

NEW YORK METROPOLITAN TRANSPORTATION COUNCIL



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Hudson River Valley Greenway Link

Task #6 Report

Alternate Design Solutions

August 16, 2010

Submitted By:



With:



TABLE OF CONTENTS

INTRODUCTION	1
MANHATTAN	5
BROADWAY BRIDGE APPROACH CORRIDOR (BBAC)	5
HENRY HUDSON BRIDGE APPROACH CORRIDOR (HHBAC)	17
BRONX	24
BROADWAY CORRIDOR (BC)	24
SERVICE ROAD CORRIDOR (SRC)	35
PALISADE CORRIDOR (PC)	45
YONKERS	63
RIVERDALE CORRIDOR (Y-RC)	63
HAWTHORNE CORRIDOR (Y-HC)	69
BUENA VISTA CORRIDOR (Y-BVC)	75
NORTH YONKERS CORRIDOR (Y-NYC)	84
WATERFRONT (WC)	100
APPENDIX: ENVIRONMENTAL SCREENING	

INTRODUCTION

The purpose of the design solutions proposed as part of Task 6 is to determine the feasibility of providing greenway facilities along the corridors under consideration. A determination is made at this level of the type of greenway facility that can physically fit along a particular right-of-way. Cross sections are developed in order to illustrate the existing width and configuration of the right-of-way, and to illustrate a possible design to accommodate a greenway facility. Other design options may be mentioned for a given corridor, and will be elaborated upon if the corridor is selected as the preferred alternative. The other purpose of this task is to flesh out the opportunities and constraints associated with each corridor. This information will be used to rank the corridors in Task 7 and select a preferred alternative. Detailed design will be developed in Task 8 for the preferred alternative.

The description of each of the corridors under consideration includes the corridor's existing conditions, along with the opportunities and constraints associated with it as a greenway candidate. Also included is an illustration of possible design solutions as cross sections for each corridor. Cost estimates are also included in order to provide an order-of-magnitude estimate of the cost to construct a given alternative. The cost estimates are intended for comparison purposes only and are not intended to determine construction budgets.

Dyckman Street has been identified as the southern boundary of the HRVGL study area. The existing Hudson River Greenway, running along the west side of Manhattan using portions of the Henry Hudson Parkway right-of-way, currently ends at Dyckman and Staff Streets. Future plans will bring the Hudson River Greenway to Dyckman Street along a waterfront path on the Amtrak right-of-way, and another route will carry it on a ramped series of switchbacks between the northbound and southbound Henry Hudson Parkway through an abandoned railroad building to Dyckman Street. The HRVGL project picks up the greenway at Dyckman Street and identifies a preferred route to carry the greenway into and through the Bronx and into Yonkers.

The Old Croton Aqueduct (OCA) Trail in Yonkers has been identified as the northern boundary of the HRVGL study area. The OCA is currently part of the Hudson River Valley Greenway, bringing the greenway south from the New Croton Reservoir. The OCA enters Yonkers just east of Warburton Avenue and continues south until it turns

east at approximately Ashburton Avenue. It turns south again just east of the Saw Mill Parkway and enters the Bronx through Van Cortlandt Park. The HRVGL project will identify the preferred route to create a connection to the OCA in Yonkers north of Ashburton Avenue.

Discussion of each corridor follows the outline below:

- Exiting Conditions
 - Traffic Volumes
 - Parking Regulations
 - Surrounding Land Use
- Opportunities
- Constraints
- Design Solutions
- Construction Impacts
- Construction Cost Estimate

The inland corridors being discussed are grouped by the borough or city in which they are located (Manhattan, Bronx, Yonkers). However, because of the unique nature of the waterfront corridor and its jurisdictions, it will be described separately and in its entirety. In addition, the Existing Conditions discussion for the waterfront corridor will contain a description of the physical characteristics of the shoreline, ownership of the shoreline and its adjacent property, and existing land use. Figures 1 and 2 illustrate the location of each of the corridors.

Following the discussion of design solutions is a chapter that provides an environmental screening of the project area. It identifies and summarizes the existing environmental conditions and sensitivities in the study area, outlines regulatory requirements relevant to the development of the corridors under consideration, and presents the findings by corridor. In addition, this section also provides demographic information about the study area including, population density, income and poverty

levels. It also includes information describing land use and zoning, parks and open space, and community facilities.



Figure 1_Manhattan and Bronx Corridors



Figure 2_Yonkers Corridors

Task 6_Design Solutions
Potential Greenway Corridors
Figure 1_Manhattan and Bronx Corridors
Figure 2_Yonkers Corridors

Hudson River Valley Greenway Link

RBA
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VALLEY
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LINK



MANHATTAN

BROADWAY BRIDGE APPROACH CORRIDOR

Dyckman Street / Seaman Avenue / 218th Street / Broadway

Existing Conditions

While overall roadway widths differ, Dyckman Street and Seaman Avenue are both configured with one lane of traffic in each direction, Class 2 striped bicycle lanes and on-street parking on both sides. However, for a short stretch of Seaman Avenue between Isham and 214th Streets, no bike lane exists.



Existing bicycle lanes along Dyckman Street and Seaman Avenue

Along 218th Street there is a bicycle lane, parking on both sides of the street, and one travel lane in each direction.



Sidewalk along north side of 218th
Street adjacent to Columbia University

Broadway between 218th Street and the Broadway Bridge has two travel lanes in each direction parking on each side, a six foot wide median, and is covered by the elevated subway. The sidewalks are 19 feet wide on the west side and 15 feet on the east. The emergency room entrance to New York Presbyterian Hospital is located on the west side of Broadway and its access is controlled by its own traffic light.

This route is designated as a proposed route on the New York City Cycling Map.



Sidewalk on west side of Broadway in
Manhattan leading to the Broadway Bridge

Parking Regulations

Parking regulations along Dyckman Street, Seaman Avenue and 218th Street consist primarily of alternate side of the street parking regulations (temporary parking prohibitions that alternate sides of the street by day to allow for street cleaning) on both curbs occurring between the hours of 9:00 AM and 12:30 PM.

Broadway between 218th Street and the Broadway Bridge consists of 'No Parking Anytime' regulations on both sides of the street.

Surrounding Land Use

Dyckman Street is primarily a commercial street, but also runs adjacent to the southern edge of Inwood Hill Park. There are currently no designated entrances to Inwood Hill Park from Dyckman Street.

Seaman Avenue is primarily a residential street with six story apartment buildings lining the blocks. A break in the residential buildings occurs at Isham Park between Isham Street and 214th Streets.

The south side of 218th Street is residential similar to Seaman Avenue, while the north side is lined by Columbia University's athletic complex.

The west side of Broadway is also lined by institutional uses – Columbia University and New York Presbyterian Hospital. The emergency room entrance to the hospital is located along this block, and is controlled by its own traffic light. The east side of Broadway is lined by commercial uses and an MTA facility.

Opportunities

- Dyckman Street provides direct access to the Hudson River waterfront park and the Dyckman Street Marina.
- Dyckman Street also provides an important connector to the existing greenways that continue south along the Harlem and Hudson rivers.
- Parts of the route run adjacent to Inwood Hill Park and Isham Park. There is the opportunity to place the route along park paths through Inwood Hill Park between 218th and Dyckman Streets. However, significant portions of the park are designated as Forever Wild by NYCDPR and development is restricted in

areas with that designation. Coordination with NYCDPR will be necessary to determine feasibility of this route.

- There may be an opportunity to capture property along 218th Street, adjacent to Columbia University to widen the sidewalk on the north side of 218th Street in order to be able to accommodate cyclists as well as pedestrians.
- Installation of a bicycle lane along 218th Street would necessitate a reduction in the width of the travel and parking lanes and could have a calming effect on traffic speeds.
- Transit Access

Nearby subway stations included:

- #1 train stations at Dyckman Street and Nagle, 207th Street and Tenth Avenue, 215th Street and Tenth Avenue.
- The A train station at Dyckman Street and Broadway

Bus routes along or near the corridor include:

- M100, Bx7 and Bx20 running along Broadway
 - Bx12 over the University Heights Bridge
 - M4 to Fort Tryon Park and points south
- This corridor provides a connection to the Broadway Bridge and the Bronx.

Constraints

- Cyclists are currently required to dismount and walk bicycles across the Broadway Bridge using designated walkways.
- Dyckman Street and Broadway are higher volume commercial streets.
- Seaman Avenue has an uphill slope from Dyckman Street to 218th Street. Other parts of the route are relatively flat. Should the route be placed along paths in Inwood Hill Park the steep slopes in the park would be a factor.
- Environmental Concerns - Routing the greenway through the park would require that new paths be developed. However, significant portions of Inwood Hill Park are designated as Forever Wild by NYCDPR and development is restricted in areas with that designation. Coordination with NYCDPR will be necessary to determine feasibility of routing the greenway through the park.

- This route directs users from Staff and Dyckman Streets away from the Hudson River to the Broadway Bridge, the Harlem River crossing (within the study area) that is furthest from the Hudson River.

Design Solutions

Possible design solutions include bicycle lanes, which already exist as Class 2 facilities along Dyckman Street, Seaman Avenue and 218th Street. NYCDOT is currently exploring the possibility of placing a more robust bicycle facility along Dyckman Street. Community groups have recommended a separated bicycle facility along the north side of Dyckman Street that would connect existing greenways along the Harlem and Hudson Rivers. Auto dependent uses along Dyckman Street could present challenges to this proposed design option. See Figures BBAC-1 and BBAC-2 for the recommended route to the Broadway Bridge and proposed cross sections of Dyckman Street, Seaman Avenue and 218th Street.

Another solution for future consideration would be the use of park paths in Inwood Hill Park to route the greenway between Dyckman Street and 218th Street. Much of this section of Inwood Hill Park is designated Forever Wild, which limits development of facilities of any kind. It may be possible, within Forever Wild designated areas, to enhance existing park paths. However, creation of new park paths is not feasible due to strict development restrictions within Forever Wild designated areas.

There is no striped bicycle facility on a short portion of Seaman Avenue between Isham Street and 214th Street. According to NYCDOT, at the time the bike lanes on Seaman Avenue were installed, NYCDOT did not install Class II facilities on blocks with speed bumps, therefore Class III markings were used for this block. Since then, NYCDOT has begun installing lanes where there are speed bumps. In the future, when the markings on Seaman Ave are refurbished or the roadway is resurfaced, Class II markings will be installed on this block.

It is recommended that cyclists and pedestrians share the ample sidewalk on the west side of Broadway to access the Broadway Bridge from 218th Street. This allows both pedestrians and cyclists to avoid crossing Broadway, in the north direction, and its higher traffic volumes. See Figure BBAC-1 for a cross section of a shared sidewalk facility along Broadway.

Seaman Avenue and 218th Street both have relatively low traffic volumes. Dyckman Street has higher traffic volumes and auto dependent stores. While traffic is more of an issue along Dyckman Street, existing bicycle lanes currently accommodate both motor vehicle and bicycle traffic. Broadway is a major arterial in the city and has higher traffic volumes. This was taken into account in the design recommendation, keeping bicycles and pedestrians off the street.

Construction Impacts

On street portions of this corridor would have minimal construction impacts as they primarily involve application of thermoplastic paint on existing pavement. If the corridor uses existing park paths, the impacts would also be minimal requiring only the addition of identification and directional signage. However, if new park paths were to be laid in order to connect the corridor through Inwood Hill Park, construction impacts could involve disturbance of parkland including possible removal of trees. This would be especially significant since most of Inwood Hill Park is designated as Forever Wild, which restricts development. Placement of a separated facility along the north side of Dyckman Street may require changes to existing drainage, and could necessitate lane closures.

Construction Cost Estimate

Thermoplastic Paint and signs for on-street portions including Dyckman Street, Seaman Avenue, 218th Street and the Broadway west sidewalk: \$33,000

Approximately 4,000 linear feet of park path if route were placed within Inwood Hill Park: \$700,000

Additional six feet of concrete sidewalk along 218th Street: \$120,000

If north side of Dyckman Street were improved to include a separated bicycle and pedestrian facility, cost would vary depending upon the amenities provided.

Broadway Bridge

Existing Conditions

A walkway currently exists on both the eastern and western sides of the Broadway Bridge. The width of the walkways varies, but in some sections the walkway is as much as 8 feet wide. Though the roadway is not striped for bicycles, it is possible to ride across the bridge using the traffic lanes. The walkway surface is a metal grid filled with concrete so it provides a suitable surface for biking and walking. However, bicyclists using the walkways are required to dismount and walk their bicycles across the bridge.



Approach to the west walkway over
the Broadway Bridge from Manhattan

The Broadway Bridge is currently designated as a “planned or proposed path” on the New York City Cycling Map.

Traffic Volumes

At the Broadway Bridge, peak hour traffic volumes are approximately 1,300 vehicles per hour (vph) per direction during peak hours. Pedestrian volumes along the western walkway of the Broadway Bridge were approximately 150 pedestrians per hour during AM and PM peak hours. There is a curb cut along the western sidewalk just south of the Broadway Bridge which is a driveway entrance/exit for the New York Presbyterian Hospital Allen Pavilion. There are approximately 50 to 75 vehicles turning in and 50 to 75 vehicles turning out of the driveway during AM and PM peak hours.

Parking Regulations

There are 'No Parking Anytime' regulations along the Broadway Bridge (between 220th and 225th Streets).

Opportunities

- Wide sidewalk along Broadway provides the opportunity to use it to accommodate both pedestrians and cyclists as they approach the Broadway Bridge in Manhattan.
- Extra capacity on the Broadway Bridge may allow for cyclists to have a protected on street crossing, allowing for the walkways to be used exclusively by pedestrians and eliminating the need for cyclists to dismount and walk bicycles across the bridge.
- While not part of a natural setting, the Broadway Bridge offers views of the Harlem River, the bluffs of Marble Hill and Inwood, and the Henry Hudson Bridge.
- The Broadway Bridge is an important link between the Bronx and Manhattan and serves as a practical transportation link for commuters and shoppers.
- The grade of the bridge is not steep offering a relatively flat Harlem River Crossing.

Constraints

- Of the Harlem River crossings considered for this study, the Broadway Bridge is the furthest from the Hudson River and offers the least in terms of a visual connection to the natural environment.
- Expansion joints on the bridge are a potential hazard for cyclists, as bicycle tires may get caught. These joints would have to be retrofitted to cover dangerous gaps.

Design Solutions

Bicycle and pedestrian access are currently accommodated over the Broadway Bridge. It is possible to continue this access as it is. Since cyclists are currently required to dismount and walk bikes across the bridge, another option may be to continue pedestrian access across the existing walkways and provide a bicycle facility on the

roadway. NYCDOT is currently exploring improvements to bicycle access over the Broadway Bridge.

Construction Impacts

Construction impacts on the Broadway Bridge would be minimal as it primarily involves application of thermoplastic paint on existing pavement. Adding protective coverings over expansion joints could disrupt the flow of traffic during installation, but this would also be of a minimal duration.

Construction Cost Estimate

Thermoplastic Paint and signs: \$6,500



Task 6_Design Solutions
Broadway Bridge Approach Corridor
Figure_BBAC-Index







- LEGEND**
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|---------------------|-----------------------------|---------------------------------------|------------------------------------|
| Study Area Boundary | Palisade Corridor | Service Road Corridor | Waterfront Corridor |
| Park/Open Space | Palisade Corridor Alternate | Service Road Corridor Alternate | Waterfront Corridor Desired Access |
| Railroad | Broadway Corridor | Broadway Bridge Approach Corridor | |
| Rail Station | Broadway Corridor Alternate | Henry Hudson Bridge Approach Corridor | |

Task 6_Design Solutions
Broadway Bridge Approach Corridor
Figure_BBAC-2

New York State Thruway Authority

RBA THE REGIONAL BUREAU OF ARCHITECTS

PARSONS BRINCKERHOFF

Hudson River Valley Greenway Link



HENRY HUDSON BRIDGE APPROACH CORRIDOR

Existing Conditions

The Henry Hudson Bridge Approach Corridor would follow park paths from Dyckman Street to the Henry Hudson Bridge walkway adjacent to the southbound lower roadway. The corridor would enter Inwood Hill Park from Dyckman Street west of the Henry Hudson Parkway and Amtrak's Empire Line, and follow the existing paved waterfront path past Dyckman Fields. It would then cross back over the tracks and into the main section of Inwood Hill Park via a pedestrian bridge just north of the softball diamonds. The bridge is not ramped and cyclists are required to carry their bicycles. NYCDPR is currently planning to install a tire rail so bicycles can be pushed along a channel instead of carried. Once on the east side of the tracks the bridge connects to park paths that lead to the entrance to the Henry Hudson Bridge walkway. From Dyckman Street, this corridor is entirely off-street, and surrounding land uses are entirely open space.

Opportunities

- Along the Hudson River, views of the river, Palisades, George Washington Bridge and old growth forest to the east.
- Proximity to recreational activities: softball diamonds, skating rink and soccer field.
- East of tracks the path goes through old growth forest providing a direct connection to the natural environment
- Completely off-street with no motor vehicle traffic.
- Existing walkway over Henry Hudson Bridge, reopened in June of 2010, after having been closed for rehabilitation, can be used to cross the Spuyten Duyvil

Constraints

- Stairs to bridge are not ADA compliant and present a challenge for cyclists who must carry bicycles up stairs

- Though park path already exists connecting to the Henry Hudson Bridge walkway, the path is within the Forever Wild boundary, which limits development of any kind. If improvements or enhancements are proposed for the path they could be limited by Forever Wild considerations. The path is also not ADA compliant.
- The Henry Hudson Bridge walkway is a sub-standard width for a shared use path.

Design Solutions

Design solutions could include improvements to existing park paths such as the installation of protective barriers to keep users on the paths and off the adjacent old growth forest. The picture below shows existing improvements recently made in Inwood Hill Park that may also be appropriate for the approach to the Henry Hudson Bridge walkway. Additionally, while the bicycle tire rail will improve bicycle access over the pedestrian bridge, constructing an ADA compliant ramp would improve both pedestrian and bicycle access.



Recent improvements to
Inwood Hill Park paths

Construction of a ramp could have an impact on existing views from Inwood Hill Park towards the Hudson River, and the extent of that impact would need to be studied further. While the existing walkway over the Henry Hudson Bridge provides a connection over the Spuyten Duyvil between the Bronx and Manhattan, its width is sub-standard and cyclists are forced to dismount and walk bicycles over the bridge. A

design solution could be considered to cantilever a 10-foot wide shared use walkway outboard of the existing bridge structure. Landing points in Manhattan and the Bronx could be placed in the same locations as the existing walkway. This would help minimize conflict with Forever Wild designated areas in Manhattan and tight right-of-way widths in the Bronx.

A suggestion was made by a TAC member to consider the possibility of taking one lane of traffic on the Henry Hudson Bridge in the southbound direction and converting it into a multi-use path. A preliminary assessment of traffic volumes on the bridge's southbound lanes was conducted, to determine its feasibility from a traffic operations standpoint. The following conclusions were drawn.

NYCDOT's *NYC Bridge Traffic Volumes 2007* (p. 164) showed a peak volume of 3,576 vehicles in the morning from 7-8 AM. There are currently four southbound lanes on the lower level of the bridge. It is assumed there were also four lanes in 2007 when this volume was recorded.

With four lanes of traffic, the 3,600 vehicles would result in about 900 vehicles per lane (vpl). The *Highway Capacity Manual* (HCM) provides guidance on levels of service for basic freeway sections under various design speeds. According to the HCM, with a design speed of 50 mph, volumes of 900 vpl would result in a level of service of C or better. However, this is an incomplete assessment of LOS on the southbound HHB.

What is unknown, however, is the actual *capacity* of the southbound HHB. The traffic volume of 3,600 vehicles per hour provides the vehicle *demand*. It is generally accepted that 1,200 to 1,400 vehicles per lane per hour (vplph) is the maximum capacity of a lane of traffic in a dense urban area. This does not account, however, for all parameters such as grade, weaving, or a toll plaza. A capacity analysis would adjust this ideal capacity of 1,200 to 1,400 vplph downward to the actual capacity that is observed in the field. This actual capacity would be compared to the volume of traffic to determine a volume to capacity ratio and a level of service.

As a result, although the 900 vpl would indicate a level of service resulting in excess roadway capacity, this cannot be actually determined without additional analysis.

Finally, the question of changing the HHB southbound to only three lanes would result in about 1,200 vpl in the peak hour. According to the HCM, this would result in the

high end of LOS C (close to LOS D). However, this calculation is similarly limited by the lack of a capacity analysis.

See Figures HHBAC-1 and HHBAC- 2 for route of and proposed improvements to this corridor.

Construction Impacts

Some potential impacts from construction equipment to old growth forest if improvements were made to existing paths.

Construction of a ramp to replace stairs of the pedestrian bridge would require the placement of heavy construction equipment on park land and the use of park land for staging such equipment. Construction noise could also be a factor.

Construction Cost Estimate

ADA Compliant Ramp: At the planning stages, there are too many variables involved with the design and construction of an ADA compliant ramp of that size to be able to develop an accurate cost estimate. Based on existing concrete and steel prices, the cost of such a ramp could be in the range of \$2 million, depending upon whether it will require minor retrofits or a major reconstruction of the span. Several examples of pedestrian bridges with ADA compliant ramps are located along the FDR Drive, carrying pedestrians from the residential neighborhood on the east side of Manhattan, over the FDR Drive, to the East River waterfront. Such bridges are located at 102nd Street, 78th Street, 71st Street, 63rd Street, 25th Street, 10th Street, Stuyvesant Town, Delancey Street, and Corlears Hook Park. The required vertical clearance over the railroad is higher (23 feet) than over the FDR Drive. Therefore the ramps would need to be longer.

Asphalt and gutters: installation of asphalt and gutters to control erosion = \$250,000

Cantilevered Walkway: \$30-35 million for design and construction

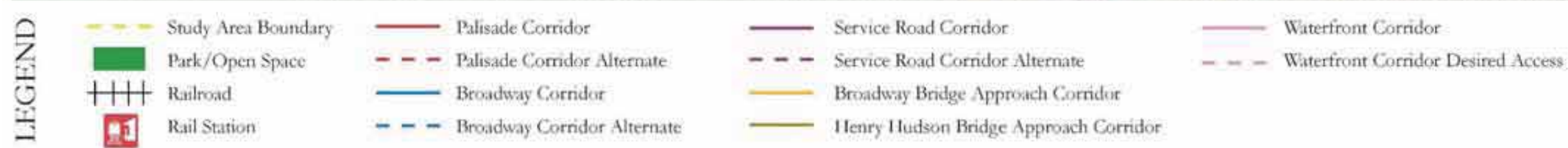


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Task 6_Design Solutions
Henry Hudson Bridge Approach Corridor
Figure_HHBAC-Index





Task 6_Design Solutions

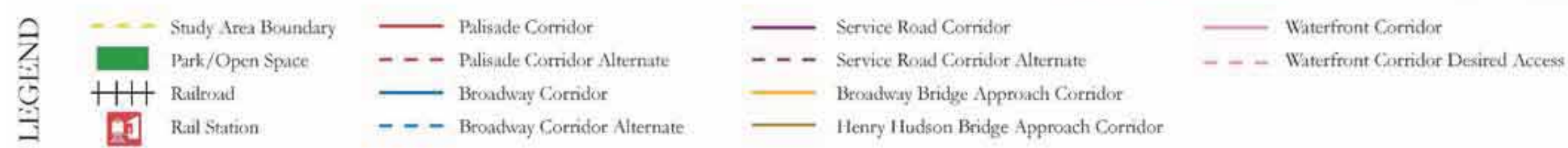
Henry Hudson Bridge Approach Corridor

Figure_HHBAC-1

NEW YORK STATE
TRANSPORTATION CORP.

Hudson River Valley Greenway Link





Task 6_Design Solutions

Henry Hudson Bridge Approach Corridor

Figure_HHBAC-2



Hudson River Valley Greenway Link



BRONX

BROADWAY CORRIDOR

Existing Conditions

Just north of the Broadway Bridge a route was recommended by the East Coast Greenway to direct cyclists away from the less desirable section of Broadway between the bridge and 242nd Street. This route was refined by NYCDOT and was recently implemented. The route takes a circuitous path along safer streets through Marble Hill, then along Tibbet Avenue, and emerges at 242nd Street via Manhattan College Parkway. Most of the striping consists of Class 3 shared lane markings. A short portion of the route is off-street, along a path adjacent to a parking lot between 240th and Manhattan College Parkway. North of the off-street portion the corridor has been divided into two possible routes. One would follow quiet, tree-lined, residential streets along Waldo Avenue and Fieldston Road. This portion of Waldo Avenue is part of the Fieldston Historic District. Another option for this corridor is to follow Manhattan College Parkway to Broadway and continue up Broadway to 261st Street. The east side of Broadway is lined by Van Cortlandt Park and the west side by commercial uses. North of the terminus of the Number 1 elevated subway platform at 242nd Street, Broadway opens into two lanes in each direction with on-street parking on both the east and west sides. The sidewalk on the west side of the street is between 10 and 15 feet wide. The sidewalk adjacent to Van Cortlandt Park on the east is 12 feet wide.



Fieldston Road north of
Mosholu Avenue



Broadway looking north from
242nd Street

Summary of Traffic Volumes

Along Broadway between 242nd Street and the Henry Hudson Parkway ramps, traffic volumes are 600 to 700 vph in the northbound direction and 550 to 800 vph in the southbound direction during the AM peak hour. During the PM peak hour traffic volumes are 650 to 850 vph in the northbound direction and 550 to 600 vph in the southbound direction. North of the Henry Hudson Parkway ramps, AM peak hour traffic volumes are approximately 800 vph in the northbound direction and 1,450 vph in the southbound direction. During the PM peak hour, traffic volumes are approximately 900 vph and 1,050 vph, in the northbound and southbound directions, respectively.

Parking Regulations

Tibbett Avenue generally consists of alternate side parking regulations (occurring between the hours of 9:00 AM and 12:30 PM). There is six-hour metered parking on the east curb between 240th and 238th Streets (between 8:00 AM to 10:00 PM Monday through Friday), except from 7:00 to 8:00 AM Monday and Friday for which there are alternate side restrictions.

Parking along Marble Hill, Kingsbridge, and Terrace View Avenues consists of alternate side parking regulations (8:30 to 10:00 AM).

Parking regulations along this stretch of 230th Street consist of either alternate side parking (occurring between the hours of 8:30 and 10:00 AM) or 'No Parking Anytime' regulations (between Tibbett and Corlear Avenues).

Along this section of Broadway, there is a mix of no regulations and alternate side parking restrictions (from 9:30 to 11:00 AM). There are also 'No Parking Anytime' regulations along the east side of Broadway between 254th Street and Lakeview Place (where the Henry Hudson Parkway on- and off- ramps are located).

Surrounding Land Use

Most of the land uses surrounding the East Coast Greenway route are residential (single family bungalows and multi-unit buildings) with commercial along Kingsbridge Road. Along the Waldo Avenue / Fieldston Road portion, single family homes prevail on larger lots. Broadway is a combination of open space (Van Cortlandt Park) to the east and commercial to the west.

Opportunities

- The slope of this corridor is relatively flat except for the portion through Marble Hill. There are also hills along Manhattan College Parkway.
- Views of the Harlem River and the bluffs of Inwood are seen from the Marble Hill portion of the route.
- This route provides connections to commercial uses along Broadway
- Provides connections to transit including the 1 train at Broadway and 242nd Street, buses along Broadway and the Marble Hill Metro North Station.
- The route also provides access to Van Cortlandt Park, one of New York City's premier parks.
- Waldo Avenue and Fieldston Road provide quiet, tree-lined streets for greenway users.

Constraints

- Aside from the Marble Hill portion of the corridor, there are no significant views.
- Steeper slopes occur in Marble Hill and along Manhattan College Parkway.
- This route steers users away from the Hudson River.

- The interchange at Broadway and the Henry Hudson Parkway presents safety issues for pedestrians and cyclists. It would require treatments to enhance safety at locations where vehicles enter and exit the parkway.
- Waldo Avenue, south of 250th Street is part of the Fieldston Historic District and routing the greenway here would require approval from the Fieldston Owners Corporation.
- Bicyclists are not allowed on the OCA Trail within Van Cortlandt Park

Design Solutions

East Coast Greenway Route:

The East Coast Greenway Broadway alternative route has been striped recently by NYCDOT. It includes bicycle lanes, shared lane markings, greenway signage, intersection improvements and an off-road path adjacent to a parking lot between Manhattan College Parkway and 240th Street. This route takes greenway users from the Broadway Bridge to the entrance to Van Cortlandt Park at 242nd Street, avoiding the congested, high traffic volume section of Broadway. See Figure BC-1.



Shared lane markings along Tibbett Avenue, part of the East Coast Greenway's Broadway alternative route.

Broadway Option A:

This option would place the bicycle lane between the parking lane and travel lane with a 3-foot buffer strip between the bicycle lane and travel lane. Currently the travel and parking lanes along Broadway are very wide with room for a protected bike lane.



Buffered bike lane

Photo Credit: Transportation Alternatives

Broadway Option B:

Given the available space along Broadway a bicycle lane could also be placed next to the curb with the parking lane acting as a buffer, creating a separation from the travel lane. There is a possibility for a design similar to NYCDOT's complete street design for Eighth Avenue in Manhattan as shown in the picture below.

See Figure BC-2 for cross sections of Broadway Options A and B.



Ninth Avenue complete street

Photo credit: NYCDOT

Van Cortlandt Park Option:

This option would route the greenway into Van Cortlandt Park at 242nd Street instead of along Broadway. The route could be off road, following park paths, including a bridle path over the Henry Hudson Parkway. It could continue on park paths north of the parkway and merge back onto Broadway at Mosholu Avenue via a park maintenance road. A major advantage of this option is that it takes advantage of the proximity of Van Cortlandt Park and avoids Broadway, especially the interchange with the Henry Hudson Parkway. A disadvantage of this option is that it routes greenway users furthest from the waterfront. Also, since bicycles are prohibited from using the OCA Trail in Van Cortlandt Park for safety reasons, there is no advantage to trying to connect to the OCA through Van Cortlandt Park. In addition, the Friends of Van Cortlandt Park wish to keep the path unpaved at this time. See the dotted blue line on Figures BC-2 and BC-3, which illustrates the possible route through Van Cortlandt Park.

Fieldston/Waldo Option:

From the East Coast Greenway Connector another option is to use Waldo Avenue and Fieldston Road to continue north. These streets are low volume, quiet, tree-lined, residential streets and offer a calmer on-street greenway experience for the user. Along

this route, bicycle lanes or shared lane markings can be used to designate the route. This portion of Waldo Avenue is part of the Fieldston Historic District and proposed improvements would require approval from the Fieldston Property Owners Association in order to be implemented. See Figures BC-2 and BC-3

Construction Impacts

Construction impacts along Broadway, Fieldston Road and Waldo Avenue would be minimal because it would involve primarily the use of thermoplastic paint. Additional signage and safety features would be necessary along Broadway as the route crosses the Henry Hudson Parkway entrance and exit ramps. A route through the park would also have minimal construction impacts because existing park paths would be used.

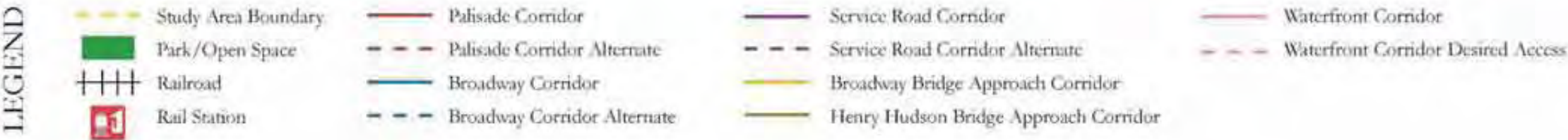
Construction Cost Estimate

Broadway Option A - Buffered Bike Lane on Broadway: Thermoplastic Paint = \$65,000

Broadway Option B – Complete Street on Broadway: \$100,000

Shared Lane Markings along Fieldston and Waldo: Thermoplastic Paint and signs = \$25,000

Stabilized Stone Screening for route through the park using the bridle path and park road. If the paths were reconstructed the cost could be \$700,000. It could be less costly because a large portion of this route would use existing paths.



