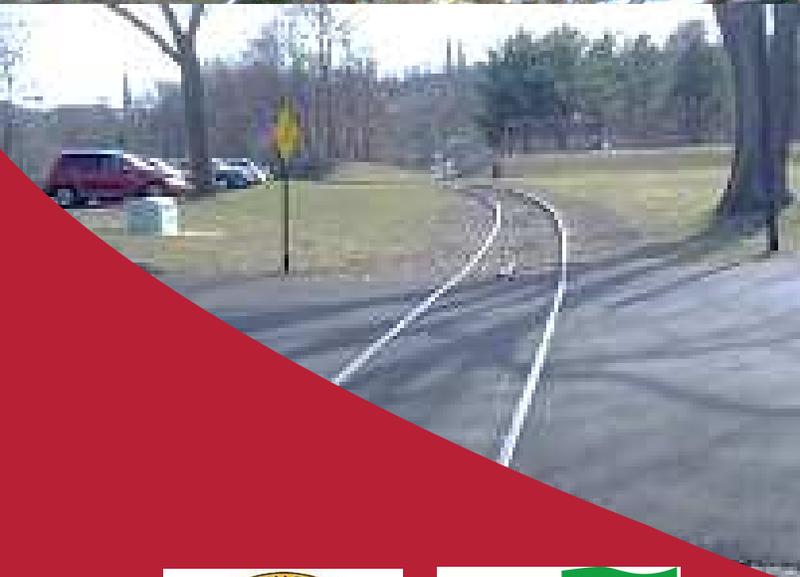


Kingston Point Rail Trail Feasibility Study

Kingston Land Trust
March 2013



The preparation of this document was funded in part by a Community Development Block Grant from the City of Kingston, Office of Community Development and a grant from the Hudson River Valley Greenway.



Table of Contents

Executive Summary	1
1 Introduction.....	3
2 Existing Planning Documents	6
3 Engineering and Environmental Assessment	9
3.1 Right-of-Way Encroachments	13
3.2 Environmental Remediation	13
3.3 Stormwater	14
3.4 Physical Conditions	15
3.5 Safety	16
3.6 Adjacent Uses.....	18
3.7 Access.....	18
3.8 Users.....	19
3.9 Multi-Use.....	19
4 Conceptual Trail Design	19
4.1 Trail Alignment.....	19
4.2 Cross Section.....	23
4.3 Drainage.....	23
4.4 Trail Access and Trailheads.....	24
4.5 Trail Crossings	32
4.6 User Safety	36
4.7 Adjacent Uses.....	36
4.8 Trolley Use	36
5 Implementation Plan	40
5.1 Implementation Steps.....	40
5.2 Permits	40
5.3 Cost Estimates.....	40
5.4 Maintenance	42
5.5 Funding Opportunities	44

List of Figures

Map 1: Base Map	4
Map 2: Zoning Map	5
Map 3: Opportunities and Constraints Northern Section	10
Map 4: Opportunities and Constraints Mid-Section	11
Map 5: Opportunities and Constraints Southern Section	12
Map 6: Conceptual Design Northern Section	20
Map 7: Conceptual Design Mid-Section	21
Map 8: Conceptual Design Southern Section	22
Trailhead 1: Chester Avenue and Jansen Avenue	26
Trailhead 2: Livingston Avenue and Delaware Avenue	27
Trailhead 3: Delaware Avenue and Murray Avenue	28
Trailhead 4: JFK Elementary School	29
Trailhead 5: Rondout Apartments	30
Trailhead 6: Rondout Waterfront	31
Roadway Crossing 1: Delaware Avenue and Route 9W on-ramp	33
Roadway Crossing 2: 2 nd Avenue	34
Roadway Crossing 3: Delaware Avenue and Murray Avenue	35

List of Tables

Kingston Point Rail Trail Project Summary:	2
Table 1: Kingston Point Rail Trail	3
Table 2: Roadway Crossings	16
Table 3: Rail-Trolley with Trail	38
Table 4: Bus- Trolley Trail	39
Table 5: Trail Costs	41
Table 6: Trailhead Costs	42

Executive Summary

The Kingston Point Rail Trail (KPRT) is a proposed 1.5 mile rail-trail between the Kingston Hospital to the west, and the Trolley Museum to the east. The western terminus is to be located at the intersection of Jensen Avenue and Chester Street. The eastern terminus will be located at on Strand Street, at the public parking area.



The KPRT will provide access to the Kingston High School, the JFK Elementary School, City Hall, Kingston Hospital, Hasbourk Park, the Rondout Waterfront, shopping districts and several residential neighborhoods.

Kingston Point Rail Trail	
Trail Length	1.5 miles
Trail Width	10 feet / 2' shoulders
Right of Way Ownership	City of Kingston
Right of Way Width	35 to 45 feet
Crossings	10 at grade crossings
Grade	3% decline to east
Structures	Route 9W ped bridge, 3 railroad trusses

The existing right-of way (ROW) is approximately 35 to 45 feet wide with a gradual 3% grade declining to the east. The grade of the existing ROW lends itself well to ADA accessibility.

A 10 foot shared use path with an asphalt surface is recommended. Two foot gravel shoulders will be provided on either side. There are several locations where grades warrant additional drainage to be provided by grass swales.

Fencing will be required in locations where grades exceed 1:3 within 5 feet of the trail. Additional mitigations, such as access or a blue light phone, should be considered in coordination with the Kingston police department at the location of the tunnel.

In addition to ten at-grade crossings, there are also periodic locations for access and trailheads. Each of these crossings and trailheads are listed in the project description on the following page.

Kingston Point Rail Trail Project Summary:

Project Description

The Kingston Point Rail Trail is a proposed 1.5 mile, 10 foot shared use path, utilizing the old railroad right-of-way through the eastern portion of the City of Kingston. The western terminus is located at the corner of Chester Ave and Jansen Ave. The eastern terminus is located at Strand St.



