

# HUDSON HIGHLANDS FJORD TRAIL

## Alternative Alignments Analysis

Prepared for:  
Scenic Hudson, Inc.

February 2021



draft

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This document has been prepared by SLR International Corporation (SLR). The material and data in this report were prepared under the supervision and direction of the undersigned.

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# ALTERNATIVES ROUTING ANALYSIS

Hudson Highlands Fjord Trail

February 2021  
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## INTRODUCTION

This document presents the alternatives analysis for the Main Trail route of the Hudson Highlands Fjord Trail. The HHFT Main Trail is a proposed 7.5-mile unique recreational experience unlike a traditional multiuse trail as presented in the Hudson Highlands Fjord Trail Master Plan (2020). The project will connect some of the Hudson Valley's most visited destinations while highlighting the Hudson Highlands' landscapes of distinction through a unique linear park of movement and rest, destinations, and journeys. The project aims to restore, rehabilitate, and reconnect the shoreline corridor and surrounding forested and wetland landscapes for the enjoyment of current and future generations.

- This alternatives analysis evaluates multiple alignments within three defined reaches between the Village of Cold Spring and City of Beacon: Docksides reach
- Shoreline reach – this reach extends from Docksides Park in the Village of Cold Spring to Breakneck Ridge.
- Breakneck Connector – this reach extends from the Breakneck Ridge Trailhead to the MNR pedestrian bridge.
- Forest reach – this reach extends from the pedestrian bridge to Long Dock Park in Beacon.

## HHFT PROJECT VISION

Excerpt from the Hudson Highlands Ford Trail Master Plan, February 2020:

*The Fjord Trail creates 14.5 new miles of privately maintained public paths that trace the Hudson River and offer unique glimpses into the diverse landscapes of the Hudson Highlands. It is a place with varied scales of spaces and aesthetic experiences that emerge along the slender route, offering new ways to inhabit and understand the Highlands region. It is a portal that links the City of Beacon and the Village of Cold Spring to the water's edge and the greater Hudson Valley region, and connects urban residents of New York City to the scenic beauty and restorative power of the river and the highlands landscape.*

*Finally, it is a preserve that protects and restores the landscape, inspiring conservation, stewardship, and engagement in the ecological cycles and patterns that are so often invisible in our busy lives. These ambitions combine to create a linear public landscape that connects over 8,000 acres of Hudson Highlands State Park Preserve directly to the Hudson River.*

*The project strives to reveal the landscapes of the river to all people, regardless of age, background, or ability level. A single, shared trail for all unites the project and connects the Village of Cold Spring with the City of Beacon.*

## MAIN TRAIL – MINIMUM PERFORMANCE CRITERIA

The master plan delineates both a Main Trail and "meanders" or spur paths. The 7.5-mile Main Trail connects Cold Spring to Beacon and is defined as an accessible, walkable, and bikeable path that remains consistent in facility type to inspire user confidence in the trail system. Meanders are for quick departures to destinations and adventures, are pedestrian only, and are meant to provide an expanded and unique hiking experience; they are not required to have a consistent width or material and vary based on the terrain they traverse. For the purposes of this analysis, we are focused only on the Main Trail route and how each of the alternatives considered compare to the vision and performance criteria established by the 2020 Hudson Highlands Fjord Trail Master Plan.

The Main Trail is to be a "trail for all," an accessible route following the guidelines established by the *United States Access Board's Final Accessibility Guidelines for Outdoor Developed Areas* (AGODA). The following is a brief overview of the minimum accessible standards for the Main Trail:

- 1:20 (5%) running slope for not greater than 50 feet
- 1:12 (8.33%) running slope for not greater than 30 feet
- Cross slope of paved or wood surfaces not greater than 1:48 (2%)
- 8-foot minimum vertical clearance
- Firm and stable surface
- ½-inch maximum rise in surface irregularity in paved or wood surfaces

The 2020 Hudson Highlands Fjord Master Plan has established a unique vision beyond a typical multiuse trail, and as such has established a minimum performance baseline that the Main Trail must achieve to reach desired goals. The minimum standards include, but are not limited to:

- The Main Trail has a 10 feet minimum width with 12 to 14 feet being preferred, excluding shoulders, for bidirectional pedestrian, bicycle, and nonmotorized traffic.
- The Main Trail maintains minimum overhead clearances of 8 feet and side clearances of 6 feet.
- The Main Trail minimum design elevation is 8 feet NAVD88, planned to clear Mean Higher High Water (MHHW) and 75-inch Sea Level Rise (SLR) (2100 high projection established by New York State in 6 NYCRR Part 490, Project Sea Level Rise). MHHW tidal data is taken from the online version of the National Oceanic and Atmospheric Administration's (NOAA) *VDatum* software at locations adjacent to each town.
- The Main Trail minimum design elevation is 8 feet NAVD88, above the 100-year (1% annual chance) storm assumption for 2020 (7.3 feet NAVD88).

The Main Trail should directly connect the following key destinations:

- Long Dock Park
- Dennings Point
- Notch
- Breakneck
- Little Stony Point
- Dockside Park

## ALTERNATIVE ALIGNMENT ANALYSIS PROCEDURE

The evaluation of the alternate alignments was conducted through desktop reviews of pertinent and available mapping, planning documents, and regulatory frameworks as well as through a series of field investigations and ongoing discussions with the project design team and key stakeholders. The alternative alignments were established previously during the master planning process and refined through this study as needed to best explore the potential for optional routes that meet the needs of the Master Plan vision, surrounding communities, and stakeholders.

The alternative alignments are mapped in four designated areas or reaches and are identified as follows:

- Reach 1 – Dockside Park to Little Stony Point
- Reach 2 – Little Stony Point to Breakneck
- Reach 3 – Breakneck Connector
- Reach 4 – Breakneck to Beacon

For each reach, the analysis reviews and scores the draft preferred Main Trail alignment as contained in the Master Plan and any alternative alignments considered in the determination of that route. The mapping is a high-level representation of routes and should be viewed as a master plan level of design. Opportunities and constraints are identified on the mapping and summarized in the following narratives. To assist in the evaluation, a decision, or ranking, matrix was established that set a criterion of baseline performance information to evaluate all alignments, including the Master Plan defined Main Trail alignment.

## ALTERNATIVES ANALYSIS MATRIX

The ranking matrix provides guidance regarding a trail alignment's apparent suitability consistent with the established goals, performance criteria, policies, and environmental characteristics defined by the Hudson Highlands Fjord Master Plan

The matrix is comprised of 11 specific criteria established from the overall project goals and performance, information gathered throughout the master plan process, and ongoing meetings with key stakeholders, including but not limited to the Towns of Fishkill and Philipstown, the Village of Cold Spring and City of Beacon, the Metro-North Railroad (MNR), the New York State Department of Parks Recreation & Historic Preservation, and the New York State Department of Environmental Conservation.

The following categories have been established to evaluate the alternative alignments. All categories will be rated on a scale of one to five (1 to 5) with five being most preferred. Refer to the scoring matrix and category scoring summaries appended to the matrix for more information.

Alignment Type – Alignments will be evaluated against desired width and clearances, inclusion of multimodal users in a single facility, and consistency of form and material.

Resiliency – Alignments will be evaluated against desired minimum sea-level rise and 100-year flood elevations as defined in the Performance Criteria. Emphasis will be given to routes that promote, enhance, or establish stormwater and pollution mitigation features, alternative energy sources, and consider seasonal changes related to flooding, storm waves, and ice.

Traffic and Safety – Prioritize alignments that are universally accessible; limit at-grade crossings of roads, intersections, and driveways; improve safety along State Route 9D (9D); promote traffic calming; provide separation or buffers to vehicular travelways; and ease emergency response.

Context – Prioritize alignments that offer the most scenic, ecological, and cultural experience of the Hudson Highlands while blending seamlessly into the surrounding environment. Emphasis will be placed on views, vistas, variety of environment traversed, increased public access particularly to water-based activities, and separation from vehicular travelways. Alignments alongside low-volume and low-speed roads (25 miles per hour or less) will be considered more advantageous.