Task 6_Design Solutions
Broadway Corridor
Figure_BC-Index

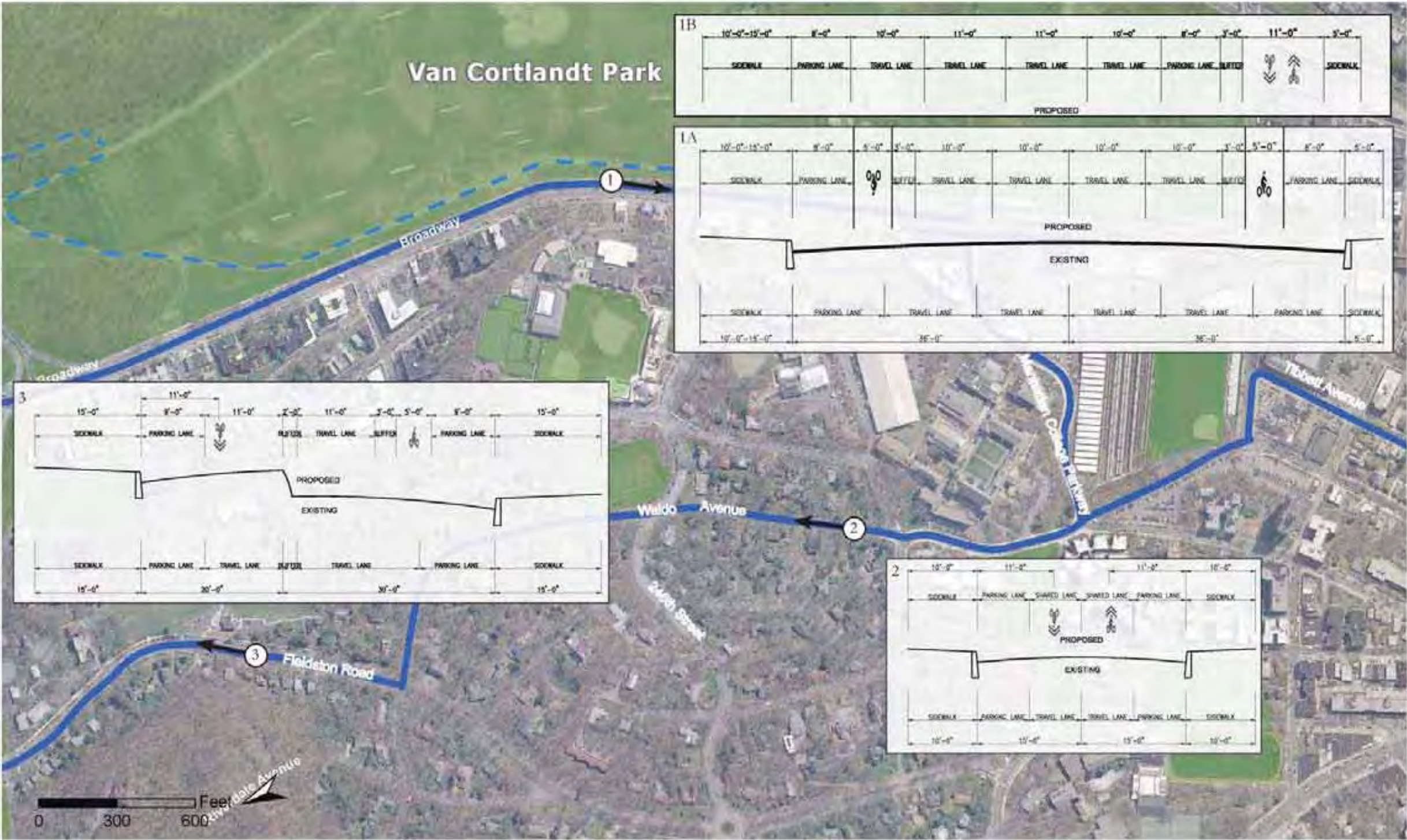




Task 6_Design Solutions
Broadway Corridor
Figure_BC-1

Hudson River Valley Greenway Link

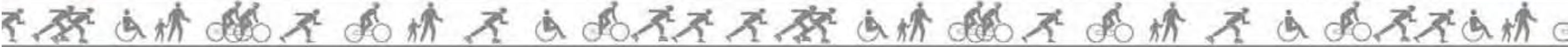


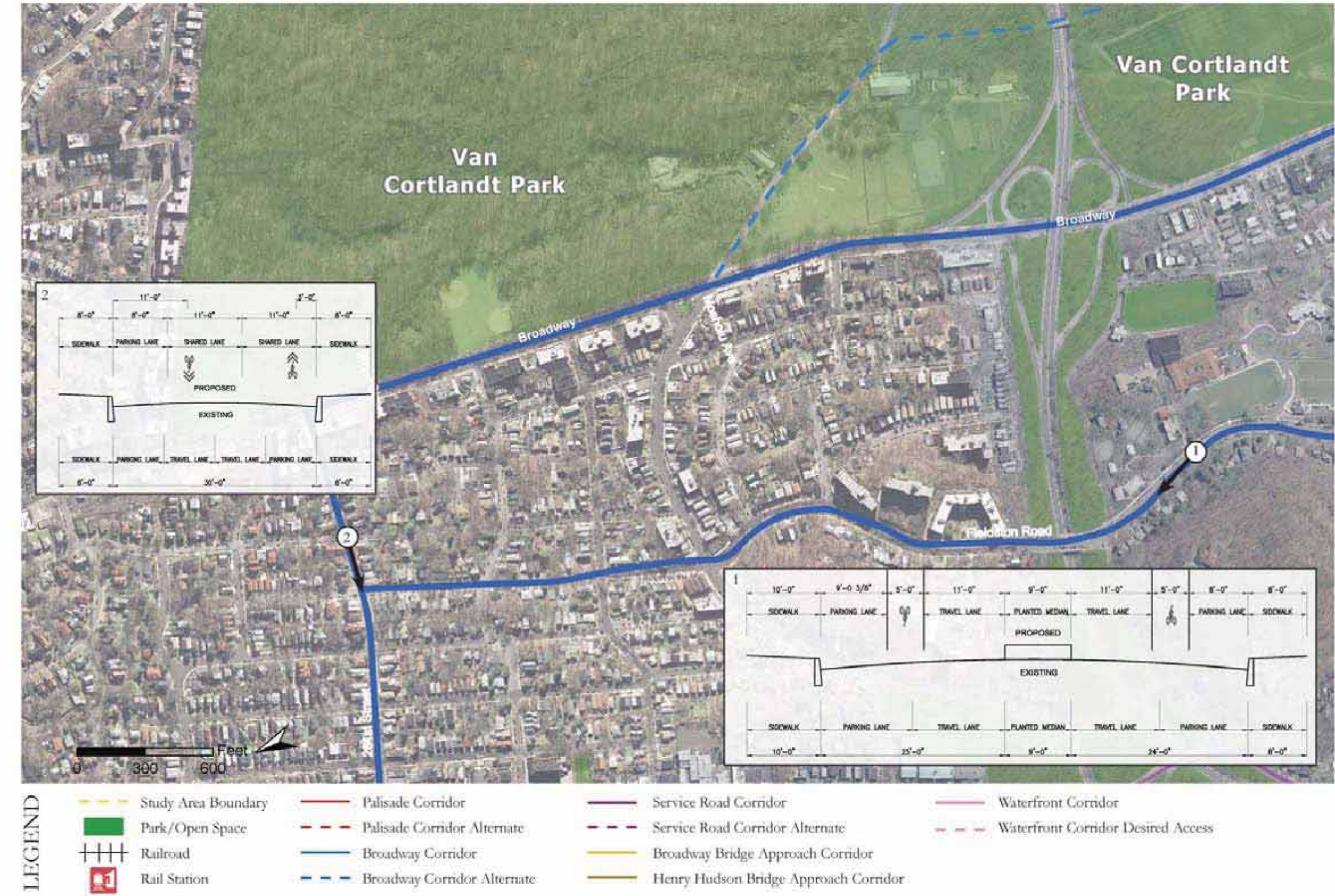


- LEGEND**

 - Study Area Boundary
 - Park/Open Space
 - Railroad
 - Rail Station
- Palisade Corridor
 - Palisade Corridor Alternate
 - Broadway Corridor
 - Broadway Corridor Alternate
- Service Road Corridor
 - Service Road Corridor Alternate
 - Broadway Bridge Approach Corridor
 - Henry Hudson Bridge Approach Corridor
- Waterfront Corridor
 - Waterfront Corridor Desired Access

Task 6_Design Solutions
Broadway Corridor
Figure_BC-2





Task 6_Design Solutions
Broadway Corridor
Figure_BC-3

NEW YORK METROPOLITAN TRANSPORTATION AUTHORITY

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Engineering, Planning & Architecture

Hudson River Valley Greenway Link



SERVICE ROAD CORRIDOR

Existing Conditions

The service roads to the Henry Hudson Parkway are multi-purpose roads, serving to provide access and egress to and from the Parkway, but also act as a local through route and bus route at times. Typically, the service roads, in both directions, have parallel parking on one side and No Parking on the other, where entrance and exit ramps merge with the Service Road. The Parkway itself meanders through and across the western Bronx creating irregular geometries with the existing street grid, leaving the service road a contributor to obscure, often wide and complex intersections with the local grid-bound side streets.

Service Road East (Northbound)

South of 239th St, the service road is narrow, with entrance and exit ramps at 238th St. North of 239th St, the road widens and remains wide enough to accommodate a bicycle facility. The exit and entrance ramps on the west side at 246th Street create irregular geometries with grid-bound side streets. At 252nd Street, the service road becomes a narrow two-way, residential road until its termination at Britton Road.



Narrow Service Road East south of 239th Street



Exit ramp merging with Service Road East south of 246th Street

Service Road West (Southbound)

From 252th St to 236th St, the service road is wide, leaving room for merging traffic at entrance and exit ramps. Aside from an exit ramp south of 249th St, the service road is disrupted south at 239th St, where drivers must make a 90-degree right turn (westbound) and then a 90-degree left turn across oncoming traffic to continue on the service road. The service road terminates at a right angle bend in the road intersecting with Independence Avenue and Kappock Street.



Exit ramp merging with Service Road West north of 237th Street

The Service Road Corridor includes Riverdale Avenue between 254th Street and the Yonkers City Line. Riverdale Avenue is 60 feet wide with two travel lanes in each direction and parking on both sides. Wide 15 and 20 foot sidewalks line this portion of Riverdale Avenue.

Summary of Traffic Volumes

Henry Hudson Parkway West is the southbound service road for the Henry Hudson Parkway. Traffic volumes on Henry Hudson Parkway West are approximately 725 vph north of 239th Street and 550 vph south of 239th Street during the AM peak hour. During the PM peak hour, these volumes decrease to 650 vph north of 239th Street and 300 vph south of 239th Street, respectively.

At its southern terminus (at Independence Avenue), Henry Hudson Parkway West has traffic volumes of 100 vph in the AM peak hour and 200 vph in the PM peak hour.

In the Bronx just north of 254th Street, traffic volumes on Riverdale Avenue are 650 to 700 vph in the northbound direction and 600 to 675 vph in the southbound direction during both peak hours.

Near the Bronx-Yonkers border (at 261st Street), traffic volumes are approximately 350 vph in the northbound direction and 450 vph in the southbound direction during both peak hours.

Parking Regulations

The curbside of the outer edges (east curb for the Service Road East; west curb for the Service Road West) has alternate side parking regulations. On the inner side of the Service Road, due to the frequent entrance and exit ramps, parking is restricted.

Most of Riverdale Avenue does not have parking regulations; however, between 259th and 261st Streets, there is one-hour metered parking for most of the day on weekdays and Saturdays (9:00 AM to 7:00 PM, except Sunday) with 30-minute alternate side parking regulations for street cleaning on most days (8:30 to 9:00 AM, Monday, Tuesday, Thursday and Friday).

Surrounding Land Use

On the outside edges of the Service Road, in both directions, mid- to high-rise residential buildings are the primary land uses along the corridor, with some single-family homes on west service road. Riverdale Avenue between the service roads and the Yonkers border is primarily commercial, with some residential and the College of Mount Saint Vincent north of 261st Street.

Opportunities

- Provides connections to multiple bus routes running along both the east and west service roads
- Direct route from upper Manhattan and through western Bronx
- Direct connection to and from the Henry Hudson Bridge
- Adjacent to linear parkway open space
- Riverdale Avenue provides the best on-street connection to Yonkers

Constraints

- Relatively high traffic volumes
- Relatively high vehicle travel speeds
- Intersections along the service roads have unpredictable and wide, multi-legged geometries which create challenges to safely accommodate cyclists and pedestrians
- Bus route on the right side of each Service Road would create conflicts between buses and cyclists
- In narrow sections, parking removal would be required to provide a safe and comfortable bicycle facility
- Service Road East (northbound) difficult to access from the Henry Hudson Bridge. Bridge walkway entrance is located on the west side of the Henry Hudson Parkway requiring a user to pass under the bridge or go to 232nd Street in order to access the east (northbound) service road.

Design Solutions

Relatively high traffic volumes, including buses, along both the north- and southbound service roads and Riverdale Avenue require that design solutions provide protection for cyclists.

Henry Hudson Parkway Service Road East (northbound)

From 227th Street to 239th Street, the proposed alternatives within the 20' of existing roadway vary in the effect each has on parking. . Option 1A would eliminate the parking lane, replacing it with a 6 foot wide buffered bicycle lane with a 3 foot buffer separating cyclists from motor vehicles in the 11 foot travel lane. Option 1B would establish a 12 foot wide shared lane, maintaining parking along the Service Road which is lined with mid- and high-rise residential buildings. See Figure SRC-1, Options 1A and 1B for proposed design solutions.

From 239th Street to 253rd Street the existing roadway width is 30 feet, and both alternatives maintain a parking lane, though in different capacities. Option 1A would have a typical buffered bicycle lane: a 5 foot bicycle lane with a 3 foot buffer next to an 8 foot parking lane. The remaining 14 feet of roadway space would be marked with an 11

foot moving lane and a 3 foot buffer on the west side of the Service Road. The travel lane would then be visually narrowed by two buffers, neither wide enough to fit a vehicle attempting to overtake another vehicle. Option 1B is a parking protected bicycle path, with an 8 foot curbside lane and 3 foot buffer. Option 1B could be more appealing to the typical greenway cyclist, but care must be given to the intersections with this type of treatment, particularly where there are turning conflicts between vehicles and cyclists. See Figure SRC-2, Options 1A and 1B for proposed design solutions.

Henry Hudson Parkway Service Road West (southbound)

The design alternatives for the Service Road West are very similar to that of the Service Road East, north of 239th Street. Option 2A is a typical buffered bicycle lane: a 5 foot bicycle lane with a 3 foot buffer next to an 8 foot parking lane. Option 2B, also like the Service Road East, calls for a parking protected bicycle path, with an 8 foot curbside lane and 3 foot buffer. See Figure SRC-2, Options 2A and 2B for proposed design solutions for the west (southbound) service road.

Riverdale Avenue

On Riverdale Avenue, traffic volumes are low enough that one of the two travel lanes in each direction can be safely removed to create room for a bicycle lane and median with left turn bays. See Figure SRC-3 for cross sections of proposed design solutions for Riverdale Avenue.

Construction Impacts

Construction impacts along the service roads would be minimal because it would involve primarily the use of thermoplastic paint.

Construction Cost Estimate

Options 1A, 2A, and 2B: Buffered Bike Lane between 227th Street and 253rd Street on both the east and west service roads: Thermoplastic paint and signs = \$65,000 each option

Option 1B: Shared Lane Markings between 227th and 239th Streets on the east service road; Thermoplastic paint and signs= \$5,000

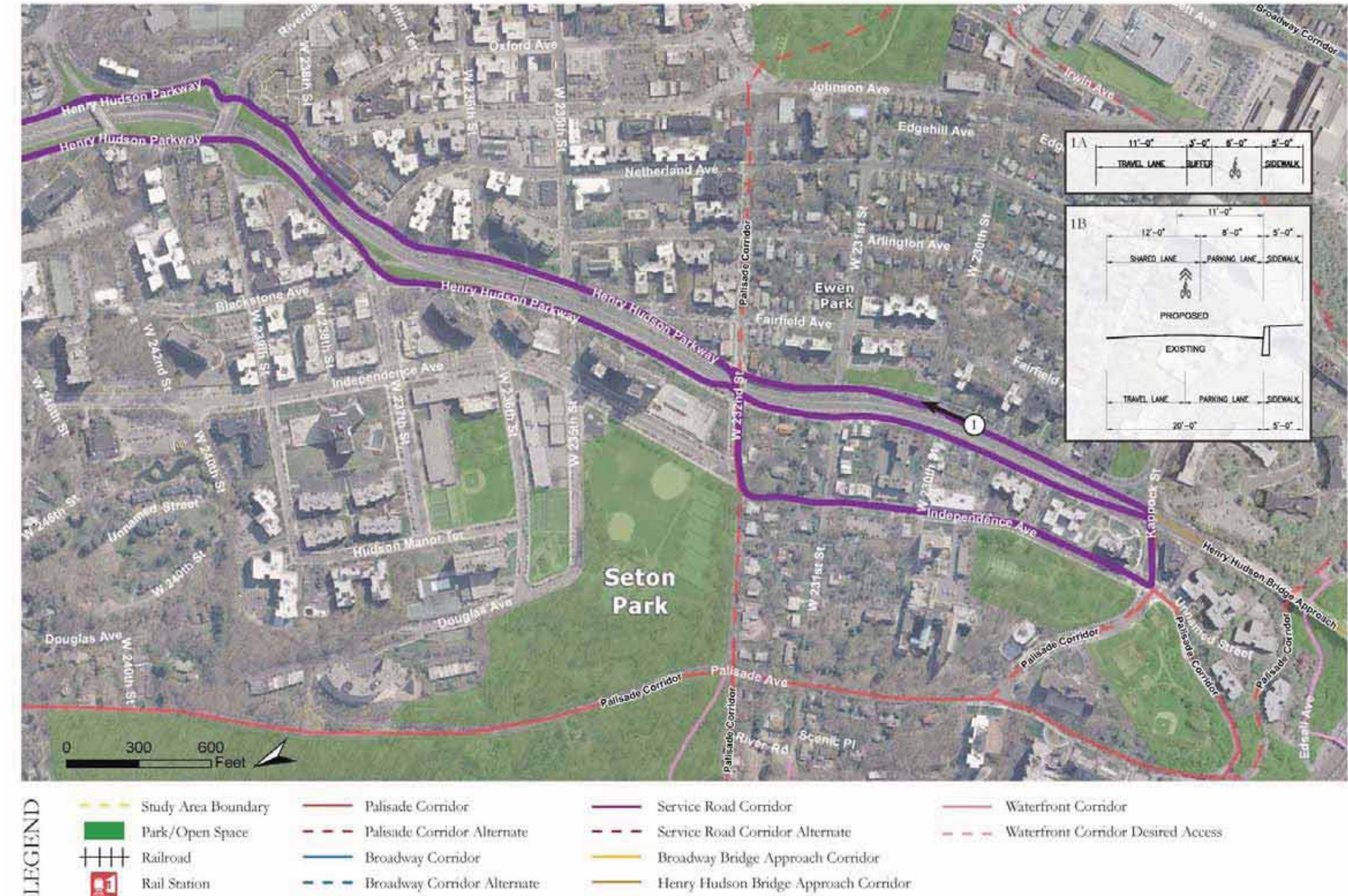
The Riverdale Avenue design solution would require a complete restriping of the roadway to move travel lanes, and add bike lanes and a median. Thermoplastic Paint and signs = \$68,000



- LEGEND**
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|---------------------|-----------------------------|---------------------------------------|------------------------------------|
| Study Area Boundary | Palisade Corridor | Service Road Corridor | Waterfront Corridor |
| Park/Open Space | Palisade Corridor Alternate | Service Road Corridor Alternate | Waterfront Corridor Desired Access |
| Railroad | Broadway Corridor | Broadway Bridge Approach Corridor | |
| Rail Station | Broadway Corridor Alternate | Henry Hudson Bridge Approach Corridor | |

Task 6_Design Solutions
Service Road Corridor
Figure_SRC-Index



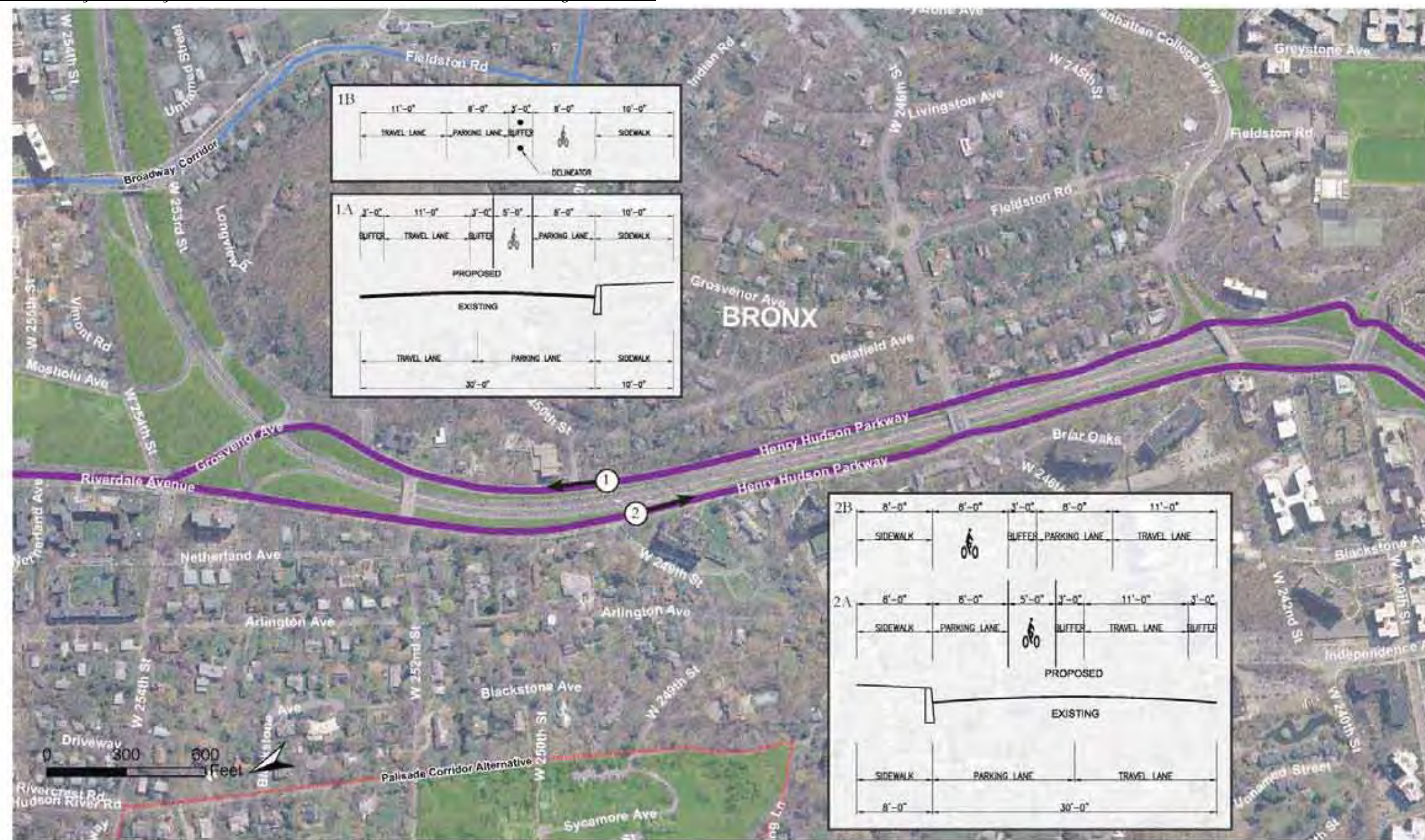


Task 6_Design Solutions

Service Road Corridor

Figure_SRC-1





Task 6_Design Solutions

Service Road Corridor

Figure_SRC-2

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Engineering, Inc.

Hudson River Valley Greenway Link





- LEGEND**
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|---------------------|-----------------------------|---------------------------------------|------------------------------------|
| Study Area Boundary | Palisade Corridor | Service Road Corridor | Waterfront Corridor |
| Park/Open Space | Palisade Corridor Alternate | Service Road Corridor Alternate | Waterfront Corridor Desired Access |
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| Rail Station | Broadway Corridor Alternate | Henry Hudson Bridge Approach Corridor | |

Task 6_Design Solutions
Service Road Corridor (Riverdale Avenue)
Figure_SRC-3



PALISADE CORRIDOR

Because of the varying characteristics of the Palisade Corridor, it has been divided for analysis purposes into four sections:

- Irwin Avenue to Johnson Avenue, Palisade Avenue between Independence and 232nd Street
- Palisade Avenue from 232nd Street to Spaulding Lane
- Riverdale Park Path and Independence Avenue Alternative
- Palisade Avenue from 254th to 261st Street, and 261st Street to Riverdale Avenue

Each section is discussed separately below.

Irwin Avenue to Johnson Avenue, Palisade Avenue between Independence and 232nd Street

Existing Conditions

This segment of the Palisade corridor allows greenway users to make an east-west connection from the Broadway Bridge to the Palisade Corridor. Irwin Avenue to Johnson Avenue is a steep and winding upward climb in the southbound direction. Johnson slopes downward under the Henry Hudson Bridge before rising again as it meets Palisade Avenue. These corridor segments are fairly narrow with one travel lane in each direction. Traffic volumes are low and speeds are low to moderate. On-street parking is located on the west (southbound) side of the street along this entire stretch. Irwin, Johnson and Palisade avenues have adequate sidewalks on both sides of the street, but no existing bicycle facilities.



Irwin Avenue south of 230th Street

Summary of Traffic Volumes

Traffic volumes on Palisade Avenue range between approximately 50 and 150 vph per direction during the AM and PM peak hours. Similar volumes were observed on Johnson Avenue and Irwin Avenue. Traffic volumes on Kappock Street west of Independence Avenue are 25 to 75 vph *per* direction during the AM and PM peak hours. East of Independence Avenue, traffic volumes on Kappock Street range from 100 to 200 vph.

Parking Regulations

Kappock Street and Johnson Avenue are characterized by a mix of 'No Parking Anytime' and alternate side parking regulations (occurring between the hours of 8:00 AM and 1:00 PM). Parking is allowed at all times on the west side, except for street cleaning twice a week. Most of the Palisade Avenue corridor has 'No Parking Anytime' restrictions. An exception is the segment between Independence Avenue and Kappock Street where parking is allowed on the west curb with alternate side parking regulations (11:30 AM to 1:00 PM, Tuesday and Friday).

Surrounding Land Use

Several multi-family buildings are located along this stretch of the Palisade Corridor. The John F. Kennedy High School campus is located just below the ridge near Spuyten Duyvil Creek.

Opportunities

- A pleasant viewing area is located at Half Moon Lookout in Spuyten Duyvil Shorefront Park. The lookout can be accessed from Palisade Avenue near the intersection with Independence Avenue and features an interesting angle of the Spuyten Duyvil Bridge, the George Washington Bridge and the New Jersey Palisades.



View Corridor from Half Moon Lookout of the Spuyten Duyvil Bridge, the George Washington Bridge and the New Jersey Palisades in early spring.

- These roadways provide access to Spuyten Duyvil Shorefront Park, which is owned by the New York City Parks Department. The park encompasses a triangular area created by Palisade Avenue, Edsall Avenue and the Metro North railroad. Greenway users can explore a network of graveled pathways and a footbridge which allows access to a natural spring and small pond which feed into the Harlem River.
- Palisade Avenue is surrounded by greenery and natural beauty; Henry Hudson Memorial Park is located to the east, while views of the Hudson River and Palisades appear to the west.
- Johnson Avenue connects to Edsall Avenue, which provides access to the Spuyten Duyvil Metro-North Station on the Hudson Line. In addition, three MTA bus routes (BxM1, Bx10, and B20) utilize Irwin Avenue and Johnson Avenue.

Constraints

- The steep slope of Johnson/Irwin and the drastic changes in elevation between Johnson and Palisade Avenues will likely present a challenge for all but the most experienced greenway users.
- Johnson and Palisade Avenue pass under the Henry Hudson Bridge. Support columns for the bridge are located on either side of the roadway which may present problems for visibility and roadway improvements along this portion.
- Making a left turn from W 230th Street to Irwin Avenue may be fairly complicated and dangerous for greenway users to navigate. It is an expansive intersection characterized by unconventional turning movements and large turning radii. The intersection of Riverdale Avenue, W 230th and Irwin Avenue should be given special attention for bicycle and pedestrian safety.



Looking southwest from W 230th street to Irwin Avenue.

Design Solutions

Relatively low traffic volumes along Irwin/Johnson and Palisade Avenue make this route a desirable one from a safety standpoint, even in areas where the roadway narrows.

Irwin Avenue/Johnson Avenue

The existing roadway width of Irwin/Johnson is 30' with travel lanes in both directions and parking on the east side. Shared-lane markings are proposed in both directions. Sidewalks are in suitable condition on both sides of the roadway. See Figure PC – 1.

Johnson Avenue/Palisade Avenue

The existing roadway width of Johnson/Palisade is 26' with travel lanes in both directions and parking on the north side. On-street parking should be removed to create a suitable width for shared-use on the roadway. This steep and windy road provides access to the Spuyten Duyvil Metro-North Station and experiences moderate traffic during AM and PM peak periods. A 2' buffer/shoulder could be added in each direction as an additional traffic calming measure. Sidewalk width and conditions are adequate on both sides of the street. See Figure PC-1.

Palisade Avenue between Independence and 232nd

Option A: Palisade Avenue is 24' wide at this location with a travel lane in each direction and parking on the west side. On-street parking should be removed to create a suitable width for shared-use on the roadway. Shared-lane markings are proposed in both directions. See Figure PC-2.

Option B: Grade and title maps obtained from the Bronx Borough President's Office show a 60' public right of way for Palisade Avenue. A more robust, separated greenway facility is proposed if this 60' is available. Residential parking would be maintained on the east side of the street.

An 11' bi-directional bikeway protected by a five-foot buffer and delineators is proposed on the east side of the street. The bikeway would be physically separated from travel lanes by the parking lane. See Figure PC-2.

Construction Impacts

Option A is not a major capital improvement and minimal construction impacts are anticipated. However, Option B would involve widening and reconstruction of Palisade Avenue. Parkland to the east of Palisade Avenue would be disturbed, and environmental impacts would need to be identified and minimized if Palisade Avenue was widened at this location.

Construction Cost Estimate

Option A: Shared Lane marking throughout Irwin, Johnson and Palisade up to 232nd Street: Thermoplastic paint and signs= \$15,000

Option B: Roadway widening, including a bi-directional bike lane and delineators: \$1.5 million.

Palisade Avenue from 232nd Street to Spaulding Lane

Existing Conditions

Palisade Avenue is a narrow, two-way residential street with direct views of the Hudson River waterfront and New Jersey Palisades. From 232nd Street to Spaulding Lane, a 7-15' dirt path runs along the west side of the roadway. The path, which is well used by pedestrians, is separated from the travel lanes by wooden guard rail and from Riverdale Park by a chain-link fence. Although the roadway is narrow along this entire stretch (< 30' wide), official maps from the Bronx Borough President's Office show additional unused right-of-way under NYCDOT ownership that could possibly be used for a more robust greenway facility. The path described above and pictured below may be part of the NYCDOT right-of-way.



A path runs along the west side of Palisade Avenue on the edge of Riverdale Park.

Summary of Traffic Volumes

Volumes range between approximately 50 and 150 vehicles per hour (vph) per direction during the AM and PM peak hours.

Parking Regulations

Parking is allowed on the east side of Palisade Avenue from Kappock Street to 231st Street. North of 231st Street, no parking is allowed on either side of the roadway.

Surrounding Land Use

Land use is predominately single-family residential to the east. A few high-rise apartment buildings are located near the intersection of Kappock Street and Palisade Avenue. Riverdale Park is to the west from approximately 232nd Street past Spaulding Lane.

Opportunities

- Views of the Hudson River and Palisades
- Palisade Avenue is surrounded by natural beauty; this on-street alignment has the feel of a greenway
- Lower traffic volumes than other on-street corridors under consideration
- Palisade Avenue provides direct access to Riverdale Park
- Opportunity to provide a Class 1 separated bicycle and pedestrian facility on adjacent path

Constraints

- Riverdale Park has been designated “Forever Wild” by NYCDPR. This designation has strong community support and presents a challenge to any new development that may be proposed on park property.
- The intersection of Palisade Avenue and Spaulding Lane presents a potentially dangerous situation for motorists, pedestrians and cyclists. Spaulding Lane has rough paving and drops steeply towards Palisade Avenue. Motorists turning right from Palisade Avenue have limited visibility at this sharp curve

Design Solutions

Option A: The roadway consists of one 10' travel lane in each direction with no curbs and no parking. Pedestrians currently use a 7-15' dirt path on the west side of the roadway. This path should be upgraded to ensure pedestrian safety and comply with ADA guidelines. Shared-lane markings are proposed on this portion of the roadway for cyclists. See Figure PC-3

Option B: Title and grade maps from the Bronx Borough President's Office indicate an 80'-120' right-of-way exists on this portion of Palisade Avenue. A physically separated greenway facility, with a bi-directional bike path and walkway is proposed here. One travel lane is maintained in each direction. See Figure PC-3

Construction Impacts

Construction could impact Forever Wild designated areas of Riverdale Park. Parkland to the east and west of Palisade Avenue could be disturbed, and environmental impacts would need to be identified and minimized if Palisade Avenue was widened at this location.

Construction Cost Estimate

Option A: Upgrade of existing path using stabilized stone screening: \$500,000

Option B: Widen existing path using stabilized stone screening: \$1 million

Riverdale Park Path and Independence Avenue Alternative

Existing Conditions

At the intersection of Palisade Avenue and Spaulding Lane is a parking lot serving Riverdale Park. At the north end of the parking lot is an unpaved trail that extends north to 254th Street. The trail appears to be in Riverdale Park. However official title and grade maps from the Bronx Borough President indicate that the trail is on NYCDOT right-of-way. An alternative to this option is to follow Spaulding Lane to Independence Avenue to 254th Street. Spaulding Lane has a steep grade and is one lane of traffic in each direction. Independence Avenue is also one lane of traffic in each direction with no parking and no sidewalks. See Figure PC-3.



Entrance to park path connecting
Spaulding Lane with 254th Street

Summary of Traffic Volumes

No traffic volumes were collected for Independence Avenue. Cars are not allowed through Riverdale Park.

Parking Regulations

No parking is allowed on Independence Avenue between Spaulding Lane and 254th Street. A parking lot is provided for Riverdale Park near the intersection of Palisade Avenue and Spaulding Lane.

Surrounding Land Use

Land use is parkland and single-family residential. Independence Avenue skirts around the Wave Hill gardens and cultural center, and the Riverdale Country School.

Opportunities

- The Riverdale Park path is a pleasant and flat route surrounded by forested open space.
- Independence Avenue provides access to the Wave Hill gardens and cultural center
- 254th Street connects Independence Avenue and the Riverdale Park path to the Riverdale Metro-North Station

Constraints

- Flooding and erosion in Riverdale Park is a community concern. Construction of a greenway facility through the park should not exacerbate this problem. Erosion is particularly a concern near the tennis courts at Riverdale County School.
- Riverdale Park has been designated “Forever Wild” by NYCDPR. This designation has strong community support and presents a challenge to any new development.
- Spaulding Lane has a steep change in grade between Palisade Avenue and Independence Avenue. Motorists and cyclists have limited sight distance at the intersection of Spaulding Lane and Palisade Avenue which may present traffic conflicts.
- Title maps from the Bronx Borough President’s Office indicate that this portion of Independence Avenue is privately owned. Private ownership presents a constraint for implementation of a public greenway facility, and may require permission from the ownership group.
- Independence Avenue is in poor condition for motorists, cyclists and pedestrians and needs to be repaved.

Design Solutions

It would be possible to leave the trail unpaved in its natural state. However this trail would not accommodate bicycles. In order to accommodate bicycles a stabilized stone screening could be installed. It is a permeable surface, consisting of a fine gravel substance held together with a binding agent. See the picture below of a stabilized stone screening in Nyack Beach State Park. Figure PC-3 shows the location of this existing trail.



Stabilized Stone Screening on path
in Nyack Beach State Park

Construction Impacts

Parkland would be disturbed, and environmental impacts would need to be identified and minimized if the park path was improved at this location.

Construction Cost Estimate

Stabilized Stone Screening: \$280,000

Palisade Avenue from 254th to 261st Street, and 261st Street to Riverdale Avenue

Existing Conditions

Palisade Avenue is a narrow residential street between 254th and 261st Streets with one travel lane in each direction, no parking and no curbs. 261st from Palisade to Riverdale Avenue continues this narrow residential character and has a sidewalk on the northern side. 261st street from Riverdale to Broadway is slightly wider with one travel lane in each direction and parking on both sides of the street.

Summary of Traffic Volumes

Volumes on Palisade Avenue range between approximately 50 and 150 vehicles per hour (vph) per direction during the AM and PM peak hours.

Parking Regulations

No parking is allowed on 261st Street from Palisade Avenue to Riverdale Avenue. From Riverdale Avenue to Broadway, parking is either unrestricted or restricted to 1 hour between 9AM and 7PM (except Sundays).

Surrounding Land Use

Land use is predominately single-family residential. 261st Street runs along the southern border of the College of Mount Saint Vincent campus.

Opportunities

- These residential streets have low traffic volumes and are surrounded by greenery
- The Riverdale Metro North Station can be accessed via 254th Street near the northern entrance to Riverdale Park.
- While the paved street is rather narrow, official maps from the Bronx Borough President's office show that there is additional right-of-way available.
- 261st Street provides an east-west connection from all inland corridors to Riverdale Avenue, the best on-street route into Yonkers.

Constraints

- The roadway is extremely narrow in some portions, and passes a number of residential driveways with poor visibility. The intersection of 261st and Palisade Avenue is a problem location that should be given attention for pedestrian and cyclist safety.
- Roadway width is extremely narrow in many places, and residential lots limit expansion for sidewalks or greenway facilities.

Design Solutions

Option A: Palisade Avenue is extremely narrow in this section. One travel lane in each direction share a 20' right-of-way with no curb or sidewalks. However, traffic volumes and speeds are low enough to recommend shared-lane markings in both directions.