At-Grade Crossings

- | | |
|---|--|
| <ul style="list-style-type: none"> • Chester St • Delaware Ave/ Route 9W on-ramp • First Ave • Second Ave • Third Ave • Delaware Ave near Murray St | <ul style="list-style-type: none"> • Murray St • Rondout Apartments driveway • Strand St at public parking • Strand St at Trolley Museum |
|---|--|

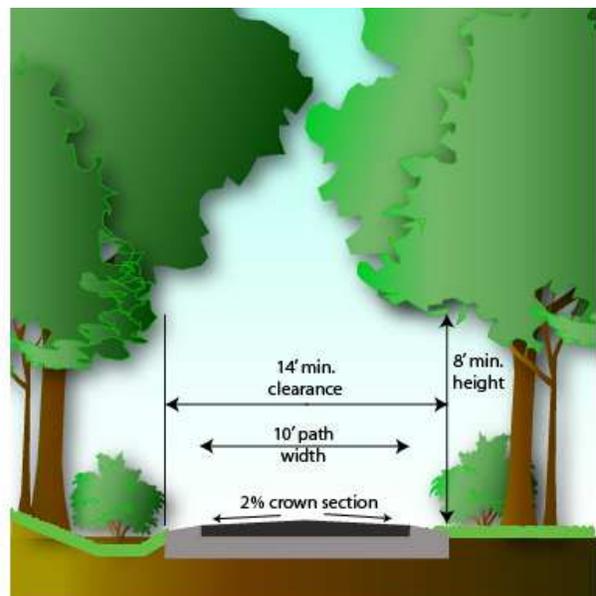
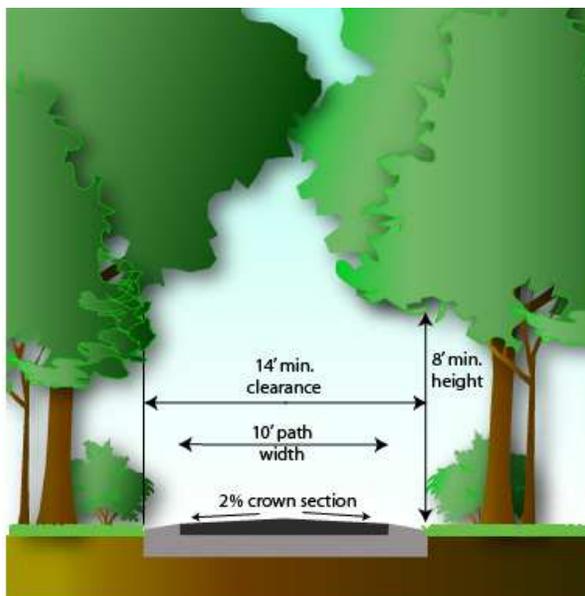
Trailheads

- Chester/Jansen Ave
- Livingston/Delaware Ave
- Delaware/Murray Ave
- JFK Elementary School
- Rondout Apartments
- Strand Street, public parking area

Additional project information:

Interested agencies: Kingston Land Trust, City of Kingston, NYS Department of Transportation, Trolley Museum

Project Cost: \$1.7 Million



1 Introduction

The Kingston Point Rail Trail (KPRT) is a proposed 1.5 mile rail-trail between the Kingson Hospital to the west, and the Trolley Museum to the east. The western terminus is to be located at the intersection of Jensen Avenue and Chester Street. The eastern terminus will be located at the public parking lot on Strand Street.

The existing right-of way (ROW) is approximately 35 to 45 feet wide with a gradual 3% grade declining to the east. A 10 foot wide asphalt shared-use path, with ADA accessibility, is proposed.

A corridor base map is located on the following page. Surrounding land uses along the trail alignment are shown on the map on page 5.

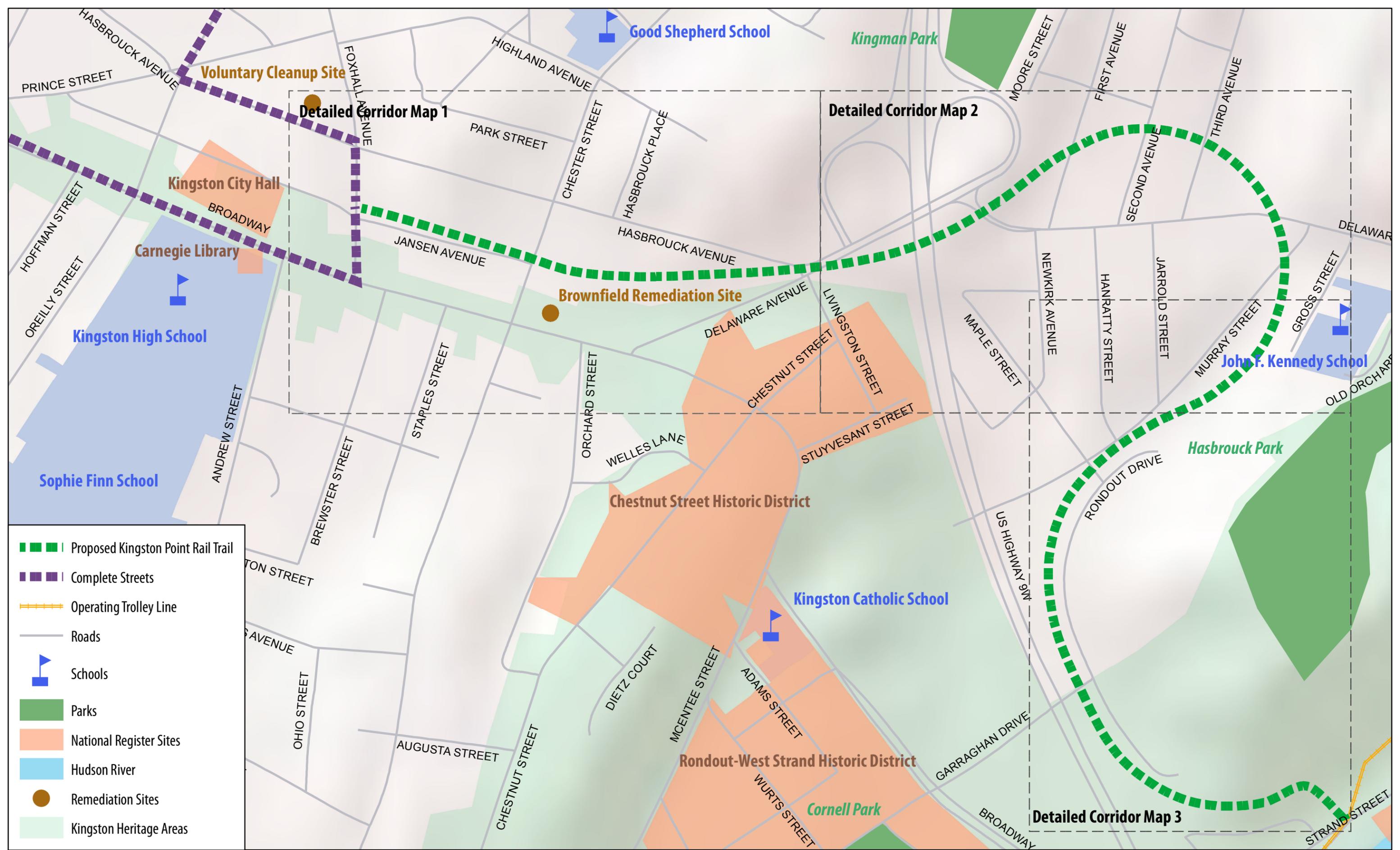


Figure 2 - Railroad bed near Rondout Apartments



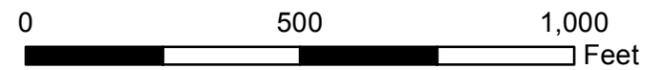
Figure 1 - Railroad bed near Rondout Apartment