Connectivity – Prioritize alignments that foster connection to the visual and physical beauty of the Hudson Highlands landscape, ecology, and history. Emphasis will be given to alignments that seek out opportunities to reunite with the river's edge, create educational opportunities, and connect regional trails, parks, and local destinations.

Diversity of Users – Prioritize alignments that amplify universal accessibility, safety, and create a unique multimodal and recreational experience for all ages and abilities.

Congestion Management – Prioritize alignments that manage access to popular destinations and sensitive sites, minimize negative impacts to community and environment, and promote new experiences, destinations, and narratives to explore.

Regional Support – Prioritize alignments that expand the region's recreational amenities, enhance access to existing or planned facilities, and have a high level of community support.

Environmental Stewardship – Prioritize alignments that minimize impacts to the environment while restoring ecological health and resiliency, promoting ecological processes, and preserving and enhancing the region's scenic beauty. Emphasis will be placed on protection and enhancement of environmentally sensitive resources such as floodplains, wetlands, steep slopes, or erodible soils; vegetative communities and buffers; habitat, threatened, endangered or rare species; and historical and cultural resources.

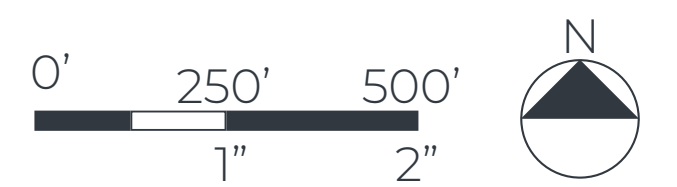
Community – Prioritize alignments that minimize impacts to natural and manmade features particularly of statewide significance, including geologic formations, vegetation, and structures, to private property, utilities, and limits the need for easements and acquisitions and disruption to community fabric.

Implementation – Prioritize alignments that are feasible, sustainable, and cost effective with fewer design challenges and impacts to the community.



- ALIGNMENT LEGEND**
- 2020 MASTER PLAN MAIN TRAIL ———
  - ALIGNMENT NO. 1 ———
  - ALIGNMENT NO. 2 ———
  - ALIGNMENT NO. 3 ———
  - ALIGNMENT NO. 4 ———
  - ALIGNMENT NO. 5 ———
  - SHARED ALIGNMENT - - - - -

**HUDSON HIGHLANDS FJORD TRAIL**  
 ALTERNATIVE ROUTING ANALYSIS  
 REACH NO.1 - DOCKSIDE PARK TO LITTLE STONY POINT



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## ALTERNATIVE ALIGNMENT ANALYSIS

### REACH NO. 1 – DOCKSIDE PARK TO LITTLE STONY POINT

#### Alignment Descriptions

For this reach, the Master Plan route and five alternatives were reviewed and evaluated. Refer to plan sheets 1 through 5 for a graphic representation of the following routes.

#### 2020 Master Plan Main Trail

This route connects primarily via an elevated structure along the west side of the MNR causeway to the existing Little Stony Point on-grade trail just west of the pedestrian bridge over the MNR tracks from Route 9D.

#### Alignment No. 1

This route departs Dockside Park east over the tracks via a pedestrian bridge, parallels the tracks on the east side between the Cold Spring Public Works yard, wastewater treatment plant, and Mayor's Park before continuing onto the eastside of the MNR causeway on an elevated structure to the grade up to the west side of 9D adjacent to the OPRHP Visitor Center at Little Stony Point.

#### Alignment No. 2

This route begins on sidewalks along West, Main, and Market Streets from Dockside Park to Lunn Terrace crossing Main Street at Depot Square. From Depot Square, the trail passes the Cold Spring Depot restaurant's parking and service areas before running at grade along the east side of MNR tracks, past the Cold Spring Public Works yard, wastewater treatment plant, and Mayor's Park and continuing onto the eastside of the MNR causeway on an elevated structure and traverses the grade up to the west side of 9D adjacent to the park's building to Little Stony Point.

#### Alignment No. 3

This route begins on sidewalks along West, Main, and Market Streets from Dockside Park to Lunn Terrace; crossing Main Street at Depot Square and continuing through Depot Square past the Cold Spring Depot restaurant's parking and service area. It then parallels the MNR tracks on the east side between the Cold Spring Public Works yard, wastewater treatment plant, and Mayor's Park; before heading east into Mayor's Park to Fair Street. On Fair Street, the route continues north to the intersection with 9D at which point it follows the existing foot path to Little Stony Point.

#### Alignment No. 4

This route begins on sidewalks along West, Main, and Market Streets from Dockside Park to Lunn Terrace; continues east on Main Street, turning west onto Fair Street; and continuing north on Fair Street to the intersection of 9D before transitioning to the existing foot path to Little Stony Point.

**Note:** Some trail users could bypass Market Street and Lunn Terrace by utilizing the access tunnel near Depot Square to Main Street east of the tracks but this is not an accessible route.



## Alignment No. 5

This route begins on sidewalks along West, Main, and Market Streets from Dockside Park to Lunn Terrace; continues east on Main Street to the intersection of Morris Avenue and 9D; turns west on Morris Avenue and continues to the Washburn parking lot; and crosses 9D at grade to access Little Stony Point.

Note: Some trail users could bypass Market Street and Lunn Terrace by utilizing the access tunnel near Depot Square to Main Street east of the tracks but this is not an accessible route.

## Shared Alignments

Several of the alignments utilize the same route to reach key destinations. The plan sheets identify these as "Shared Alignment" to simplify the mapping and allow existing features to be visible.

Alignments 2, 3, 4, and 5 begin at Dockside Park and traverse West Street, Main Street (west of tracks), Market Street, Lunn Terrace, and Main Street (east of tracks). It is impracticable to establish a separate multiuse trail facility along this stretch due to the established streetscapes and limited remaining right-of-way free-of-built features. The simplest solution would be to establish shared lanes for bicyclists and to have pedestrians use sidewalks where existing and provide sidewalks where they do not currently exist. As such, alignments that share this route would not meet several of the minimum criteria for the Main Trail performance.

These same alignments (Nos. 2, 3, 4, and 5) also share a route to reach Little Stony Point. The route includes improvements needed to create an accessible connection from 9D to the pedestrian bridge over the MNR tracks as identified in the 2020 Master Plan. This shared route is considered feasible and meets the performance goals for the Main Trail.

## **REACH NO.1 – DOCKSIDE PARK TO LITTLE STONY POINT**

### **Analysis and Rating Summary**

This section provides an "at a glance" summary of the alignment ratings. For a full description of the alignments, refer to the section "Detailed Alignment Findings and Recommendations."

The highest achievable total score on the matrix is 55 points. The alignments for Reach No. 1 scored on a range from the high teens to high forties. Unfortunately, a majority of the alignments in this reach have significant enough obstacles to overcome to be deemed infeasible.

The Master Plan Alignment was determined to be the most advantageous alignment due to its straightforward route, limited property impacts, and potential to showcase and access the shoreline and surrounding landscapes. While the route requires extensive coordination with MNR and would be challenging to construct – more so than some other alignments – overall, the route scores high in most categories as it best fits the vision and performance criteria established.

Alignment No.1 while similar to the Master Plan Alignment differs in a few key areas that resulted in a slightly lower score. These differences include the need to thread between the railroad tracks and the municipal wastewater treatment and public works yard – industrial uses with potential for large machinery, dust, noise, and odor. The alignment also requires a bridge structure over the tracks that would create a visual impact for the nearby residential community's views to the river in both its structure and required clearing for construction. To cross the tracks and then transition back to at-grade within

Dockside Park, significant lengths of elevated structure would be required, impacting the aesthetics of the park's eastern edge. Alignment No. 1 shares the complexities of the Master Plan route and adds to it further impacts to properties, community, and more extensive engineering and constructability, all resulting in a lower score than the Master Plan alignment.