Option B: Title and grade maps from the Bronx Borough President's Office indicate a 60' right-of-way exists on this portion of Palisade Avenue. If this width is available, a 10' sidewalk would be provided on the west side of the right-of-way, along with a 12' bi-directional bicycle lane, a 6' buffer and two 10' travel lanes. See Figure PC-4.

Construction Impacts

Installation of thermoplastic paint will have minimal construction impacts. However, widening this portion of Palisade Avenue could have significant impacts on adjacent property. Stone walls, fences, berms and other barriers would need to be relocated.

Construction Cost Estimate

Option A: Thermoplastic paint and signs: \$4,500

Option B: Roadway widening: \$3 million



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|---------------------|-----------------------------|---------------------------------------|------------------------------------|
| Study Area Boundary | Palisade Corridor | Service Road Corridor | Waterfront Corridor |
| Park/Open Space | Palisade Corridor Alternate | Service Road Corridor Alternate | Waterfront Corridor Desired Access |
| Railroad | Broadway Corridor | Broadway Bridge Approach Corridor | |
| Rail Station | Broadway Corridor Alternate | Henry Hudson Bridge Approach Corridor | |

Task 6_Design Solutions

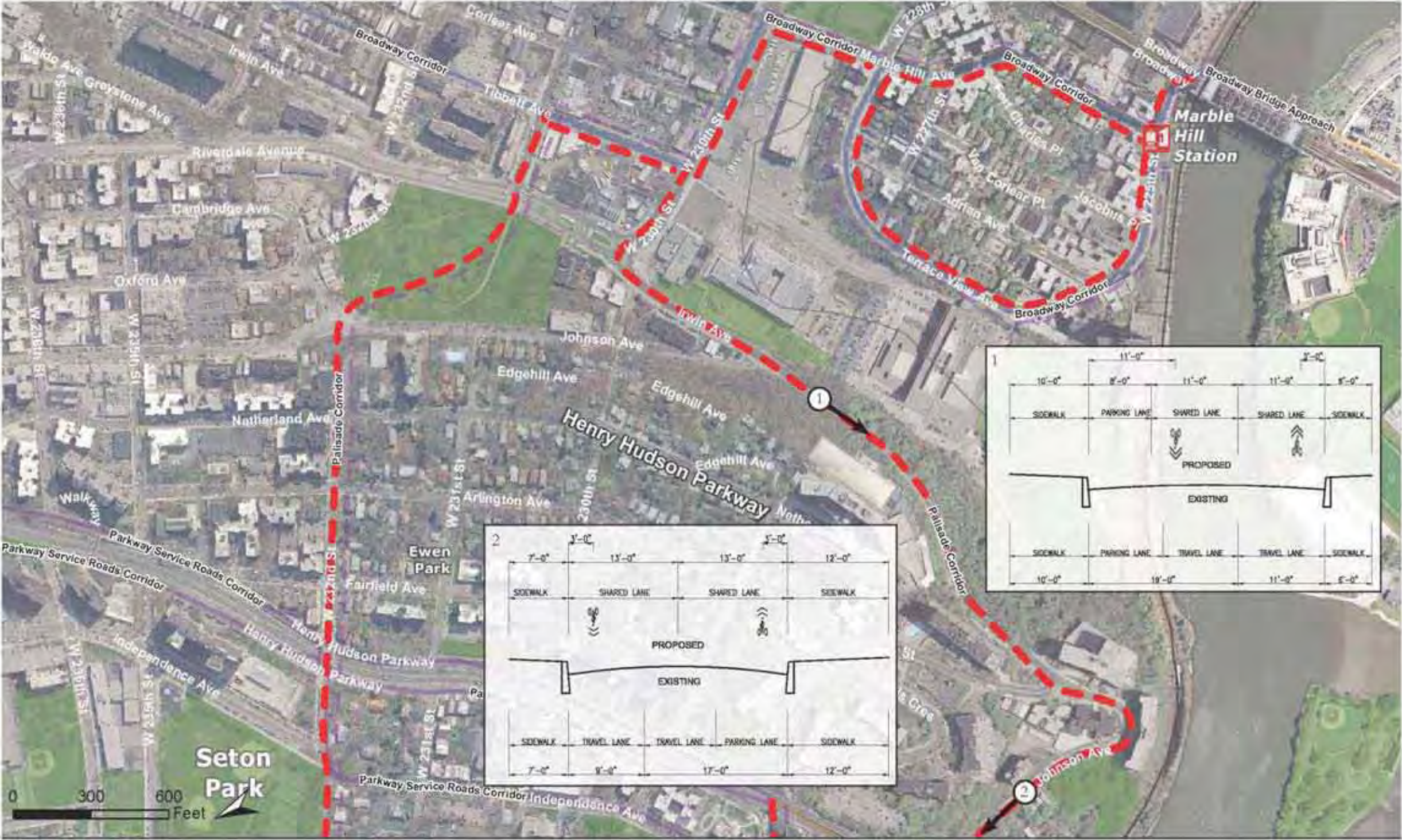
Palisade Corridor

Figure_PC-Index



Hudson River Valley Greenway Link





- LEGEND**

 - Study Area Boundary
 - Park/Open Space
 - Railroad
 - Rail Station
- Palisade Corridor
 - Palisade Corridor Alternate
 - Broadway Corridor
 - Broadway Corridor Alternate
- Service Road Corridor
 - Service Road Corridor Alternate
 - Broadway Bridge Approach Corridor
 - Henry Hudson Bridge Approach Corridor
- Waterfront Corridor
 - Waterfront Corridor Desired Access

Task 6_Design Solutions

Palisade Corridor

Figure_PC-1

Hudson River Valley Greenway Link





- LEGEND**

 - Study Area Boundary
 - Park/Open Space
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 - Broadway Corridor Alternate
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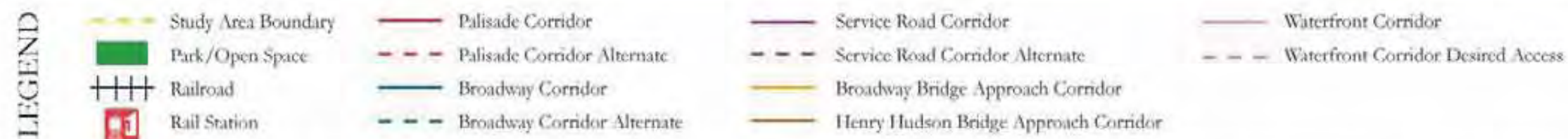
Task 6_Design Solutions

Palisade Corridor

Figure_PC-2

Hudson River Valley Greenway Link





Task 6_Design Solutions

Palisade Corridor

Figure_PC-3

RBA

Hudson River Valley Greenway Link





- LEGEND**
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|---------------------|-----------------------------|---------------------------------------|------------------------------------|
| Study Area Boundary | Palisade Corridor | Service Road Corridor | Waterfront Corridor |
| Park/Open Space | Palisade Corridor Alternate | Service Road Corridor Alternate | Waterfront Corridor Desired Access |
| Railroad | Broadway Corridor | Broadway Bridge Approach Corridor | |
| Rail Station | Broadway Corridor Alternate | Henry Hudson Bridge Approach Corridor | |

Task 6_Design Solutions
Palisade Corridor
Figure_PC-4



YONKERS

RIVERDALE CORRIDOR

Existing Conditions

Riverdale Avenue in Yonkers is a wide boulevard-like corridor with two travel lanes in each direction, on-street parking on both sides and a median. In some locations the curb-to-curb width is over 90 feet. Pedestrians are accommodated on ample 10-foot wide sidewalks. Main Street is approximately 42 feet wide with one lane of traffic in each direction and on street parking on both sides.



Riverdale Avenue between the
Yonkers/Bronx border and Valentine Lane

Summary of Traffic Volumes

In south Yonkers near Valentine Lane, AM and PM peak hour traffic volumes along Riverdale Avenue range from 350 to 500 vph per direction. Further north, near Prospect Street/Nepperhan Avenue, traffic volumes increase to 600 to 850 vph per direction during peak hours.

Under the *Alexander Street Master Plan EIS*, traffic volumes on Riverdale Avenue near Prospect Street/Nepperham Avenue are projected to increase to approximately 1,200 vph per direction in the AM peak hour and 1,000 per direction in the PM peak hour.

Parking Regulations

In Yonkers, parking along Riverdale Avenue is regulated by two-hour parking restrictions on Monday, Thursday, and Saturday. There are alternate side parking regulations from 8:00 AM to 12:00 PM between 263rd and Ludlow Streets; and from 1:00 AM to 7:00 AM between Ludlow and Main Streets. Also, there are 'No Parking Anytime' prohibitions on at least one curb along the section between Prospect and Main Streets.

Surrounding Land Use

Riverdale Avenue in Yonkers is primarily residential from the NYC City line to approximately Ludlow Street, with more commercial uses north of Ludlow. Between Franklin and Knowles on the west side of Riverdale Avenue is the Riverdale Avenue Greenway, that was put in place during the State's widening of the arterial, contributing to a feeling of expansiveness on the street.

Opportunities

- Provides the best on-street connection between Yonkers and the Bronx
- Provides access to commercial uses near downtown
- Access to bus routes along Riverdale Avenue

Constraints

- In Yonkers, this corridor is furthest from the water and has no water views or other significant views
- Least presence of foliage of the three corridors being analyzed in the southern part of Yonkers
- Wider street with higher traffic volumes and speeds than other parallel corridors

Design Solutions

High traffic volumes along with extra capacity on Riverdale Avenue contributes to higher vehicle speeds and an exposed, unsafe feeling for cyclists. In order to control vehicle speeds and create a safer cycling experience it is recommended that one travel

lane in each direction be removed and replaced with a buffered bicycle lane. Buffers between the bicycle lane and the travel lane and between the travel lane and the median will narrow the usable space available for motor vehicles and will reduce their speeds. Main Street is not wide enough to accommodate a bicycle lane, but could accommodate shared lane markings between Riverdale Avenue and the Yonkers waterfront.

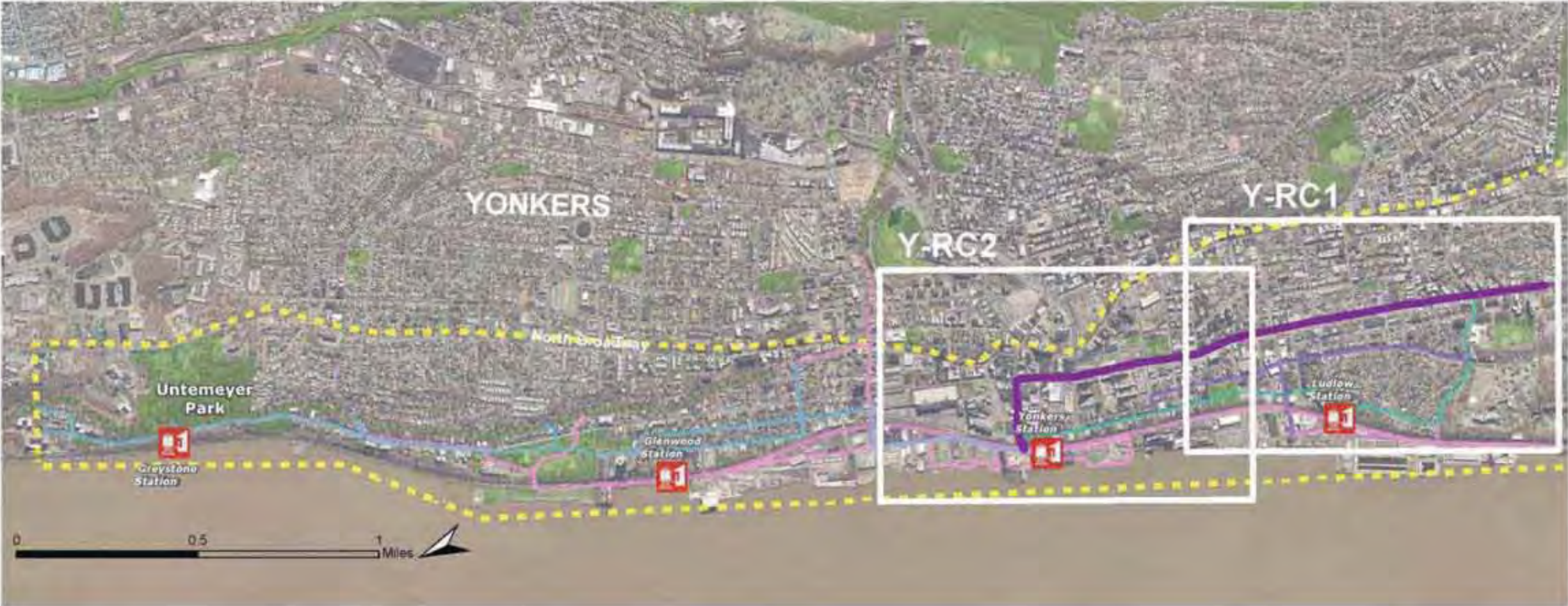
Figure Y_RC-1 illustrates two options for providing a buffered bicycle lane along Riverdale Avenue. The difference between the two options is due to the differences in the width of the existing median at various locations along Riverdale Avenue. (A 9-foot median south of Valentine Lane and a 24-foot built median between Post and Morris Streets.) Figure Y_RC-2 illustrates proposed redesigns of Riverdale Avenue, with a 14-foot existing median at Downing Street, and Main Street between Riverdale Avenue and the railroad tracks.

Construction Impacts

Design solutions for Riverdale Avenue would involve striping bicycle facilities and removing a travel lane, each of which would require the application of thermoplastic paint but minimal disruptions.

Construction Cost Estimate

Restriping of Riverdale Corridor and Main Street: Thermoplastic paint and signs = \$55,000



- LEGEND**
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|---------------------|------------------------------------|-------------------------------|
| Study Area Boundary | Old Croton Aqueduct State Trailway | Hawthorne Corridor |
| Park/Open Space | Riverdale Corridor | Buena Vista Corridor |
| Railroad | Waterfront Corridor | Waterfront Corridor Alternate |
| Rail Station | North Yonkers Corridor | |

Task 6_Design Solutions
Yonkers - Riverdale Corridor
Figure_Y-RC-Index





- LEGEND**

 - Study Area Boundary
 - Park/Open Space
 - Railroad
 - Rail Station
- Old Croton Aqueduct State Trailway
 - Riverdale Corridor
 - North Yonkers Corridor
- Hawthorne Corridor
 - Buena Vista Corridor
 - Waterfront Corridor
 - Waterfront Corridor Alternate

Task 6_Design Solutions
Yonkers - Riverdale Corridor
Figure_Y-RC-1





Task 6_Design Solutions
Yonkers - Riverdale Corridor
Figure_Y-RC-2



HAWTHORNE CORRIDOR

Existing Conditions

Between Valentine Lane and Ludlow Street, Hawthorne Avenue has one lane of traffic in each direction with parking on both sides. North of Ludlow the street narrows and there is parking on only one side of the street. Ample sidewalks on both sides of the street provide adequate space for pedestrians throughout this corridor.



Hawthorne Avenue between
Valentine and Ludlow

Summary of Traffic Volumes

Hawthorne Avenue operates with two-way traffic south of Vark Street. Traffic volumes along this section during the AM peak hour are approximately 300 to 350 vph in the northbound direction and 150 to 200 vph in the southbound direction. During the PM peak hour, traffic volumes are 100 to 150 vph per direction.

Under the *Alexander Street Master Plan EIS*, traffic volumes on Hawthorne Street are not projected to increase. However, at Vark Street the Hawthorne Corridor transitions to Buena Vista Avenue where traffic volumes will approximately double with the new waterfront development (see Buena Vista Avenue Corridor for details).

Parking Regulations

Along Hawthorne Avenue, parking is regulated by alternate side parking restrictions (from 9:00 to 11:00 AM). There are also 'No Parking Anytime' prohibitions on the west curb between Knowles and Herriot Streets.

Surrounding Land Use

Between Valentine Lane and Ludlow Street, Hawthorne Avenue is primarily single family residential with an elementary school at Beechwood Terrace, and some multiple family residential closer to Ludlow. North of Ludlow, Hawthorne Avenue is primarily multiple family residential with another school, a vacant city-owned lot and O'Boyle Park rounding out its land uses.

Opportunities

- Connection to O'Boyle Park
- Relatively low traffic volumes and speeds
- Relatively flat terrain
- Bee Line Bus Route between Valentine Lane and Herriot Street
- One block from other bus routes along Broadway
- Connection to Ludlow Metro North station at Ludlow Street

Constraints

- No significant views
- Too far east for any views of Hudson River
- Other than O'Boyle Park no direct connection to natural settings
- Transition to Buena Vista Avenue at Vark Street could be problematic due to increased traffic volumes on Buena Vista Avenue as a result of the Alexander Street waterfront development.
- The corridor passes through a short industrial stretch along Knowles Street, which is frequently used by trucks.

Design Solutions

Throughout the length of this corridor between Valentine Lane and Vark Street there is enough room to place Class 3 shared lane markings. Traffic volumes and speeds are lower along this corridor than on Riverdale Avenue, allowing for the use of a Class 3 facility instead of something more robust. See Figure Y_HC-1 for cross sections of Hawthorne Avenue near Valentine Avenue and Ludlow Street. See Y_HC-2 for a cross section of Hawthorne Avenue at O'Boyle Park.

Construction Impacts

Because the design solution will require only the application of thermoplastic paint to the pavement, construction impacts will be minimal along this corridor.

Construction Cost Estimate

Thermoplastic Paint and signs: \$14,000



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| Study Area Boundary | Old Croton Aqueduct State Trailway | Hawthorne Corridor |
| Park/Open Space | Riverdale Corridor | Buena Vista Corridor |
| Railroad | North Yonkers Corridor | Waterfront Corridor |
| Rail Station | Waterfront Corridor Alternate | |

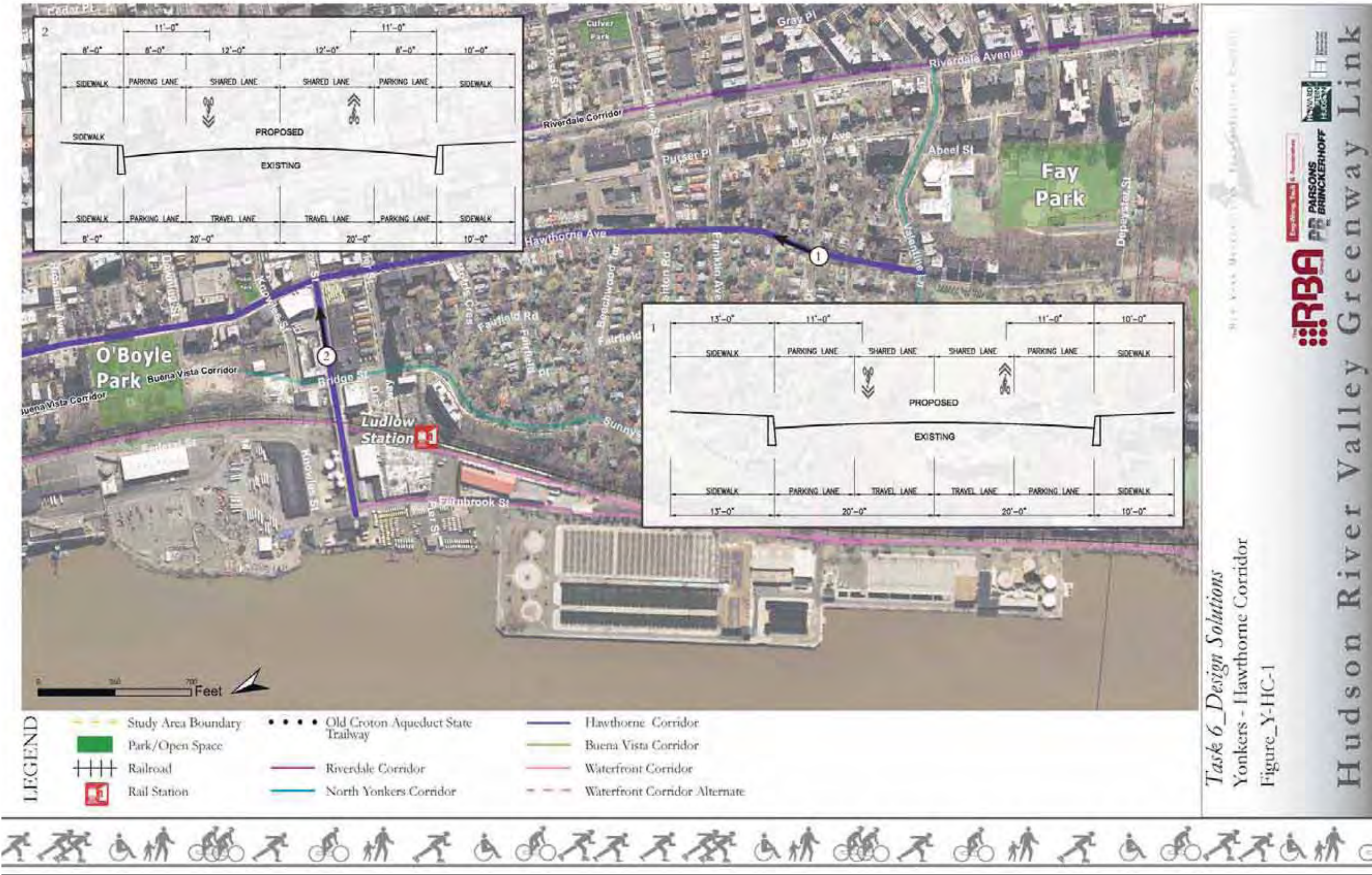
Task 6_Design Solutions

Yonkers - Hawthorne Corridor

Figure_Y-HC-Index

New York Metropolitan Transportation Authority







Task 6_Design Solutions
Yonkers - Hawthorne Corridor
Figure_Y-HC-2



BUENA VISTA CORRIDOR

Valentine Lane

Existing Conditions

Valentine Lane is a quiet, low volume street and provides an east-west connection between Riverdale Avenue and other north-south streets to the west, closer to the water. Between Riverdale Avenue and Hawthorne, Valentine Lane is a residential street with one lane of traffic in each direction and parking on both sides. West of Hawthorne, it narrows to one lane of traffic in each direction and no parking lane. Valentine Lane provides the first opportunity, upon entering Yonkers from the Bronx, to connect to other north-south routes in Yonkers.



Valentine Lane between Sunnyside
and Hawthorne

Surrounding Land Use

Adjacent to and to the south of Valentine Lane is the Leake & Watts social service facility. Other than that institutional use, Valentine Lane is lined with single family homes.

Summary of Traffic Volumes

Along Valentine Lane, traffic volumes are 125 to 200 vph per direction during the AM and PM peak hours.

Parking Regulations

Along Valentine Lane, between Broadway and Hawthorne Avenue, parking is regulated by alternate side parking prohibitions occurring between 1:00 and 3:00 PM. Between Hawthorne Avenue and Sunnyside Drive, parking is prohibited at all times.

Opportunities

- Largely tree-lined
- Primarily residential
- Low traffic volumes
- Ample 10-foot sidewalks between Riverdale Avenue and Hawthorne
- Provides an east-west connection from Riverdale Avenue to other north-south routes in Yonkers further west
- First opportunity to direct greenway users towards the river upon entering Yonkers
- Bee Line bus route along Valentine between Broadway and Hawthorne Avenue

Constraints

- Narrowness of right-of-way limits the type of facility that can be provided
- As Valentine narrows between Hawthorne and Sunnyside, there is no sidewalk and little room to provide one
- Somewhat of a grade, but less than other east-west segments throughout the study area

Design Solutions

Between Hawthorne and Riverdale Avenue, ample space is available on Valentine Lane to place a bicycle lane between the travel and parking lanes.

Between Hawthorne and Sunnyside on Valentine Lane a shared lane marking would be placed three feet from the curb.

See Figure Y_BVC-1 for each of the above mentioned cross sections.

Construction Impacts

Installation of bicycle lanes using thermoplastic paint will result in minimal construction impacts.

Construction Cost Estimate

Bicycle Lane: Thermoplastic Paint and signs = \$8,000

Shared Lane Markings: Thermoplastic Paint and signs = \$3,000

Sunnyside Drive and Buena Vista Avenue**Existing Conditions**

Sunnyside Drive and Buena Vista Avenue both have a single lane of traffic in each direction with parking on both sides of the street. Sunnyside is a quieter tree-lined street with low traffic volumes. Buena Vista is closer to downtown Yonkers and has higher traffic volumes. Sidewalks exist along both Buena Vista and Sunnyside, though the sidewalks along Buena Vista are in disrepair in some locations and need improvement.



Sunnyside Drive between
Valentine and Pier Street

Summary of Traffic Volumes

Traffic volumes on Buena Vista Street are approximately 200 to 400 vph per direction north of Prospect Street and 100 to 250 vph south of Prospect Street during peak hours.

Under the *Alexander Street Master Plan EIS*, traffic volumes on Buena Vista Avenue are projected to increase substantially. North of Prospect Street, volumes are projected at approximately 600 to 850 vph per direction in the AM peak hour and 700 to 800 vph per direction in the PM peak hour. South of Prospect Street, volumes are projected at approximately 400 vph per direction in the AM peak hour and 350 to 550 vph per direction in the PM peak hour.

Parking Regulations

Parking along Sunnyside Drive is regulated by alternate side parking restrictions at various times of the day (1:00 to 7:00 AM or 1:00 to 3:00 PM) except for the section between Pier and Ludlow Streets where there are 'No Parking Anytime' prohibitions. Along Buena Vista Avenue, parking is also regulated by alternate side parking. Also, one-hour and two-hour parking meters are present on Buena Vista Avenue between Main Street and Wells Avenue.

Surrounding Land Use

Single-family homes line a quiet and tree-lined Sunnyside Drive. A variety of uses line Buena Vista Avenue including primarily single and multiple-family residential along its southern sections, and commercial uses as Buena Vista approaches downtown Yonkers.

The route passes through O'Boyle Park. South of O'Boyle Park is a city-owned vacant property that has been identified for redevelopment as residential TOD in close proximity to the Ludlow Metro North Station.

Opportunities

- Glimpses of the Hudson River can be seen throughout the length of this corridor between houses and other structures
- Views of waterfront industrial uses and significant architecture such as the Sugar Factory
- Makes connection to downtown Yonkers

- One Bee Line Bus route along Buena Vista Avenue
- A few blocks from multiple bus routes along Broadway
- Connection to Ludlow Metro North station at Ludlow Street
- Connection to Main Street which brings users to the waterfront Riverwalk Esplanade and the Yonkers Metro North station
- Route could pass through or adjacent to O'Boyle Park
- Redevelopment of vacant property south of O'Boyle Park could include a multi-use path through it or along its edge.

Constraints

- Sidewalks in disrepair along Buena Vista Avenue
- The connection between Sunnyside and Buena Vista Avenue must pass through a short industrial stretch along Bridge and Knowles Streets. These streets are frequently used by trucks.
- Routing the greenway through O'Boyle Park and the vacant property immediately to the south of it will require approval from City of Yonkers.
- Traffic volumes are projected to increase substantially with the construction of the Alexander Street waterfront development, which may reduce the appeal of using Buena Vista Avenue north of Prospect Street as part of the greenway plan.

Design Solutions

Throughout the length of this corridor between Valentine Lane and Main Street there is enough room to place Class 3 shared lane markings. Traffic volumes and speeds are lower along this corridor than on Riverdale Avenue, allowing for the use of a Class 3 facility instead of something more robust. Sidewalks in disrepair would need to be rebuilt. See Figures Y_BVC-1 and Y_BVC-2.

Construction Impacts

Because the design solution will require only the application of thermoplastic paint to the pavement, construction impacts will be minimal along this corridor.

Construction Cost Estimate

Shared Lane Markings: Thermoplastic Paint and signs = \$15,000

Bicycle Lane: Thermoplastic Paint and signs = \$17,000

Sidewalk repair = \$800,000



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|--|---------------------|--|------------------------------------|--|-------------------------------|
| | Study Area Boundary | | Old Croton Aqueduct State Trailway | | Hawthorne Corridor |
| | Park/Open Space | | Riverdale Corridor | | Buena Vista Corridor |
| | Railroad | | Waterfront Corridor | | Waterfront Corridor Alternate |
| | Rail Station | | North Yonkers Corridor | | |

Task 6_Design Solutions
Yonkers - Buena Vista Corridor
Figure_Y-BVC-Index

Hudson River Valley Greenway Link

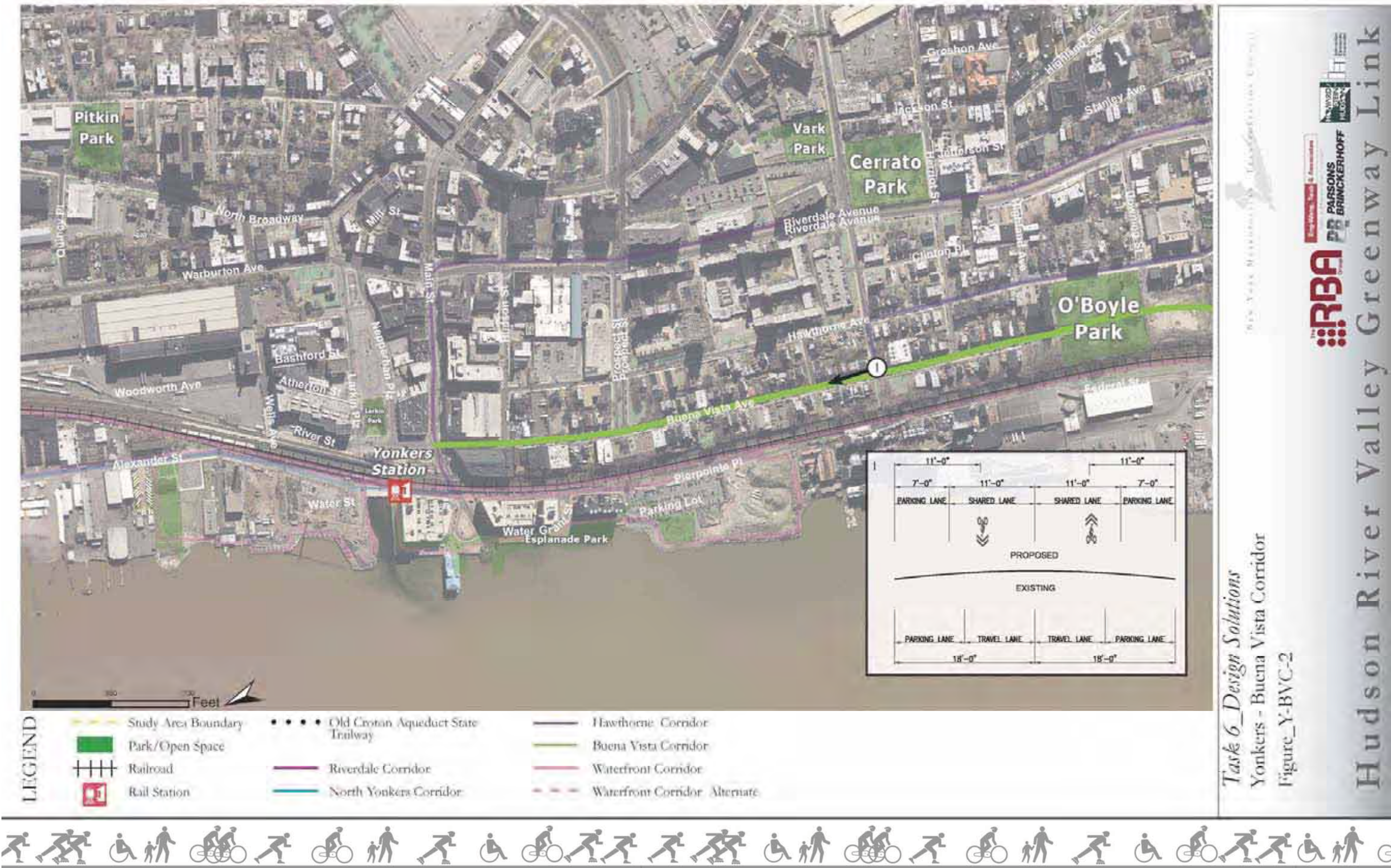




- LEGEND**
- Study Area Boundary
 - Park/Open Space
 - Railroad
 - Rail Station
 - Old Croton Aqueduct State Trailway
 - Riverdale Corridor
 - North Yonkers Corridor
 - Hawthorne Corridor
 - Buena Vista Corridor
 - Waterfront Corridor
 - Waterfront Corridor Alternate

Task 6_Design Solutions
Yonkers - Buena Vista Corridor
Figure_Y-BVC-1





NORTH YONKERS CORRIDOR

Alexander/Ashburton

Existing Conditions

Alexander Street and Ashburton Avenue are two-way collector streets with on-street parking on one side. Both streets have adequate sidewalks on both sides, but no bicycle facilities. A fair amount of truck traffic was observed exiting and entering waterfront industrial facilities. Ashburton Avenue slopes upward from west to east as it passes under the Hudson Line railroad tracks.



Ashburton Avenue looking east
toward Hudson Line Railroad tracks.

Summary of Traffic Volumes

Along Alexander Street, traffic volumes are 50 to 150 vehicles per hour per direction during peak hours.

Under the *Alexander Street Master Plan EIS*, traffic volumes on Alexander Street at Ashburton Avenue are projected to increase to 450 to 550 vph per hour per direction during peak hours.

Parking Regulations

Alexander Street: 12 Hr. parking 6 AM - 6 PM Monday through Saturday (partial block); No parking except police vehicles (partial block). No parking on portion between Wells and Ashburton.

Surrounding Land Use

In downtown Yonkers, near the Yonkers train station, land use included recently built mid-rise residential with ground floor retail in a traditional Transit Oriented Development (TOD) style. It includes a waterfront esplanade, which is part of Westchester County's RiverWalk. Also provides connection to the Yonkers train station and a water taxi that provides service to Manhattan.



Downtown Yonkers waterfront esplanade
adjacent to mixed-use residential buildings

Land use west of the Metro North overpass is industrial, while land use east of the tracks is predominately industrial and commercial. North of Babcock land use transitions to single- and multi-family residential. The Alexander Street Master Plan, which sets a framework for mixed-use redevelopment of waterfront parcels between Wells Avenue and the current end of Alexander Street, was approved. The City is working on zoning and design guidelines to implement the plan. A guiding principle of the master plan is to increase public access to the waterfront. The Alexander Street site will include a public plaza, parks, green spaces and a waterfront esplanade. The Alexander Street corridor will be connected with a causeway alongside the rail line to the JFK Marina Park and Trevor Park that is home of the Hudson River Museum.

Opportunities

Development Plans

Currently, traveling from Alexander Street to JFK Marina Park requires exiting the Alexander Street area (via Ashburton Avenue or Babcock Place), traveling north on Warburton, and then west on JFK Marina Drive. The completed Alexander Street Master Plan includes a proposal for an “Alexander Street Causeway” to directly connect Alexander Street to JFK Marina Park. The roadway would consist of one 11’ travel lane in each direction with no parking. As part of the master plan, Alexander Street would also be reconstructed. Alexander Street would be widened to contain one 11’ travel lane in each direction, a landscaped center median and a parking lane on each side of the street. Ashburton Avenue and Babcock Place would be reconstructed and connected with a service road, which would establish a “Gateway Area” to the Alexander Street site.