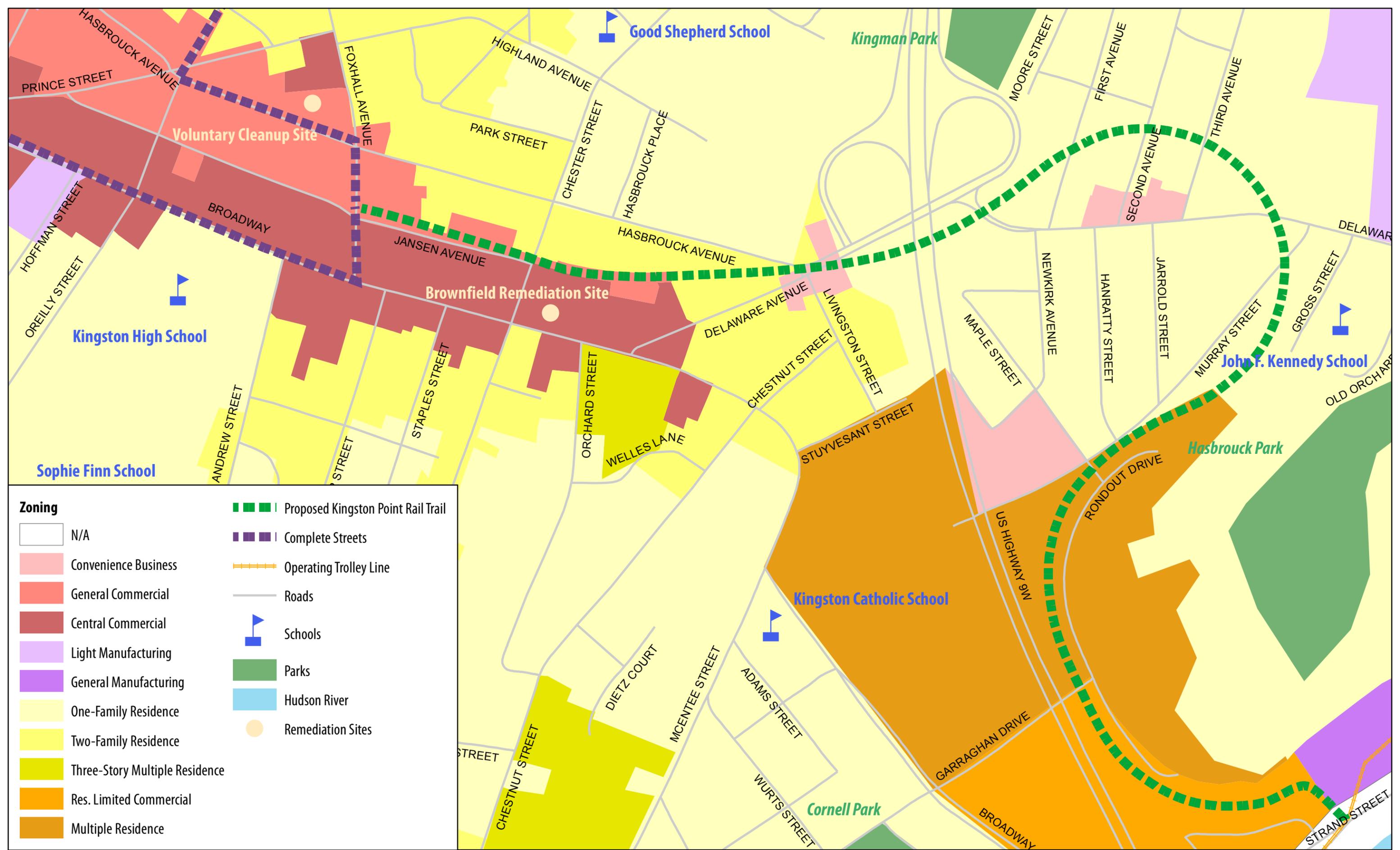
Table 1: Kingston Point Rail Trail	
Trail Length	1.5 miles
Right of Way Ownership	City of Kingston
Right of Way Width	35 to 45 feet
Crossings	10 at grade crossings
Grade	3% decline to east



- Proposed Kingston Point Rail Trail
- Complete Streets
- Operating Trolley Line
- Roads
- ▲ Schools
- Parks
- National Register Sites
- Hudson River
- Remediation Sites
- Kingston Heritage Areas

Kingston Point Rail Trail Engineering Study, Kingston, NY
- Rail Trail Corridor Physical Existing Conditions Overview Map -





Zoning

- N/A
- Convenience Business
- General Commercial
- Central Commercial
- Light Manufacturing
- General Manufacturing
- One-Family Residence
- Two-Family Residence
- Three-Story Multiple Residence
- Res. Limited Commercial
- Multiple Residence

- Proposed Kingston Point Rail Trail
- Complete Streets
- Operating Trolley Line
- Roads
- Schools
- Parks
- Hudson River
- Remediation Sites

2 Existing Planning Documents

2.1 Ulster County Non-Motorized Transportation Plan

The Ulster County Non-Motorized transportation Plan was completed in 2008 and serves as a guide for selecting appropriate areas for non-motorized transportation, prioritization of projects, and funding, constructing, and maintaining the non-motorized transportation system. The Kingston Point Rail Trail is identified as one of 15 next phase projects. Two options are presented. Option 1 proposes use of the trolley line right of way to include a rail-with-trail facility extension to the existing pedestrian bridge connection to Kingston Point Park. Option 2 proposes a continuous loop trail and bikeway west from Kingston Point Park back to the Rondout waterfront (in addition to option 1). An 8 foot wide shared use path on a shared rail facility is proposed as the trail type. The project description calls for examination of the existing right of way, causeway, pedestrian bridge, and brownfield site.