Alignments No. 2 and No. 3 share much of their routes and, due to the private property impacts required at the Cold Spring Depot Restaurant and adjacent to the MNR tracks, are not considered viable options even though they score higher than other alignments. If the routes overcame the impact to the restaurant and MNR, the removal of rock along the tracks and adjacent to the residential properties above, is still considered a less desirable route due to issues of constructability, interruption of rail service, and visual impacts from vegetation clearing. Overall, these routes have a diminished trail context and user experience as they thread a narrow passage at the restaurant, tracks, public works yard and wastewater treatment plant.

Alignment No. 2 continues to Little Stony Point similar to Alignment No. 1, maintaining a consistent form and providing views to the river and tidal pond.

Alignment No. 3 diverges from the railroad tracks into Mayor's Park having to transition to a side path trail along Fair Street, impacting parking for the park as well as having to cross residential driveways. The Village has repeatedly stressed the need for the parking by the park and has strongly objected to any modification that would encumber or reduce parking in this area. The more circuitous routing and introduction of vehicular conflicts results in a lower score than Alignment No. 2.

Alignment No. 4 fails to provide the facility type of a Main Trail and requires traversing multiple local roads including Main Street to reach Dockside Park. Additional negative aspects of Alignment No.4 include impacts to private property along much of the route, vocal community opposition, and issues with trail safety due to multiple road and driveway crossings. The trail also has limited shoreline access and increases the likelihood of congestion within the village center. This alignment would be better considered for a trail meander to connect trail users to Mayor's Park and Main Street.

Implementation of Alignment No. 5 would require extensive impacts to the infrastructure of Main Street or separate facilities for cyclists and pedestrians. The HHFT's vision for the main trail is to provide a single facility for all users. A single facility is not achievable without removal of on-street parking or portions of the existing sidewalk, both of which are considered infeasible due to the negative impacts on the congested and compact village center, business access, and streetscape functionality. Given the narrow and busy roadway, even a separated facility approach with shared lanes for cyclists on Main Street would also pose traffic and safety impacts. Once at the Main and Route 9D intersection, the alignment continues north on 9D and would impact on-street parking, front yards, private property, and would require construction of retaining walls along steep slopes. The alignment overall is considered to have a diminished context due to the route having no shoreline access, limited views, and reliance on paralleling vehicular routes. This alignment could be considered for a trail meander to connect trail users to Main Street, Haldane School fields, and the neighborhoods surrounding 9D.

Overall Alignments No. 2, No. 3, and No. 5 are not considered feasible due to significant private property and community fabric impacts. Alignment No. 4 does not meet many of the project goals and has already had strong community opposition. Alignment No. 1 scores the highest and is similar to the Master Plan alignment, but the Alignment is contingent on MNR approval of the bridge spanning the tracks and the added complexities of the route do not provide a net benefit to the project, community, or environment over the 2020 Master Plan Main Trail. The

## REACH NO.1 – DOCKSIDE PARK TO LITTLE STONY POINT

### Detailed Alignment Findings and Recommendations

Refer to plan sheets 1 through 6 for related information.

#### 2020 Master Plan Main Trail

The Master Plan indicates a shoreline alignment that takes users from at-grade, in Dockside Park, quickly to an elevated structure along the river's edge on the west side of the Metro North causeway. Due to the narrow shelf, required rail clearances, and steep grade along the causeway the trail is required to be elevated, which provides opportunities to improve resiliency, including being above the desired elevation of 8 feet for flooding as well as improving and strengthening the riprap edge of the causeway. As the trail travels north it would need to rise in elevation to eventually reach slopes on the southern end of Little Stony Point just west of the existing pedestrian bridge over the tracks.

The Master Plan alignment is straightforward in its path, allowing for a consistent route that keeps trail users on the correct path, facilitating those arriving by train in Cold Spring to quickly reach their destination without unnecessarily compounding congestion in the already-stressed village center. The trail has no transition between facility types, no vehicular intersections, or crossings and maintains a consistent width, allowing for a safe, accessible, and approachable trail alignment. The trail successfully connects two key destinations while providing a unique experience along a section of shoreline that would otherwise be inaccessible due to the railway use. Sweeping views of the Hudson River and surrounding landscape create an atmosphere full of potential for education, cultural highlights, and historic interpretation. The section of trail would likely be a destination unto itself given the potential for water access, views, and direct connectivity to popular local attractions.

The location of the route limits its negative impact on the community fabric by limiting impacts to only MNR property; however, views from and handful of homes on Fair Street would have a new elevated structure in their line of sight along the railroad causeway length.

While the route itself is straightforward, it would require extensive coordination with and approval by MNR as well as extensive design and construction detailing due to the length and scope of the elevated structure. Construction access would be difficult, and again would require coordination with MNR.

#### Alignment No. 1

Alignment No. 1 is an off-road multiuse trail that requires extensive elevated structures and a bridge crossing to navigate the proposed route. The route parallels the east side of the Metro-North Railroad tracks and causeway linking the destinations of Dockside Park and Little Stony Point. The route can be accessible and accommodate all users safely while providing sweeping views of the Hudson River and surrounding landscape. Traversing the east side of the railroad does pose unique challenges, including spanning over the railroad tracks to access Dockside Park and threading the trail through the steep terrain and narrow corridor adjacent to the Cold Spring Wastewater Treatment Plant and Cold Spring Public Works yard.

Beginning at Dockside Park, the alignment needs to quickly transition to an elevated trail and begin gaining elevation over 400 linear feet within the park headed northeast toward the railroad, where an approximately 200-foot-long bridge structure would span over the tracks to the east side. The bridge would require a bottom chord elevation set no lower than elevation 38.0 to provide the required 23 feet

of vertical clearance over the tracks that are at elevation 15.0. Approval and detailed coordination of the design for the bridge would be required. If permission to build the bridge structure is not granted by MNR, this alignment would not be feasible. If the bridge is permitted by MNR, it would be a significant impact for the neighboring residential properties, creating a visual obstruction from their properties to the Hudson River.

Continuing north, the trail would remain an elevated structure and begin to slope down, traversing the steep slope to the rear of the public works yard and wastewater treatment plant. Fitting the alignment in this location may impact some of the existing infrastructure, particularly at the wastewater treatment plant. Views to the river would be expansive from the elevated viewpoint as would views into the much less scenic adjacent municipal facilities. As the trail descends in grade it would remain an elevated structure adjacent to Mayor's Park and onto the causeway to traverse the narrow side slopes and maintain a height at or above elevation 8.

As the trail nears the northern terminus of the causeway it would need to begin rising in elevation to reach the grade of the existing bridge to Little Stony Point. This would require a sloping elevated structure for approximately 400 feet at an 8% slope with required level landings. This assumes beginning at elevation 8 and reaching a maximum elevation of 36. To achieve a more desired 5% slope or less, the structure would need a minimum length of 600 feet.

Alignment No. 1 limits property impacts to Metro-North and municipal lots; however, there are visual impacts to surrounding residential properties from the Northern Gate development off Stone Road due to the proposed bridge crossing. The alignment alleviates congestion by routing trail users directly to Dockside Park and Little Stony Point without impacting Main Street and the surrounding neighborhoods as well as providing opportunities for ecological enhancements along the causeway shoreline. The route would provide a unique experience that could highlight the rugged character and scenic beauty of the surrounding landscape.

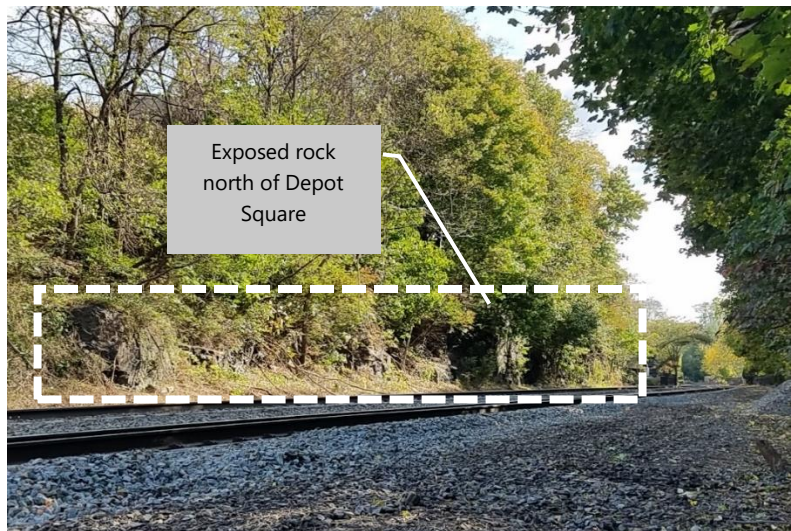
The alignment would require extensive structural design, coordination for construction access along the active railway, and detailed construction drawings and oversight of extensive elevated structures. Alignment No. 1 shares the complexities of the Main Trail route and adds to it further impacts to properties, community, and more extensive engineering and constructability, all resulting in a lower score than the Main Trail alignment.