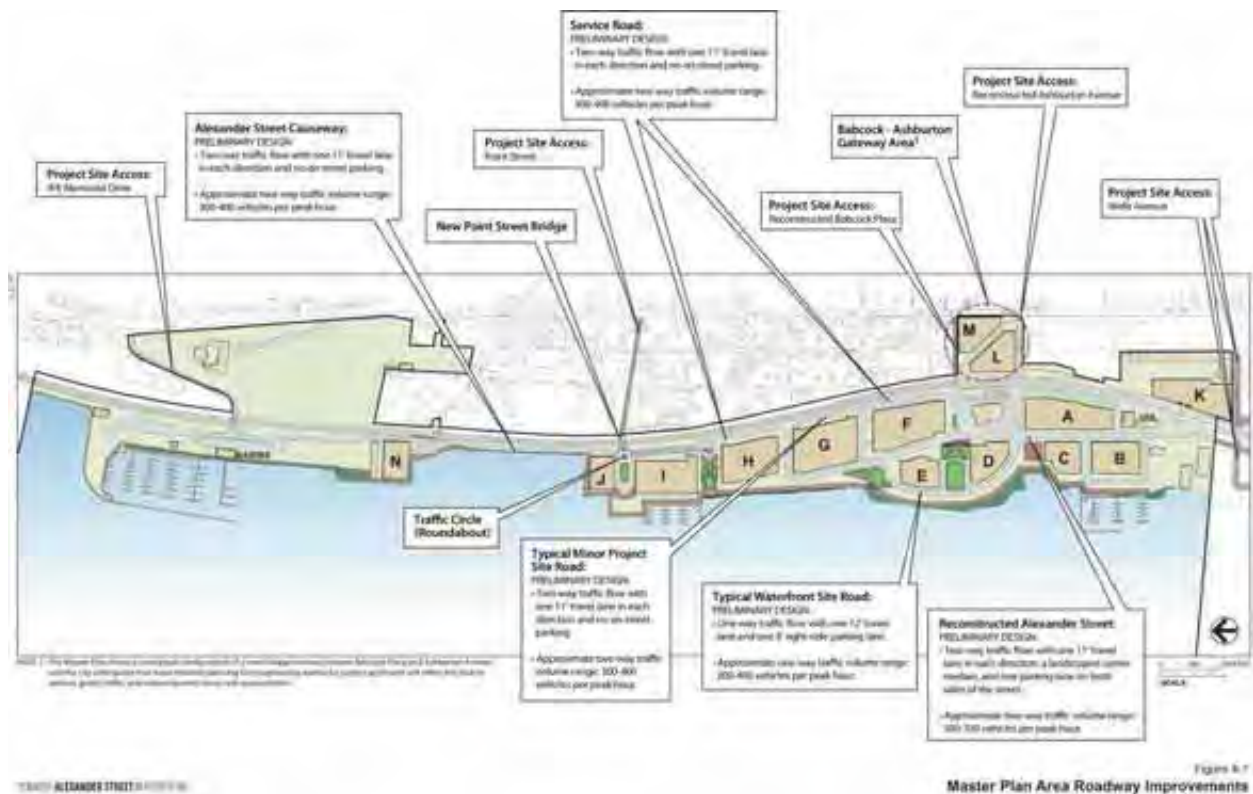
According to the Master Plan, the roadway layout aligns new streets with the existing street grid to the east of the redevelopment area, ensuring that new buildings do not block views along these corridors. Building heights were defined on the basis of minimizing the effect of the building mass and height on upland views toward the Hudson. Also included as part of the Master Plan, is an Urban Renewal Plan and a Brownfields Opportunity Area (BOA) Plan. The city of Yonkers is also working with an urban design firm to develop a “pattern book” of consistent urban design elements for the development.

In addition, new shoreline open space in the Alexander Street area will be contiguous with the Yonkers waterfront esplanade to the immediate south of the redevelopment area.

Outstanding viewpoints from the Alexander Street area include vantages from Habirshaw Park (at the Bezack Environmental Education Center), the Glenwood and Yonkers railroad platforms, and JFK Marina Park.

- Alexander Street provides a connection to Downtown Yonkers, the Bezack Environmental Education Center, Yonkers Canoe Club, the North Yonkers Pump Station, Yonkers City Jail and the Greyston Bakery.

- Within the Alexander Street area, Habirshaw Park and JFK Marina Park provide direct access to the Hudson River.



- Alexander Street provides a connection to the Yonkers train station. When complete, a route through the Alexander Street Urban Renewal Area would also connect to the Glenwood train station. No Bee-Line bus routes run along Alexander Street or Ashburton Avenue.

The plan below is taken from the Alexander Street Master Plan and calls out key features of the proposed development.

Constraints

- Ashburton Avenue has a moderately steep slope from west to east between Warburton Avenue and Alexander Street. The majority of greenway users should be able to handle this moderate slope.
- Ashburton Avenue passes under Metro-North's Hudson Line. This configuration partially obstructs the view corridor and may present challenges for roadway improvements.

- As described in the Alexander Street Urban Renewal Plan, completed in November 2008, potential impediments to developing the Alexander Street Corridor are the multiplicity of ownership and the large number of small or irregularly shaped parcels.
- Ashburton Avenue provides access to major highways east of Alexander Street (Saw Mill River Parkway and New York 9A). In addition moderately steep hills, narrow rights-of-way, sharp turns and considerable truck traffic present safety concerns for implementing a greenway facility.
- Many sites in the Alexander Street Urban Renewal Area are likely to have petroleum related contamination from above or underground storage tanks or current surface petroleum uses. Many of the sites are currently utilized as truck, bus, and other vehicle fleet lots.
- Traffic volumes are projected to increase substantially with the construction of the Alexander Street waterfront development.

Design Solutions

Alexander Street

Alexander Street is 30' wide with one travel lane in each direction and on-street parking located on the east side. Sidewalks are located on both sides of the roadway. Shared-lane markings are proposed in both directions on the roadway. Even though Alexander Street experiences limited traffic volumes, the presence of trucks and construction vehicles necessitates at least 11' wide shared travel lanes. See Figure Y_NYC-1.

Ashburton Avenue

Ashburton Avenue is 30.5' wide, with a travel lane in each direction and parking on the south side. The dimensions of Alexander Street narrow slightly east of the railroad overpass. Shared-lane markings are proposed on both sides of the street. See Figure Y_NYC-1.

Construction Impacts

Implementing the proposed design solutions will not have a significant impact on views or traffic operations in the area.

Construction Cost Estimate

Shared Lane markings along Ashburton Avenue and Alexander Street: Thermoplastic paint and signs = \$13,000

Woodworth Avenue/Ravine Avenue, Lamartine Avenue**Existing Conditions**

These residential streets are used to connect North Yonkers Corridor to the Old Croton Aqueduct (OCA) Trail access points. Woodworth Avenue is the north-south connection from the Alexander Street area to Trevor Park. North of Lamartine Avenue, Woodworth Avenue is one-way northbound. Ravine Avenue, which runs parallel to Woodworth, is one-way southbound. The two form a one-way couplet for the proposed corridor. Lamartine Avenue is an east-west connection to the OCA Trail from Woodworth Avenue.

Summary of Traffic Volumes

Traffic volumes along the one-way couplet of Ravine and Woodworth Avenues are 50 to 125 vehicles per hour (vph) per direction during peak hours.

Under the *Alexander Street Master Plan EIS*, traffic volumes on Ravine and Woodworth Avenues are expected to remain similar to existing volumes.

Parking Regulations

Alternate side parking on Lamartine Avenue, Ravine Avenue and Woodworth Avenue (except between Babcock Place and Point Street).

Surrounding Land Use

Land use is predominately single and multi-family residential along Ravine Avenue, Woodworth Avenue and Lamartine Avenue.

Opportunities

- Due to the elevation of this neighborhood above the Alexander Street area to the west, this corridor has long, unobstructed views of the Palisades and the Hudson River.
- Woodworth Avenue and Ravine Avenue provide access to Trevor Park, and are the main north-south connectors from downtown Yonkers to entrance points along the OCA Trail. Shonnard Terrace, just east of Trevor Park parking lot, provides a connection to the OCA. Lamartine Avenue also connects to the OCA; this is the southern-most access point which is being recommended in this study.
- The Hudson River Museum is located at the northern end of Trevor Park.
- The Glenwood Metro North station can be accessed via Glenwood Avenue near the entrance to Trevor Park.

Constraints

- The neighborhood has some vacant and underutilized lots.
- Sidewalks on Ravine Avenue and Woodworth Avenue are uneven and in poor condition

Design Solutions

Woodworth Avenue

Woodworth Avenue is currently 24' wide. South of Lamartine Avenue, Woodworth Avenue has one travel lane in each direction and parking on the east side of the street. North of Lamartine Avenue, Woodworth Avenue is one-way northbound with parking on both sides of the street. On-street parking would have to be removed on one side of the street to safely implement a Class 2 bicycle facility. However, removal of parking is not feasible due to strong community opposition. Therefore, a Class 3 shared lane marking would be installed. In addition, sidewalk facilities on both sides of roadway are in poor condition and need to be upgraded for pedestrian safety and ADA compliance. See Figure Y_NYC-1.

Ravine Avenue

Ravine Avenue is 30' wide, with one travel lane in the southbound direction and residential parking on both sides of the street. A 5' protected bike lane is proposed between the west parking lane and the travel lane. The east parking lane should be narrowed to 7'. Volumes and speeds are low enough to comfortably fit a striped (Class 2) bike lane without removing parking. See Figure Y_NYC-2.

Striping bike lanes on this two-way roadway pair will not cause any significant impacts to view corridors or traffic operations.

Low traffic volumes on Woodworth and Ravine allow for the use of a Class 3 facility.

Construction Impacts

Striping these streets with thermoplastic paint will have minimal construction impacts.

Construction Cost Estimate

Bicycle Lanes along Woodworth and Ravine Avenues: Thermoplastic paint and signs = \$32,000

Trevor Park/ Warburton Avenue / Connections to OCA

Existing Conditions

The greenway route will enter Trevor Park from the waterfront route and/or the Woodworth/Ravine one-way couplet. The path will use existing paved park paths leading to Warburton Avenue. From Warburton Avenue, the OCA Trail can be accessed at four possible locations listed below from south to north:

See photos on the following page of each OCA access point.

- Wicker Street; This entrance is south of Trevor Park and would be accessed from Woodworth Street. The Ravine Area Master Plan recommends creation of a park at Wicker and Warburton to create a gateway to the OCA Trail.
- Shonnard Terrace: this is the first entry point to the OCA Trail upon exiting Trevor Park. This entry point has the shallowest slope from Warburton Avenue of the four entry points. It is also closest to Trevor Park

- Arthur Street: the next entry point to the OCA Trail, Arthur Street has rather steep slopes from Warburton Avenue.
- Untermyer Park unused path: a wrought iron gate along Warburton Avenue marks the location of a path that leads through Untermyer Park to the OCA Trail. This path is overgrown, not maintained and not clearly visible or marked.
- Odell Avenue: this entry to the OCA Trail is the furthest north in Yonkers. The slope to it from Warburton Avenue is extremely steep, and is the furthest of the four entry points from Warburton Avenue.

See Figures Y_NYC-2 and Y_NYC-3 for the location of these connections to the OCA Trail.



Entrance to OCA Trail
at Shonnard Terrace



Entrance to OCA Trail
at Arthur Street



Wrought Iron Gate at Entrance to
Untermyer Park path connecting to
OCA Trail



Entrance to OCA Trail
at Odell Avenue

Warburton Avenue between Trevor and Otis parks is one lane of traffic in each direction with parking on each side. This section has sidewalks on both sides. North of Otis Park Warburton Avenue is also one lane of traffic in each direction but with parking and a sidewalk on only the west side of the street. As part of City of Yonkers North Hudson Promenade the western sidewalk of Warburton Avenue was recently rebuilt with viewing areas, benches and traditional street lights. The OCA Trail, which runs to the east of and parallel to Warburton Avenue, is not paved and has a variety of packed surfaces, including dirt and grass.

Summary of Traffic Volumes

Warburton Avenue has traffic volumes that range from 200 to 300 vph in the northbound direction during the AM peak hour and 275 to 400 vph during the PM peak hour. In the southbound direction, traffic volumes are 275 to 400 vph during AM and PM peak hours.

Under the *Alexander Street Master Plan EIS*, traffic volumes on Warburton Avenue are projected to increase to approximately 550 to 800 vph in each direction in the AM peak hour, and to 750 to 950 vph in each direction in the PM peak hour.

Parking Regulations

Parking along the Warburton Avenue corridor varies. Between JFK Memorial Drive and Arthur Street, parking is regulated by alternate side parking prohibitions occurring between 1:00 and 3:00 PM. Parking is prohibited at all times between Arthur Street and the MTA Metro-North Railroad Greystone Station.

Surrounding Land Use

Open space, including Trevor, Otis and Untermeyer parks line Warburton Avenue. There are some single family homes north of Trevor Park. The Hudson River Museum is within Trevor Park, and a high school is located just to the north. The OCA Trail is also surrounded by open space, with the property of some single family homes coming quite near the trail in some locations.

Opportunities

- Warburton Avenue provides glimpses between trees and other vegetation of the Hudson River.
- The Yonkers North Hudson Promenade has been developed along the west side of Warburton Avenue providing pedestrians with an ample sidewalk and viewing areas with seating.
- The OCA Trail provides fewer opportunities to view the Hudson River, but it provides a quiet, traffic free greenway experience
- Abundant open space along both Warburton Avenue and the OCA Trail provide users with access to nature and a greenway experience.
- Provides access to key destinations such as Untermeyer Park and the Grecian Gardens, the Hudson River Museum.
- Three Bee Line bus routes run along Warburton Avenue
- Four locations along this corridor by which the OCA Trail can be accessed: Shonnard Terrace, Arthur Street, a wrought iron gate to Untermeyer Park and at Odell Avenue..

- The Greystone Metro North Station is accessed from Warburton Avenue and is the only station in the project study area that currently provides bicycle parking for commuters.

Constraints

- Connections to the OCA Trail from Warburton Avenue via Odell and Arthur Streets have very steep grade changes.
- Access to the OCA Trail through Untermeyer Park will require substantial improvements to the existing path
- Traffic along Warburton Avenue can be higher speed
- Traffic volumes are projected to increase substantially with the construction of the Alexander Street waterfront development.

Design Solutions

Along Warburton Avenue there is enough room to place Class 3 shared lane markings. See Figure Y_NYC-3. These lane markings can also be placed on the three on-street access points to the OCA Trail: Shonnard Terrace, Arthur Street and Odell Avenue. If the Untermeyer Park path were chosen as the preferred entry point to the OCA Trail the path would need to be upgraded, and an appropriate riding and walking surface provided. Higher traffic volumes along Warburton could make a Class 3 facility along this corridor less desirable.

Construction Impacts

If the greenway is routed along Warburton Avenue, the design solution will require only the application of thermoplastic paint to the pavement. Therefore, construction impacts will be minimal along this corridor. If the Untermeyer Park path is improved, the natural environment will be disrupted in the park during construction.

Construction Cost Estimate

Warburton Avenue: Thermoplastic Paint and signs: \$21,000

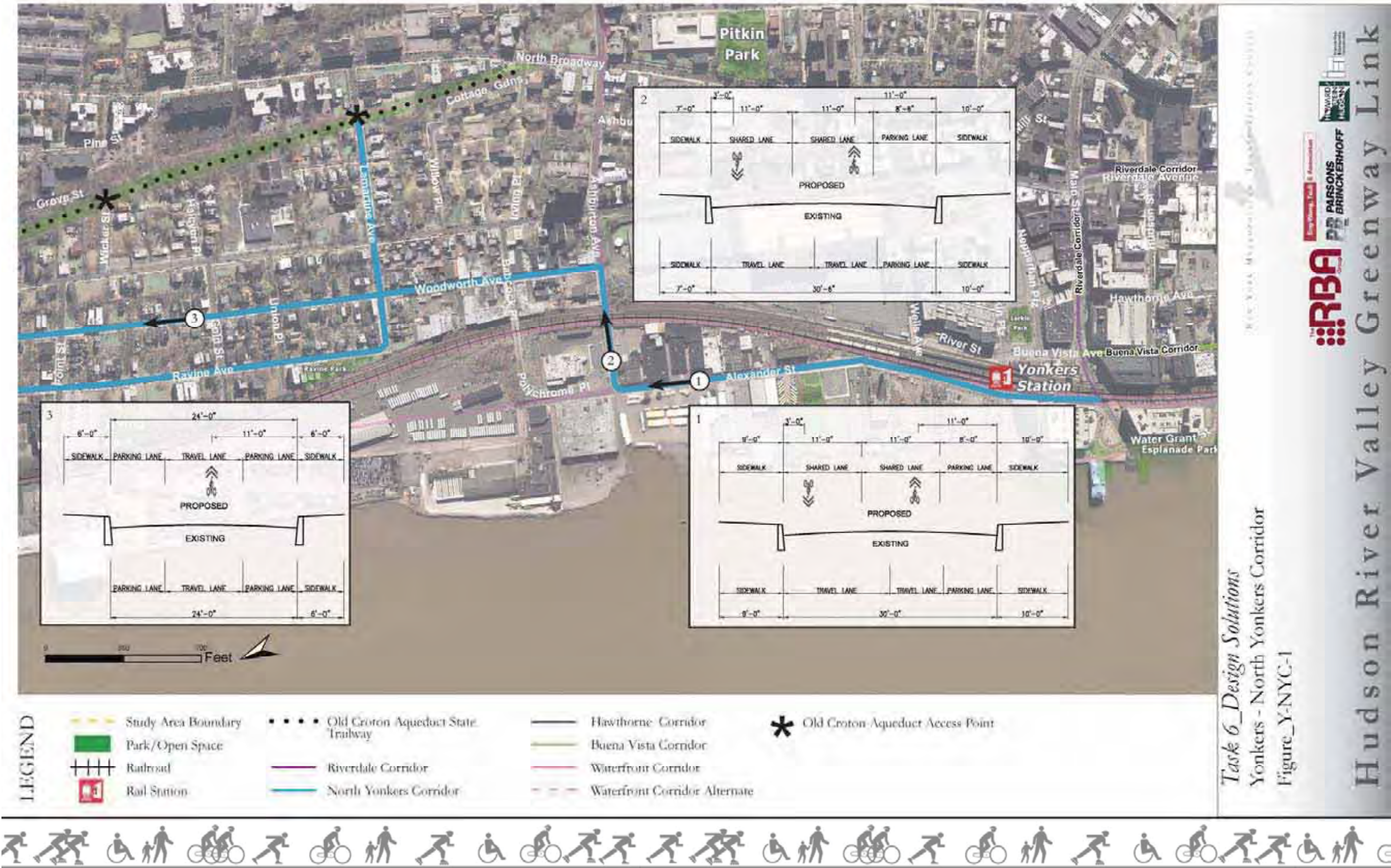
Stabilized Stone Screenings: \$70,000



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| | Study Area Boundary | | Old Croton Aqueduct State Trailway | | Hawthorne Corridor |
| | Park/Open Space | | Riverdale Corridor | | Buena Vista Corridor |
| | Railroad | | North Yonkers Corridor | | Waterfront Corridor |
| | Rail Station | | | | Waterfront Corridor Alternate |

Task 6_Design Solutions
Yonkers - North Yonkers Corridor
Figure_YNYC-Index







- LEGEND**
- Study Area Boundary
 - Park/Open Space
 - Railroad
 - Rail Station
 - Old Croton Aqueduct State Trailway
 - Riverdale Corridor
 - North Yonkers Corridor
 - Hawthorne Corridor
 - Buena Vista Corridor
 - Waterfront Corridor
 - Waterfront Corridor Alternate
 - Old Croton Aqueduct Access Point

Task 6_Design Solutions
Yonkers - North Yonkers Corridor
Figure_YNYC-2





WATERFRONT ALIGNMENT

This section describes a HRVGL alignment that follows the shoreline of the Hudson River as closely as possible from the northern end of Manhattan through the Bronx to northern Yonkers. This alignment creates a continuous path the length of the study area, or some sections of this alignment could be combined with other alignment options to create a continuous path.

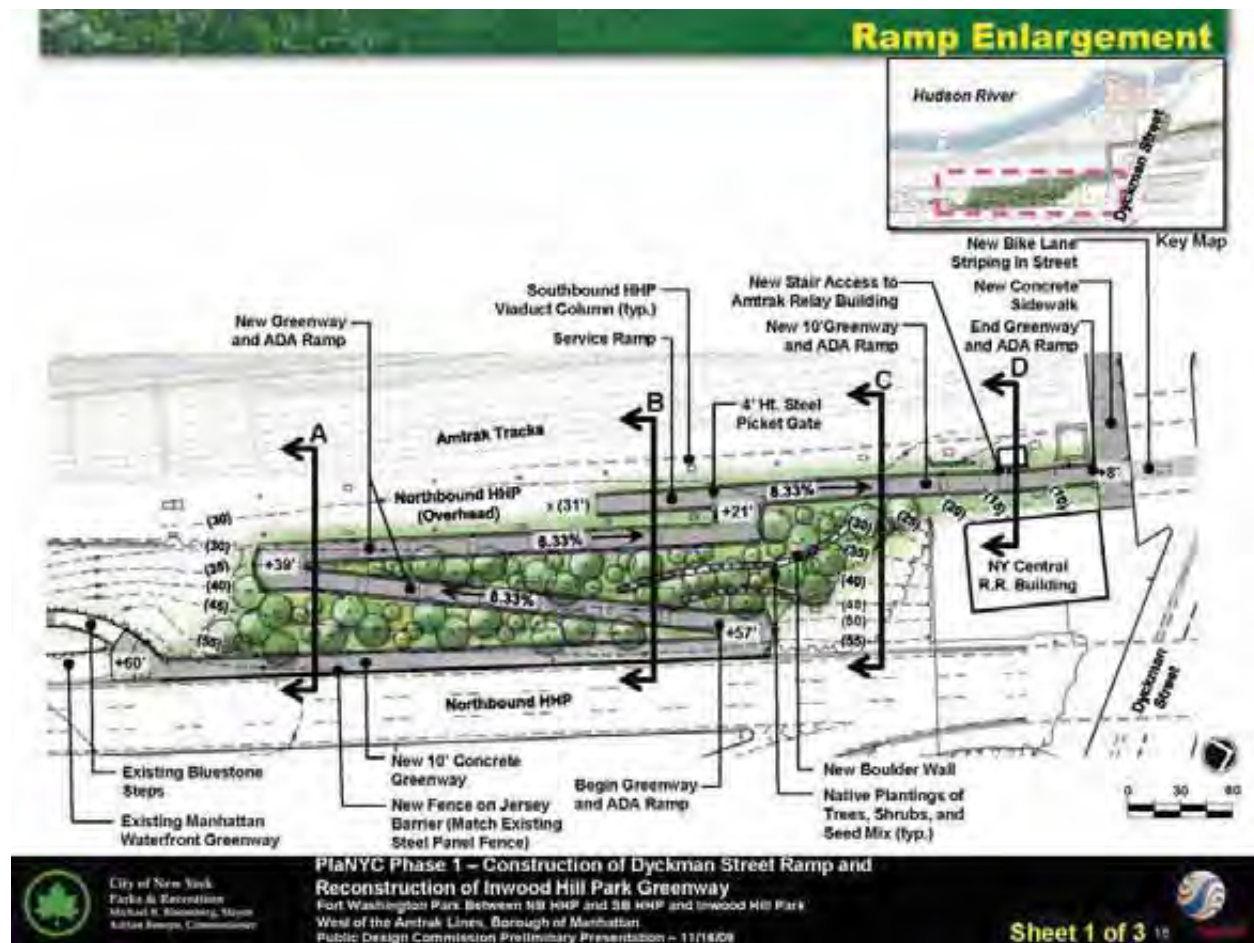
There are several benefits of a continuous alignment along the Hudson River waterfront. Most importantly, the Waterfront Alignment provides direct access to the Hudson River itself, providing a continuous view of the river, the George Washington Bridge, and the New Jersey Palisades. It provides a route with minimal elevation change, and a separation from vehicular traffic, which helps to accommodate a range of skill levels.

The description of the alignment and possible design options is divided into four sections from south to north: Manhattan, the Harlem River Crossings, the Bronx, and Yonkers.

Manhattan Section

Existing Conditions

The waterfront alignment begins at the existing northern terminus of the Hudson River Greenway. The Hudson River Greenway runs through Manhattan along the Hudson River and its terminus is currently located at the intersection of Dyckman and Staff Streets. NYCDPR is developing plans to relocate the terminus by bringing it to Dyckman Street via a new ramp that will be constructed adjacent to the abandoned railroad building on Dyckman Street between the north- and southbound lanes of the Henry Hudson Parkway. This plan is illustrated below. It will bring a ramp from the existing path adjacent to the northbound Henry Hudson Parkway to Dyckman Street.



A second greenway route has been proposed by DPR along the waterfront west of the railroad tracks. The status of this route is described below by DPR.

"The New York City Department of Parks and Recreation (at the time of this printing) has designs for the "Lighthouse Link" project. The Lighthouse link project is meant to extend the existing waterfront Greenway along the Hudson River, past its current turn off near the George Washington Bridge, all the way to Dyckman Street. Construction of the first phase of this project is scheduled to begin in 2011. The route will head southward from Dyckman Street towards the bridge and stop at about the one mile mark where the waterline diminishes the usable right of way. The Parks Department hopes to continue the path southward to the bridge, in the future."

From here, the alignment would follow Dyckman Street under the Henry Hudson Parkway and West Side Rail Line to enter the west side of Inwood Hill Park between the railroad and the river. The alignment would turn north using existing multi-use paths within this section of the park. These existing paths are paved and are directly

adjacent to the Hudson River, as seen in the photo below. See also Figure WC-1 for the location of the waterfront path.



Waterfront Path adjacent to the Hudson River in Inwood Hill Park

At the northern end of this section of Inwood Hill Park the path crosses the West Side Rail Line via a pedestrian bridge. The bridge has stairs leading to it and cyclists must dismount and carry bicycles.



Stairs leading to bridge over tracks in Inwood Hill Park

The path then enters the main portion of Inwood Hill Park where it uses park paths to access a pedestrian walkway over the Henry Hudson Bridge. The walkway was

reopened in Spring of 2010, after having been closed for rehabilitation. This walkway is the existing crossing of the Harlem River that is closest to the Hudson River.

Opportunities

- Aside from a short stretch of Dyckman Street, the pathway would be an entirely off-road, multi-use path
- Alignment almost entirely within publicly-owned lands, primarily Inwood Hill Park, which is administered by the NYCDPR.
- Immediate access to the Hudson River shoreline, beautiful views of the river to the north and south, and views of the Palisades to the west
- Spectacular views of the Henry Hudson Bridge above, to the east
- Access to key destinations
 - Inwood Hill Park
 - Dyckman Marina & Inwood Canoe Club
- Direct connection to Henry Hudson Greenway (in Manhattan)

Constraints

- Inwood Hill portion east of rail track is designated “Forever Wild,” a protected area of heightened environmental sensitivity that could limit greenway development options
- Stairs on the bridge over the railroad tracks leading to the Henry Hudson Bridge walkway from the waterfront require that cyclists dismount and carry bicycles.

Design Solutions

Using Existing Harlem River Crossing on Walkway of Henry Hudson Bridge

Access to the existing walkway over the Henry Hudson Bridge is possible from the Inwood Hill Park waterfront, via the existing pedestrian bridge that crosses the railroad tracks and enters park paths leading to the walkway. The bridge currently requires that cyclists dismount and carry bicycles up a long flight of stairs, before crossing the tracks. NYCDPR is planning to install a tire rail on the staircase of the bridge so cyclists will be able to push bicycles up the stairs instead of having to carry them.

A more robust design solution would be to build an ADA compliant ramp leading to the bridge, allowing cyclists to ride over the bridge and into Inwood Hill Park. This

option is discussed earlier in this report as the Henry Hudson Bridge Approach Corridor.



Inwood Hill Park path leading to
Henry Hudson Bridge walkway

Using a New Harlem River Crossing On or West of the Spuyten Duyvil Railroad Bridge

If a river crossing on or to the west of the Spuyten Duyvil railroad bridge were chosen, the path would continue along an existing path which ends in a cul de sac about 560 ft. (170 m) south of the Spuyten Duyvil railroad bridge, and then on new path to the crossing. See the photos below.



Waterfront park path cul-de-sac at
northern tip of Manhattan



View of Spuyten Duyvil railroad bridge from waterfront path cul de sac in Inwood Hill Park

See Figure WC-1 showing the route of the waterfront alignment from Dyckman Street to the area of the Spuyten Duyvil Railroad Bridge.

Harlem River Crossings

Existing Conditions

West of the Broadway Bridge, there are two additional Harlem River Crossings:

- Spuyten Duyvil Railroad Swing Bridge
- Henry Hudson Bridge

Each is described below.

Spuyten Duyvil Railroad Swing Bridge

The Spuyten Duyvil railroad bridge is a truss swing bridge constructed in 1899 and rehabilitated in the 1980s to provide Amtrak service into Penn Station. The bridge previously had two tracks, but currently has only one track on its east side. The 2009 New York State Rail Plan identifies a proposal to double track the bridge to increase capacity and schedule reliability of Amtrak service into Penn Station¹. Double tracking may also facilitate proposed Metro-North service into Penn Station and potential higher-speed rail service.

¹ New York State Department of Transportation, 2009 New York State Rail Plan, Appendix B, page 5.

There is currently no pedestrian access over the swing bridge. While the west side of the bridge is not currently used for trains, it was determined to be unavailable for a non-motorized path because of a planned future addition of a second track on the bridge, to accommodate future increases in train volumes. These volume increases and plans for expansion are summarized below.

Recent studies, including the *2009 New York State Rail Plan*, are not the first documents to address the addition of a second track over the Spuyten Duyvil Bridge. In 1999, the FTA and MTA Metro-North Railroad initiated the *Penn Station Access Study*, an evaluation of options for additional commuter rail service to the West Side of Manhattan. According to the MTA's Office of Capital and Long-Range Planning, the study is ongoing, and estimates of future operations will be included as part of an Environmental Assessment, which is expected to be completed in late 2011 or early 2012 in conjunction with the *Penn Station Operations Study*. Improvements to the Empire Connection in order to accommodate Metro-North service will likely begin soon after in 2012, with revenue service projected by 2017, the same year that the East Side Access project is expected to commence revenue service.

Currently, Amtrak operates passenger service on the West Side Line, also known as the Empire Connection, north of Penn Station beginning at 34th Street and over the Spuyten Duyvil Bridge. The line carries trains heading north and west through Albany to Toronto, Montreal, Chicago, and Vermont, and returns south to Penn Station via the same route. Each average weekday, Amtrak schedules 16 northbound trains and 14 southbound trains to travel through the project study area. The planned addition of high-speed inter-city Amtrak service would likely increase the frequency of trains significantly (see answer to Comment 2 below.)

On average, 214 Metro-North trains also operate daily through the project study area to and from Grand Central Terminal along the Hudson Line. According to Metro-North, once the Penn Station studies are complete, the agency will have developed a service plan and an estimate of the number of these trains that will be diverted to Penn Station over the Spuyten Duyvil Bridge. Metro-North also expects that further service will be added to the West Side in addition to the trains diverted to and from Grand Central.

The MTA's 2010-2014 Capital Program budgeted \$2.95 billion for the ongoing East Side Access project. Completion of construction and revenue service for LIRR service to Grand Central Terminal is expected by late 2016 or early 2017.

In late 2009, as part of the first round of President Obama's American Recovery and Reinvestment Act (ARRA), funding was secured by the Federal Railroad Administration (FRA) and New York State DOT for a Tier 1 Environmental Impact Statement (EIS) for proposed high-speed inter-city rail service throughout the state. The EIS is nearing completion and additional ARRA funds are expected to be allocated to the project, the Empire Corridor High Speed Rail Program, in the coming months. Current plans estimate that high-speed Amtrak service would be operational through the corridor, including over the Spuyten Duyvil Bridge in New York City, as early as 2012.

In addition, "Improving Inter-City Rail Service in the Empire Corridor" is included in NYMTC's most recent Regional Transportation Plan as a Strategic Regional Investment Option.

Category C: Project Planning and/or Environmental Assessment to begin in First 5 Years

Cost: \$35 million

Area: New York City, Lower Hudson Valley

Issue Addressed: Overall Growth

Planning and EIS: 2009-2014

Adoption of Preferred Alternative: 2009-2014

Design: 2009-2014

Construction and Implementation: 2009-2014

Henry Hudson Bridge

The Henry Hudson Bridge carries the Henry Hudson Parkway over the Harlem River just east of the Spuyten Duyvil Railroad Bridge. The Henry Hudson Bridge has a pedestrian walkway that was reopened in Spring of 2010 after having been closed for rehabilitation. This walkway is accessed from park paths in Inwood Hill Park. Though the path is open to the public, it is a substandard width for a multi-use path. Cyclists are required to dismount and walk bicycles over the bridge.

Opportunities

- Greenway could be at or near the Hudson River Shore
- Views of Hudson River and Palisades
- Greenway could be entirely off-road, on park land, in a natural setting with beautiful views
- A new crossing could be constructed near the Hudson River
- Access/connection to transit

- Spuyten Duyvil Station (Metro-North Railroad)
- Dyckman Street Station (Subway - A line)

Constraints

- The existing pedestrian/bicycle crossing of the Harlem River closest to the Hudson River is on the Henry Hudson Bridge, which is to the east of the railroad tracks. From this crossing, the railroad tracks are a barrier to waterfront access.
- Frequent Metro-North and Amtrak passenger trains could affect a peaceful waterfront greenway experience.
- The Harlem River is a navigable waterway and a new crossing would have to maintain certain vertical and horizontal clearances to allow access to maritime traffic.
- Space currently available on Spuyten Duyvil swing bridge is planned for double-tracking
- Spuyten Duyvil swing bridge owned by Amtrak
- Henry Hudson Bridge walkway is a substandard width.

Design Solutions

Five options for a non-motorized crossing of the Harlem River close to the Hudson River have been identified:

1. A multi-use path cantilevered off one or both sides of the existing Spuyten Duyvil Bridge,
2. A new railroad bridge with an integral multi-use path,
3. A new bridge for non-motorized traffic, either east or west of the existing bridge,
4. A ferry service for pedestrians and cyclists.
5. Use existing walkway over Henry Hudson Bridge

Each option is discussed below.

1. Path Cantilevered off Swing Bridge

The feasibility of cantilevering a structure off of the existing bridge is dependent on the structure of the more than 100 year old bridge to carry the additional weight, especially as it relates to the mechanisms that move the swing bridge. Cantilevering only one side would affect the balance of the bridge, which is of particular consequence for a movable structure. An option may be to counter-weight the other side of the bridge or add matching pathways on both sides. Operating rules and

opening patterns for the bridge may differ when a multi-use path is added. This option would have minimal visual impact and would require almost no grade change.

In response to inquiries regarding the Spuyten Duyvil railroad swing bridge, Amtrak has stated unequivocally, in writing, that they will not consider a cantilevered walkway over the bridge. They wish to maintain the bridge for operations and maintenance personnel only. They also state in writing, plans to increase train volumes over the bridge, citing a doubling of the number of Amtrak trains, and accommodation of Metro-North trains to Penn Station in the future.