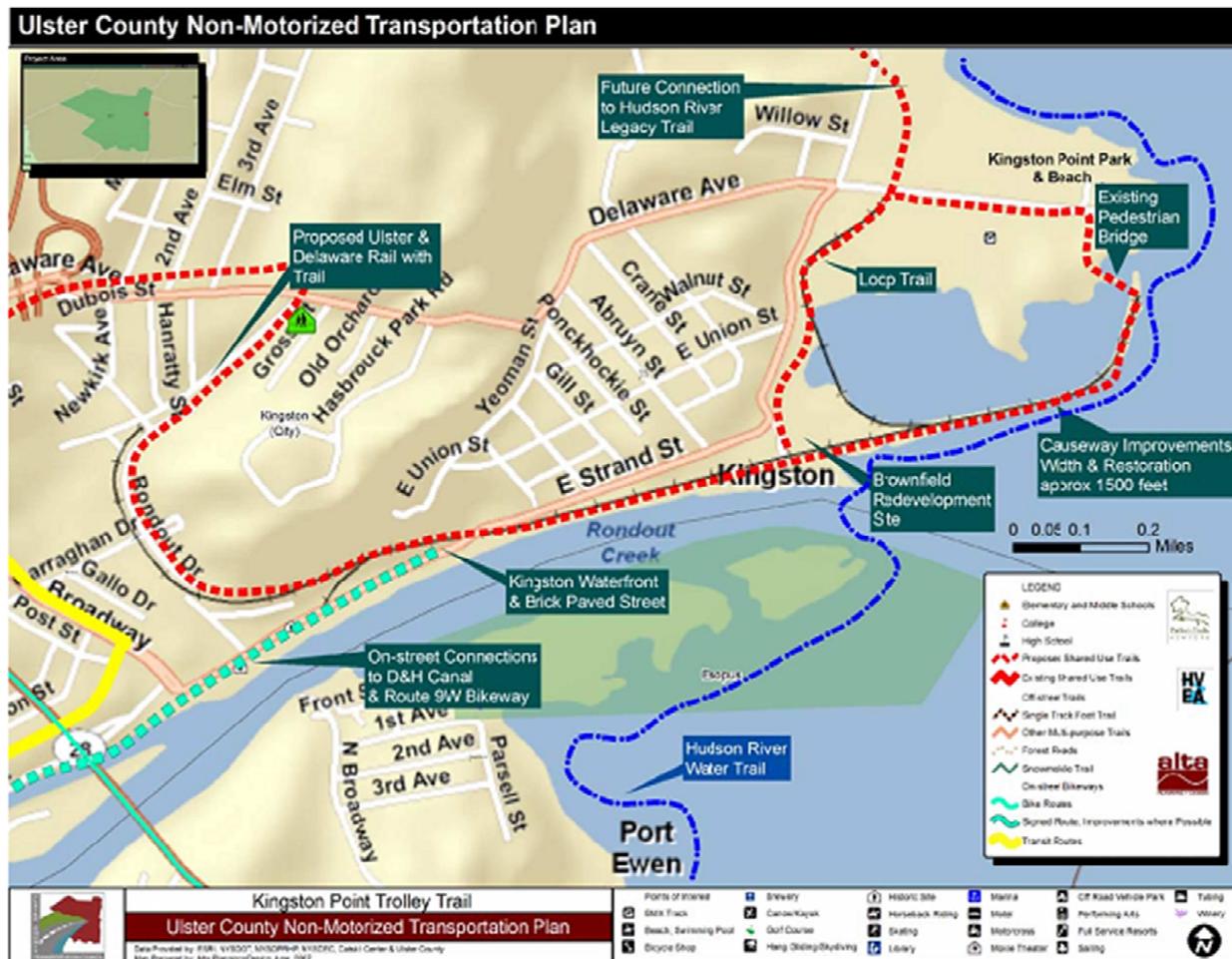


Figure 3 - Proposed Trails from Ulster Country Non-Motorized Transportation Plan

completed many of the action items under planning for the Rail Trail and is now engaging in the design phase. The management plan also provides an existing conditions overview of the railroad corridor in terms of condition, natural resources and features, historical resources, land use, and trail users. Potential trail users are identified as pedestrians, runners, disabled, bicyclists, and winter trail users. Trail surfaces, width, clearance, access, fencing, road crossings, parking, signage, and landscaping are identified as an initial screening of needs and desires for the corridor. Potential issues such as liability, safety, and trail maintenance are also identified.

2.4 City of Kingston Climate Action Plan

The City of Kingston Climate Action Plan, completed in 2012, supports the construction of the Kingston Point Rail Trail as it will provide a resource for non-motorized transportation. Completion of this trail will help to reach some of the goals outlined in the Climate Action Plan by reducing travel demand and vehicles mile traveled, promoting safe walking, protecting and enhancing the environment, and improving quality of life. Construction of this rail trail and others is proposed by 2020.

2.5 Kingston Local Waterfront Revitalization Program and Implementation Plan

The result of the Kingston Local Waterfront Revitalization Program was the recommendation of 14 projects. Included among these are improvements to the Rondout neighborhood with sidewalks and landscaping, improvements to the Trolley Museum and waterfront trolley service, and Kingston Point Park improvements focusing on passive recreation opportunities. The Implementation Plan supports many waterfront projects such as trolley service, park rehabilitation, and waterfront trails. One of the goals identified is access to the waterfront. The completion of the Kingston Point Rail Trail will facilitate better access to the improving and expanding waterfront, and will reduce the need for other transportation and parking needs as the number of visitors and attractions increase.

2.6 City of Kingston Comprehensive Master Plan

The Common Council last year approved funding the development of an updated comprehensive master plan for the City of Kingston. A firm began work by April 2012 to include the development of the plan and associated zoning code updates under the guidance of a 30-member Comprehensive Master Plan Steering Committee.

2.7 Kingston Urban Cultural Park

The Draft Management Plan for the Kingston Urban Cultural Park was developed by the City of Kingston and the NYS Office of Parks, Recreation, and Historic Preservation in 1987. The development of the Urban Cultural Park has four major goals: preservation, education, recreation, and economic development. The City of Kingston's cultural park is centralized around three themes that have been influential in the development of Kingston, the first of which is transportation. The City of Kingston was a major hub for both the waterborne and railroad transportation eras, and later for the NYS Thruway. The Kingston Point Rail Trail will both connect people with history as well as provide recreational

opportunities, meetings the main objectives of the Urban Cultural Park. Encouraging bicycling as an alternative mode of transportation is also encouraged.

Hasbrouck Park, located along the Kingston Point Rail Trail, is specifically identified as a major Park resource for recreation and the views of Kingston Point. A switch-back hiking trail is identified to provide pedestrian access and a segment of Union Street from the intersection of Yeomans Street is identified to provide bicycle access.

2.8 Complete Streets SWOT Analysis

A Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis was performed in 2010 to evaluate complete streets within the City of Kingston. Several strengths were identified such as a dense street grid, planning, engineering, and DPW staff, a deep history, and rail right-of-way. Increasing awareness, creating benchmark indicators and milestones, and encouragement of safe routes to school programs are just some of the recommendations made to improve the vitality of a complete streets program. Kingston's walkable scale, sense of place, and existing recreational opportunities are all opportunities to advance complete streets.

3 Engineering and Environmental Assessment

The engineering and environmental assessment examines the Kingston Point Rail Trail corridor for opportunities and constraints to completing a multi-use path. There are several existing conditions that will need to be resolved to complete the trail, including drainage and several crossings. There are also several opportunities such numerous trailheads. Each of these elements is described in this section and shown on the opportunities and constraints maps on the following pages.



- Remediation Sites
- Complete Streets Solutions
- Proposed Kingston Point Rail Trail
- Roads
- Bus Stop (letter signifies bus route)
- Bus Route
- Schools
- National Register Sites
- Vacant Parcels
- Kingston Heritage Areas

- Opportunity
- Neutral
- Constraint

- Proposed Kingston Point Rail Trail
- Roads
- Bus Route
- Bus Stop (letter signifies bus route)
- Schools
- National Register Sites
- Kingston Heritage Areas
- Vacant Parcels

- Opportunity
- Neutral
- Constraint



Poor sight distance in both directions. Right turn slip ramp induces higher speeds.