Alignment No. 2

Alignment No. 2 travels the shared route from Dockside Park to Main Street before heading northwest to the east side of Depot Square. From there it travels through the Cold Spring Depot Restaurant's parking lot and service area before having to navigate between the railroad tracks and rock face for approximately 450 linear feet. The restaurant's service area is private property and a functioning space for deliveries and refuse storage/disposal. The area needs to function for the restaurant and is already limited by its shape and single access point. Threading the trail through this space is not considered safe or an appealing user experience. The space needed for the trail and buffer from maneuvering vehicles would infringe substantially on the area's functionality for the restaurant. The potential impacts to private property and business make this alignment undesirable and unfeasible without the property owner's approval.



If the obstacle of the service area were overcome, the alignment would then be faced with an area of significant exposed rock and vertical rock face within MNR property. Benching the trail into the rock could require removal of up to approximately 2,500 cubic yards of rock as the alignment parallels the east side of the railroad tracks. While this area has been altered in the past, the trail's construction would impact the neighboring residential properties to the east though vegetation removal and acoustics



and vibrations if rock removal is allowed. Reducing the rock removal and pinning an elevated structure to the rock itself would require extensive geotechnical investigation beyond the scope of this study. In either case, rock removal would be required and result in the clearing of vegetation. Significant acoustic and visual impacts during construction and afterward would occur for the neighboring residences. Significant coordination would be needed with MNR for construction access and lengthy interruption to the rail service for the eastern track would be necessary.

After navigating the rock and steep grades, the trail would then transition to, or continue as, an elevated structure traversing the steep slopes to the rear of the Cold Spring public works yard and water treatment plant. The trail would remain an elevated structure adjacent to Mayor's Park and onto the causeway to traverse the narrow side slopes and maintain a height at or above elevation 8.

As the trail exits the causeway it transitions onto the New York State parkland property and switchbacks up the existing slopes at a grade of 5% or less, finally reaching the shared path at the entry to Little Stony Point.

Alignment No. 2 severely impacts the private property of the Cold Spring Depot Restaurant as well as requires access within Metro North property. The route would likely exacerbate congestion at the pulse point of Main Street and Depot Square and negatively impact the residential community above Depot Square and Stone Road.

The alignment would require extensive rock removal, structural design, coordination for access along the active railway, and construction of elevated structures. As stated earlier, this route is not considered feasible due to the property impacts and implementation costs; however, further discussions with the property owners and MNR will be explored to fully vet the option.

### Alignment No. 3

Alignment No. 3 shares much of its routing with Alignments No. 2 and No. 4. The route travels the shared route from Dockside Park to Main Street before heading northwest to the east side of Depot Square; from there it would travel through the Cold Spring Depot Restaurant's service area before having to navigate the vertical rock face between the service area and railroad tracks, continuing as an elevated structure to the rear of the Cold Spring public works yard and water treatment plant before entering Mayor's Park.



At Mayor's Park, the alignment would enter the park along the southern property line and continue to Fair Street where it would transition to a side path trail along the west side of Fair Street. This portion of the route would share the same route as Alignment No. 4 headed west to Little Stony Point.

Alignment No. 3 shares the same pitfalls of Alignment No. 2, including relying on private property access through the Cold Spring Restaurant service yard and significant rock removal within MNR property. This

alignment is not considered a viable alternative; however, further discussions with the property owners will be explored to fully vet the option.

#### Alignment No. 4

Alignment No. 4 travels the shared route from Dockside Park to Main Street before heading north on the west side of Fair Street as an 8-to-10-foot-wide side path, eventually transitioning onto the New York State Parkland property as an on-grade multiuse path.

The Fair Street community has experienced first-hand the increased popularity of the local hiking trails, parks and commercial areas, experiencing a sharp increase in vehicular and pedestrian traffic that has made the experience of Fair

Street more of a “cut-through” street to access Main Street. The Fair Street side path alignment has been presented to the Village of Cold Spring in previous iterations of the HHFT master planning process and received adamant opposition to the route due to concerns over quality of life impacts to the residential properties adjacent to and surrounding Fair Street.



If implemented, this alignment would have to navigate a varying right-of-way width which narrows significantly at the southern end of Fair Street. The narrow right-of-way limits the opportunity to provide the desired trail width and buffer to the street for at least 400 linear feet from Main Street to Cross Street. These constraints begin to lessen north of Cross Street and Northern Avenue as the right-of-way widens and buildings are setback further or are less frequent however front yard impacts would continue the length of Fair Street. The alignment also raises concerns of pedestrian and vehicular conflicts due to the number of driveway crossings which typically have vehicles backing out. This concern grows when approaching the residences on the southern end of Fair Street which have limited sight-lines due to the proximity of neighboring buildings.

The west side of Fair Street was selected for the alignment because it avoids most utility poles, allows for more opportunity to buffer the trail, slightly reduces the number of intersection crossings, and allows for a smoother transition to an off-road multiuse trail at the route's northern terminus near Little Stony Point. The west side alignment also provides direct access to Mayor's park, the park's angled parking, and the municipal parking lot. The alignment does directly impact all three of these facilities, requiring reconstruction of the park's perimeter fence, removal of a minimum of 10 angled parking spaces, and redesign of the municipal parking lot's entries, resulting in the removal of at least 2 center parking spaces.

As the route heads north past Mayor's Park, it would have to traverse the slopes adjacent to the tidal pond east of the MNR causeway, which would require the construction of a retaining wall or elevated structure for approximately 280 feet. Disturbance of the shoreline could allow for enhancements through invasive species management, revegetation with native species, and improving resilience by elevating the

area above elevation 8. Currently this area is at elevation 7 – 6.5 feet. The area is approximately 450 feet in length including the area adjacent to the tidal pond and south along a portion of Mayor's Park. It appears this area could be raised; however, this would affect the grades within the baseball field of Mayor's Park, requiring significant regrading and reconstruction of the field. If the field were left at existing grade, raising the road would require construction of a wall and modified pedestrian access into the park.

Beyond the tidal pond, the side path trail would traverse the right-of-way along the frontage of residential properties to the intersection of Fair Street and 9D, where it would transition to a multiuse trail through the New York State Parks property. As the trail exits Fair Street, the steep grades would need to be modified to better accommodate accessibility and may require a wall on the southwest side. The trail would continue up slope to the front the New York State Parks building before utilizing the shared route to enter Little Stony Point.

The alignment provides access to Main Street businesses and Mayor's Park and connects the key destinations of Dockside Park and Little Stony Point, but has limited interaction with the river itself and has had vocal community opposition. The alignment can accommodate all trail users; however, the circuitous routing, multiple intersections and driveway crossings, and reduced width necessary at points are concerns for safety. Clear wayfinding and traffic signage would be a necessity. The trail experience is also diminished traversing alongside Fair Street due to the limited buffer available, which further raises safety concerns for pedestrian/bicyclist and vehicular conflicts. Guardrails or other barriers may be needed to aid in clearly delineating between trail and roadway; however, in some cases these barriers could impair sight distances, reduce trail width, or create hazards as fixed objects and should be evaluated carefully, if proposed.

The route directs traffic into the village center's busy Main Street area, creating more congestion due to intersection crossings, increased parking demand, and removal of parking in select areas. The route can provide greater exposure for local businesses but could also impact on-road parking, making it more difficult for business patron turnover.