Cost Estimate

The cost of retro-fitting the existing Spuyten Duyvil Railroad Bridge with a cantilevered pedestrian walkway is not possible to estimate under this current assignment, as it would require research into the existing condition of the bridge and its load-bearing design to determine how much retro-fitting of the original structure would be required to install a cantilevered walkway. A gross estimate of \$19 million for an eight-foot wide cantilevered path has been developed based upon very limited available information. No information is currently available regarding the bridge's structural design and its current condition.

2. New Railroad Bridge with Multi-Use Path

A new railroad bridge with multi-use path could either be as a replacement of the existing low level Spuyten Duyvil bridge, or a higher structure just for a new northbound track to facilitate a flyover at the rail junction to the north. Operating rules and opening patterns for the bridge may differ when a multi-use path is added. Similar to the cantilevered path discussed above, it would have minimal visual impacts and involve very little grade change.

Cost Estimate

Cost for the construction of a new railroad swing bridge with an integrated pedestrian walkway is not possible to estimate with accuracy at this time. Preliminary design is currently underway for a new movable railroad bridge spanning the Hudson River between Albany and Rensselaer, NY with a preliminary construction cost estimated at \$145 million.

3. New Non-Motorized Bridge

A new bridge for non-motorized traffic could create new, striking views of the Hudson River and Palisades, but may obstruct existing views of the Henry Hudson Bridge from the shoreline & would require coordination with Amtrak, the Coast Guard, and environmental permitting. Preliminary coordination with the Coast Guard indicates that the vertical clearance requirement for a fixed bridge is 55', while the vertical clearance in the down position for a movable bridge is 25'.

Cost Estimate

Construction of a new pedestrian bridge could cost approximately \$15 million. An example of a large scale pedestrian bridge is the Millennium Bridge, a pedestrian-only bridge in London spanning the Thames River. It was constructed in 1999 at a cost of £18.2m (\$28.7m). It is 1,082 feet in length, and 13 feet wide. The bridge is 35.4 feet above the river at high tide.

4. Ferry Service

For a ferry service, operating schedule, seasonal variations and operating costs would be important factors. It would require docking facilities on both sides of Harlem River. An existing bicycle ferry service is in operation along the Island Line Trail in Vermont. It transports cyclists, walkers, anglers and runners across the 200-foot "cut" in the Colchester - South Hero Causeway -- a critical link in the Island Line Trail. The ferry currently runs a limited schedule of August weekends and Labor Day Weekend from 10am-6pm. A \$5 donation is requested to help offset operating expenses. The ferry is operated by a local advocacy group, Local Motion, which promotes active transportation and recreation in the area. Currently operating as a demonstration project, they are working to offer expanded service throughout the season. Service is currently limited by weather and wave conditions, and operators are in need of a wave attenuator in order to insure a safe crossing.

Cost Estimate

The Island Line Trail Ferry currently requires \$50,000 per year to operate two boats. This includes insurance, salaries, volunteers, maintenance and depreciation. A 24-30 foot long boat with a capacity of 6, could be purchased for \$20,000, requiring only a "6-pack" license, which is relatively inexpensive and easy to obtain. A larger boat would be a commercial vessel requiring a commercial license. The ferry also relies on volunteers to help operate the service.

Construction of docks could vary in price. Docks for the Island Line Ferry cost \$50,000 (for both docks) but were not ADA compliant. They are planning to install ADA compliant docks that are estimated to cost \$200,000. The range between high and low tide will be a factor in the design of the docks.

A donation of \$5 is requested per round trip, generating \$15,000 per season, helping to defray operational and maintenance costs.

Boat storage and docking: May be possible to explore docking and storage at the Dyckman Street Marina or the Riverdale Yacht Club.

Depending upon height of waves and the size of the ferry, wave attenuators may also be necessary.



Island Line Bike Ferry Service

5. Henry Hudson Bridge

While the existing walkway over the Henry Hudson Bridge was reopened in Spring of 2010 to provide a connection over the Spuyten Duyvil between the Bronx and Manhattan, its width is sub-standard and cyclists are forced to dismount and walk bicycles over the bridge. A design solution could be considered to cantilever a 10-foot wide shared use walkway outboard of the existing bridge structure. Landing points in Manhattan and the Bronx could be placed in the same locations as the existing walkway. This would help minimize conflict with Forever Wild designated areas in Manhattan and tight right-of-way widths in the Bronx.

Stakeholders suggested that NYMTC explore the possibility of converting one lane of traffic on the Henry Hudson Bridge to a walkway, citing excess capacity on the bridge. MTA Bridges and Tunnels responded to this suggestion with the following statement:

"As you know, we are required by law to provide toll funds to help support the mass transit services of the MTA, and the MTA is in the midst of a budget crisis. The alternative of developing a bike-path on a cantilever off the side of the bridge-while technically possible from a construction standpoint-is not part of the current or next capital plan, which focuses on keeping existing vehicular facilities in a state of good repair.

The other alternative, to reduce the Manhattan-bound lower level from its current four to three roadway lanes and developing the fourth lane as a dedicated bike path, is not currently practical. The primary function of the bridge is to carry vehicular traffic, and we cannot remove a lane from a bridge used by toll-paying customers in order to better serve cyclists. Finally, please remember that bicycles are not barred from crossing on the existing pedestrian path; cyclists simply must dismount and walk their bikes while on the bridge as a safety measure in accordance with TBTA Rules and Regulations for all facilities."

The above comments are not official MTA Bridges and Tunnels policy, however, due to current budget constraints MTA Bridges and Tunnels does not foresee undertaking the extensive construction that would be required to have a multi-use path, whether cantilevered or using an existing traffic lane, on the Henry Hudson Bridge in the near future.

Cost Estimate

A cantilevered walkway could cost \$30-35 million for design and construction

Bronx Section

Existing Conditions

Once in the Bronx, the Waterfront Alignment runs adjacent to the Spuyten Duyvil Triangle. From Spuyten Duyvil, past the Riverdale train station, to the Bronx/Yonkers city line, the Waterfront Alignment would continue along the narrow strip of land between the Hudson River and Metro-North Railroad's Hudson Line. Through this section of the waterfront corridor, the width of the space between rail tracks and shoreline varies from 13 to 38 feet.

Spuyten Duyvil Triangle

At Spuyten Duyvil, the Metro-North Hudson Line tracks meet the Amtrak Empire line and delineate a triangular piece of land, with the Harlem River forming the third side. Cut off by the tracks, the triangular area and waterfront are not accessible to the public today. Metro-North's Spuyten Duyvil station is located just to the east and is connected to the neighborhood on the hill above by a pedestrian bridge over the tracks, but does not provide access to the waterfront. A railroad signal tower building sits within the triangle along the Amtrak line. See Figure WC-2 for the location of waterfront alignment scenarios in the Spuyten Duyvil Triangle.

Spuyten Duyvil Triangle to Riverdale Station

From the Spuyten Duyvil area to the Riverdale station, a dirt and gravel service road occupies much of the space between the railroad tracks and the water's edge, providing access for railroad personnel to control equipment and track turnouts ("switches") where the two lines meet. The service road is separated from the shoreline in this area by a narrow line of scrubby vegetation followed by a sloped area down to the water's edge. In some locations, the shoreline is piled up with large rocks and small ballast or rip-rap. See the photo below. This photo also shows remnants of a bridge that once connected the waterfront to the neighborhood at approximately 232nd Street. Adjacent to the service road are several sets of railroad tracks; there is no fence or barrier of any type between the service road and the tracks. On the eastern side of the tracks, an abrupt change in elevation separates the track area from Riverdale Park. In addition, the park is fenced off from the tracks with chain-link fencing.



Maintenance road, scrubby vegetation,
rip rap, ballast and bridge remnants

At Riverdale station, a small park has been developed for waterfront access, which is reached by a pedestrian crossing from the southbound platform and across Track 6. See the photograph below. The space occupied by the park would be incorporated into the trail. See Figures WC-2, WC-3 and WC-4 for the location of the waterfront alignment between Spuyten Duyvil Triangle and the Riverdale Station.



Riverdale Station waterfront park

It is important to note that Amtrak plans to install a second track over the Spuyten Duyvil Railroad Bridge. This second track will extend north to the point where the existing non-electrified Track 6 ties into the main line at the approximate equivalent of 247th Street,, and is intended to accommodate higher speed rail service. It will be located between the existing tracks and the river, within the Metro North property line. This new track will require the relocation of the existing power substation, however, at

this time a determination has not been made as to where it will be placed. A time line for implementation is not available at this time. However, the project is included in Amtrak's 2030 planning document, and is intended to be implemented within that time frame.

Riverdale Station to Yonkers City Line

North of Riverdale station the space between Track 6 and the river's edge becomes very narrow and would be inadequate for a trail. The reason for this is that Track 6 shifts to the west, and is therefore is spaced much farther from the other four tracks in this location. See the photo below with Track 6 to the left with ample space between it and the main line.



Rail corridor north of Riverdale Station with Track 6 to the left

At the College of Mount Saint Vincent, the shoreline becomes wider, creating a large point which juts into the water and which is owned by the college and connected to the college by a pedestrian bridge over the tracks. There was once a station here, with a side platform between Tracks 5 and 3, as at Riverdale and Ludlow stations. See Figures WC-4 and WC-5 for the waterfront alignment between the Riverdale Station and the Yonkers city line.

Opportunities

- Pathway would be an entirely off-road, multi-use path
- Immediate access to the Hudson River shoreline, views of the river to the north and south, and views of the Palisades to the west

- Access to key destinations
 - Spuyten Duyvil Triangle
 - Dodge Point
 - Riverdale Park (with connector path)
 - Riverdale Yacht Club
 - College of Mount Saint Vincent (with re-use of existing pedestrian bridge) & Mt. St. Vincent Point
 - Hebrew Home (with connector path)
- Access/connection to transit
 - Spuyten Duyvil Station (Metro-North Railroad)
 - Riverdale Station (Metro-North Railroad)



Views of the Hudson River and Palisades from the shoreline

Constraints

- Strip of land between rail tracks and shoreline is very narrow in places
- Two Metro-North maintenance or service buildings are present at Control Point 12 (just north of the Spuyten Duyvil triangle) and constrict the right-of-way width
- Overpasses at the Riverdale Yacht Club and the College of Mount Saint Vincent also constrict right-of-way widths
- Frequent Metro-North and Amtrak passenger train traffic could affect a peaceful greenway experience
- Alignment appears to be entirely within Metro-North jurisdiction & would require coordination/approval

- Metro-North has expressed a need to maintain the non-electrified Track 6 to the west of the main line, and will not likely approve its removal at any location along the corridor in the Bronx.
- Federal law requires a 23-foot vertical clearance between railroad tracks and an overhead structure such as a bridge. This requirement presents a challenge to bringing a pedestrian overpass back to grade, or track level, and would require multiple switchbacks.
- Amtrak's planned installation of a second track over the Spuyten Duyvil Railroad Bridge will extend the second track north to the point at which the existing non-electrified Track 6 currently ties into the main line at the approximate equivalent of 247th Street, to accommodate high speed rail service. This track will be located between the existing track and the water, and will limit available right-of-way at this location.
- Installation of a second Amtrak track will further constrain available right-of-way in the area adjacent to the Riverdale Yacht Club.
- The project team requested but was not able to obtain any data regarding freight usage of Track 6. Freight railroads are unwilling to provide information about specific rail car deliveries to specific customers.

Design Solutions

Spuyten Duyvil Triangle

Three alignment options have been identified in this area, which are related in part to where the trail crosses the Harlem River. One, if the trail spans the Harlem River along the west side of the Spuyten Duyvil Bridge, the trail could continue north in the space between the Hudson River and the Amtrak line. Secondly, if the trail spans the Harlem River just east of the Spuyten Duyvil Bridge, then the path would enter the triangle on the north shore and would need to cross the Amtrak line to continue north along the river's edge. With the existing single track, an at-grade crossing with warning signals would be possible. However, if this connection is double tracked at-grade in the future, the risks associated with an at-grade crossing would increase. In either case, an elevated crossing of this track may be required.

A third alignment involves an extension (and possible widening) of the pedestrian bridge at the Spuyten Duyvil Metro-North station over track 3 to the triangle between the tracks, then across the Amtrak line to reach the waterfront. This connection could be provided as a means to connect a crossing at the Henry Hudson Bridge or Broadway Bridge to the waterfront alignment, or it could be provided as a connection to nearby neighborhoods in conjunction with one of the first two alignments.

See Figure WC-2 for possible alignments through and around the Spuyten Duyvil Triangle.

Spuyten Duyvil Triangle to Riverdale Station

Three options for placement of a trail between Spuyten Duyvil and Riverdale Station have been identified: a multi-use path separated from the service road by a fence in-between; or a combined service road/multi-use path for non-motorized traffic in a wider alignment, with a fence separating the combined service road-path from the tracks. Another option would construct a concrete walkway over the riprap with piles driven through the rip rap.² The area available for a multi-use path (or combined service road/path) varies in width from as narrow as 13 feet to as wide as about 38 feet, as measured from the outside rail of Track 6 to a reasonably stable edge along the shoreline.

² While all waterfront alignment options have environmental compliance implications, construction of any structure over the rip rap may raise greater issues. These possible issues are spelled out in the Environmental Screening Appendix of this report.

Control equipment is located in two structures present in the southern portion of this section. The southern structure, which is the larger of the two, is set closer to the water's edge so the existing service road passes through a narrow space between the structure and the adjacent track. Approximately 15 feet separates the structure from the electrified third rail of Track 4. See figure WC-2 for possible alignment options around this structure.

The smaller northern structure is set closer to the track, with the service road located between the structure and the river bank. This structure is approximately 15 feet from the line of scrubby brush that delineates the sloping area of shoreline, and about 8 feet from the third rail of Track 4. The Waterfront Alignment would run between the southern structure and the tracks (separated from the tracks by fencing) and between the northern structure and the water. See Figure WC-3 Option 1 for alignment around this building.

Metro North has expressed its requirement to maintain unfettered access to their maintenance road adjacent to the tracks, and is therefore opposed to a combined maintenance road/greenway.

Where there is no structure but varying widths between the track and the shoreline, Figure WC-3 Options 2A and 2B show possible alignments depending upon available right-of-way. It should be noted that if Amtrak installs a second track over the Spuyten Duyvil Railroad Bridge and extends the track to the point at which Track 6 ties into the main line, it will limit available right-of-way.



Existing maintenance road adjacent to tracks

In addition to a possible connection at the Spuyten Duyvil station, other potential access points between the Waterfront Alignment and neighborhoods on the hill to the east could be provided at West 231st Street or the south end of Riverdale Park (West 232nd Street), and at West 247th Street. The existing bridge at West 254th Street just south of Riverdale station, which serves the Riverdale Yacht Club, would provide access to the trail at that point. These connections are shown on Figures WC-2 and WC-3.

Riverdale Station to the Yonkers City Line

Adequate space for a trail and fence could be obtained though most of this area by shifting Track 6 to the east, closer to the other tracks. By doing this, ample room could be created for the trail to pass under the pedestrian bridge. Public or student access to the trail could be provided via the college campus and pedestrian bridge if desirable. See Figure WC-4 for a cross section of the relocation of Track 6.

A path on or near the existing maintenance road could be asphalt or a stabilized stone screening, as shown in the photo below.



Stabilized stone screening as seen in Nyack State Park

Construction Impacts

- In places, the strip of land is narrow between the shoreline and the tracks. Adding a multi-use path could require use of fill in Hudson River or an elevated boardwalk-type structure along short segments of the Hudson River shoreline

- In addition, narrow right-of-way in some locations along the rail corridor, could require the use of work barges to stage and site construction equipment on the water.
- Riverdale Station promenade would be incorporated into multi-use path and would no longer exist as a separate park
- Construction of a bridge crossing the tracks at 232nd Street could have impacts on Riverdale Park as well as the railroad. Riverdale Park is designated as Forever Wild which restricts development. Use of the tracks would need to be maintained during construction, possibly causing a lengthened construction period.



Park at Riverdale Station would be incorporated into multi-use path

Cost Estimate

Reconstruction of Track 6 closer to the main line: no cost estimates are available at this time, however it is assumed that the track, because of its age would need to be replaced, and would require a significant capital expenditure.

Installation of stabilized stone screening throughout the length of the rail corridor in the Bronx assuming a 12 foot wide path = \$1.5 million.

The Riverwalk project on the west side of Manhattan between 83rd and 91st Streets is a multi-use path built on piles over the shoreline. Based on the cost to construct that project, installation of a path built on piles along the shoreline in the Bronx may cost \$12 million per half mile. It is not possible at this time to determine what the Department of

Environmental Conservation will require in terms of mitigation of impacts on shoreline habitats. This would be an additional project cost.

Installation of a 10-foot high wrought iron fence throughout the length of the corridor = \$2.7 million

A chain link fence could be used instead of wrought iron, though wrought iron would be more durable. Installation of 10-foot high chain link fence throughout the length of the corridor = \$800,000.

Construction of a pedestrian bridge at 231st or 232nd Street could be \$10 million.

Yonkers Section

Existing Conditions

A number of options are possible in Yonkers for the Waterfront Alignment. Among the options are joining the RiverWalk, using portions of the existing rail alignment, using on-street or on-sidewalk solutions, or a combination of these. In some places, such as at the Yonkers Joint Wastewater Treatment Plant and American Sugar Refinery, an alignment along the water is not available. In these locations, alternatives to a water-adjacent facility were identified as close to the water as feasible.

Former industrial areas along the Yonkers waterfront are currently being redeveloped and plans for redevelopment provide an opportunity to include multi-use pathways and facilities. In particular, incorporation of a multi-use pathway in the plans for the Palisades Point and Alexander Street development sites will be discussed below.

New York City Line to Palisades Point Development Site

Just north of the Yonkers City limit, the Yonkers Joint Wastewater Treatment Plant, owned and operated by Westchester County, occupies the waterfront, with the rail line passing on its inland side. There is track siding and fencing along the land side of the treatment plant in this area. The current distance from the fence to the siding is approximately 18 feet, with another 14 feet from the siding to Track 6. See Figure WC-5 for an aerial view of the Wastewater Treatment Plant.



Gated entrance to the Westchester
County Wastewater Treatment Plant

North of the Wastewater Treatment Plant the waterfront is lined with industrial uses, creating a barrier to public access to the waterfront. Once the Waterfront Alignment passes north of the Wastewater Treatment Plant, Track 6 passes through a narrow space between the Ludlow station and adjacent buildings and two sidings provide access to two properties (Tyco Plastics at 78 Fernbrook Street and Hudson Scenic Studios, at 130 Fernbrook Street). The narrowness of the alignment combined with the two sidings renders use of the rail alignment highly unlikely. Instead, two other opportunities exist. A new bridge for non-motorized travel could be provided over the tracks to Valentine Lane with a ramp approach from the south. From here, the trail could turn north on Sunnyside Drive, joining the Buena Vista Corridor. Sunnyside Drive is a residential street with single family homes and apartments, as discussed in the Buena Vista Corridor section of this report. Alternately, the multi-use trail could connect to the south end of Fernbrook Street, and continue north on Fernbrook Street and Knowles streets. These streets pass through a light industrial area planned for redevelopment, but remain close to the waterfront. Whichever route the HRVGL takes, both of these connections could be provided to maximize community access to the trail. Use of either of the identified routes allows travel through this area without affecting Track 6 or the sidings to Tyco Plastics and Scenic Hudson. See Figure WC-5 for an aerial view of waterfront industrial uses north of the Wastewater Treatment Plant.



Fernbrook Street

Continuing north from Fernbrook and Knowles Streets, an off-road multi-use path could run between the American Sugar Refinery and the rail line. The refinery is a water dependent industrial use, so it would be impossible to route a greenway to the waterside of the operation. Just north of Knowles and Federal Streets, there is ample space for a multi-use path in an area previously occupied by track spurs. North of that, the space occupied by Track 6 becomes narrow for a distance of about 280 feet (85m), with just enough room for the track, before widening again with a spur leading into the American Sugar Refinery's loading dock and Track 6 continuing in a space with walls on both sides to the north end of the plant. (At this point, the passenger rail tracks to the east of Track 6 are on an embankment about 15 feet higher than Track 6.) Immediately to the north of the American Sugar Refinery, is a vacant property slated for redevelopment. The development project, known as Palisades Point, will construct new mid-rise residential units. See Figure WC-6 showing an aerial view of the American Sugar Refinery and the Palisades Point development site directly to the north.



American Sugar Refinery
with tracks in the foreground.

Palisades Point Development Site to the Alexander Street Development (Wells Street)

At the north end of the Palisades Point development site, the path could connect to the end of Water Grant Street, and join the existing multi-use path, which follows the shoreline in downtown Yonkers, providing access to the esplanade along the waterfront. It is designed as a promenade in this area with excellent amenities for recreational walkers and bicyclists. However, it makes several abrupt turns and is paved with small stones, making it less desirable for people who wish to travel more quickly. See Figure WC-6 showing the waterfront esplanade north of the Palisade Point development.



Downtown Yonkers waterfront esplanade

Alternatively, the multi-use path could follow the former alignment of Track 6 on top of the viaduct that serves the Yonkers train station. See Figure WC-6. Currently, there is approximately 14 feet of space between the third rail of Track 4 and the fence of the viaduct. This space within the viaduct presents a unique opportunity for an off-road path without street crossings, and with striking views of the waterfront area from its elevated position.

Alexander Street Development (Wells Street) to Trevor Park

North of the downtown development beginning at Wells Street is the proposed Alexander Street development site, which extends north along the waterfront past the Glenwood Station into JFK Marina. This project plans to develop mid-rise, mixed-use residential, including public access to the waterfront. North of Point Street along the water, up until just south of the abandoned Glenwood Power Station, the distance between the railroad tracks and the shore is quite narrow. The Alexander Street redevelopment plans include a widening of this area to provide a causeway including a roadway and walkway. See Figure WC-7.

The northernmost part of the Alexander Street development includes the site of the abandoned Glenwood Power Plant.



Abandoned Glenwood Power Plant

Just north of the Glenwood Power Plant, the proposed roadway would pass along the edge of JFK Marina and connect to the existing JFK Memorial Drive bridge.



Park at JFK Marina

The bridge leads to Trevor Park which has paved paths through it leading to Warburton Avenue.

The following points summarize the existing conditions described above along various portions of the waterfront alignment.

- Rail right-of-way
 - Limited space in rail right-of-way from Yonkers City line to American Sugar Refinery
 - Wastewater Treatment Plant, Fernbrook Street, siding tracks serving the former Tyco Plastics site, Hudson Scenic Studio, and American Sugar Refinery limit available right-of-way
 - East of (behind) American Sugar Refinery, Track 6 appears to be unused. See Figure WC-5 existing cross section.
 - Track 6 ends north of American Sugar Refinery, although some trackage is still present
- Space formerly occupied by Track 6 at Yonkers Station. See Figure WC-6 existing cross section
- Fernbrook Street
 - Little traffic during the day; light traffic on weekends
 - Low speeds (dead-end street)
 - Five-foot sidewalks present on eastern side only
 - Many vehicles parked on sidewalks
 - Active light industrial land uses
- Palisades Point Development (SFC Development Corporation)
 - Development underway in downtown Yonkers, will include public waterfront access
- Water Grant (Van der Donck) Street
 - 30-foot wide street (at Main Street)
 - Metered parallel on-street parking on east side (in places)
 - Low observed traffic volumes
- Alexander Street (between Wells Avenue and Babcock Place)
 - 30-foot wide street
 - 10 foot sidewalks on both sides
 - Metered, on-street parking on east side, next to Yonkers station
 - Low observed traffic volumes and speeds
- Alexander Street Development
 - Development underway north of downtown
 - Will include causeway over narrow stretch of land between tracks and shore south of the abandoned Glenwood Power Station
- Zoning
 - Industrial zoning along southern portion of alignment

- Zoned urban renewal sites at Palisades Point and Alexander Street development
- Alexander Street development area is zoned industrial but the master plan calls for rezoning to mixed use commercial/residential.

Opportunities

- An off-road multi-use path possible for much of the alignment
- Waterfront access and/or views for most of the alignment
- Views of interesting sites
 - American Sugar Refinery (active industrial site)
 - Glenwood Power Plant (abandoned site)
- Access to key destinations
 - O'Boyle Park (with connector path)
 - Esplanade Park (including Sculpture Garden)
 - Yonkers Recreation Pier
 - Downtown Yonkers business district & Yonkers promenade
 - Beczak Environmental Center
 - Trevor Park
 - JFK Marina Park
 - Glenwood Power Station
 - Hudson River Museum
 - Old Croton Aqueduct Trail (with connector path)



Old Croton Aqueduct Trail in Yonkers

- Access/connection to transit
 - Ludlow Station (Metro-North Railroad)

- Yonkers Station (Metro-North Railroad, Amtrak, Westchester Co. Beeline bus)
- Yonkers Ferry Slip (New York Water Taxi service to Manhattan); service has recently been discontinued.
- Glenwood Station (Metro-North Railroad)
- In downtown Yonkers, RiverWalk already exists and provides access to waterfront, downtown Yonkers businesses, Esplanade Park, and Beczak Environmental Center
- Palisades Point Development
 - Incorporate multi-use pathway into new downtown Yonkers development plans
- Alexander Street Development
 - Modify plans for causeway south of Glenwood Station to incorporate multi-use path or on-street striped bike path

Constraints

- Yonkers Joint Wastewater Treatment Plant
 - Facility occupies waterfront and is fenced off from public access
 - Currently impossible to access water side of facility
 - The Wastewater Treatment Plant is looking into the possibility of bringing chemicals to the facility in the future via rail. This would occur in seven years when their existing trucking contract expires.
- American Sugar Refinery
 - Water-dependent industrial use with an active dock facility
 - Impossible to route a greenway on the active waterside of the operation
 - Placement in rail right-of-way behind American Sugar Refinery requires reconfiguration of Track 6 and plant siding.
 - Due to its active dock facility, American Sugar Refinery area is subject to the U.S. Coast Guard's Marine Security ("MARSEC") system and procedures.
- RiverWalk
 - Portions of RiverWalk may not be suitable for bicyclists to ride given sharp turns and anticipated pedestrian traffic
- From JFK Marina to Greystone Station
 - Very little space between the Hudson Line tracks and the water
 - Very steep elevation changes between waterside and inland destinations
- Traffic and safety issues
 - On weekdays, a lack of off-street parking on Fernbrook Street results in vehicles parked on sidewalks
 - On-street parking on Water Grant Street

- Portion of alignment within rail corridor would require coordination with/approval from Metro-North Railroad



Little room along some portions of the railroad right-of-way

Design Solutions

New York City Line to Palisades Point Development Site

In Yonkers, the waterfront alignment would initially continue north in an area between the rail tracks and the Wastewater Treatment Plant. This may require removing a track siding or shifting the fencing along the land side of the treatment plant in this area. The current distance from the fence to the siding is approximately 18 feet, with another 14 feet from the siding to Track 6.

Adjacent to the American Sugar Refinery's loading dock area, a multi-use path could occupy the space currently occupied by Track 6, leaving the spur to the plant in place, but a crossing and possibly shifting the spur track to share space with a roadway within the plant property may be required. The multi-use path would then continue in the walled section where Track 6 passes the plant. See Figure WC-5 for a cross section of a path passing the loading dock area.

The multi-use path would continue where the end of Track 6 is today, adjacent to the Palisades Point development site. Track 6 ends several hundred feet north of the of the sugar refinery. Once Track 6 ends, several opportunities are available to provide an alignment close to the waterfront.

Public waterfront access is planned for the Palisades Point development and would be incorporated into Yonkers RiverWalk.

Palisades Point Development Site to Alexander Street Development (Wells Street)

For bicyclists wishing to travel at greater speeds than the Yonkers Promenade is designed for, the Waterfront Alignment could continue along the base of the railroad viaduct on Alexander Street past the Yonkers station area. This on-street route could continue on Alexander Street to just north of Babcock Place, where it could transition back to the west side of the rail line. See Figure WC-6, Option 1B.

Alternatively, the multi-use path could follow the former alignment of Track 6 on top of the viaduct that serves the Yonkers train station. Currently, there is approximately 14 feet of space between the third rail of Track 4 and the fence of the viaduct. This space within the viaduct presents a unique opportunity for an off-road path without street crossings, and with striking views of the waterfront area from its elevated position. Such a path would require relocation of two small signal structures and covering of a light well into the station corridor below. A narrow cantilever about 2 feet wide along the side of the structure would add needed width and an access stair could be provided at the northeast corner of Dock Street and Alexander Street. A ramp access could be provided in an open triangle near the north end of the station and across from the Beczack Environmental Education Center at 35 Alexander Street. The elevated alignment could continue in the former space of Track 6 north crossing over Ashburton Avenue and under Babcock Place. See Figure WC-6, Option 1A for a cross section of this path on the viaduct.

Whether the Waterfront Alignment follows the RiverWalk, an on-street solution on Alexander Street, or the rail viaduct, all options would converge north of downtown Yonkers just north of Babcock Place next to the Alexander Street Redevelopment site.

Alexander Street Development (Wells Street) to Trevor Park

North of downtown, the Waterfront Alignment could continue north along the west side of the rail line, passing the Alexander Street development without street crossings. North of Point Street, the land narrows for about 700 feet (215m) until it reaches the Glenwood train station. The Alexander Street redevelopment plans include a widening of this area to provide a causeway including a roadway and walkway. The multi-use corridor could be included in this space, possibly with a space reserved primarily for cyclists on the railroad side of the segment (to avoid street crossings) and a pedestrian

walkway along the waters edge. This configuration would continue in the space between the southbound platform of the Glenwood station and the adjacent abandoned Glenwood Power Plant. (The Waterfront Alignment connects or passes through several redevelopment projects in the City of Yonkers. Opportunities to include the Alignment in redevelopment plans should be pursued.) See Figures WC-7 and WC-8 for cross sections along the rail corridor and future causeway.

Just north of the Glenwood Power Plant, the proposed roadway would pass along the edge of JFK Park and connect to the existing JFK Memorial Drive bridge. The multi-use path could follow the east side of this alignment, using the south sidewalk on JFK Memorial Drive to cross the railroad tracks and connect to Trevor Park on the east side of the tacks. See Figure WC-8 for the path of this route.

From JFK Memorial Drive, the path could pass through Trevor Park and connect to Warburton Avenue. Along Warburton Avenue the trail could connect to the OCA Trail at 4 different locations: Shonnard Terrace, Arthur Street, a path through Untermeyer Park, and Odell Avenue. Shonnard Terrace is the closest connection point to Trevor Park. These OCA connection points are discussed earlier in this report as part of the North Yonkers Corridor.

This route would provide good access to the Hudson River Museum at the north end of Trevor Park and to the Museum School 25, the Museum Middle School, and Riverside High School, all located at the intersection of JFK Memorial Drive and Warburton Avenue.

Construction Impacts

- On-street solutions could require elimination of on-street parking on Fernbrook Street, Water Grant Street
- Removal of unused Track 6 would be required behind American Sugar Refinery

Construction Costs

Installation of stabilized stone screening through the Yonkers portion of the greenway from the Bronx/Yonkers border to approximately Valentine Lane, assuming a 12 foot wide path = \$300,000

Installation of a 10-foot high wrought iron fence through the same length as above = \$500,000

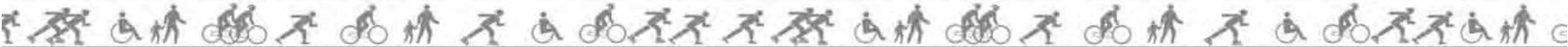
A chain link fence could be used instead of wrought iron, though wrought iron would be more durable. Installation of 10-foot high chain link fence throughout the length of the corridor = \$50,000.

Construction of a pedestrian bridge at Valentine Lane could cost approximately \$10 million.