Enchroachment - small section of short fence.

Good sight distance.

Some overgrown sections.

Corridor crosses driveway then roadway. Good sight distance.

Rt. 9W pedestrian bridge in good condition, but needs silt build up maintenance.

Good sight distance south, partially limited to the north.

Flows discharge in existing drain leading to unknown location.

End of railroad tunnel. Beginning of wood beam and planked covered section.

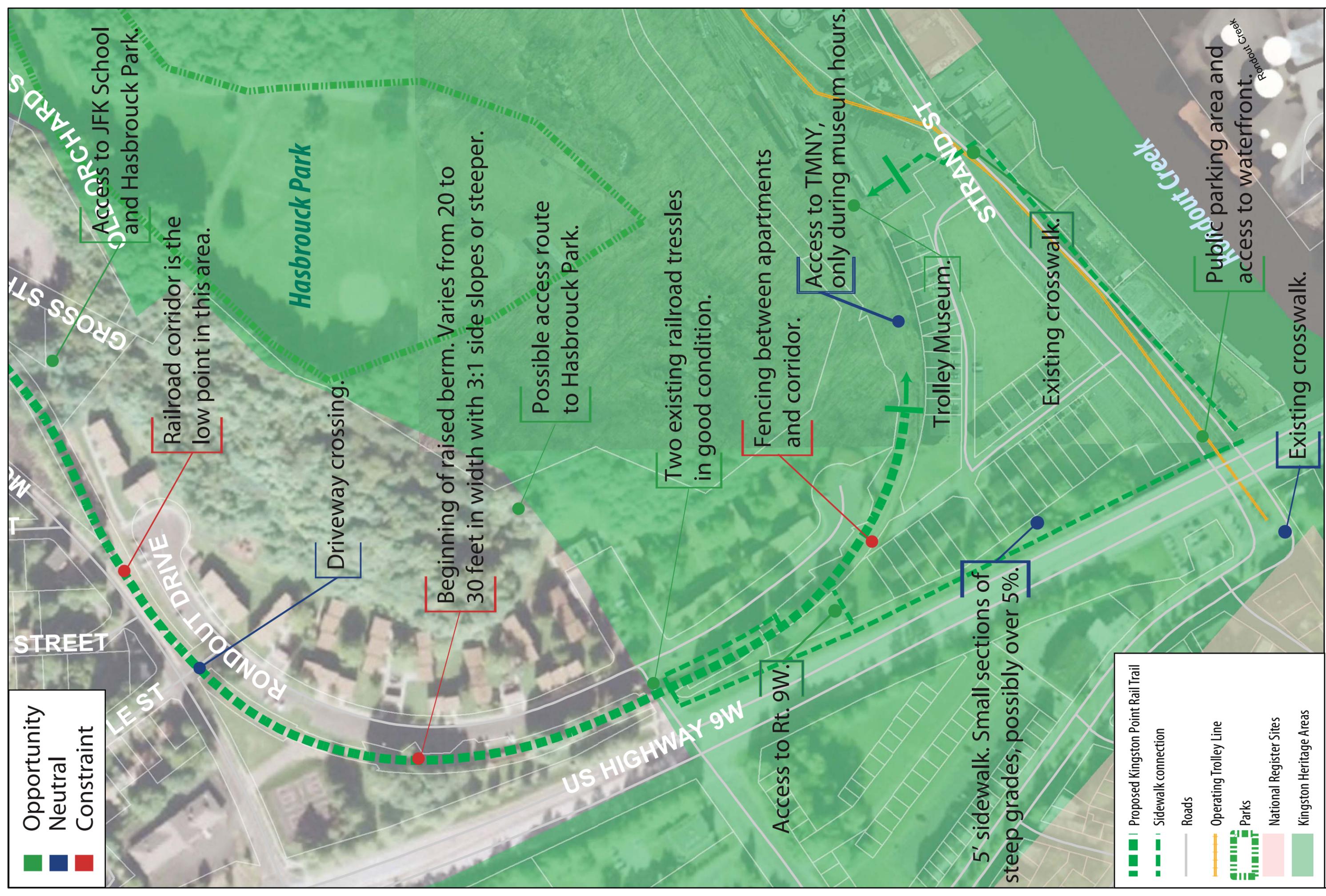
Access to John F. Kennedy School.

Stormwater flows freely on the southside of the tunnel.

Steep slopes leading down to trail.

Access to apartments and bus stops.

■ Opportunity
■ Neutral
■ Constraint



Access to JFK School and Hasbrouck Park.

Railroad corridor is the low point in this area.

Hasbrouck Park

Driveway crossing.

Beginning of raised berm. Varies from 20 to 30 feet in width with 3:1 side slopes or steeper.

Possible access route to Hasbrouck Park.

Two existing railroad tressles in good condition.

Fencing between apartments and corridor.

Access to TMNY, only during museum hours.

Trolley Museum.

5' sidewalk. Small sections of steep grades, possibly over 5%.

Existing crosswalk.

Public parking area and access to waterfront.

Existing crosswalk.

- Proposed Kingston Point Rail Trail
- - - Sidewalk connection
- Roads
- Operating Trolley Line
- Parks
- National Register Sites
- Kingston Heritage Areas

3.1 Right-of-Way Encroachments

There are three obvious encroachments within the railroad corridor. To the north, the railroad corridor has been converted into off-street parking by both the Hospital and the local grocery store on Jansen Avenue. Regaining this ROW is possible but involved. Alternatives using the roadway width should also be explored.



Figure 5 - Encroachments on Jansen Avenue

To the east of the Second Avenue roadway crossing, a small fenced in area has been constructed in the ROW. The fencing can easily be removed and should be discussed with the adjacent land owner.

A driveway crosses the railroad corridor at the Delaware Avenue (east) crossing. An easement was obtained for the driveway prior to construction. Conflicts between the driveway, trail, and crosswalk will need to be resolved.

The sidewalk on the east side of the Route 9W ROW is owned and maintained by NYSDOT.

Correspondence and approval from NYSDOT will be needed to widen the sidewalk in their ROW, or replace it with an asphalt path, to connect to the waterfront area. A connection between the NYSDOT ROW and the trail may require an easement across a vacant parcel but an alternative can be found if needed.



Figure 6 - Encroachment on Second Avenue

Additional research on landownership will be needed as trail access from the High School, John F. Kennedy School, Hasbrouck Park, and the Hudson Landing/Sailor's Cove properties. A property owner on Gross St has agreed to donate a small parcel. An easement has already been granted for access between Rondout Gardens and Gross St/Kennedy School. Some vacant parcels and City owned properties exist that may provide this access. If not, easements will need to be acquired.

3.2 Environmental Remediation

There is no evidence of wetlands or environmental contamination along the corridor. The abandoned ROW has been used for dumping in prior years and is in the process of being cleaned up.