Alignment No. 4 minimizes environmental impacts by following an established right-of-way, utilizing areas of previous disturbance, and primarily avoiding sensitive resources and regulated areas; however, it provides limited opportunity for ecological enhancement or highlighting of the area's scenic beauty and would significantly impact the community fabric of Fair Street. Various private property impacts would be unavoidable and the increased traffic along the trail route would be considered by many as a detriment to the neighborhood's quality of life. Street tree removals, particularly at the southern end of Fair Street, would remove the quaint character of the street creating a more urban-feeling streetscape that is incongruous with the town's character.

#### Alignment No. 5

Alignment No. 5 travels the shared route from Dockside Park to Main Street, continuing east on Main Street to State Route 9D. Routing the trail through the busy Main Street corridor is quite challenging. To create a dedicated Main Trail facility along Main Street would require significant alterations to the roadway and streetscape. On-street parking on at least one side would have to be removed and the existing sidewalk reduced in width by a minimum of 2 feet. Removal of on-street parking is considered unlikely due to the lack of available nearby surface lot or garage parking facilities and the detrimental effect this would have on local businesses.



Pedestrians are well accommodated along the existing wide sidewalks on both sides of Main Street; therefore, any use of Main Street for the HHFT Main Trail should focus on better accommodations for bicycle traffic. The simplest and least impactful treatment would be to add shared lane markings and signage for the length of Main Street. This would not impact parking, street trees, or sidewalks; however, shared lanes are not considered a safe option for inexperienced cyclists and would likely result in some cyclists using the sidewalk. Alternatively, separated bike lanes could be installed on both sides of the street and parking could remain, but this would result in significant loss of sidewalk area. Separated bike lanes require the removal of street trees and sidewalk amenity areas to accommodate the 3-foot striped buffer and 5-foot-wide bike lane, resulting in the removal of at least 8 feet from both sides of the streetscape. Such a significant change to the streetscape is not considered viable as the character of Main Street is intrinsically tied to its wide sidewalks with outdoor eateries and sidewalk sales. The variation in storefronts and property access as well as sidewalk width would also not allow for a consistent final width of the walks if separate bike lanes were installed.



Whatever treatment is shown along Main Street, the alignment is anticipated to continue as a side path along the west side of Morris Avenue, State Route 9D once it reaches the intersection of Main Street and Morris Avenue. To accommodate a 10-foot side path, modifications to the roadway would be necessary from the intersection of Main Street and Morris Avenue to Northern Avenue. The approximately 8-foot-wide shoulder/parking aisle would need to be reduced at a minimum to 4 feet wide, but more than likely would need to be reduced to 2 feet wide to avoid permanent easements or acquisition of private property. All roadway alterations would require New York State Department of Transportation coordination and approval.

North of Northern Avenue, Morris Avenue narrows slightly, and the right-of-way widens, which helps to better accommodate the side path; however, challenges still persist. The trail would need to avoid the head-in parking along the Haldane High School athletic fields and would require an easement through the property. Continuing north, the side path would affect residential front yards including existing trees and hedges. Continuing the shoulder reduction through this area would help negate property impacts.



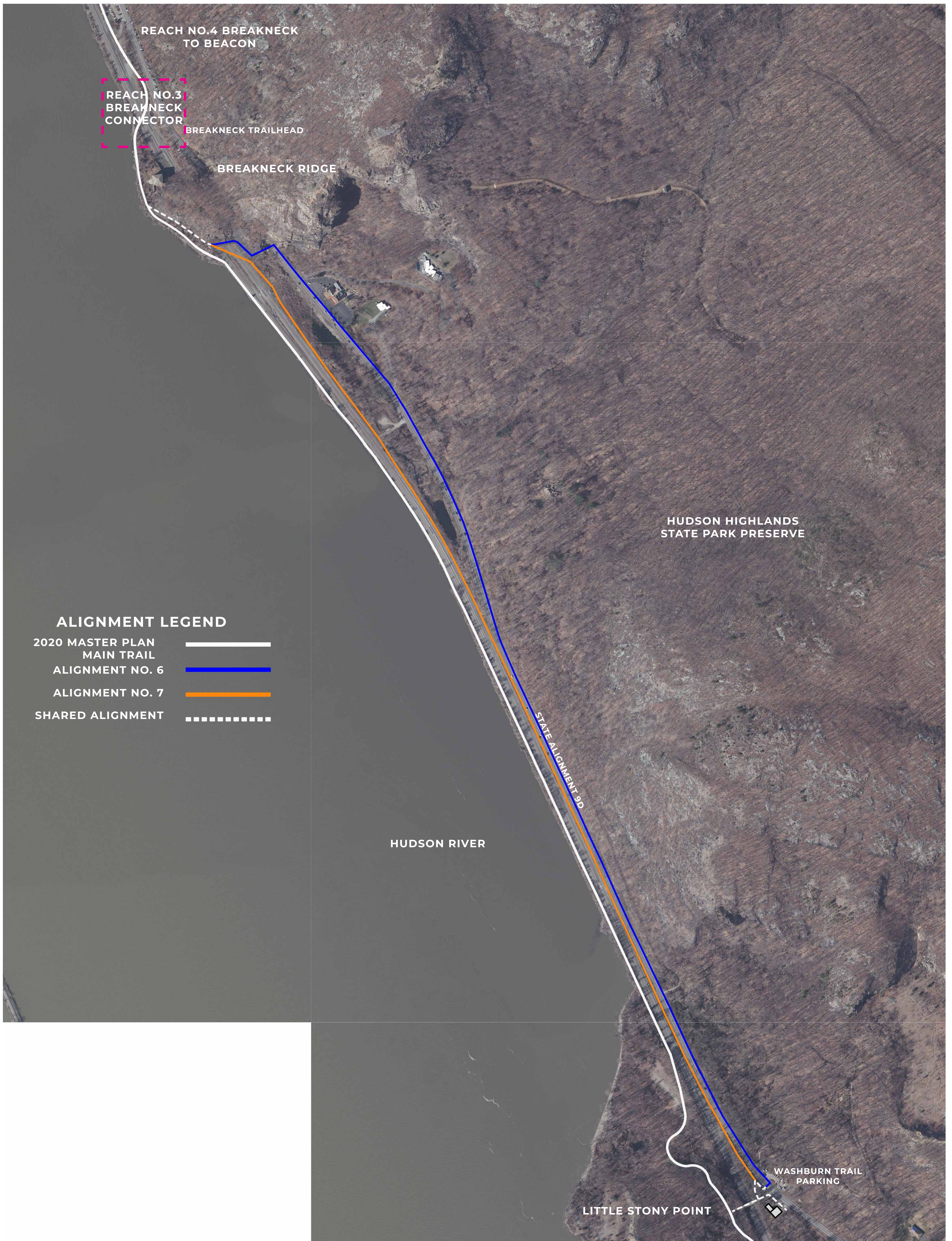
Further north, the grade of Morris Avenue begins to pitch to the north at an average slope of 8% down to the intersection with Fair Street. This section of Morris Avenue also has steep side slopes on both sides of the road. The west side drops off significantly and continuing the side path would require a retaining wall ranging in height from 2 to 10 feet. Clearing of vegetation would also be required.



The trail would then cross the Fair Street intersection at grade and continue along the west side of Route 9D, traversing the frontage of the New York State Park's office property before reaching the shared path at the entry to Little Stony Point. The side path would need to be set back to avoid utility poles, which would aid in buffering the trail from the roadway but would require grading to provide a shelf for the trail that would be depressed below the roadway slightly. A low retaining wall would be required along the eastern edge of the trail for approximately 200 feet. The addition of a guiderail along Route 9D would provide improved protection from the roadway.

While a side path route along Route 9D may fit the community fabric of Cold Spring better than Alignment No. 4 along Fair Street, the alterations required would impact private properties and the character of the streetscape. The route also fails to connect to the river and follows high-traffic roads, creating a less-than-unique trail user experience. Travelling alongside a state highway also diminishes the trail experience significantly while greatly raising the potential for pedestrian/bicyclist and vehicular conflicts. While vehicle speeds are reduced through this section of 9D, vehicles regularly exceed the posted limit and the sheer volume of traffic greatly increases the potential for accidents. Minimal buffers between the road and trail cannot be implemented in most cases without removal of parking or paved shoulders and may still result in impacts to private properties.