- LEGEND**
- | | | | |
|---------------------|-----------------------------|---------------------------------------|------------------------------------|
| Study Area Boundary | Palisade Corridor | Service Road Corridor | Waterfront Corridor |
| Park/Open Space | Palisade Corridor Alternate | Service Road Corridor Alternate | Waterfront Corridor Desired Access |
| Railroad | Broadway Corridor | Broadway Bridge Approach Corridor | |
| Rail Station | Broadway Corridor Alternate | Henry Hudson Bridge Approach Corridor | |

Task 6_Design Solutions
Waterfront Corridor
Figure_W/C-Index





- LEGEND**

 - Study Area Boundary
 - Park/Open Space
 - Railroad
 - Rail Station
- Palisade Corridor
 - Palisade Corridor Alternate
 - Broadway Corridor
 - Broadway Corridor Alternate
- Service Road Corridor
 - Service Road Corridor Alternate
 - Broadway Bridge Approach Corridor
 - Henry Hudson Bridge Approach Corridor
- Waterfront Corridor
 - Waterfront Corridor Desired Access

Task 6_Design Solutions
Waterfront Corridor
Figure_WC-1

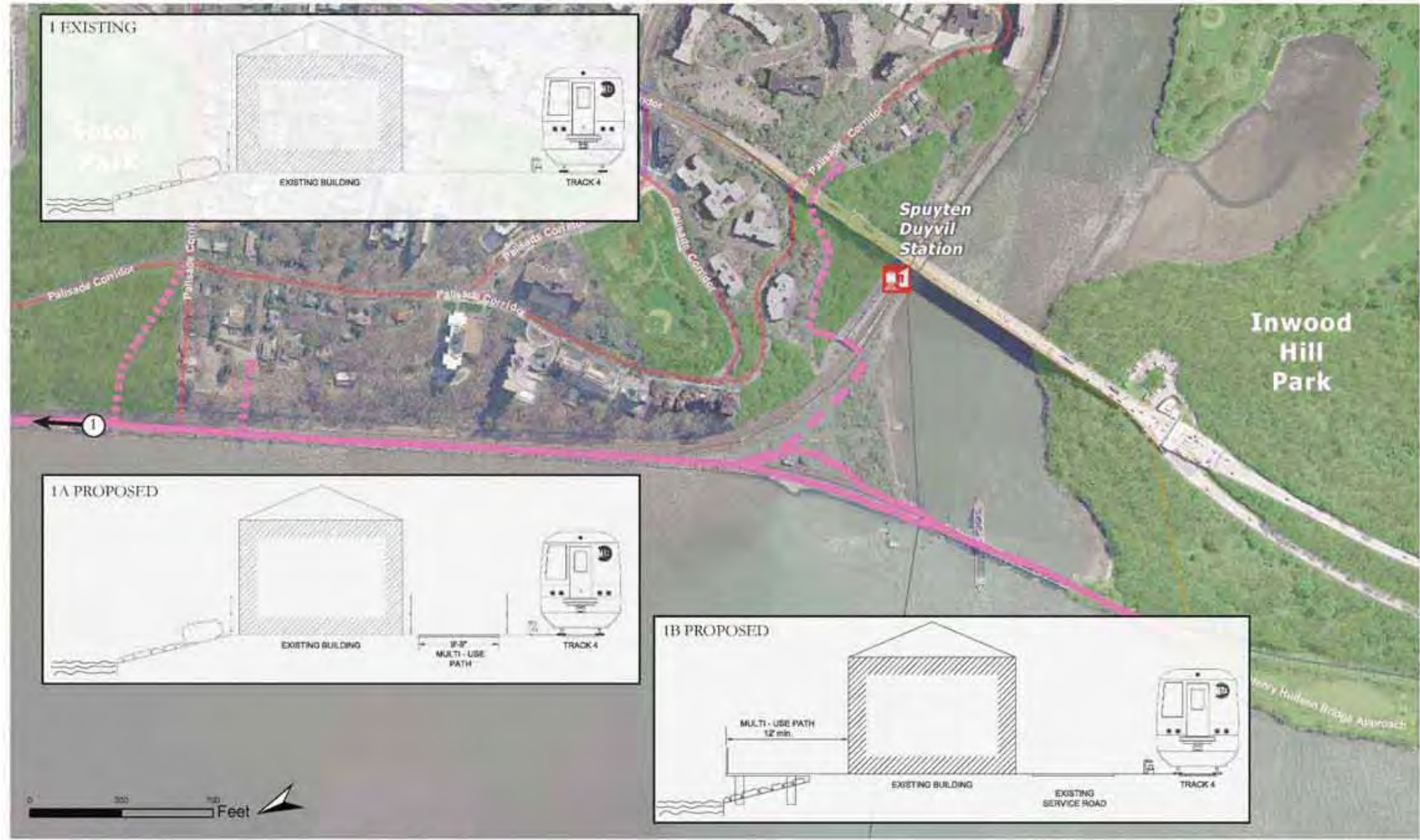
NEW YORK STATE DEPARTMENT OF TRANSPORTATION

RBA
RIVERSIDE BRIDGE AND ASSOCIATES
INCORPORATED

PARSONS BRINCKERHOFF
CONSULTANTS

Hudson River Valley Greenway Link



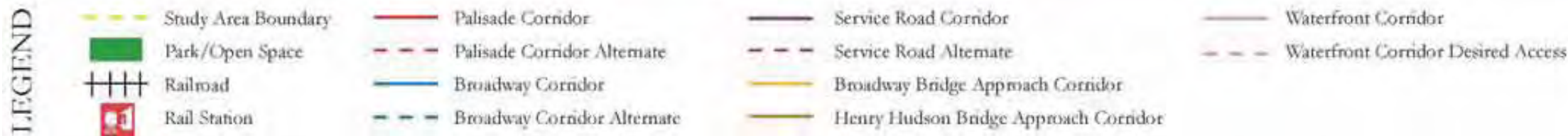


Task 6_Design Solutions

Waterfront Corridor

Figure_WC-2





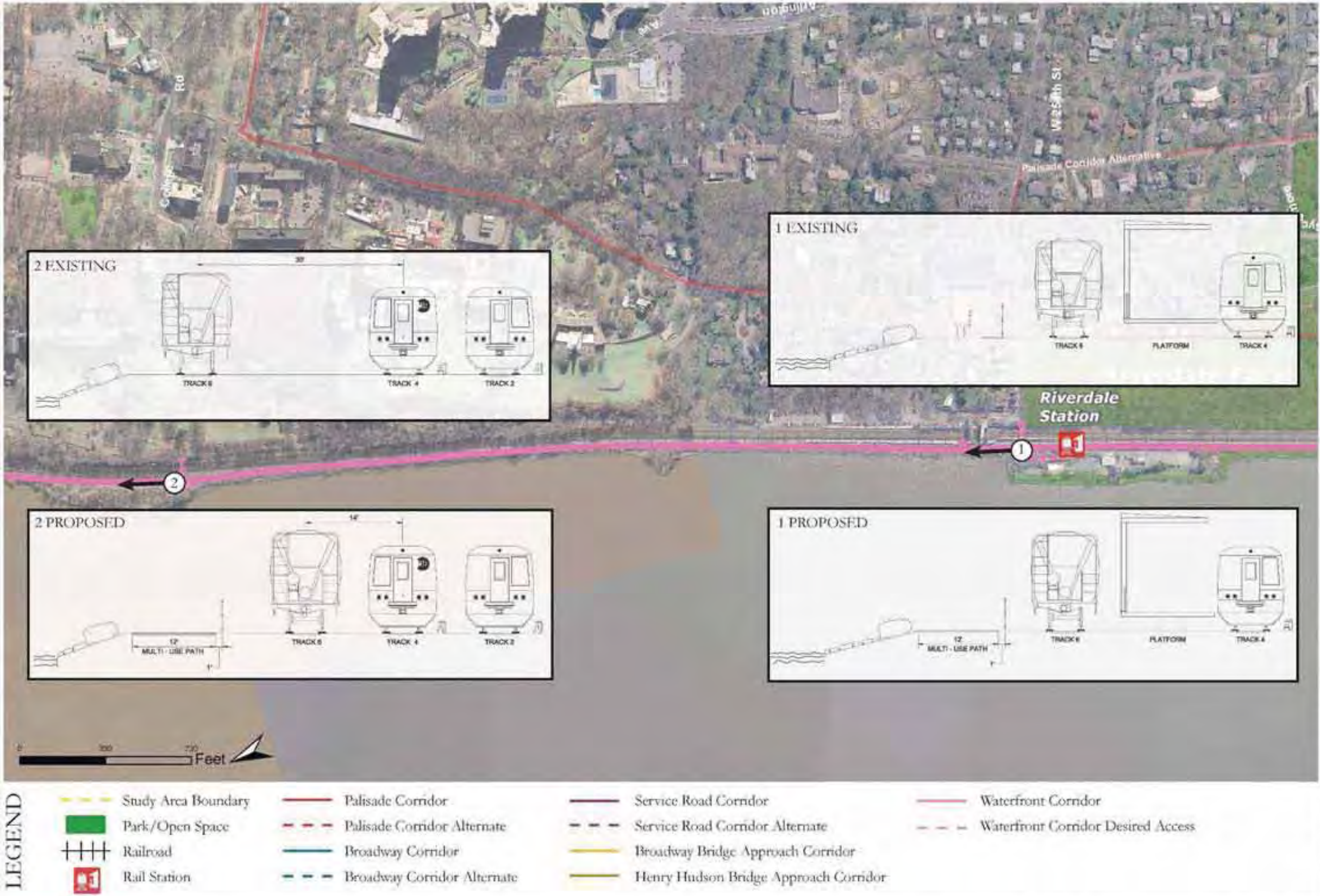
Task 6_Design Solutions
Waterfront Corridor
Figure_WC-3

Hudson River Valley Greenway Link

RBA
RIVERDALE
BRIDGE
APPROACH

PARSONS
BRINCKERHOFF





Task 6_Design Solutions

Waterfront Corridor

Figure_W/C-4





- LEGEND**
- | | | | |
|---------------------|-----------------------------|---------------------------------------|------------------------------------|
| Study Area Boundary | Palisade Corridor | Service Road Corridor | Waterfront Corridor |
| Park/Open Space | Palisade Corridor Alternate | Service Road Corridor Alternate | Waterfront Corridor Desired Access |
| Railroad | Broadway Corridor | Broadway Bridge Approach Corridor | |
| Rail Station | Broadway Corridor Alternate | Henry Hudson Bridge Approach Corridor | |

Task 6_Design Solutions
Waterfront Corridor
Figure_WC-5

RBA PARSONS BRINCKERHOFF
Hudson River Valley Greenway Link



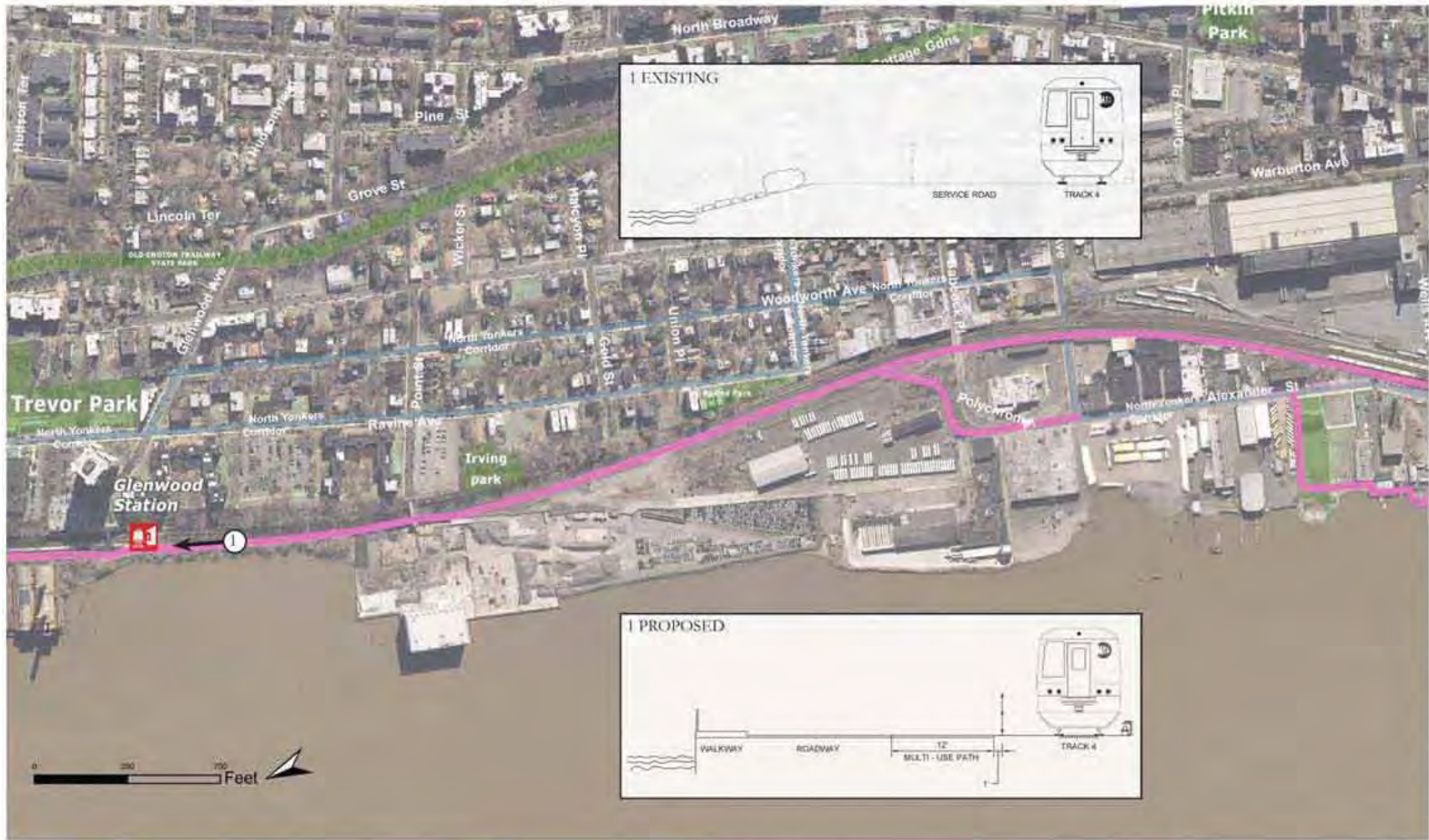


- LEGEND**
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|---------------------|-----------------------------|---------------------------------------|------------------------------------|
| Study Area Boundary | Palisade Corridor | Service Road Corridor | Waterfront Corridor |
| Park/Open Space | Palisade Corridor Alternate | Service Road Corridor Alternate | Waterfront Corridor Desired Access |
| Railroad | Broadway Corridor | Broadway Bridge Approach Corridor | |
| Rail Station | Broadway Corridor Alternate | Henry Hudson Bridge Approach Corridor | |

Task 6_Design Solutions
Waterfront Corridor
Figure_WC-6

RBA **PARSONS BRINCKERHOFF**
Hudson River Valley Greenway Link





- LEGEND**
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|---------------------|-----------------------------|---------------------------------------|------------------------------------|
| Study Area Boundary | Palisade Corridor | Service Road Corridor | Waterfront Corridor |
| Park/Open Space | Palisade Corridor Alternate | Service Road Corridor Alternate | Waterfront Corridor Desired Access |
| Railroad | Broadway Corridor | Broadway Bridge Approach Corridor | |
| Rail Station | Broadway Corridor Alternate | Henry Hudson Bridge Approach Corridor | |

Task 6_Design Solutions
Waterfront Corridor
Figure_WC-7

Hudson River Valley Greenway Link





- LEGEND**
- | | | | |
|---------------------|-----------------------------|---------------------------------------|------------------------------------|
| Study Area Boundary | Palisade Corridor | Service Road Corridor | Waterfront Corridor |
| Park/Open Space | Palisade Corridor Alternate | Service Road Corridor Alternate | Waterfront Corridor Desired Access |
| Railroad | Broadway Corridor | Broadway Bridge Approach Corridor | |
| Rail Station | Broadway Corridor Alternate | Henry Hudson Bridge Approach Corridor | |

Task 6_Design Solutions
Waterfront Corridor
Figure_WC-8

RBA **PARSONS BRINCKERHOFF**
Hudson River Valley Greenway Link



River Access and East-West Connections

Throughout the course of the project, stakeholders have identified the need to establish east/west connections, bringing people to the waterfront from the neighborhoods inland. Barriers such as railroad tracks and steep grade changes make the establishment of these connections very challenging. The discussion below outlines the challenges presented at each of the possible connection points identified in this study.

Bronx

231st Street - If 231st Street were to extend past its western termination point at Palisade Avenue it would pass through a privately owned parcel of land, leading to railroad right-of-way and the river. The terrain leading through the privately owned parcel is very steep, leading to a point where a bridge would be constructed over the tracks. See the parcel ownership map on the following page. The clearance of the bridge over the tracks must be 23 feet according to railroad requirements. With a clearance of this height, the path would then be brought back to grade on the water side of the tracks. This would require an ADA compliant ramp of approximately 276 feet in length, or a mechanical devise such as an elevator.

232nd Street near Riverdale Park – If 232nd Street were to extend past its western termination point at Palisade Avenue it would pass along the lot line separating Riverdale Park and a privately owned parcel. As stated above, the terrain leading through Riverdale Park is very steep, leading to a point where a bridge would be constructed over the tracks. The clearance of the bridge over the tracks must be 23 feet according to railroad requirements. With a clearance of this height, the path would then be brought back to grade on the water side of the tracks. This would require an ADA compliant ramp of approximately 276 feet in length, or a mechanical devise such as an elevator.

Dodge Dock – Dodge Dock is a small outcropping of land into the Hudson River at approximately 246th Street. Parcel ownership maps indicate that this piece of land is owned by the New York City Department of Parks and Recreation. Connections to this parcel from the east would face the same topographic obstacles as those outlined above at 231st and 232nd Streets. See the parcel ownership map on the following page.

North End of Riverdale Station Parking Lot – Access to the waterfront at the north end of the Riverdale Station parking lot is an at grade crossing of the electrified tracks, and is designated for railroad maintenance workers only. Access across these electrified, active tracks by the general public would be dangerous, and little opportunity exists to create a safe at grade crossing here.

The Point at the College of Mount Saint Vincent - The Point is a property owned by the Sisters of Charity at the College of Mount Saint Vincent. It can only be accessed from inland via the College campus. The College is very security conscious and restricts public access. Therefore, the Point could not be accessed by the general public.

Yonkers

Ludlow Street existing bridge – This project's Task 4 document outlined the characteristics of Ludlow Street and the Ludlow Street Bridge crossing the tracks as an east-west connection. The Task 4 document stated that Ludlow Street provides the first existing location north of the Yonkers city line to cross over the rail tracks. Ludlow Street is wide enough for striped bike lanes on both sides, although currently there is parking on the south side of the street. In addition, because Ludlow Street is the only access point to the industrial uses on the water's edge, a moderate amount of truck traffic was observed.

Characteristics described in the Task 4 document include:

- Two way street, one lane in each direction, parking on one side
- Possible connection to the waterfront - crosses the rail tracks
- Provides connection to the Ludlow Train Station
- Light truck traffic from waterfront industrial uses
- Surrounding land uses include small warehouses and factories

Sugar Factory Bridge – The bridge from Vark Street over the railroad tracks and into the Sugar Refinery do not provide access to the waterfront nor does it provide a public east-west connection.



APPENDIX: ENVIRONMENTAL SCREENING

This appendix summarizes existing environmental conditions and sensitivities in the study area, outlines regulatory requirements relevant to the development of the alternative alignments under consideration, and presents the environmental screening findings by alternative alignment. Data collection and analysis methodologies are presented under each subject heading. The following environmental resources and conditions were evaluated under this task (organized from south to north—Manhattan, Bronx, Yonkers), as applicable:

- Land use and zoning
- Parks and open space
- Community facilities
- Natural resources (coastal zone, floodplains, and wetlands)
- Visual quality and aesthetics
- Historic and archaeological resources
- Hazardous materials
- Socioeconomics
- Environmental justice
- Preliminary List of Permits and Approvals (Waterfront)

LAND USE AND ZONING

Data for Manhattan and the Bronx come from the City of New York's MapPLUTO file, published in June 2009. The MapPLUTO dataset represents a compilation of data from various government agencies throughout the City of New York, represented in a geographic dataset. The underlying geography is derived from the Tax Lot Polygon feature class which is part of the Department of Finance's Digital Tax Map (DTM). Information for the City of Yonkers was extracted from tax parcel data maintained by the City's Department of Public Works, also represented as a geographic dataset, and is current as of August 2009. Data for the City of New York is presented as received; the data for the City of Yonkers was edited for completeness, consistency, and currency. Parcel land use categories were derived from land use codes within each of the municipal data sets.

While no zoning or land use changes are anticipated as a result of the HRVGL project, both zoning and land use provide an understanding of the built environment surrounding the proposed alignments and the context in which the future greenway link will exist.

Land Use

The greatest use of land in the study area is for residential purposes, with 27% of the study area dedicated to one or two-family housing and a further 11% used for multi-family housing. Open space is the next largest use of land in the study area, comprising 20% of the land. Public facilities make up the next greatest amount acreage, at 17% of the study area. Table 1 summarizes land use in the study area as a whole. Maps in Figures 1 and 2 show land use in Manhattan & the Bronx and in Yonkers.

TABLE 1: LAND USE IN THE STUDY AREA

Overall area		
	Type of Land Use	Acres Percent of study area
	Total Residential	853 38%
	<i>One & Two Family Buildings</i>	605 27%
	<i>Multi-Family Buildings</i>	248 11%
	Open Space and Outdoor Recreation	463 20%
	Public Facilities and Institutions	393 17%
	Vacant	184 8%
	Industrial and Manufacturing	93 4%
	Unknown	68 3%
	Transportation and Utility	101 4%
	Commercial and Office Buildings	60 3%
	Parking Facilities	18 1%
	Residential of Unknown Density	5 0%
	Mixed Residential and Commercial	33 1%
	Total	2,272 100%

FIGURE 1: LAND USE AND ZONING IN MANHATTAN AND THE BRONX

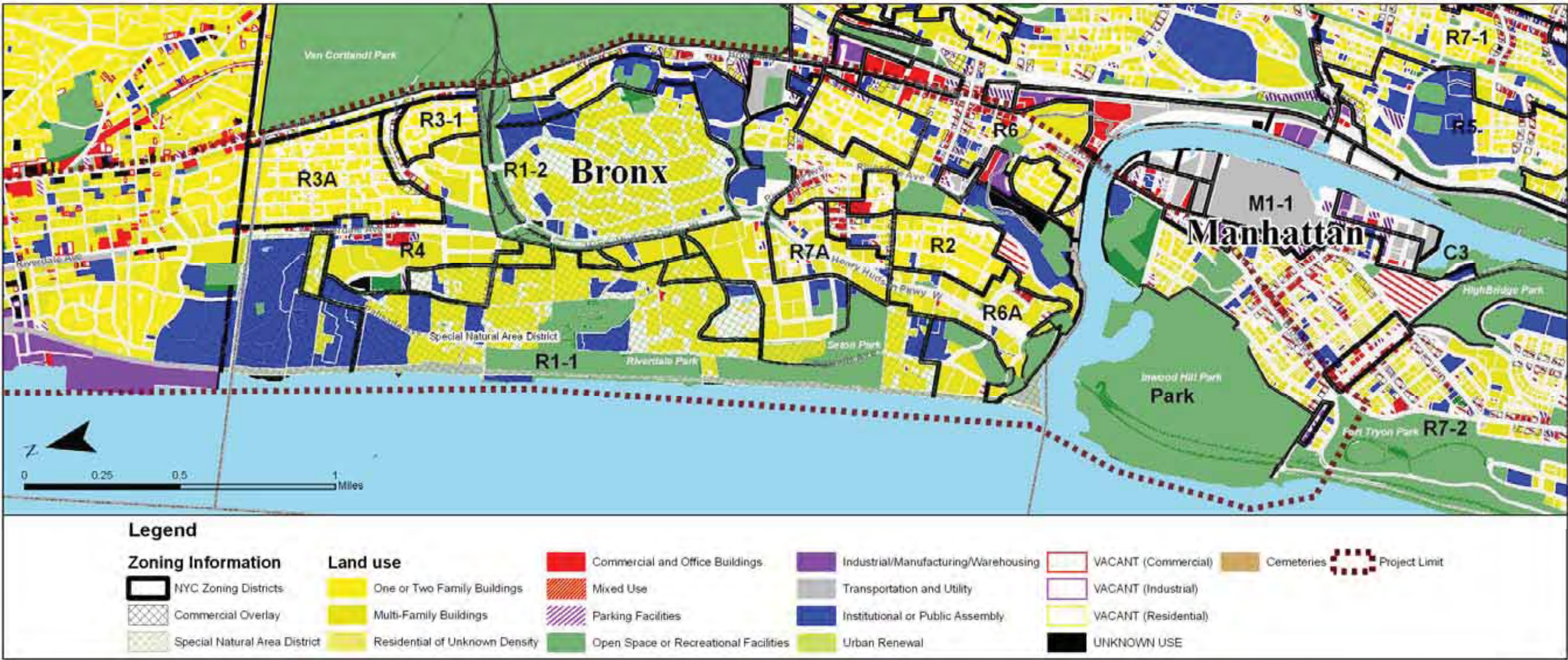
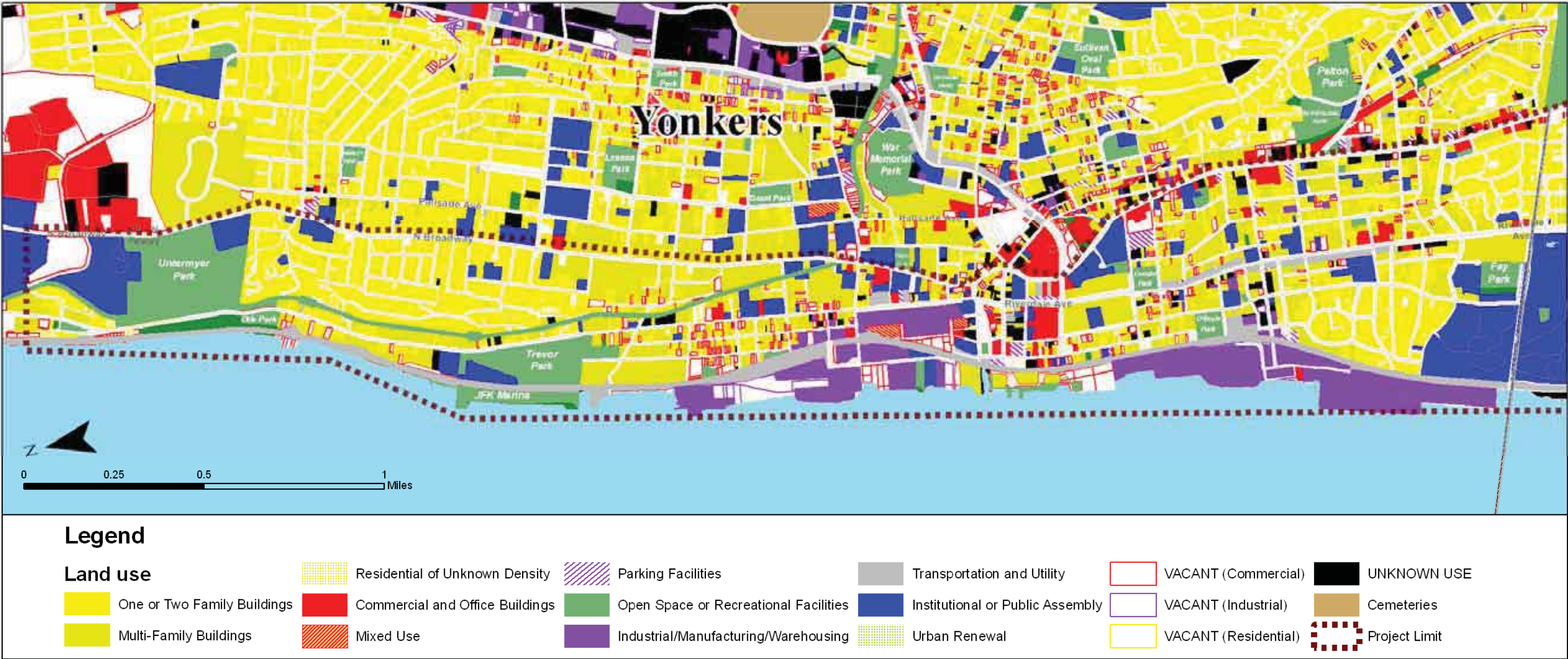


FIGURE 2: LAND USE IN YONKERS



Zoning

Zoning information for Manhattan and the Bronx is presented in Figure 1. Zoning districts in the study area include residential, commercial, manufacturing, and parkland uses.

Residential zoning in the Manhattan and Bronx portion of the study area includes single family, detached housing on large lots (R1-1, R1-2, R2); one or two-family semi-detached housing (R3-1, R3A); a variety of housing types and densities (R3-2, R4, R5), and apartment housing at varying densities (R6, R7-1, R7-2, R7A). Commercial zoning in the study area is present as zoned districts C8-1, C8-2, C8-3, all of which bridge commercial and manufacturing uses by allowing commercial uses that require large lots, such as auto repair shops. Commercial overlays in residential districts allow local retail (C1-2, C1-3, C1-4, C2-2, and C2-3). A small Manufacturing zoning district is present (M1-1), which allows light industry.

An overlay zone of note is present in the Bronx portion of the study area; this is the Special Natural Area District (NA-2), or SNAD, which covers almost 900 acres in the Bronx. SNAD overlays are present in areas of New York City with significant natural features such as steep slopes, rock outcroppings, forests, wetlands, ponds, and stream corridors. The SNAD in the Bronx is one of four such districts city-wide. The purpose of the SNAD is “to guide development to preserve unique natural features by requiring City Planning Commission review of new developments and site alteration on primarily vacant land.”¹

Note: Information on zoning is not currently available for the Yonkers portion of the study area.

¹ See New York City Department of City Planning, <http://www.nyc.gov/html/dcp/html/snad/index.shtml>

PARKS & OPEN SPACE

There are 36 public open spaces and playgrounds situated within the HRVGL study area, ranging from regional parks and forests to small local playgrounds. This information was compiled from a variety of databases: the New York City Department of Parks & Recreation; the City of Yonkers Department of Parks, Recreation & Conservation; and the New York State Office of Parks, Recreation & Historic Preservation (see Figures 3 and 4 and Table 1).

Should the selected alignment(s) require acquisition from public parkland, the agency having jurisdiction would be consulted regarding measures to avoid, mitigate, or minimize impacts. Should the project receive federal transportation funding, then a Section 4(f) Evaluation² would be required if the project proposes to use property from:

- 1) a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance; or
- 2) a historic site of national, state, or local significance.

The FTA may not approve the use of Section 4(f) property unless it determines that:

- There is no feasible or prudent alternative and the action includes all possible planning to minimize harm to the property resulting from such use; or
- The use of the property, including any measure(s) to minimize harm will have a *de minimis* impact on the property.

With regard to public parks, recreation areas, and wildlife and waterfowl refuges, mitigation measures may include (but are not limited to) design modifications, replacement of land or facilities of comparable value and function, or monetary compensation to enhance the remaining property or to mitigate the adverse impacts of the project in other ways.

² A Section 4(f) Evaluation is prepared pursuant to federal regulations contained in 23 CFR 774 that implement 23 U.S.C. 138 and 49 U.S.C. 303, which were originally enacted as Section 4(f) of the Department of Transportation Act of 1966 and are still commonly referred to as "Section 4(f)".

Another pertinent regulation is Section 6(f) of the Land and Water Conservation Fund Act (LWCFA) of 1965, which concerns transportation projects that propose to convert outdoor recreation property acquired or developed with LWCFA grant assistance. Section 6(f) of the act prohibits the conversion of property acquired or developed with these grants to a non-recreational purpose without the approval of the US Department of the Interior's National Park Service (NPS).

The NPS must assure that replacement lands of equal value, location, and usefulness be provided as conditions to approval of land conversions, and the NPS's position on the land transfer must be documented.

While Section 6(f) is similar to the recreation-related provisions of Section 4(f), there are some key differences:

- Whereas Section 4(f) applies only to programs and policies undertaken by the US Department of Transportation (USDOT), Section 6(f) applies to programs and policies of any federal agency.
- Mitigation opportunities are more flexible under Section 4(f) and may or may not include replacement lands. As previously stated, Section 6(f) directs the NPS to assure that replacement lands are of equal value, location and usefulness as impacted lands.

With this in mind, the LWCFA database was reviewed to determine whether any of the study area's parks received funding through this program in case alignments required acquisition of parkland. Several parks were found to have received such funding and they are identified in Table 2.

In addition to the federal-level regulations detailed above, it is important to note that if public parkland is alienated and developed for another use, this action must be approved by the New York State Legislature.

Manhattan

There are two public parks within the study area in Manhattan: Inwood Hill Park (a 200-acre park that possesses the last natural forest in Manhattan) located at the northern edge of the borough; and Isham Park, just east of Seaman Avenue. (See Figure 3 for parks and open spaces in Manhattan and the Bronx.) Both of these parks received LWCFA funding in the last 40 years. Within

Inwood Hill Park, the Shorakapok Preserve (comprising 136 acres of forest and salt marsh) is part of the NYC Department of Parks and Recreation's Forever Wild Program, an initiative to protect and preserve the most ecologically valuable lands within New York City.

Bronx

There are 17 parks and open spaces in the Bronx portion of the study area; the largest ones are located west of Henry Hudson Parkway and include Riverdale Park, Henry Hudson Park, Wave Hill, and Seton Park. Additionally, the very large Van Cortlandt Park lies just outside the eastern boundary of the study area along the east side of Broadway.

Yonkers

There are 17 parks and open spaces in the Yonkers study area. The largest parks are located in the northern portion of Yonkers and include Trevor Park and Untermyer Park. (See Figure 4 for parks and open space in Yonkers.)

FIGURE 3: PARKS AND OPEN SPACE IN MANHATTAN AND THE BRONX



FIGURE 4: PARKS AND OPEN SPACE IN YONKERS

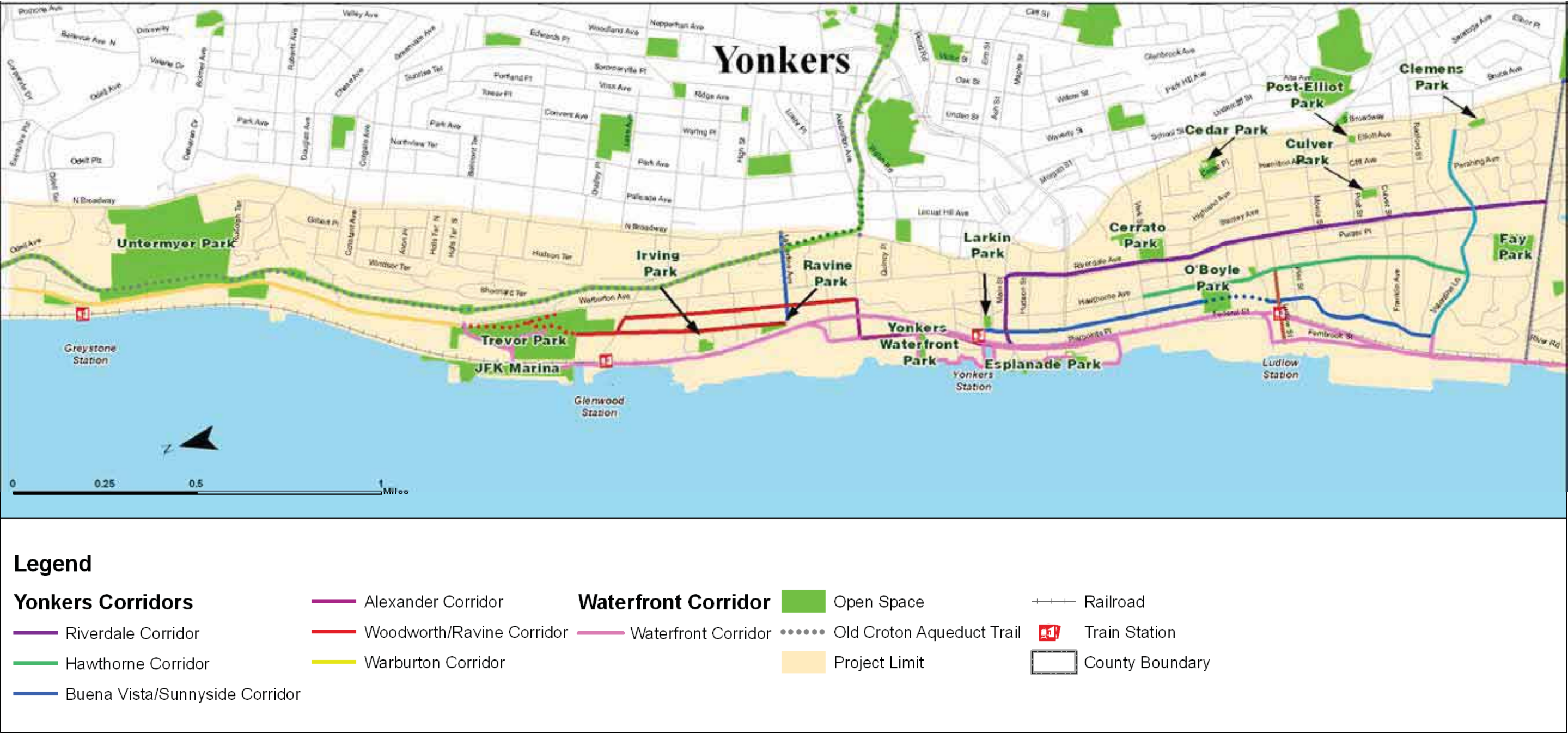


TABLE 2: PARKS AND OPEN SPACES IN MANHATTAN, THE BRONX AND YONKERS

	Name	Location	Acreage	Type	Features
1	Inwood Hill Park*	Manhattan	196.4	Forest/Salt Marsh	Barbecuing Areas, Baseball Field, Basketball & Handball Courts, Dog Runs, Tennis Court, Soccer Field, Marina, Kayak/Canoe Sites, Playground, Nature Center
2	Isham Park*	Manhattan	20.09	Park	
3	Henry Hudson Park	Bronx	8.97	Park	Playground, Baseball Field, Basketball & Handball Courts
4	Spuyten Duyvil Shorefront Park	Bronx	0.19	Passive	Gravel Pathways, Foot Bridge, Benches
5	Phyllis Post Goodman Park	Bronx	50.0	Passive	Sitting Area, Garden
6	Ewen Park	Bronx	7.84	Park	Two Basketball Courts
7	Marble Hill Playground	Bronx	1.6	Playground	Basketball Court, Playground, Spray Showers
8	Riverdale Park	Bronx	97.19	Forest	
9	Raoul Wallenberg Forest	Bronx	4.37	Forest	
10	Seton Park	Bronx	11.69	Park	Jungle Gym, Sprinklers, Basketball & Tennis Courts, Flagpole, Sitting Areas
11	Spuyten Duyvil Playground	Bronx	1.85	Playground	Basketball Court, Playground, Spray Showers
12	Riverdale Playground	Bronx	2.58	Playground	Baseball Field, Handball Court, Basketball Court, Playground
13	Bell Tower Park	Bronx	0.5	Greenstreet	The Bell Tower, Benches
14	Maclaughlin Playground	Bronx	0.3	Playground	Play Equipment, Benches
15	Brust Park	Bronx	1.8	Park	Play Equipment
16	Wave Hill	Bronx	20.87	Estate	The Wave Hill House, Garden, Green House
17	Henry Hudson Parkway	Bronx	54.1	Parkway	Dog Runs, Roadside Green space
18	Hackett Park	Bronx	1.0	Park	Dog Run, Lighted Pathways,

	Name	Location	Acreage	Type	Features
19	Vinmont Veteran Park	Bronx	3.52	Park/Playground	Baseball Field, Mosholu Playground, Benches, Picnic Tables, Water Fountains
20	Fay Park	Yonkers	6.27	Park	Playground, Benches, Baseball Diamond, Tennis Court
21	Clemens Park & Playground	Yonkers	0.3	Park	Playground, Sitting Area
22	Culver Street Playground	Yonkers	0.2	Park	Playground, Basketball Court, Sitting Area
23	Picket Park & Playground	Yonkers	0.2	Park	Playground, Basketball Court
24	Post-Elliot Park	Yonkers	0.2	Park	Unknown
25	Cedar Place Playground	Yonkers	0.2	Park	Playground
26	O'Boyle Park	Yonkers	3.4	Park	Basketball Court, Playground, Kickball Diamond, Benches

* Received Land & Water Conservation Fund (LWCF) Grants

Note: LWCF Grants may have been applied to open space resources within the project study area under the listing of Yonkers Two Parks, sponsored by the City of Yonkers

TABLE 2: PARKS AND OPEN SPACES IN MANHATTAN, THE BRONX AND YONKERS (CONT'D)

	Name	Location	Acreage	Type	Features
27	Cerrato Park	Yonkers	2.3	Park	Playground, Handball & Basketball Courts, Sitting Area
28	Esplanade Park	Yonkers	2.5	Park	Sculpture Garden, Sitting Area
29	Yonkers Waterfront Park	Yonkers	1.0	Passive	Docking Facility, Benches
30	Larkin Plaza Park	Yonkers	0.2	Plaza	Sitting Areas, Garden, Fountain
31	Ravine Avenue Park & Playground	Yonkers	0.2	Park	Playground, Basketball Court, Benches
32	Irving Park	Yonkers	0.8	Park	Unknown
33	Trevor Park	Yonkers	25.0	Park	Playground, Sitting Area, Basketball & Tennis Courts

	Name	Location	Acreage	Type	Features
34	JFK Marina	Yonkers	n/a	Marina	Picnic Pavilion,
35	Old Croton Aqueduct State Historic Park	Yonkers	26.2	Passive	Multi-use Pathways
36	Untermeyer Park	Yonkers	33.0	Park	Garden

* Received Land & Water Conservation Fund (LWCF) Grants

Note: LWCF Grants may have been applied to open space resources within the project study area under the listing of: Yonkers Two Parks, sponsored by the City of Yonkers

COMMUNITY FACILITIES

Community facilities are defined here as hospitals, schools, nursing homes, houses of worship and other public facilities. They tend to be sensitive to noise and generate substantial amounts of foot and vehicular traffic. No environmental regulations apply specifically to community facilities; however, they are typically considered sensitive noise receptors and noise standards have been developed to protect them. Projects that require discretionary public action would have to comply with relevant federal and local noise codes and standards, as applicable. While the proposed greenway would not necessarily increase ambient noise levels, there could be changes to traffic, bicycle, and pedestrian flows. With this in mind, community facilities were identified in the study area to inform the operational studies being conducted and conceptual designs being developed for the plan.