If any area within the railroad corridor is to be tested for contaminants, tests should be performed at the southwest corner of the tunnel. The corridor slopes southwest prior to this location and the corridor is closed by walls and hard cap. This is where the highest contamination is likely to be, if there are contaminants present.

The railroad corridor is the low point for much of the corridor. Typically the disposal of cut soils is the largest obstacle to overcome when converting rails to trails, due to the special requirements when disposing of soils contaminated with arsenic and creosote. If the soil is to remain on site, human contact with the soil must be limited. Inevitably, this requires some sort of constructed path over the contaminated soil, whether that is stone dust or other pavement.

3.3 Stormwater

The railroad corridor is the low point for much of the ROW, capturing run-off from 10 to 100 feet on either side. Although stormwater mitigation will need to account for discharge from the trail and some of the surrounding area, there are several options to capture and treat the run-off linearly within the ROW. These will be explored during conceptual design. Several maintenance issues will also need to be addressed along the corridor:

- There is an existing roof or foundation drain from one of the nearby businesses discharging into the railroad corridor.
- Stormwater is channeled through the tunnel and creates a stream, discharging primarily into a stormwater pipe. The discharge location of this pipe is unknown.
- The Route 9W Pedestrian Bridge is designed to drain into two scuppers located in the center of the bridge on the north and south sides of the bridge. Silt has built up over time and blocks the drainage on the bridge. The structure will need to be cleaned, and checked on regular basis to prevent this issue in the future. There is an asphalt surface on the structure which will degrade more rapidly than



Figure 7 - West of the railroad tunnel: railroad bed is low point



Figure 8 - Rool drain discharging into the right-of-way



Figure 9 - Stormwater south of the tunnel discharges here



Figure 10- Silt build up blocks scuppers on the Route 9W bridge

expected if water is allowed to stand on the bridge.

3.4 Physical Conditions

The railroad bed, bridge spans, and the Livingston St/Delaware Ave tunnel were reviewed for structural integrity and issues that may inhibit the development of the trail.

- There is a sink hole on Jansen Avenue on the north side between the hospital parking area and grocery store parking area. An additional sink hole was noted near the storm grate at the southeast corner of Livingston St and Delaware Ave. These should be resolved as soon as possible, including an investigation as to the cause. The sink hole could have been caused by a poor sub-base or a leaking or burst pipe located under the roadway.
- The Livingston St/ Delaware Avenue Tunnel has no apparent structural issues. No significant cracking or missing mortar was evident in either the tunnel walls or ceiling. Stormwater needs to be addressed to reduce impacts to the foundation. The extended tunnel structure, located under the park, is comprised of wood beams and wood planks. There may be some form of wood or concrete slab on top of the wood planking but further investigation will be needed. Soil and grass cover this portion of the structure. Some pooling was evident in the soil during a heavy rain event, but no leaking or rotting was evident from beneath. The tunnel can be inspected by either the City Engineer or perhaps on request, by NYSDOT. Additionally, this could also be inspected during detailed design or construction.
- The NYSDOT Route 9W Railroad Bridge was inspected in October 2011. No flags were reported and the bridge is in structurally sound condition. There are some maintenance issues as noted earlier.



Figure 11- Sink Hole on Jansen Avenue



Figure 12 - Sink hole on Livingston Avenue

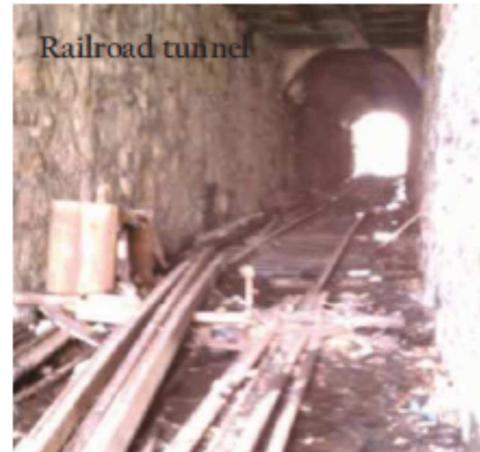


Figure 14 - Railroad tunnel under Delaware



Figure 13 - Roof of extended tunnel structure

- The railroad bridges near Route 9W again appear to be in structurally sound condition. There was no sign of significant corrosion of the steel. The wood beams carrying the railroad structure are rotted, will need to be removed, and a new deck installed.

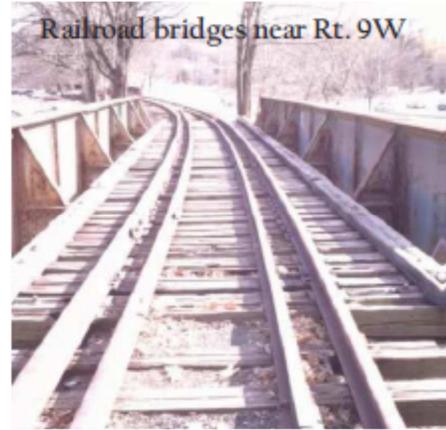


Figure 15 - Railroad bridges between the Rondout Apartments and Route 9W

3.5 Safety

3.5.1 Crossings

Sight distance is sufficient at a majority of the corridor at-grade crossings. Vehicle volumes are also low allowing adequate gaps for crossing the roadways. The following table summarizes the ten roadway crossing along the corridor.

Table 2: Roadway Crossings			
Roadway	Traffic Volumes	Sight Distance	Land Use
Chester Street	Low	Good	Commercial/residential
Delaware Avenue (west)*	Low	Poor	Residential
First Avenue	Low	Good; angled crossing	Residential
Second Avenue	Low	Good	Residential
Third Avenue	Low	Good	Residential
Delaware Avenue (east)*	Low	Good; driveway conflict	Residential / School
Murray Street	Low	Good	Residential/ School
Rondout Drive*	Low	Good; set back from roadway	Residential
Rondout Landing (two)*	Moderate	Good	Commercial

- Delaware Avenue (west) – there is poor distance to the north traveling east due to the bridge and right turn slip ramp. There is poor sight distance in both directions traveling west due to the intersection and left turn movement to the north, and shrubs and rock outcrop to the south. The right turn slip ramp onto Delaware Avenue allows for vehicles to travel at higher speeds creating a safety concern for trail users.

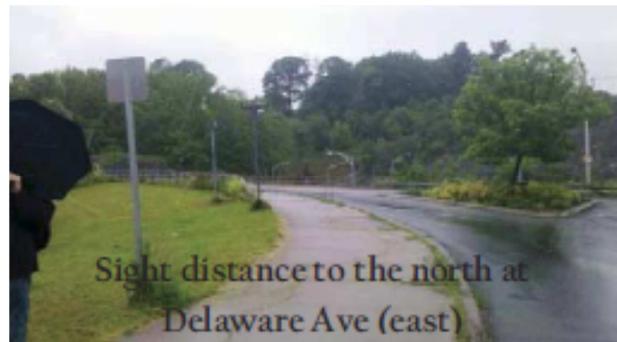


Figure 16

- Delaware Avenue (east) – Sight distance is good in both directions but the corridor crosses driveway to the north. The driveway owner obtained an easement prior to construction.
- Rondout Drive – There is good sight distance at this trail crossing but it is currently located 20 feet south of the sidewalk crossing and intersection.
- Rondout Landing – An existing midblock crosswalk is located at the Trolley Museum. An additional crossing will be needed to connect the Route 9W connection to the waterfront. Sight distance is good and there are adequate gaps in traffic volumes.