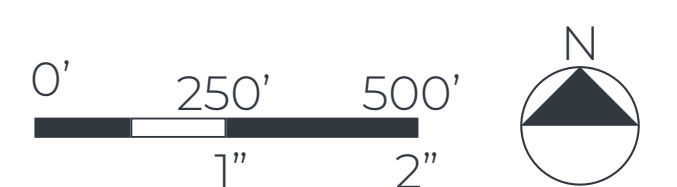
The significant challenges Alignment No. 5 has related to connecting along Main Street would require broad community support and, beyond the addition of shared-lane markings, are viewed as not feasible.



# HUDSON HIGHLANDS FJORD TRAIL

## ALTERNATIVE ROUTING ANALYSIS

### REACH NO.2 - LITTLE STONY POINT TO BREAKNECK



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## REACH NO. 2 –LITTLE STONY POINT TO BREAKNECK

### Alignment Descriptions

Refer to plan sheets 6 through 8 for a graphic representation of the following routes.

#### 2020 Master Plan Main Trail

Beginning on-grade at Little Stony Point continue along the west side of the MNR railway primarily via an elevated structure to the lower overlook at Breakneck Ridge point where there is currently a small beach area. Traverse the western edge of the rock slope and shoreline before transitioning to Reach No.3.

#### Alignment No. 6

Crossing from Little Stony Point to the east side of Route 9D, head north parallel to 9D as a sidepath until the approach to Breakneck Tunnel. As the alignment approaches the tunnel, transition to an elevated structure that continues to rise in grade above the tunnel as an elevated structure traversing the rock face of Breakneck Ridge. Continuing along the rock face the trail remains above the railroad tracks and along the east face of the ridge connecting to the proposed Reach No. 3.

#### Alignment No. 7

Leaving Little Stony Point, continue along the west side of Route 9D (between 9D and railroad tracks) headed north as a side path and quickly transition to a slightly elevated structure above the existing drainage swale. As the area of land between Route 9D and the railroad tracks begins to widen the alignment veers northwest following the east side of the railroad tracks. Continuing north the trail could transition to at-grade with the addition of fill or continue as a slightly elevated structure. Eventually the alignment is required to become an elevated structure to span the railroad tracks via a bridge and connect to the Shared Alignment as a cantilevered structure along the exposed rock face eventually connecting to the proposed Reach No. 3.

#### Shared Alignments – Reach No. 2

Some alignments utilize shared routes to reach key destinations. The plan sheets identify these routes as "Shared Alignment" to simplify the mapping and allow existing features to be visible.

Alignments 6 and 7 share routes connecting to Little Stony Point and Breakneck Trailhead. At Little Stony Point they share the improved accessible route from 9D and bridge crossing over the railroad tracks. At Breakneck they share a portion of the cantilevered structure traversing the ridge's south and west rock faces prior to connecting to Reach No. 3.

## REACH NO. 2 –LITTLE STONY POINT TO BREAKNECK

### Analysis and Rating Summary

This section provides an "at a glance" summary of the alignment ratings. For a full description of the alignments, refer to the section "Detailed Alignment Findings and Recommendations."

Based on the matrix criteria the highest total score achievable is 55 points. The alignments scored in Reach No. 2 from highest to lowest are:

- 2020 Master Plan Main Trail = 50 points
- Alignment No. 7 = 32 points
- Alignment No. 6 = 24 points

The 2020 Main Trail is the baseline rating to compare the other alignments against and evaluate if they provide feasible and prudent alternatives. For Reach No. 2, the Master Plan Main Trail alignment was found to be the most advantageous alignment due to its straightforward route, limited property impacts, and potential to showcase and access the shoreline and surrounding landscapes. While the route requires extensive coordination with MNR and would be challenging to construct, overall the route scores high in most categories as it best fits the vision and performance criteria established.

Both Alignments 6 and 7 have considerable challenges. Implementation of the routes would require extensive structures, alterations to infrastructure, and impacts to the geologic form of Breakneck Ridge. Both alignments would require extensive coordination with MNR and NYSDOT as each effect existing infrastructure for both parties. The overall user experience of both alignments is considerably less than the 2020 Main Trail due to their distance from the shoreline and close proximity to Route 9. Alignment 6 scores particularly low due to the long distance it follows Route 9D. These alternative alignments do not provide a net benefit to the project, community, or environment over the 2020 Master Plan Main Trail and are not recommended as prudent alternatives.

## REACH NO. 2 –LITTLE STONY POINT TO BREAKNECK

### Detailed Alignment Findings and Recommendations

Refer to plan sheets 6 through 11 for related information.

#### 2020 Master Plan Main Trail

The Master Plan Alignment continues from Little Stony Point to the west side of the train tracks quickly transitioning from an at-grade trail to an elevated structure following the Hudson River shoreline for the remainder of the route. An elevated structure is necessary due to the limited space of shoreline between the tracks and Hudson River and to achieve the targeted elevation of 8' for the Master Plan alignment. The alignment would touch down at-grade briefly near its northern terminus at Breakneck Ridge to provide access to an overlook area and key experiential space along the banks of the river and toe of the ridge. The shoreline alignment is consistent in elevation and grade and only reduces in width from 14 to 10 feet in selected areas due to site constraints. This reach ends with an overlook and water access site at the southern point of Breakneck Ridge before transitioning to Reach 3: Breakneck Connector at the DEP property and drainage chamber.

The Master Plan Main Trail alignment strives to follow the shoreline with the trail structure landward of the river's edge to the extent possible, and simultaneously parallel the MNR railroad tracks providing adequate horizontal clearances. Ongoing coordination with MNR would continue to vet the alignment's location and impact to existing infrastructure, culvert crossings, and required clearance distances. The trail would reduce in width from 14' to 10' as a general rule for the shoreline trail to accommodate clearances and navigate site constraints to lessen impacts.

As the alignment leaves Little Stony Point and parallels the MNR railroad it appears to be able to maintain 25' clear from the centerline of the west tracks for approximately 3,000 linear feet before the shoreline begins to narrow and a reduced clearance distance from the tracks would need to be agreed upon with MNR. The design team strives to minimize in-water construction of the trail and the variance would allow the width of the trail to be maintained and less trail construction within the water's edge. Along the alignment existing MNR infrastructure would necessitate the trail to bow out into the water for a short distance to provide a minimum of 6' clearance around the facility. The crossing of Breakneck Brook culvert may also require the trail to place "feet" into the water.

Other impacts related to this alignment include clearing of vegetation along the shoreline. Trees and scrub shrubs of various condition and desirability inhabit the landscape. The trail would be routed to avoid mature and desirable vegetation to the extent possible. Constructing along the shoreline would provide the opportunity to strengthen eroded sections, remove invasive vegetation, and improve the resiliency of the railway. The alignment would provide expansive views to the river and surrounding highlands as well as provide opportunities for direct water access. The route is entirely removed from vehicular traffic and has no road or driveway crossings. Property impacts are limited to MNR and NYS Parks parcels.



While the design of the 2020 Master Plan Trail alignment would need to be detailed extensively and construction would be difficult, the unique experience created far surpasses the other options within this reach which also require extensive engineering, costly construction, and result in greater physical and visual impacts.

## Alignment No. 6

Alignment No. 6 would be a sidepath trail along the eastern shoulder of Route 9D for the majority of its length and would require users to cross 9D at-grade to access Little Stony Point. The alignment, north of the Brook Trailhead, would need to transition to an elevated structure. The structure is needed to raise the alignment's elevation to span over the commercial and residential driveways prior to Breakneck Tunnel and then navigate the rock face of the ridge as a cantilevered structure. The route poses several unique challenges and would significantly impact existing infrastructure, viewsheds, geologic forms, and private property.