Based on information gathered from New York City Department of City Planning and Westchester County GIS databases, over 100 community facilities were identified within the study area. Tables 3 and 4 identify these facilities by address and type and are numbered to correspond to Figures 5 and 6.

Note: in Tables 3 and 4, facilities may be listed more than once if they perform more than one function or if multiple buildings comprise an institution.

FIGURE 5: COMMUNITY FACILITIES IN MANHATTAN AND THE BRONX



FIGURE 6: COMMUNITY FACILITIES IN YONKERS



TABLE 3: COMMUNITY FACILITIES IN MANHATTAN AND THE BRONX

ID	Address	Facility Name	Facility Type
1	5233 Broadway	Carolina Baptist Church	Religious Institution
2	4780 Broadway	Inwood Branch Public Library	Library
3	620 Isham Street	Roman Catholic Church Of Good Shepherd School	Education Institution
4	4852 Broadway	Public School 176	Education Institution
5	630 Academy Street	JHS 52 Inwood	Education Institution
6	144 West 228 Street	St. Stephens Spanish United Methodist Church	Education Institution
7	146 West 228 Street	St. Stephens Spanish United Methodist Church	Education Institution
8	1815 Riverside Drive	The Church Of Jesus Christ Of Latter Day Saints	Religious Institution
9	168 West 225 Street	Mission Pentecostal Rehoboth	Higher Education
10	5141 Broadway	Columbia Presbyterian Hospital	Religious Institution
11	3030 Godwin Terrace	Public School 207	Education Institution
12	3029 Godwin Terrace	Public School 207	Education Institution
13	3021 Kingsbridge Avenue	Public School 7	Education Institution
14	3053 Kingsbridge Avenue	Church Of The Mediator	Religious Institution
15	3033 Kingsbridge Avenue	St Johns Roman Catholic Church	Education Institution
16	3041 Kingsbridge Avenue	Spuyten Duyvil Pre-School	Higher Education
17	3035 Corlear Avenue	American Legion	Education Institution
18	311 West 231 Street	Manhattanville Nursing Center	Education Institution
19	3115 Corlear Avenue	Kingsbridge Public Library	Library
20	3135 Kingsbridge Avenue	St Johns Elementary School	Health Facility
21	3201 Kingsbridge Avenue	Public School 7	Higher Education

ID	Address	Facility Name	Facility Type
22	3245 Kingsbridge Avenue	Greek Orthodox Church Of Kingsbridge And Riverdale	Higher Education
23	3234 Tibbett Avenue	Advocates For Services For The Blind	Health Facility
24	3450 Kingsbridge Avenue	Bronx 50th Police Precinct	Religious Institution
25	3350 Johnson Avenue	In-Tech Academy Middle/High School 368	Education Institution
26	2570 Independence Avenue	Edgehill Church	Religious Institution
27	666 Kappock Street	Fieldston Lodge Care Center	Health Facility
28	2973 Independence Avenue	Frances Schievier HSG	Education Institution
29	641 Fairfield Avenue	Riverdale Nursing Home	Health Facility
30	3132 Henry Hudson Pkwy E	Riverdale Mental Health Facility	Religious Institution
31	3220 Henry Hudson Pkwy E	Hudson Pointe Center For Nursing	Education Institution
32	650 West 235 Street	Spuyten Duyvil Branch Public Library	Library
33	3250 Arlington Avenue	Church Of St Gabriels	Religious Institution

TABLE 3: COMMUNITY FACILITIES IN MANHATTAN AND THE BRONX (CONT'D)

ID	Address	Facility Name	Facility Type
34	660 West 237 Street	JHS 141	Education Institution
35	3700 Independence Avenue	Riverdale Jewish Center	Religious Institution
36	629 West 239 Street	Congregation Torah V'Chesed Nanash	Synagogue
37	3700 Henry Hudson Pkwy E	Coalition For Jewish Concerns	Community Center
38	3726 Henry Hudson Pkwy E	Coalition For Jewish Concerns	Community Center
39	521 West 239 Street	Jewish Board Of Family & Children's Services	Community Center
40	3901 Fieldston Road	Ethical Culture Fieldston School	Health Facility
41	3830 Waldo Avenue	Van Cortlandt House Museum	Higher Education
42	3825 Corlear Avenue	Manhattan College Book Store	Education Institution
43	5845 Broadway	Manhattan College	Higher Education
44	5905 Broadway	Words Of Life Christian Center	Religious Institution
45	4415 Post Road	Manhattan College Brother's Residence	Library
46	4401 Cayuga Avenue	Horace Mann School	Cultural Institution
47	4381 Post Road	Manhattan College	Religious Institution
48	4481 Manhattan College Py	Manhattan College	Education Institution
49	4401 Tibbett Avenue	Manhattan College	Education Institution
50	4499 Waldo Avenue	Methodist Church Home	Education Institution
51	4450 Fieldston Road	Manhattan College	Higher Education
52	4502 Henry Hudson Pkwy E	Young Israel Of Riverdale	Education Institution
53	4550 Henry Hudson Pkwy E	Fire Department	Fire Department
54	535 West 246 Street	Chabad Lubavitch Of Riverdale	Synagogue

ID	Address	Facility Name	Facility Type
55	4545 Independence Avenue	Riverdale Temple	Temple
56	800 West 254 Street	Riverdale Yacht Club	Recreational Center
57	4930 Palisade Avenue	Riverdale Country School Lower	Health Facility
58	4900 Palisade Avenue	Riverdale Country School	Education Institution
59	4904 Independence Avenue	Yeshiva Of Telshe Alumni	Education Institution
60	640 West 249 Street	Yeshiva Of Telshe Alumni	Education Institution
61	4759 Henry Hudson Parkway W	Riverdale Presbyterian Church	Religious Institution
62	450 West 250 Street	Yeshiva Ohavei Torah Riverdale Inc	Health Facility
63	475 West 250 Street	Conservative Synagogue Of Riverdale	Synagogue
64	5030 Henry Hudson Pkwy E	Christ Church Of Riverdale	Education Institution
65	5040 Henry Hudson Pkwy E	Christ Church Of Riverdale	Religious Institution
66	5050 Iselin Avenue	Jewish Board Of Family & Children's Services	Community Center

TABLE 3: COMMUNITY FACILITIES IN MANHATTAN AND THE BRONX (CONT'D)

ID	Address	Facility Name	Facility Type
67	5223 Fieldston Road	Riverdale Country School	Education Institution
68	5260 Fieldston Road	Riverdale Country School	Education Institution
69	231 West 252 Street	Riverdale Country School Upper	Education Institution
70	5079 Tibbett Avenue	Riverdale Country School	Education Institution
71	5028 Fieldston Road	Riverdale Country School	Education Institution
72	4664 Tibbett Avenue	Horace Mann School	Education Institution
73	4662 Tibbett Avenue	Horace Mann School	Education Institution
74	231 West 246 Street	Horace Mann School	Education Institution
75	225 West 254 Street	Susan E Wagner Day School At Riverdale	Education Institution
76	5540 Mosholu Avenue	Riverdale Branch Public Library	Library
77	5500 Riverdale Avenue	Public School 81	Education Institution
78	5625 Arlington Avenue	Rabbi Jacob Joseph School	Education Institution
79	655 West 254 Street	Salanter Akiba Riverdale Academy	Education Institution
80	5655 Arlington Avenue	St Josephs Seminary	Education Institution
81	5801 Palisade Avenue	Cardinal Spellman Retreat House	Housing
82	750 West 261 Street	College Of Mount Saint Vincent	Education Institution
83	5959 Palisade Avenue	Palisade Nursing Home	Health Facility
84	5901 Palisade Avenue	Judaica Museum	Cultural Institution
85	5961 Palisade Avenue	Palisade Nursing Home	Health Facility
86	5959 Independence Avenue	High Ridge House Inc	Housing
87	6301 Riverdale Avenue	College Of Mount Saint Vincent	Higher Education

ID	Address	Facility Name	Facility Type
88	755 West 261 Street	Mount St Vincent College	Higher Education
89	6015 Riverdale Avenue	Young Israel-Ohab Zedek Of North Riverdale	Education Institution
90	503 West 259 Street	Salanter Akiba Riverdale Academy	Education Institution
91	5940 Riverdale Avenue	St Margaret Catholic Church	Religious Institution
92	6000 Riverdale Avenue	St Margaret's Youth Center	Child Care Center
93	6010 Riverdale Avenue	St Margaret Of Cortona School	Education Institution
94	6118 Riverdale Avenue	Bender Animal Hospital	Animal Hospital
95	6240 Riverdale Avenue	Advocates for Services for the Blind Multihandicapped	Health Facility
96	6585 Broadway	Parkview Nursing Home	Health Facility
97	537A West 261 Street	The Leake & Watts Child Care Center	Child Care Center

TABLE 4: COMMUNITY FACILITIES IN YONKERS

ID	Address	Facility Name	Facility Type
1	463 Hawthorne Avenue	Carol & Frank Biondi Education Center	School
2	132 Valentine Lane	Montessori Elementary School 27	School
3	435 Riverdale Avenue	Yonkers Police Department - 3rd PCT	Police Department
4	348 Hawthorne Avenue	Pearls Hawthorne Elementary School	School
5	75 Morris Street	Eugenio Maria de Hostas Microsociety School	School
6	20 Cedar Place	Cedar Place School	School
7	204 Hawthorne Avenue	St Peter's School	School
8	104 South Broadway	Yonkers Police Department - Head Quarters	Police Department
9	122 S. Broadway	St. Joseph's Senior Housing	Nursing Home
10	127 S. Broadway	St. Joseph's Nursing Home	Nursing Home
11	127 South Broadway	St. Joseph's Medical Center	Hospital
12	15 St Mary's Street	St Mary's School	School
13	96 Vark Street	Yonkers Fire Department	Fire Department
14	75 Riverdale Avenue	Early Childhood Elementary Center	School
15	34 Riverdale Avenue	Tabernacle Faith Christian Academy	School
16	7 Main Street	Yonkers Public Library	Library
17	2-8 Hudson Street at Getty Square	Philipsburg Performing Arts Center	Theater
18	44 Hudson Street	City Harvest Christian Academy	School
19	Alexander Street (behind pump station)	Yonkers Paddling & Rowing ('Canoe') Club	Recreational Facility
20	Warburton Avenue	John F. Kennedy Memorial Marina	Recreational Facility

21	565 Warburton Avenue	Museum Middle School	School
22	579 Warburton Avenue	Museum Elementary School	School
23	571 Warburton Avenue	Yonkers Fire Department	Fire Department
24	759 N Broadway	Elementary School 16	School
25	771 Warburton Avenue	Yonkers Corinthian Yacht Club	Recreational Facility
26	967 North Broadway	St. John's Riverside Medical Center	Hospital
27	120 Odell Avenue	Michael N. Malotz Nursing Pavilion	Nursing Home
28	967 North Broadway	Cochran School of Nursing-St. John's Riverside Hospital	R.N. Licensing School
29	1061 N Broadway	The Foxfire School	School
30	1061 Broadway	Center for Continuing Education	School

NATURAL RESOURCES

While the study area is located in a densely developed urban environment, significant natural resources are present primarily along the Hudson River waterfront and within select interior parklands. Several sources were reviewed to determine significant natural resources: the New York State Department of State, Division of Coastal Resources Coastal Zone Boundary Map; New York State Coastal Atlas; New York State Department of Environmental Conservation (NYSDEC) 1974 Tidal Wetlands Inventory; Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps; and the National Wetlands Inventory (NWI). Figures 7 and 8 show these natural features.

The data show that the study area is located within the New York State Coastal Zone. When a proposed project is located within the coastal zone and it requires a local, state, or federal discretionary action (i.e., permits or funding), a determination of the project's consistency with the policies and intent of the applicable Waterfront Revitalization Program (WRP) must be made before the project can move forward. Since the project is within the coastal zone, the applicant would have to consult with the NYC Department of City Planning and submit a consistency review per the policies of the *New Waterfront Revitalization Program* (the local WRP) and New York State Department of State Coastal Zone Management Program (CZMP).

Floodplains are defined as the area low enough in elevation to hold flood waters during large storm events. Regulated floodplains are defined by the Federal Emergency Management Agency (FEMA) and include areas that flood during storms that have a one percent chance of occurring in any given year, which is equivalent to the likelihood of a storm occurring once every 100 years (100-year storm). The extent of the Project Area within the 100-year base flood area, also known as the Special Flood Hazard Area, is depicted in Figure 7 and 8. Most of the area lies outside the Special Flood Hazard Area, and according to FEMA, is an area of minimal flooding hazard.

FEMA also maps the 500-year floodplain but these areas are not regulated. At the local level, New York City's Local Law 33 of 1988 regulates construction in

the 100-year floodplain. In all cases, habitable structures must be flood-proofed or raised above the 100-year floodplain.

Edges of the study area are situated within the 100-year floodplain, however the proposed greenway alignments and associated signage would not result in any significant increases in flood levels in surrounding areas, represent a significant floodplain encroachment, or alter existing primary floodplain characteristics.

According to the New York State Coastal Atlas, the study area is located within the Lower Hudson River Reach and adjacent to significant coastal fish and wildlife habitats (in the Hudson River). Wetlands are present in areas along the Hudson River. Certain wetland-related regulatory boundaries are present within the study area, as shown on Figures 7 and 8.. According to the NYSDEC, the Tidal Wetlands within the HRVGL study area are classified as 5000 Adjacent Area (AA), 2020 Littoral Zone (LZ), or 3000 Intertidal Marsh (IM). "Adjacent Area"(which is not shown on Figures 7 and 8) refers to those land areas not included in any other tidal wetland categories that are not inundated by tidal water and that extend 300 feet landward of the most landward tidal wetlands boundary or to an elevation of ten feet. The adjacent area is meant to be a protective area around an actual wetland and, in some cases, it is extended for particularly sensitive wetlands. "Littoral Zone" includes lands under tidal waters which are not included in any other category. "Intertidal Marshes" are vegetated tidal wetland zones generally lying between average high and low tidal elevations in saline waters. There is a small intertidal marsh on the southern border of the Bronx. The wetland maps are drawn at a scale that does not establish an exact wetland boundary; and are meant to signal the potential presence of a wetland. Not all wetland activities are regulated but any project in the wetland boundaries would require a consultation with NYSDEC.

The project team consulted the New York State Department of Environmental Conservation (NYSDEC) Natural Heritage Program to identify any endangered, threatened, or special concern terrestrial species in the study area that might inform the choice of alignment(s). Based on this information, several species are present but, given the developed nature of much of the study area, on-street alignments are not anticipated to lead to a potential disturbance of habitat. The exception is along the waterfront, where the need to add fill or construct an

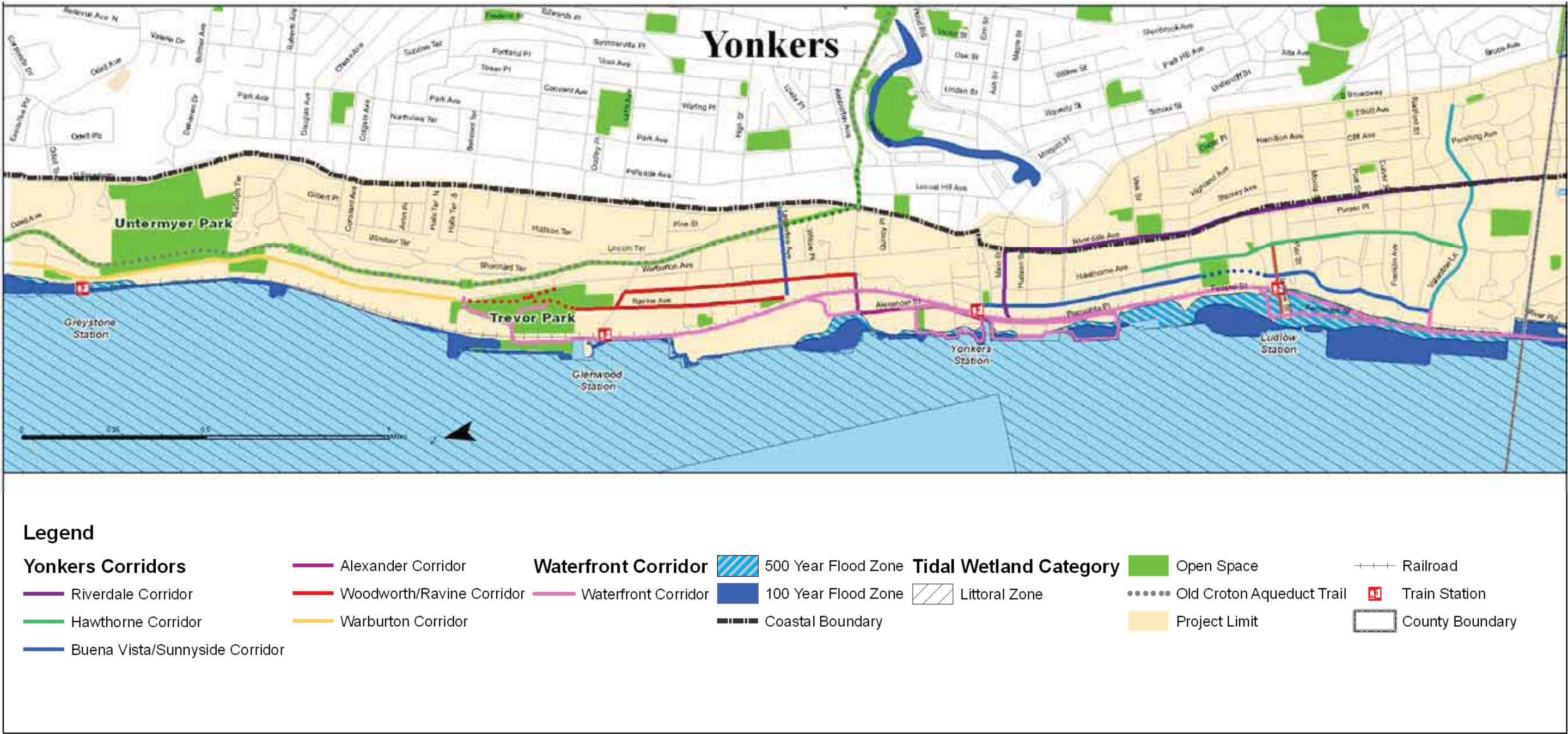
elevated pathway has the potential to disturb habitat. Once the specific alignment has been identified, a biologist will need to perform more intensive research to identify the presence of sensitive species and their habitat.

If the project would create disturbances (including riprap) or require construction along the water's edge or in the water, permits would most likely be required from the NYSDEC and U.S. Army Corps of Engineers (ACOE). These are described in greater detail in the Preliminary List of Permits and Approvals at the end of this document.

FIGURE 7: NATURAL RESOURCES IN MANHATTAN AND THE BRONX



FIGURE 8: NATURAL RESOURCES IN YONKERS



VISUAL QUALITY & AESTHETICS

There are many sensitive visual resources in the study area whose generally high visual quality is due to the historic nature of the area, its dramatic topography, and unique setting near the Hudson and Harlem Rivers. These visual resources include historic structures of national significance, local landmarks, natural landmarks, parks, and numerous scenic views of the Hudson River and Palisades beyond. Similar to community facilities, a public action must consider and disclose all environmental impacts from a proposed project (including visual resources) prior to agency approval. In this case, the project would likely expand public accessibility to significant visual resources and create opportunities for new views and viewers.

Manhattan

Sensitive visual resources in Manhattan include views of Inwood Hill Park, the George Washington Bridge, Spuyten Duyvil Bridge, and views of the Hudson River particularly from high points within Inwood Hill Park. Dramatic views of the towering Henry Hudson Bridge as it crosses the Harlem River are present from portions of the northern shoreline of Manhattan. Several historic resources located on Broadway at the eastern edge of the study area also provide the area with high aesthetic value.

Bronx

There are scenic vistas from the Spuyten Duyvil Shorefront Park toward the Harlem and Hudson Rivers on the eastern edge of the study area and from the numerous historic properties and two large historic districts located along the easterly and central portions of the study area, respectively. As in Manhattan, views of the Henry Hudson Bridge are present from southern portions of the Bronx. The expansive Fieldston Historic District in the center of the study area and Riverdale Historic District overlooking the river (beside Wave Hill public garden) provide scenic vistas and contain notable visual resources themselves. Riverdale Station allows the sole access in the Bronx to the Hudson River shoreline, providing views of the river itself and the New Jersey Palisades.

Yonkers

Visual quality in this portion of Yonkers is defined by the mix of established industrial buildings and developing residential waterfront as well as by the city's civic center. Metro North Railroad's Hudson Line provides an interesting aesthetic resource, providing passengers with scenic views of the Hudson as it runs along the shoreline and elevated through downtown Yonkers. While there are several landmarks of national significance in the study area (see next section), the waterfront parks such as Esplanade Park, Yonkers Waterfront Park, and JFK Marina provide the most direct and expansive vistas of the Hudson River and the Palisades. Yonkers' restored Victorian Pier is the only one of its type on the Hudson.

HISTORIC & ARCHAEOLOGICAL RESOURCES

Based on a review of the New York State Office of Park, Recreation and Historic Preservation (NYSOPRHP) and the New York City Landmark Preservation Commission (NYCLPC) GIS databases, designated historic properties were identified within the study area.

Within the project study area there are 37 historic resources of local, and national significance that include individual structures (churches, homes, etc.), locally landmarked lampposts in Manhattan and the Bronx, and expansive historic districts (e.g., Fieldston and Riverdale) in the Bronx. (See Figures 9 and 10 and Table 5.) [Note: Consultation is currently underway with the New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP) to determine whether there are other properties of note that should be considered in this environmental screening.]

As with parklands, if this project receives federal transportation funding, a Section 4(f) evaluation would be conducted per FTA's guidance. Mitigation measures would be developed to preserve the historic activities, features, or attributes of the site as agreed by the FTA and the official(s) with jurisdiction over the Section 4(f) resource.

Manhattan

There are five historic resources in the Manhattan portion of the study area, primarily located along the Broadway corridor. Most of these are historic lampposts (local landmarks). The William Dyckman House is located here and is both a New York City landmark and listed on the National Register.

Bronx

There are 21 historic resources and two historic districts in the Bronx. Several historic homes and estates are located west of the Henry Hudson Parkway and historic institutional sites are located just south of the Yonkers border. Henry Hudson Parkway is itself eligible for listing on the National Register. New York City historic lampposts are located south of Broadway on Post Road. The Fieldston Historic District (locally designated) is located east of the Henry Hudson Parkway in the center portion of the Bronx study area and features

picturesque revival style homes including Medieval, English Tudor, Mediterranean, Dutch and Georgian Colonial homes. The Riverdale Historic District (also locally designated) is located farther west, adjacent to Riverdale Park. It features a selection of villa estates built during the mid-19th century and fashioned from Greek Revival, Gothic Revival, Tuscan, and varied Italianate styles.

Yonkers

There are 10 historic sites in the Yonkers study area, all which are listed on the National Register of Historic Places, including two historic districts: The Delavan Terrace Historic District located along the eastern portion of the study area on North Broadway and the Halcyon Place Historic District located in the central portion of the study area near Warburton Avenue.

FIGURE 9: HISTORIC RESOURCES FOR MANHATTAN AND THE BRONX



FIGURE 10: HISTORIC RESOURCES FOR YONKERS

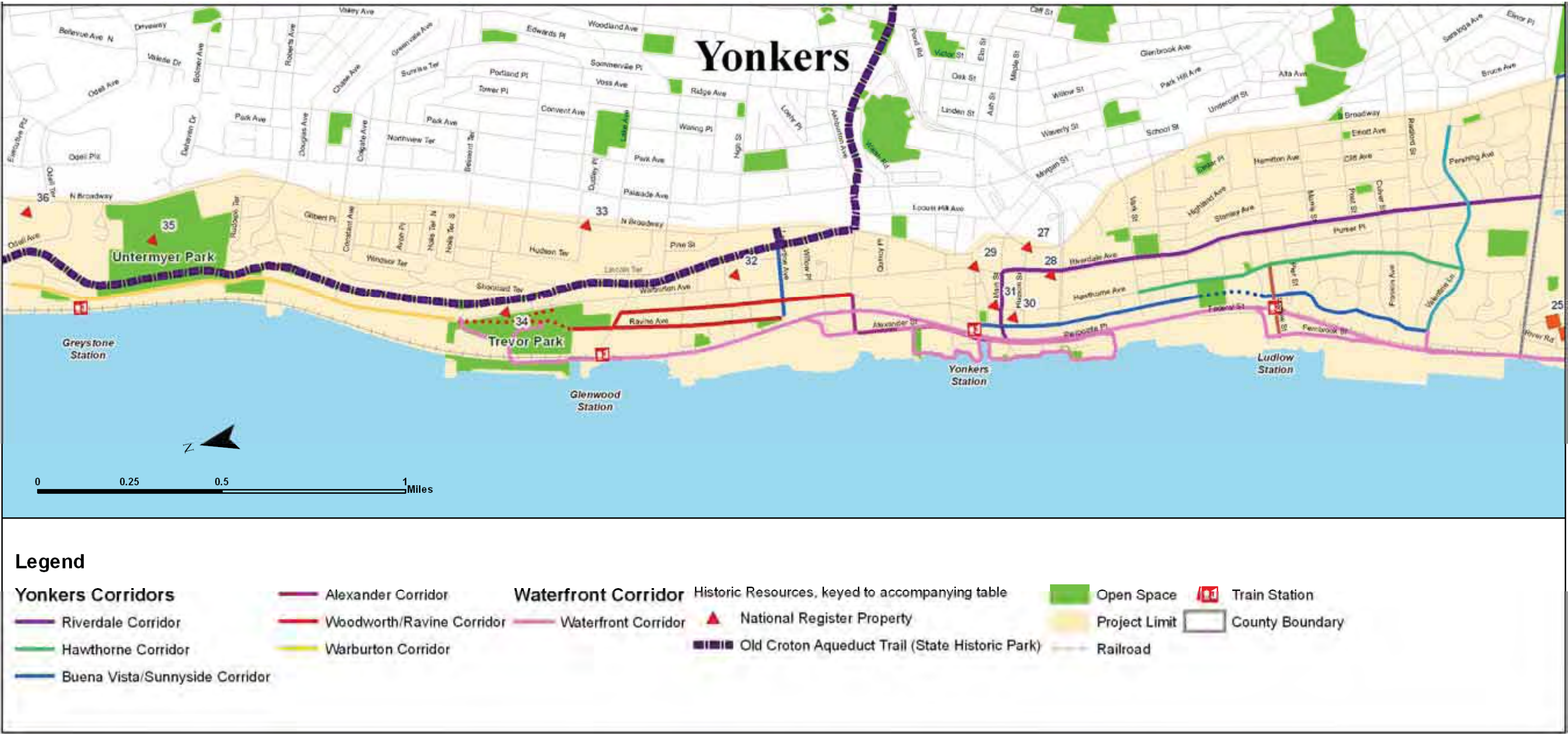


TABLE 5: HISTORIC RESOURCES IN MANHATTAN, THE BRONX AND YONKERS

ID	Name	Designation
MANHATTAN		
1	William Dyckman House	New York City and National Register - Listed
2	Historic Lamppost 85	New York City Landmark
3	Historic Lamppost 87	New York City Landmark
4	Historic Lamppost 86	New York City Landmark
5	Historic Lamppost 88	New York City Landmark
THE BRONX		
6	Historic Lamppost 83	New York City Landmark
7	Edgehill Church of Spuyten Duyvil	New York City and National Register - Listed
8	242nd Street--Van Cortlandt Park Station (IRT)	National Register - Listed
9	Christ Church Complex	National Register - Listed
10	Hadley House	New York City Landmark
11	Christ Church	New York City Landmark
12	Riverdale Presbyterian Church	New York City and National Register - Listed
13	Duff House	New York City Landmark
14	Anthony Campagna Estate	New York New York City Landmark
15	William E. Dodge House	New York City and National Register - Listed

ID	Name	Designation
16	Henry F. Spaulding House	New York City and National Register - Listed
17	Wave Hill House	New York City Landmark
18	Wave Hill	National Register - Listed
19	Robert Colgate House	New York City and National Register - Listed
20	Historic Lamppost 102	New York City Landmark
21	Historic Lamppost 101	New York City Landmark
22	Historic Lamppost 96	New York City Landmark
23	Fonthill Castle and the Administration Building of the College of Mount St. Vincent	National Register - Listed
24	Cottage and Stable, College of Mount St. Vincent	New York City Landmark
25	College of Mount St. Vincent Administration Building	New York City Landmark
26	Fonthill (College Library)	New York City Landmark
	Riverdale Historic District	New York City Historic District
	Fieldston Historic District	New York City Historic District
	Henry Hudson Parkway	National Register – eligible

TABLE4: HISTORIC RESOURCES IN MANHATTAN, THE BRONX AND YONKERS (CONT'D)

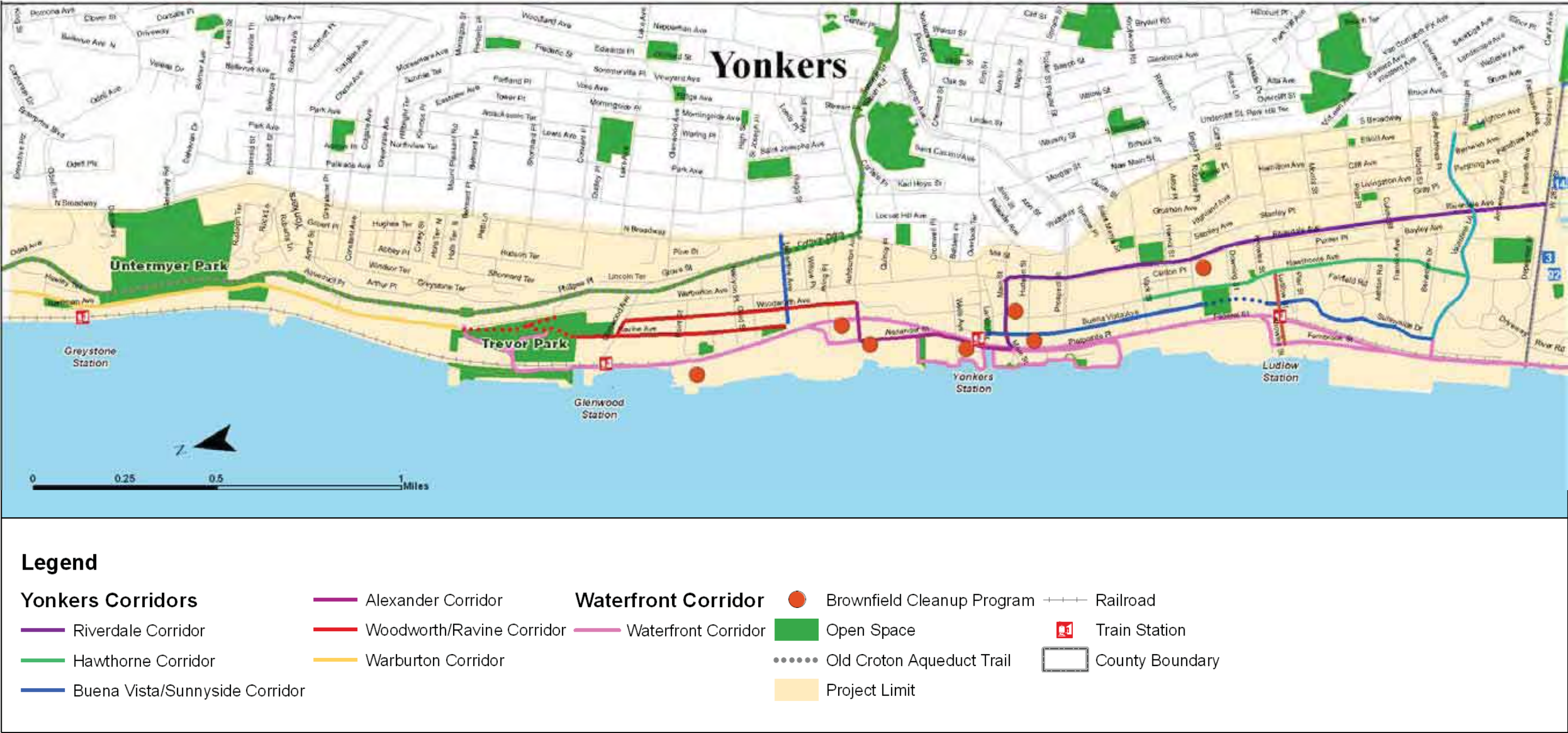
ID	Name	Designation
YONKERS		
27	St. John's Protestant Episcopal Church	National Register - Listed
28	Philipsburgh Building	National Register - Listed
29	Philipse Manor Hall	National Register - Listed
30	Yonkers Trolley Barn	National Register - Listed
31	US Post Office--Yonkers	National Register - Listed
32	Halcyon Place Historic District	National Register - Listed
33	Delavan Terrace Historic District	National Register - Listed
34	Trevor, John Bond, House	National Register - Listed
35	Untermeyer Park	National Register - Listed
36	Thompson, W. B., Mansion	National Register - Listed
	Old Croton Aqueduct Trail	New York State Historic Park

HAZARDOUS MATERIALS

As part of the environmental screening exercise, data was gathered from a variety of available sources on known contaminated sites or hazardous waste generators that could potentially threaten the environment or public health. Prior to any ground disturbance, further research should be conducted to determine the likelihood of contamination and if necessary, a plan for remediation should be developed, per NYSDEC guidelines.

