvements Project Schedule - Statewide Trails to the Newport River Trail.

Although the Bond Bill funding represents the most immediate and relevant opportunity to fund preliminary design of the preferred alignment, it consists entirely of state funds. Consideration should be given to using those state funds as a local match to obtain Federal design and construction funding.

Because of the magnitude of this project, the Federal trail funding programs used in Delaware, the Recreational Trails and Transportation Alternatives Programs, are not plausible sources of funding. The example of the JAM Trail (which is the only trail that has been built in Delaware that was similar in cost to the Newport River Trail) instead suggests the need for a public agency to access either the Federal Congestion Mitigation and Air Quality program or Surface Transportation Program. One alternative possibility to consider, however, would be the State of Delaware's new Transportation Infrastructure Investment Fund, which reimburses businesses for the construction of "*transportation infrastructure in order to attract new businesses to this State, or expand existing businesses in this State, when such an economic development opportunity would create a significant number of direct, permanent, quality, full-time jobs.*"

## NEWPORT RIVER TRAIL FEASIBILITY STUDY

### Phasing

Fiscal realities often require significant public works projects to be phased. Due to the isolated nature of the blue alignment and the fact that it connects to the existing trail and roadway network only at its endpoints, construction of the project in phases would not provide benefits to the traveling public. However, should funding constraints dictate, the blue alignment could be built and extended to tie directly into the street network within the industrial park. Although the trail would not provide a fully separated facility connection between downtown Newport and Wilmington, it would provide an interim meaningful connection until additional funds are in place to build the yellow alignment.

As the yellow alignment proceeds, there could be value to exploring access management and streetscape opportunities along Water Street.

### Permitting requirements

Implementation of the recommended alternative will require agency permits. NEPA documentation will also be required due to the need for Federal permits as well the likelihood that Federal funding will be required for a project of this magnitude. The concept design process should include preparation of a categorical exclusion evaluation document for NEPA concurrence. Specific permit needs are typically identified during the concept design process rather than the feasibility stage. DNREC and the Coast Guard will require permits and USACE may as well.

Invasive plant species such as phragmites are found throughout the study area. If mitigation is required due to wetland impacts, removal or control of those invasive species could be considered.

### Conclusion

The study recommends that the Town of Newport and New Castle County, in conjunction with other agencies on the steering committee, incorporate the Newport River Trail into their comprehensive plans and move directly into concept and final design of the blue and yellow alignment alternatives. Upon completion of concept design, including a refined cost estimate, additional funds can be sought for final design and construction. Advancing this stage quickly will help make the project “shovel ready” and thereby more likely to qualify for potential post-COVID-19 stimulus funding.