The shoulder area of Route 9D alone presents several challenges due to limited width, infrastructure, exposed rock, and steep side slopes. The shoulder is vegetated and averages approximately 8 feet wide however several existing structures and utilities interrupt that width throughout the route. Beginning at the Washburn parking lot utility poles exist within the shoulder for the first 3,500 linear feet of the alignment. Once the utility poles transition to the west side of 9D the alignment continues to contend with periodic guy poles supporting the main utility poles on the west side of the road north and south of the Brook Trailhead. For a main trail route to traverse the shoulder, significant infrastructure relocations and drainage improvements would be necessary. In conjunction, regrading and construction of retaining walls would be required to accommodate even a reduced trail width of 8'.



Due to the narrow width of the shoulder and steep slopes rising to the east for much of the alignment the grade would have to be cut and retaining walls or exposed rock face constructed to maintain an acceptable trail width of 10' minimum. An additional minimum 2' shoulder would be necessary along the road edge to provide a buffer and area to install a protective guardrail. Ideally, this buffer would be 5' wide.

Adding to the challenges of utilizing the shoulder is the fact that the area serves as drainage infrastructure for Route 9D. The shoulder is graded as a depressed swale intercepting runoff from Route 9D and the adjacent eastern slopes. The runoff is captured and then directed to a series of drainage structures and culverts located within the shoulder. The shoulder is a critical piece of low-impact infrastructure protecting Route 9D and the railroad tracks from becoming inundated during storm events while providing stormwater capture, mitigation and infiltration.

It is not considered feasible to regrade the roadway of 9D to capture runoff prior to the shoulder so the trail would have to allow for the capture and transfer of runoff under the trail surface via a series of structures and pipes. The new drainage system would connect to existing culverts under route 9D conveying runoff to the west side between 9D and the train tracks. Currently the vegetated swale removes sediment, heavy metals and pollutants from the runoff and aids in reducing water volume and

temperature, acting as a pretreatment for stormwater. If collected in structures and conveyed via pipes the runoff would have significantly less pretreatment and higher volumes resulting in more pollutants potentially reaching the river. The system can be designed with a permeable trail surface and base with perforated underdrains, but this requires careful engineering and would create a more complex and costly drainage system than existing conditions.

As the alignment approaches the Brook Trailhead and Breakneck Ridge the shoulder typically narrows further and drops-off in grade to the east. A structure to cross Breakneck Brook would be required and as the trail continues north it would have to transition to an elevated structure. Due to the trail's location on the east side of Route 9D it must cross to the west and navigate over Route 9, the railroad tracks, and rock face of Breakneck Ridge. To reach an elevation adequate



to cross along the rock face above Breakneck Tunnel and maintain a manageable running slope of 5%, the trail must begin to rise in elevation approximately 1,000 linear feet prior to the tunnel entrance. This length also accommodates spanning over the commercial and residential driveways adjacent to the tunnel. The construction of this alignment impacts the private properties within this area. The commercial property would need to redesign its driveway entrance and remove parking from along its frontage. Grading and temporary rights would be needed to construct the alignment and the finished installation would create a visual impact to the neighboring properties and overall appearance of the Route 9 corridor in this area.

The greatest impact associated with this alignment would be attaching a trail structure to Breakneck Ridge. Alterations to significant geologic formations does not align with the project goals or the State Coastal Consistency Policy regarding scenic quality and irreversible modifications to geologic forms. Breakneck Ridge and tunnel are iconic locations and the views to them from the south and west (via Storm King Mountain) would be affected by this alignment's construction. The structure would have to slope along the face to eventually make a transition to the Main Trail alignment. The design and construction costs associated with a structure attached to the rock face would be significant, if permitted. The structure would also be a permanent physical and visual alteration to Breakneck Ridge particularly as viewed from the river and surrounding Highlands. This alteration would likely be viewed by many as diminishing the natural beauty of the ridge, a signature landscape feature of the entire Hudson Highlands and half of the Highlands Gate (with Storm King Mountain).

The overall experience of this alignment would be paralleling the state highway. Route 9D is a major thoroughfare with vehicle speeds regularly exceeding the posted speed limit of 55 mph. Walking along the shoulder currently is an unpleasant and unnerving experience. Without significant alterations to the shoulder, the proposed alignment, while slightly improved, would still be in close proximity to the noise and speeds of passing high-speed traffic creating a less than peaceful or scenic experience. The route pulls users away from the shoreline providing no direct physical access to the river or foreshore and would only provide limited views of the river and surrounding landscape. During most of the year, vegetation



along the shoreline would obscure any view from the alignment to the river. The elevated trail would be a unique experience that could provide interesting views particularly from the rock face looking south but at significant construction cost and permanent alteration to a significant natural feature. However, this alignment’s overall experience, when considering the related costs and impacts to existing infrastructure as well as when weighed against other potential route options is not considered beneficial to the HHFT vision or surrounding community fabric.

Alignment No. 7

Alignment No. 7 shares several similarities with Alignment 6 and in so doing shares similar challenges. Paralleling two active transportation corridors also creates challenges unique to this alignment. After exiting Little Stony Point, Alignment No. 7 begins as a side path on the west side of Route 9D but quickly would need to transition to an elevated structure. Throughout this section the alignment parallels Route 9D within an area of land between 9D to the east and the railroad tracks to the west. This space varies in width but on average the space between the outer edge of the tracks’ ballast stone and western edge of Route 9D is approximately 15’ wide with little to no buildable shoulder. The MNR clear zone of 25’ from the centerline of track typically leaves 8’ or less to implement the trail within. The trail itself and corresponding barriers, needed particularly for safety to the tracks, would require coordination with MNR and approval with an agreed-upon clear zone.

The approximate 15’ wide vegetated drainage way, similar to the eastside shoulder for Alignment No. 6, is utilized as critical drainage infrastructure. In many areas because it is wider, and also accepting more runoff than the eastside of the road, it is graded as a deeper depression. There are several concrete headwall structures as well as areas of standing water as the runoff from both the tracks and



Route 9D is collected. One such area is a flagged wetland, approximately 1,400 s.f. in size. The area is vegetated primarily with herbaceous plants and periodic single or small tree clusters. The most common plant present is the invasive plant species Mugwort (*Artemisia*). Any construction occurring within this space could provide an opportunity for invasive species removal and establishment of native species.

Construction of the alignment within this space is assumed as an elevated structure, possibly as a center pier boardwalk, to allow current drainage to continue unimpeded. The elevation and trail surface would directly affect shading of the ground below. To allow adequate light and space for vegetation to grow the trail should be at least 4 feet above. If disturbed for trail construction, the area could be further improved for water collection and treatment. Filling the space or constructing retaining walls, while possible, was considered a detriment to the area and would need to be studied in more detail to understand the impacts to surface runoff, drainage, and wildlife movement.

As the alignment heads north the space between the two transportation corridors (highway and railroad) begins to widen. The trail alignment would follow the east side of the rail corridor outside the required

MNR clear zone. This pulls the route away from Route 9D, improving the user experience. While avoiding 9D and its steep side slopes, this area of land is low lying with large areas of surface water including tidal influenced pools and associated wetlands. The area has a significant watershed directly fed by Breakneck Brook to the east and is tidally influenced via an existing culvert connecting to the Hudson River. The capacity of these low areas and wetlands are critical to mitigating the more frequent severe storm events and will become more strained as sea levels rise. Any proposed alterations including the potential for added drainage infrastructure would need an in-depth hydrologic analysis.

As the trail diverges from 9D the existing topography is generally at elevation 6 necessitating either fill or an elevated structure to be at or above the target elevation of 8. If fill is placed, it would require approximately 1,400 cubic yards of material and the removal of vegetation along the edges of flagged wetlands for approximately 1,500 lf. In select areas small boulder retaining walls could be needed to ensure no direct wetland impact occurs. As the trail continues to head north, it eventually be required to transition to an elevated structure and continue as one sloped at no more than 5% for approximately 600 linear feet to rise in grade to eventually reach an elevation able to cross above the tracks at the minimum required 23 foot vertical clearance. A bridge structure would then take trail users west over the tracks and transition to the Shared Alignment along the west rock face of Breakneck Ridge.