Figure 17



Figure 18

3.5.2 User Safety

The tunnel creates an isolated area with no existing egress or ingress for over 800 feet. Fencing is present along the northern and southern walls approaching the Tunnel. The Tunnel itself is over 230 feet, with no available lighting. Safety concerns will need to be mitigated through this section, by providing additional access if possible, lighting, and perhaps an emergency blue light phone.



Figure 19

Vegetative screening is already present in much of the residential neighborhoods, providing both security and privacy for neighbors of corridor. Much of this screening can and should be maintained.

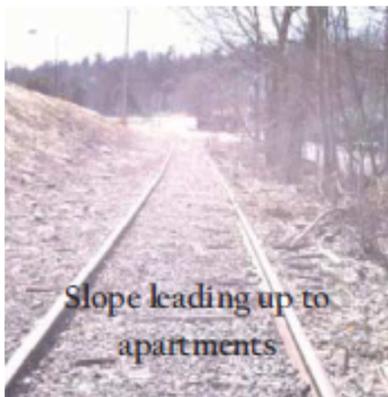


Figure 21

Fencing along steep slopes leading down the railroad corridor will need to be



Figure 20

maintained or replaced. The side slopes and distance to the trail will need to be evaluated during the design process to determine if fencing or guide rail is needed along portions of the berm. There should be five feet between the trail and a steep side slope.

3.6 Adjacent Uses

A majority of the adjacent land along the corridor is developed. The northern section and the southern termini are located in commercial districts. The majority of the corridor travels through residential neighborhoods. The corridor is screened by natural vegetation. Clearly and grubbing should be limited to the immediate corridor to maintain as much of this natural barrier as possible. Clearly defined and well placed access trails will prevent the development of cut-through paths and breaks in the screening.



Figure 22 – A significant portion of the trail is adjacent to residential properties

3.7 Access

Trail access is provided at each trail crossing. This allows walking and bicycle access from the residential neighborhoods without the need for additional parking. Public parking currently exists on E. Charles Street, north of Jansen Avenue and at Rondout Landing. Parking is also available at the Trolley Museum. There is a small park located at Delaware Ave and Livingston Ave that may also be utilized for trail access and parking. Significant generators and destinations within the corridor include:

- o Kingston Point High School
- o Kingston Hospital
- o Commercial uses on Broadway
- o Delaware Avenue neighborhood
- o John F. Kennedy School
- o Rondout Garden Apartments
- o Rondout Apartments
- o Rondout Creek Waterfront

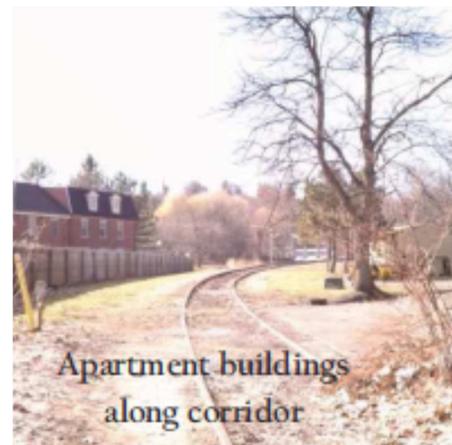


Figure 23

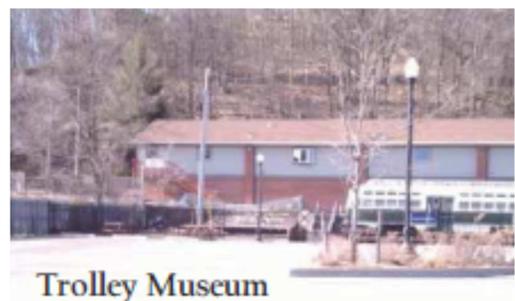


Figure 24

3.8 Users

City of Kingston has a 5.6% pedestrian mode share (2006 – 2010 American Community Survey) and 0.8% bicycle mode share (2000 census). There are approximately 15,700 people living within 1 to 2 miles of the proposed trail. It is assumed, based on use of other similar trails in the Northeast, that 1 in 30 people will use the trail on a daily basis. With the addition of visitors and tourists, trail use is expected to be approximately 500 to 700 trail users per day.