According to data retrieved from the US Environmental Protection Agency (EPA) and NYSDEC, several sites within the study area were identified as handling regulated hazardous materials. Many of the *Resource Conservation and Recovery Act (RCRA)* sites have been identified as dry cleaners and auto-related sites that do not pose an immediate threat to the environment or public health. There are seven contaminated sites on or near the Yonkers waterfront that are in the process of being remediated (see Figure 11).

FIGURE 11: CONTAMINATED SITES - YONKERS



SOCIOECONOMICS

This section provides an overview of the socioeconomic characteristics of the population in the project study area. The study area's general socioeconomic conditions are based on 2000 US Census data, New York City Community District Profiles, and Westchester County: City of Yonkers data. These data are provided since development of the alignments(s) must consider potential impacts of the project on sensitive populations.

Manhattan

The project study area is located within Manhattan Community District 12 in Census Tracts 297, 295, 303, 307, and 309. Census Tract 297, however, has no residential population; therefore, only socioeconomic data from Census Tracts 295, 303, 307, and 309 were used in this analysis.

Based on these four tracts, the Manhattan portion of the study area has a total population of 23,172 residents, comprising 24.7 percent White/non-Hispanic, 12.9 percent African American, 2.5 percent Asian, and 57.4 percent of Hispanic Origin (any race). The median household income in 2000 was \$35,839, and approximately 21.7 percent of families were living below the poverty level. The highest proportion of families below the poverty level was reported in Census Tract 309. The median age of residents is 33.4 years and approximately 89.4 percent of residences are renter-occupied. (See Figure 12 and Table 6.)

Bronx

The Bronx portion of the study area is located in Bronx Community District 8 and falls within 18 Census Tracts. According to the 2000 Census, this area had a total population of 55,292 comprising 66.7 percent White/non-Hispanic, 6.9 percent African American, 5.4 percent Asian, and 18.3 percent Hispanic (any race). The median household income was \$53,317 and approximately 5.9 percent of families were living below the poverty level. In the Bronx portion of the study area, the lowest median household income of \$9,625 was reported in Census Tract 317. The median age for residents in the study area is 43.1 years and approximately 65.8 percent of residential units are renter-occupied. (See Figure 12 and Table 7.) As Figure 15 shows, within the Bronx portion of the study area, population density is highest along the Broadway Corridor.

Yonkers

In Yonkers, the study area falls within 11 Census Tracts. According to the 2000 Census, this area had a combined population of 48,382, comprising 32.4 percent White, 34.1 percent Black, 3.4 percent Asian, and 41.8 percent Hispanic (any race). The median household income was \$28,546, and the highest proportion of families below the poverty level in this portion of the study area was reported in Census Tract 1.03. The median age of residents is 31 years and 79.5 percent of housing units are renter-occupied. Compared to the Manhattan and Bronx portions of the study area, the Yonkers portion of the study area has the highest percentage of total minority population and the lowest median household income. (See Figure 13 and Table 8.) As Figure 16 shows, population density is higher in the southeastern portion of the study area within Yonkers.

FIGURE 12: CENSUS TRACTS IN MANHATTAN AND THE BRONX

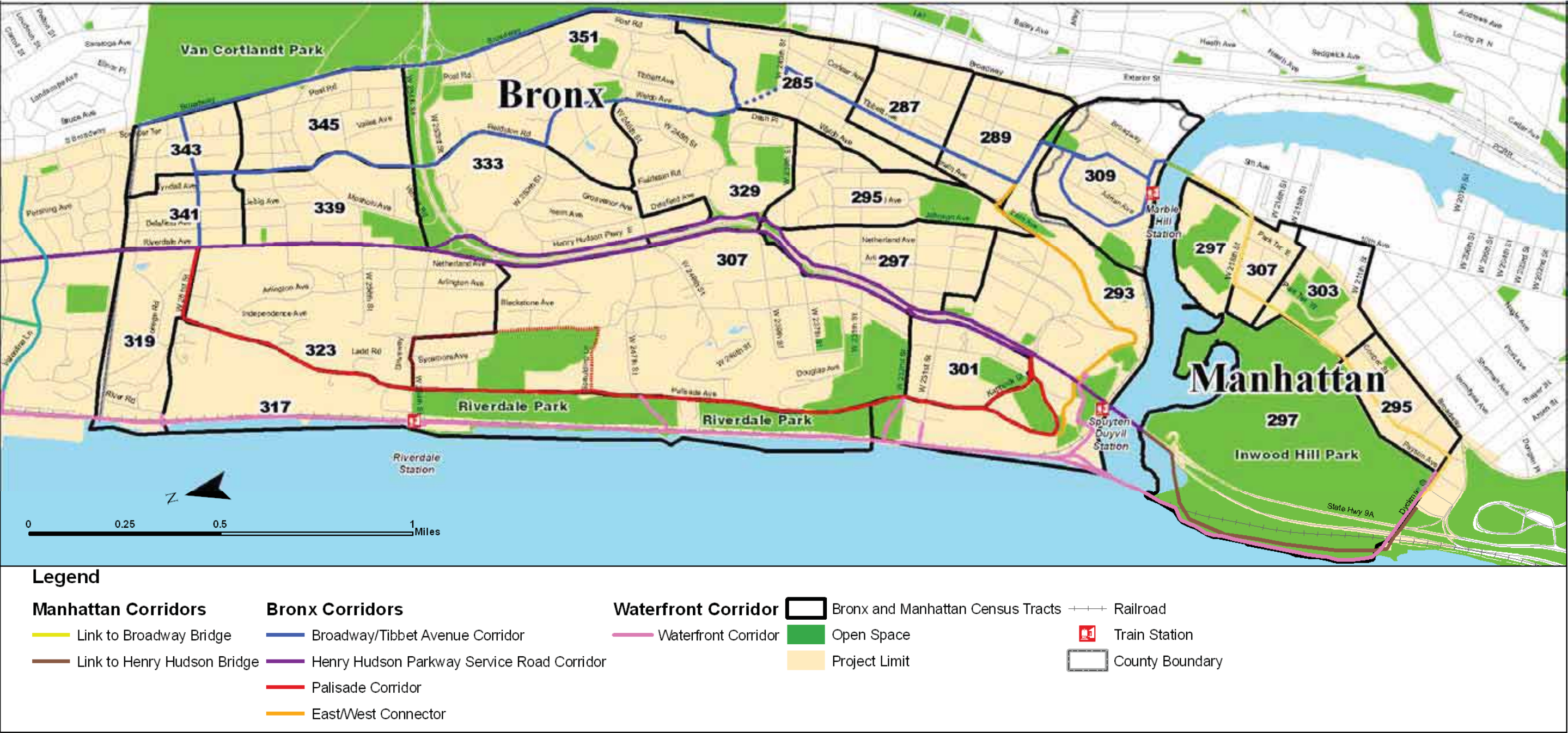


FIGURE 13: CENSUS TRACTS IN YONKERS

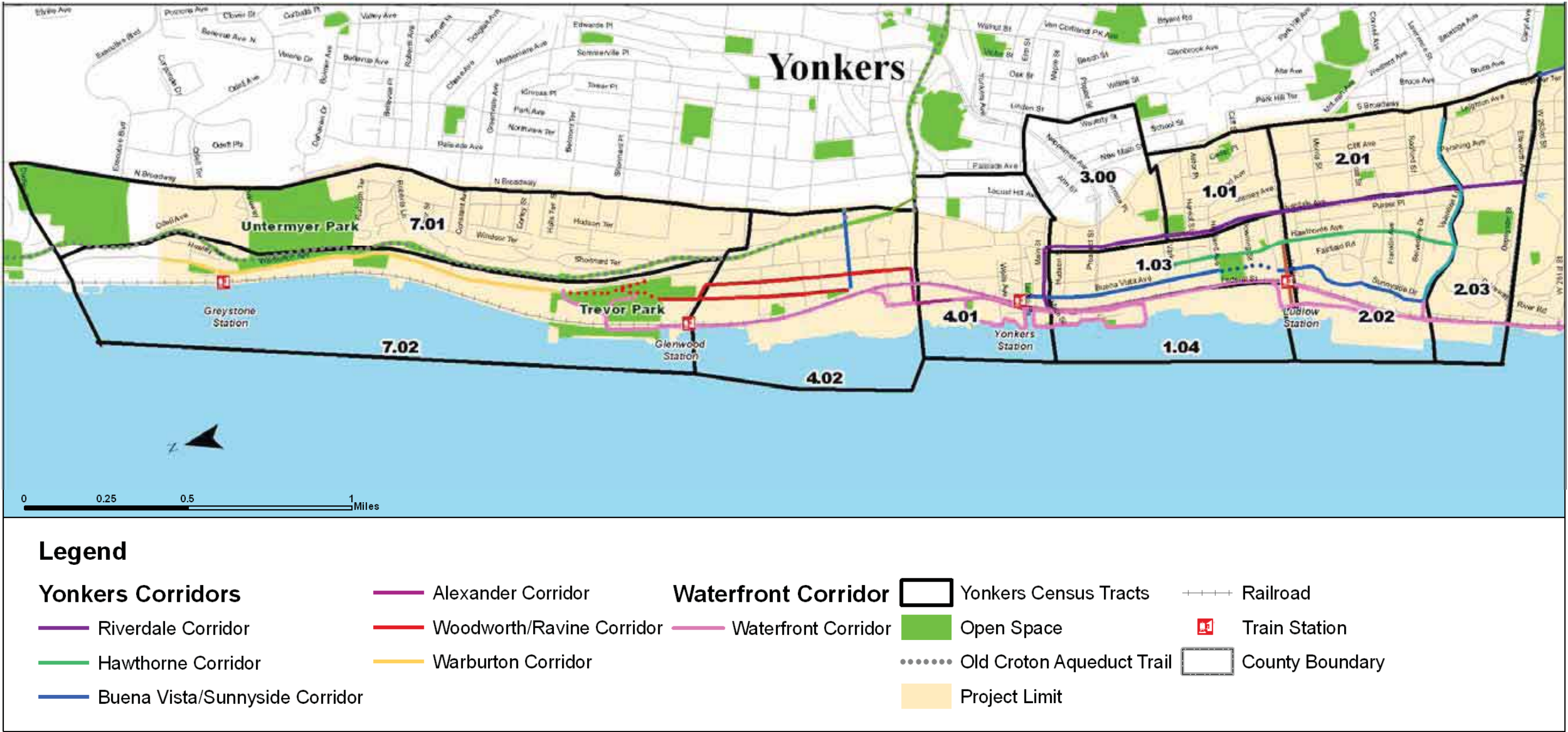


FIGURE 14: POPULATION DENSITY IN MANHATTAN AND THE BRONX

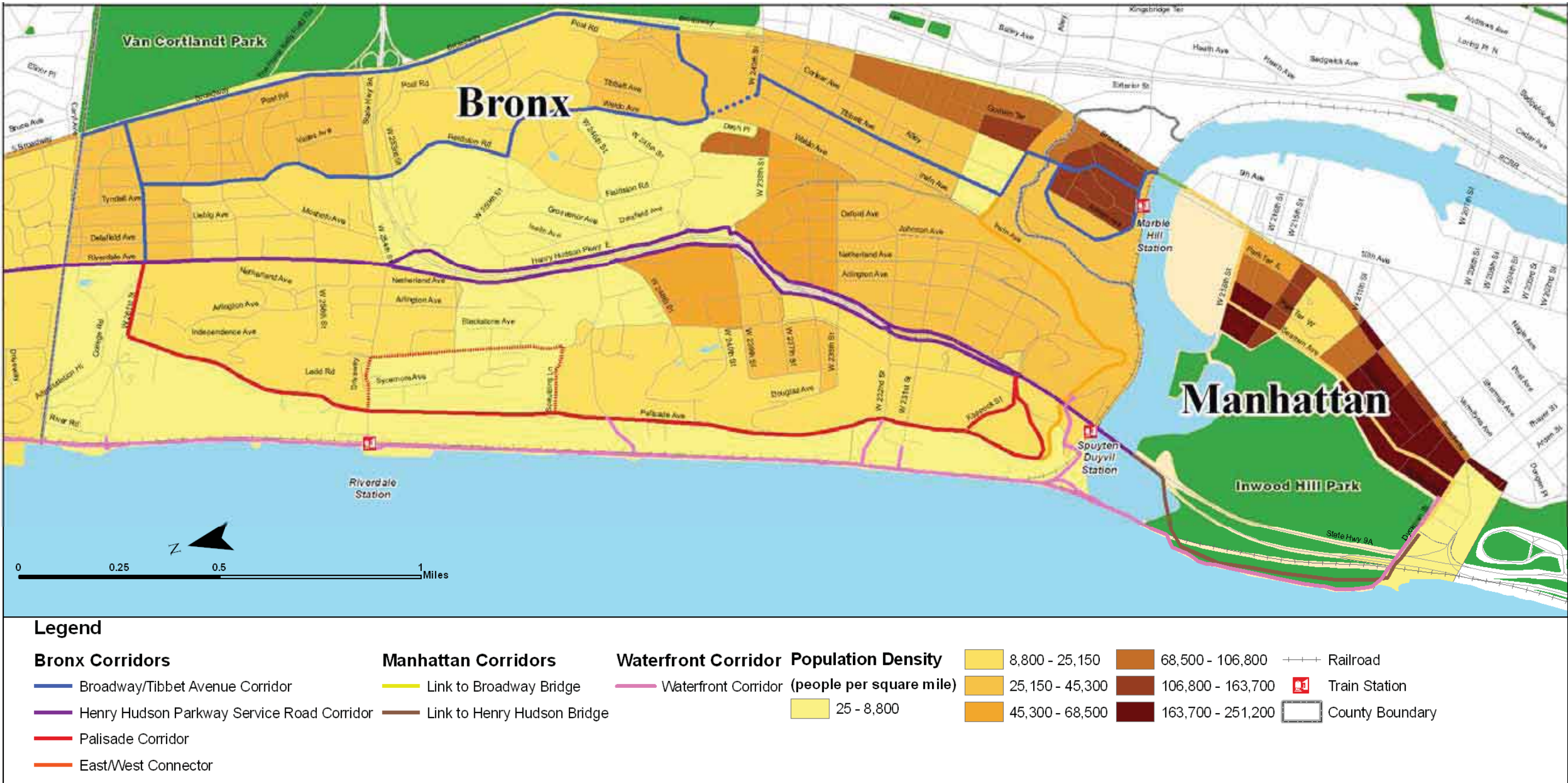


FIGURE 15: POPULATION DENSITY IN YONKERS

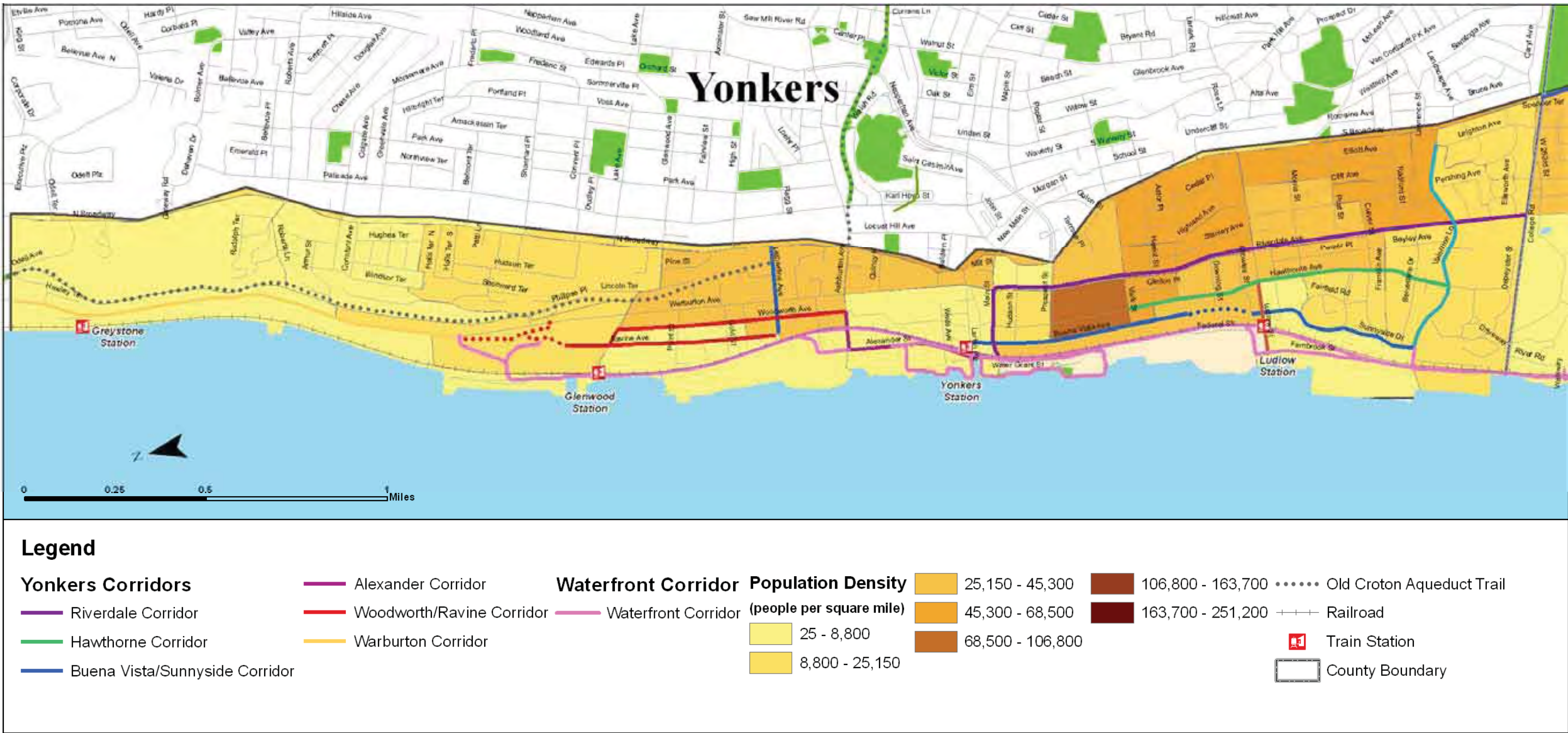


TABLE 6: MANHATTAN STUDY AREA POPULATION AND ECONOMIC CHARACTERISTICS

Area	Population							Median Age	Economic Profile		
	Total	Race and Ethnicity (%)							Number of Households	Median Household Income (1999)	Families Below Poverty Level (%) ⁵
		White ¹	Black ¹	Asian ¹	Other ^{1,2}	Hispanic ³	Total Minority ⁴				
Manhattan	1,537,195	45.8	15.3	9.3	0.4	27.2	25	35.8	1,477,358	\$47,377	17.5
Manhattan Study Area*	23,172	24.7	12.9	2.5	0.3	57.4	15.7	33.4	9,705	\$35,839	21.7
CT 295	7,588	28.9	4.6	3.2	0.4	60.9	8.2	33.6	3,260	\$35,073	19.4
CT 303	4,178	30.1	5.4	2.7	0.3	59.2	8.4	32.7	1,751	\$38,472	21.6
CT 307	3,586	50.1	11.3	2.7	0.3	32.5	14.3	37.1	1,824	\$47,903	10.4
CT 309	7,820	6.2	25.8	1.7	0.3	64.5	27.8	31.5	2,870	\$25,866	28.6

Source: U.S. Department of Commerce, Bureau of Census, U.S. Census of Population of Housing, 2000, SF1 for total population, race, and ethnicity; SF3 for median income, households, and poverty.

* Includes Census Tracts: 295, 303, 307, 309. Census Tract 297 was excluded due to no population. Only parkland and open space is present.

¹ White, Black, Asian, and Other populations may be Hispanic and non-Hispanic (see note 3). This table lists only non-Hispanic population in these columns.

² "Other" includes residents of American Indian, Alaska Native, Native Hawaiian, and Other Pacific Islander descent, as well as those respondents who did not identify with any listed racial groups (White, Black, Asian), or who indicated that they are of more than one race defined in the Census.

³ The Hispanic category consists of those respondents who classified themselves in one of the several Hispanic Origin categories in the Census questionnaire. People of this ethnic group may be any race (see note 1).

⁴ The total minority population includes all Blacks, Asians, Other, and Hispanic Whites. Does not include Hispanic (all

rates).

⁵ Percent of families with incomes below established poverty level, as defined by the U.S. Census Bureau.

TABLE 7: BRONX STUDY AREA POPULATION AND ECONOMIC CHARACTERISTICS

Area	Population							Median Age	Economic Profile		
	Total	Race and Ethnicity (%)							Number of Households	Median Household Income (1999)	Families Below Poverty Level (%) ⁵
		White ¹	Black ¹	Asian ¹	Other ^{1,2}	Hispanic ³	Total Minority ⁴				
Bronx	1,332,650	14.5	31.2	2.9	0.9	48.4	35	31.2	463,212	\$27,971	28
Bronx Study Area*	55,292	66.7	6.9	5.4	0.4	18.3	18.1	43.1	24,535	\$53,317	5.9
CT 285	3,238	54.4	5.6	8	0.5	26	22.1	37.9	1,606	\$35,947	9.9
CT 287	3,159	31.8	8.4	8.8	0.1	48.6	26.1	34.8	1,231	\$38,777	11.5
CT 289	4,283	34.3	6.7	4.1	0.6	51.4	15.5	33.1	1,699	\$31,524	20.8
CT 293	7,196	75.7	8.6	3.9	0.3	9.5	16.7	50.1	3,678	\$62,942	3.4
CT 295	4,081	67.9	6.2	7.4	0.2	16.9	21.2	40.1	1,991	\$49,248	3.8
CT 297	3,812	75.1	4.7	7.5	0.9	9.7	20.6	48	1,702	\$59,959	4.9
CT 301	1,510	81	5.4	2.8	0.1	8.5	11.1	61	612	\$46,667	3
CT 307	8,260	85.1	3	3.5	0.4	7.1	10.4	47.8	4,033	\$69,875	2.3
CT 317	1,047	96	2.2	0.1	0.2	1.5	2.6	67.2	167	\$9,625	0
CT 319	7	100	0	0	0	0	0	43.8	3	\$0	0
CT 323	5,189	66.6	11.6	4.8	0.5	14.5	21.7	44.2	2,757	\$58,586	2.7
CT 329	1,668	78.7	4.7	3.2	0.8	10.6	11.9	38.3	658	\$64,004	11.4
CT 333	435	81.6	6	5.7	0	6.2	17.4	47.3	147	\$168,750	0
CT 339	1,071	76.1	3.6	8	0.4	10.1	20	40.9	436	\$50,283	7.4
CT 341	1,901	72.5	3.8	7.5	0.5	12.7	19.3	33.9	575	\$62,981	6.1
CT 343	1,570	58.9	11.7	6.1	0.3	21.5	24.2	42.5	579	\$61,625	1.9

CT 345	3,499	58.6	9.4	6.6	0.3	21	22.9	42.8	1,526	\$52,143	6.2
CT 351	3,366	59.4	10.7	5.9	0.5	21	23	28.5	1,135	\$49,958	3.5

Source: U.S. Department of Commerce, Bureau of Census, U.S. Census of Population of Housing, 2000, SF1 for total population, race, and ethnicity; SF3 for median income, households, and poverty.

* Includes Census Tracts: 285, 287, 289, 293, 295, 297, 301, 307, 317, 319, 323, 329, 333, 339, 341, 343, 345, 351

¹ White, Black, Asian, and Other populations may be Hispanic and non-Hispanic (see note 3). This table lists only non-Hispanic population in these columns.

² "Other" includes residents of American Indian, Alaska Native, Native Hawaiian, and Other Pacific Islander descent, as well as those respondents who did not identify with any listed racial groups (White, Black, Asian), or who indicated that they are of more than one race defined in the Census.

³ The Hispanic category consists of those respondents who classified themselves in one of the several Hispanic Origin categories in the Census questionnaire. People of this ethnic group may be any race (see note 1).

⁴ The total minority population includes all Blacks, Asians, Other, and Hispanic Whites. It does not include Hispanic (all races).

⁵ Percent of families with incomes below established poverty level, as defined by the U.S. Census Bureau.

TABLE 8: YONKERS STUDY AREA POPULATION AND ECONOMIC CHARACTERISTICS

Area	Population							Median Age	Economic Profile		
	Total	Race and Ethnicity (%)							Number of Households	Median Household Income (1999)	Families Below Poverty Level (%) ⁵
		White ¹	Black ¹	Asian ¹	Other ^{1,2}	Hispanic ³	Total Minority ⁴				
City of Yonkers	196,086	60	16	5	13	26	34	35.8	74,358	\$59,316	16
Yonkers Study Area*	48,382	32.4	34.1	3.4	0	41.8	37.5	31.0	17,395	\$28,546	-
CT 1.01	5,381	26.5	31	2.6	0.1	58.7	33.7	27.3	1,659	\$28,422	25.3
CT 1.03	5,475	23.5	37.4	2.8	0	51.1	40.2	27.7	1,790	\$24,877	29.9
CT 2.01	7,721	30.6	19.9	4.5	0	60	24.4	28.6	2,574	\$24,648	26.2
CT 2.02	3,507	46.9	21.8	3.8	0	39.8	25.6	34	1,285	\$45,926	10.1
CT 2.03	2,963	64.2	9.3	3.4	0	36.3	12.7	37.9	1,281	\$41,563	13.4
CT 3	4,837	28.3	34.3	5.6	0	48	39.9	30.6	1,550	\$25,918	27.5
CT 4.01	4,087	22	42.4	1.7	0	46.2	44.1	27.3	1,307	\$28,546	26.7
CT 4.02	6,033	13.9	64.1	1.7	0.1	25.6	65.9	31	2,336	\$24,802	25.4
CT 7.01	3,595	60.3	22.8	6.2	0	15.8	29	37.6	1,335	\$63,319	4.2

Source: U.S. Department of Commerce, Bureau of Census, U.S. Census of Population of Housing, 2000, SF1 for total population, race, and ethnicity; SF3 for median income, households, and poverty.

* Includes Census Tracts: 1.01, 1.03, 2.01, 2.02, 2.03, 3, 4.01, 4.02, 7.01, 7.02

¹ White, Black, Asian, and Other populations may be Hispanic and non-Hispanic (see note 3). This table lists only non-Hispanic population in these columns.

- ² “Other” includes residents of American Indian, Alaska Native, Native Hawaiian, and Other Pacific Islander descent, as well as those respondents who did not identify with any listed racial groups (White, Black, Asian), or who indicated that they are of more than one race defined in the Census.
- ³ The Hispanic category consists of those respondents who classified themselves in one of the several Hispanic Origin categories in the Census questionnaire. People of this ethnic group may be any race (see note 1).
- ⁴ The total minority population includes all Blacks, Asians, Other, and Hispanic Whites. It does not include Hispanic (all races).
- ⁵ Percent of families with incomes below established poverty level, as defined by the U.S. Census Bureau.

ENVIRONMENTAL JUSTICE

Executive Order 12898 requires local agencies that receive federal funds for projects to achieve environmental justice by identifying and addressing disproportionately high and adverse human health and environmental effects, including the interrelated social and economic effects of their programs, policies, and activities on minority populations and low-income populations in the United States. A disproportionately high and adverse effect is characterized as:

predominantly borne by a minority population and/or a low-income population; or affecting a minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non low-income population.

In cases where the proposed project will have no adverse environmental effects, then there will be no disproportionate adverse effects on these sensitive populations.

As shown in Table 6, 15.7 percent of the Manhattan study area population is identified as a minority group, compared with 25 percent in the borough of Manhattan as a whole. In Manhattan, approximately 17.5 percent of families are living below the federal poverty threshold, while within the study area approximately 21.7 percent of the families are living below poverty level; therefore, this portion of the study area would not be considered to an environmental justice population.

As seen in Table 7, the general population within the Bronx study area is not considered to be a minority or low-income population. Residents within the study area are predominately White, accounting for 66.7 percent of the population. In the borough of the Bronx, approximately 28 percent of families are living below the federal poverty threshold, while within the Bronx study area approximately 5.9 percent of the families are living below poverty level; therefore, this would not be considered an environmental justice population.

As seen in Table 8, 37.5 percent of the Yonkers study area population is identified as a minority group, compared to 34 percent in the City of Yonkers. In the City

of Yonkers as a whole, approximately 16 percent of the families live below the federal poverty threshold, while within the study area portion of Yonkers, the percentage of families living below the poverty level is much higher in many of the census tracts; therefore, this portion of the study area would be considered an environmental justice population.

PRELIMINARY LIST OF PERMITS AND APPROVALS

Environmental Review and Permitting

Under New York's State Environmental Quality Review Act (SEQR), state and local government agencies must consider the environmental impacts of discretionary actions. Alternatives for the Hudson River Valley Greenway Link may be required to have an Environmental Assessment Form (EAF) under SEQR. The EAF process would include coordination and/or correspondence with the several agencies for specific topics, such as the following: State Historic Preservation Office (SHPO) for information on historic resources; the New York State Department of Environmental Compliance (NYSDEC) Natural Heritage Program and the United States Fish & Wildlife Service for information on natural resources and wildlife; and the National Oceanic and Atmospheric Association (NOAA) Marine Fisheries Service for living marine resources. A completed EAF would be included in permit applications.

Consultation with the NYSDEC and ACOE is strongly recommended to determine which permits are necessary once the action has been identified. Here is a preliminary list of approvals and permits that would likely be required but could change depending on type and extent of disturbance and construction along the water's edge.

State and City Coastal Zone Consistency Reviews

- NYC Department of City Planning (NYC DCP) Waterfront Revitalization Program Consistency Review
- NYS Department of State (NYS DOS) Coastal Consistency Certification

To build within the coastal zone of NYC, the applicant would have to consult with the NYC Department of City Planning and submit a consistency review per the policies of the *New Waterfront Revitalization Program* (the local WRP). The policies in the WRP comprehensively incorporate the policies articulated in New York State's *Waterfront Revitalization and Coastal Resource Act* of 1981.

Where the project elements are outside of NYC, but within the State's coastal zone, an assessment would be completed and submitted to the New York State

Department of State (NYSDOS) through its Coastal Zone Management Program (CZMP) for consistency certification.

The study area is within the Lower Hudson River Reach and is classified by NYSDEC as a Significant Coastal Fish and Wildlife Habitat. If Yonkers has a Local WRP in place, consistency with that program would also be required.

NYS Department of Environmental Conservation (DEC) Permits

- Tidal Wetlands Permit (Article 25 of ECL, 6NYCRR part 661)-- areas identified on NYS Tidal Wetland Inventory (including Lower Hudson River) NYSDEC regulates activities within 150 feet inland of the wetland boundary in New York City and 300 feet inland in the remainder of New York. Therefore, work activities not directly within the water can be subject to tidal wetlands permitting requirements under NYSDEC. These work activities include but are not limited to:
 - Placement of fill, dredging, excavation in these areas...
 - Restoration, reconstruction, expansion of existing functional structures
 - Construction of structures including bulkheads, etc.
- Coastal Erosion Control Permit (Article 34 of ECL, 6NYCRR Part 505.6)
 - Construction/modification/restoration of structures including walkways
 - Excavation, grading, dredging, deposition of material, etc.
- Protection of Waters Permit (Article 17, Title 5 of ECL, 6NYCRR Part 608).
 - For example, if the project entails placing fill for bank stabilization or to isolate a work area. (if project is repair or in-kind replacement of small areas of disturbance (less than 50 linear feet along any 1000 feet of watercourse-or
 - Excavating or placing fill in navigable waters below the MHW level, including adjacent and contiguous marshes and wetlands (installation of bulkheads, revetments and other bank or shoreline protection measures, installation; placement of fill for access, construction or structure installation))

- State Pollution Discharge Elimination System (SPDES) Permit (Article 17, Title 7& 8 of ECL- Clean Water Act) if the project changes/increases discharge to Hudson River
- Section 401 Clean Water Act- Water Quality Certification (6NYCRR Part 608)

Depending on scale of the project, it would be classified as a minor or major action and this would affect permit application review schedule.

U.S. Army Corps of Engineers (ACOE) Permits:

Depending on the work, the following ACOE permits may be required:

- Clean Water Act
 - Section 404- discharge or dredge or fill material into jurisdictional waters and wetlands of the US.
 - Section 401 requires issuance of NYS Water Quality Certificate, as a prerequisite to issuance Section 404 permit.
- Section 10 (Rivers and Harbor Act) structures and fills in navigable waters. Conformance with NYS CZMP
- Coastal Zone Management Act – compliance with NYS CZMP

The ACOE and DEC require only one application between them, the Joint Application for Permit, but also require an environmental questionnaire and the NYSDOS Federal Consistency Form. If no federal approval is required, then the NYSDOS State Consistency Form is required.

The actual applications and questionnaires for the DEC and ACOE are very short. However, the DEC and the ACOE require five sets each of maps, plans, photographs, as well as a SEQR/NEPA review (EAF or EIS) and may also require an essential fish habitat assessment.