While this alignment improves upon the trail experience and somewhat lessens the complexity of design and construction compared to Alignment No. 6; it still requires disturbance to significant drainage infrastructure, requires extensive elevated structures, impacts the geologic formation of and views to Breakneck Ridge, and parallels a highly trafficked state highway. The associated costs and impacts of the alignment coupled with a diminished user experience, in comparison to the 2020 Master Plan Main Trail, require this alignment to be rated lower and not considered to be a prudent alternate route.

### REACH NO. 3 – BREAKNECK CONNECTOR

The area between Breakneck Ridge Trailhead and the Breakneck Metro-North Station is one of the most concentrated areas of use along the potential trail route. Thousands of hikers arrive via train, car, bike and on foot to access Breakneck Ridge. With limited parking, no defined walking paths, and the typical daily traffic on Route 9D, congestion and safety issues abound. The 2015 master plan efforts identified this area as a critical project and slated it to be one of the first constructed developing full construction plans and bidding the project several times. The bids received each time were above the available funding and the project was put on hold. The 2020 planning effort has reexamined this area and made modifications to align the improvements to the current vision and goals of the updated master plan, but the ultimate goal of greater safety, convenience, and resiliency remains.

Breakneck Connector is a bridge structure that crosses the MNR railway linking the Breakneck trailhead and the proposed parking and train station improvement to the shoreline. Alignments in Reach 2 and 4

rely on the Breakneck Connector to continue the trail route regardless of which alignment is chosen in each Reach.



Amy K. and Scape to provide insight into current design/discussions

#### REACH 4: BREAKNECK CONNECTOR TO BEACON

##### Alignment Descriptions

Refer to plan sheets X through X for a graphic representation of the following routes.

Hudson Highland Fjord Trail - Alternative Alignments  
 Decision Matrix  
 12/11/2020

Criteria	Maximum Category Score	Reach No. 1 Dockside Park to Stony Point	Master Plan Main Trail	Alignment No. 1	Alignment No. 2	Alignment No. 3	Alignment No. 4	Alignment No. 5	Reach No. 2 Stony Point to Breakneck	Master Plan Main Trail	Alignment No. 6	Alignment No. 7		
<b>Alignment Type</b> – Alignments will be evaluated against desired width and clearances, inclusion of multi-modal users in a single facility, and consistency of form and material.	5			5	5	3	2	2		1		5	3	4
<b>Resiliency</b> – Alignments will be evaluated against desired minimum sea-level rise and 100-year flood elevations as defined in the Performance Criteria	5			5	5	5	3	3		4		5	4	5
<b>Traffic &amp; Safety</b> – Prioritize alignments that are universally accessible, limit at-grade crossings of roads, intersections and driveways, improve safety along Route 9D, promote traffic calming, provide separation or buffers to vehicular travel ways, and enhance emergency response	5			4	4	3	2	1		1		4	1	3
<b>Context</b> - Prioritize alignments that offer the most scenic, ecological, and cultural experience of the Hudson Highlands while blending seamlessly into the surrounding environment	5			5	3	3	3	2		1		5	2	3
<b>Connectivity</b> - Prioritize alignments that foster connection to the visual and physical beauty of the Hudson Highlands landscape, ecology, and history	5			5	4	4	3	2		1		5	2	3
<b>Diversity of Users</b> - Prioritize alignments that amplify universal accessibility, safety, and create a unique multimodal and recreational experience for all ages and abilities	5			5	5	4	4	3		2		5	4	4
<b>Congestion Management</b> - Prioritize alignments that manage access to popular destinations and sensitive sites, minimize negative impacts to community and environment, and promote new experiences, destinations, and narratives to explore	5			5	4	3	3	2		1		5	2	3
<b>Regional Support</b> - Prioritize alignments that expand the region's recreational amenities, enhance access to existing or planned facilities, and have a high level of community support	5			4	4	2	2	2		2		5	2	2
<b>Stewardship</b> - Prioritize alignments that minimize impacts to the environment while restoring ecological health and resiliency, promoting ecological processes, and preserving and enhancing the regions scenic beauty.	5			4	3	2	2	3		1		4	2	2
<b>Community</b> – Prioritize alignments that minimize impacts to private property, utilities, limits the need for easements and acquisitions and disruption to community fabric	5			5	3	2	1	1		1		5	1	2
<b>Implementation</b> - Prioritize alignments that are feasible, sustainable, and cost effective with fewer design challenges and impacts to the community	5		2	1	1	2	2	1		2	1	1		
<b>Total Score</b>			49	41	32	27	23	16		50	24	32		
<b>Ranking Per Reach</b>			1	2	3	4	5	6		1	3	2		

Note: Refer to Alignment Narratives and Plans for more detailed information

draft

## Category Scoring Summary

### Alignment Type

- 5 = Alignment is a single multi-modal facility consistent throughout route and meets all target widths and clearances
- 3-4 = Alignment is a single multi-modal facility consistent throughout the majority of the route and meeting minimum target width
- 1-2 = Alignment utilizes more than one facility type, with required width or clearances potentially not met

### Resiliency

- 5 = Entire alignment is at or above elevation 8 and promotes enhancements for stormwater, flooding, ice flow
- 3-4 = Majority of alignment is at or above elevation 8 with limited opportunity to promote enhancements for stormwater, flooding, ice flow
- 1-2 = Majority of alignment is below elevation 8 with no opportunity for enhancements

### Traffic & Safety

- 5 = Alignment has no at-grade crossings, and is separated from vehicular traffic
- 3-4 = Alignment has limited at-grade crossings, and is separated from vehicular traffic
- 1-2 = Alignment has many at-grade crossings, and limited or no buffer from vehicular traffic

### Context

- 5 = Entire alignment has a high quality of user experience and does not follow a vehicular right-of-way
- 3-4 = Majority of alignment has a high quality of user experience; a portion of the route may follow a vehicular right-of-way with a posted speed limit less of 25mph or less
- 1-2 = Lack of user experience with potential for some users to feel uncomfortable or excluded

### Connectivity

- 5 = Alignment results in the connection of targeted destinations while providing direct access to the waterfront
- 3-4 = Alignment results in the connection of targeted destinations with limited waterfront access
- 1-2 = Alignment does not result in the connection of targeted destinations or provides no waterfront access

### Diversity of users

- 5 = Alignment is universally accessible and maintains a consistent facility type throughout the route
- 3-4 = Alignment is universally accessible but transitions between one or more facility types throughout the route
- 1-2 = Alignment has limited accessibility, utilizes separate facility types for users, or could be uncomfortable for potential users

### Congestion Management

- 5 = Alignment reduces visitation at pulse points by providing alternative destinations, controls traffic onto sensitive sites, and promotes unique user experiences
- 3-4 = Alignment slightly reduces visitation at pulse points by providing limited alternative destinations, limited control of traffic onto sensitive sites, and relatively familiar user experiences
- 1-2 = Alignment exacerbates potential congestion by not providing alternative destinations, directing traffic onto main thoroughfares (pedestrian or vehicular), or sensitive sites

### Regional Support

- 5 = Alignment expands regional trail networks and recreational opportunities and has high level of community support
- 3-4 = Alignment supports growth of regional trail networks and recreational opportunities and has a majority community support
- 1-2 = Alignment has limited growth potential or compatibility with regional trail networks and recreational opportunities, or low community support

### Stewardship

- 5 = Alignment avoids, protects, and enhances ecological, cultural, and social resources
- 3-4 = Alignment has limited impacts to environment, private property and community fabric while mitigating all impacts to the extent feasible
- 1-2 = Alignment has significant impacts to environment while mitigating a limited amount or none of the impacts

### Community

- 5 = Alignment utilizes public lands with little to no impact to private property or community fabric
- 3-4 = Alignment has limited private property and community fabric while mitigating all impacts to the extent feasible
- 1-2 = Alignment has significant impacts to private property and community fabric while mitigating a limited amount or none of the impacts

### Implementation

- 5 = Alignment construction is straightforward, utilizes best practices and materials, with little to no impact on the community
- 3-4 = Construction has limited challenges and will create minor impact on the community
- 1-2 = Construction has significant challenges and impacts on the community.