3.9 Multi-Use

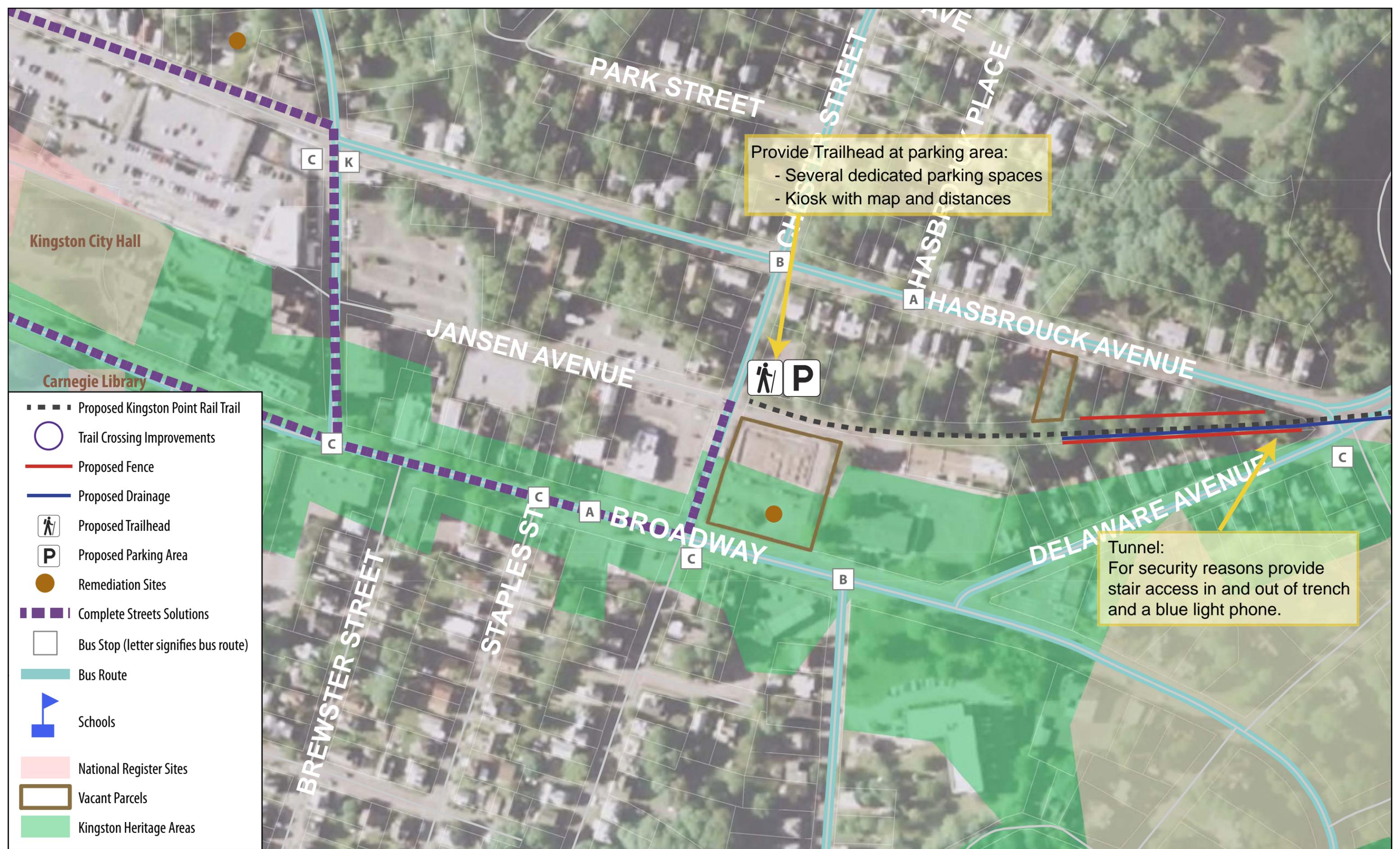
The railroad corridor is planned for future use by the Trolley Museum to provide trolley service along the corridor. Funding is not in place and this is a long term goal. During the design process, the feasibility of reinstalling tracks will be determined. The railroad trusses and berm are too narrow to carry both a trolley and multi-use path with a significant separation. There are several sections along the corridor where the ROW is narrow or constrained. A 10 feet setback from the centerline of re-installed tracks is recommended with a 5 foot high fence as a barrier between a trail and railroad. Other alternatives will be considered.

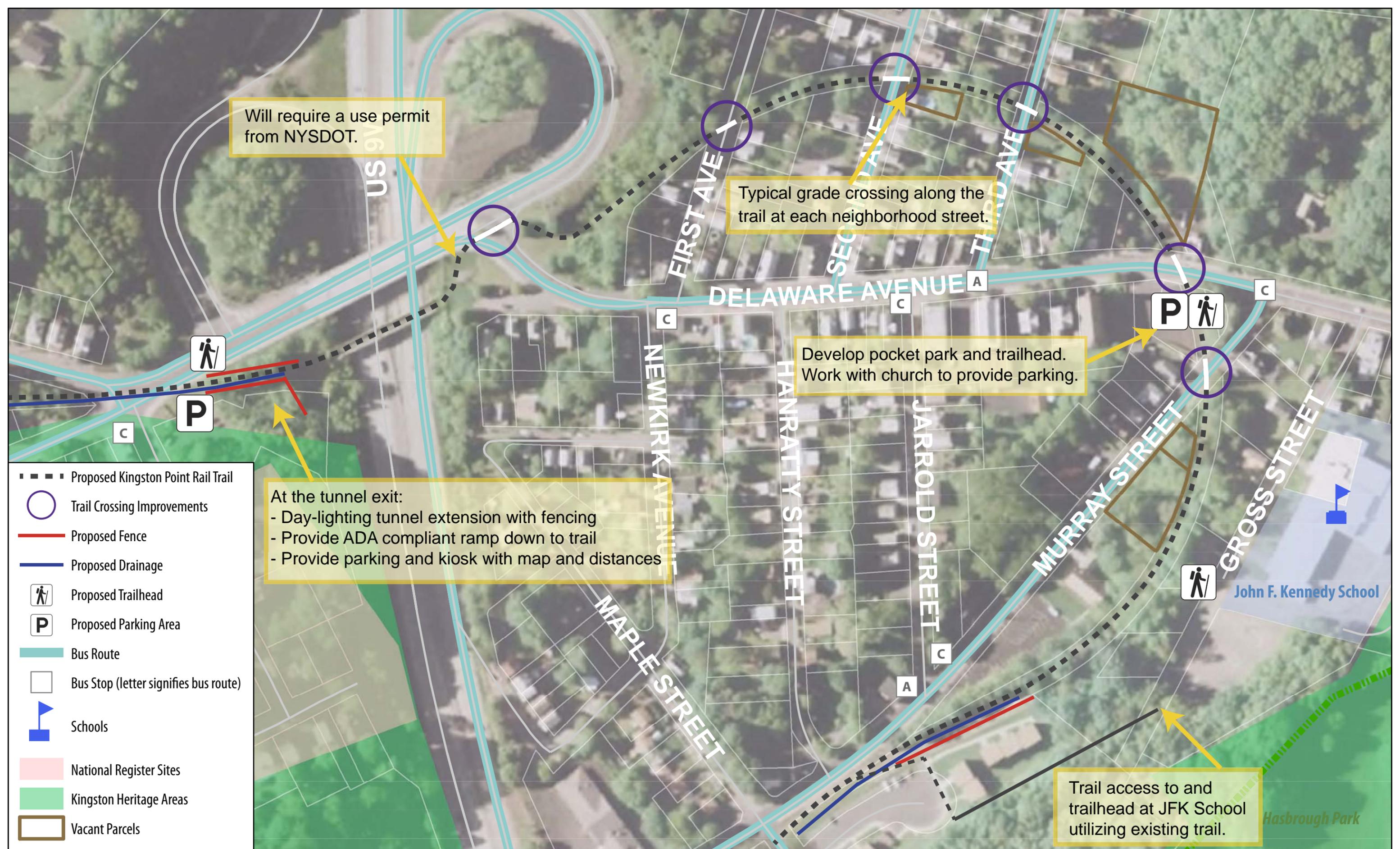
4 Conceptual Trail Design

4.1 Trail Alignment

The trail alignment will follow the railroad right of way alignment from Chester Ave to Rondout Gardens. After passing over the railroad trusses, the alignment will deviate from the right of way and follow Route 9W down to the waterfront. The trail alignment is shown on the following pages.

The vertical alignment of the trail is a general 3% down slope from west to east. There is one notable location where grades may exceed 5%, along Route 9W. These steeper slopes should be mitigated wherever possible to meet ADA (American with Disabilities Act) requirements. The horizontal alignment of the trail follows the railroad alignment. Horizontal curves should have a radius of 100' or greater. Where this radius cannot be met, warning signs should be placed along the trail to alert bicyclists of the limited sight distance and to slow down.





Will require a use permit from NYSDOT.

Typical grade crossing along the trail at each neighborhood street.

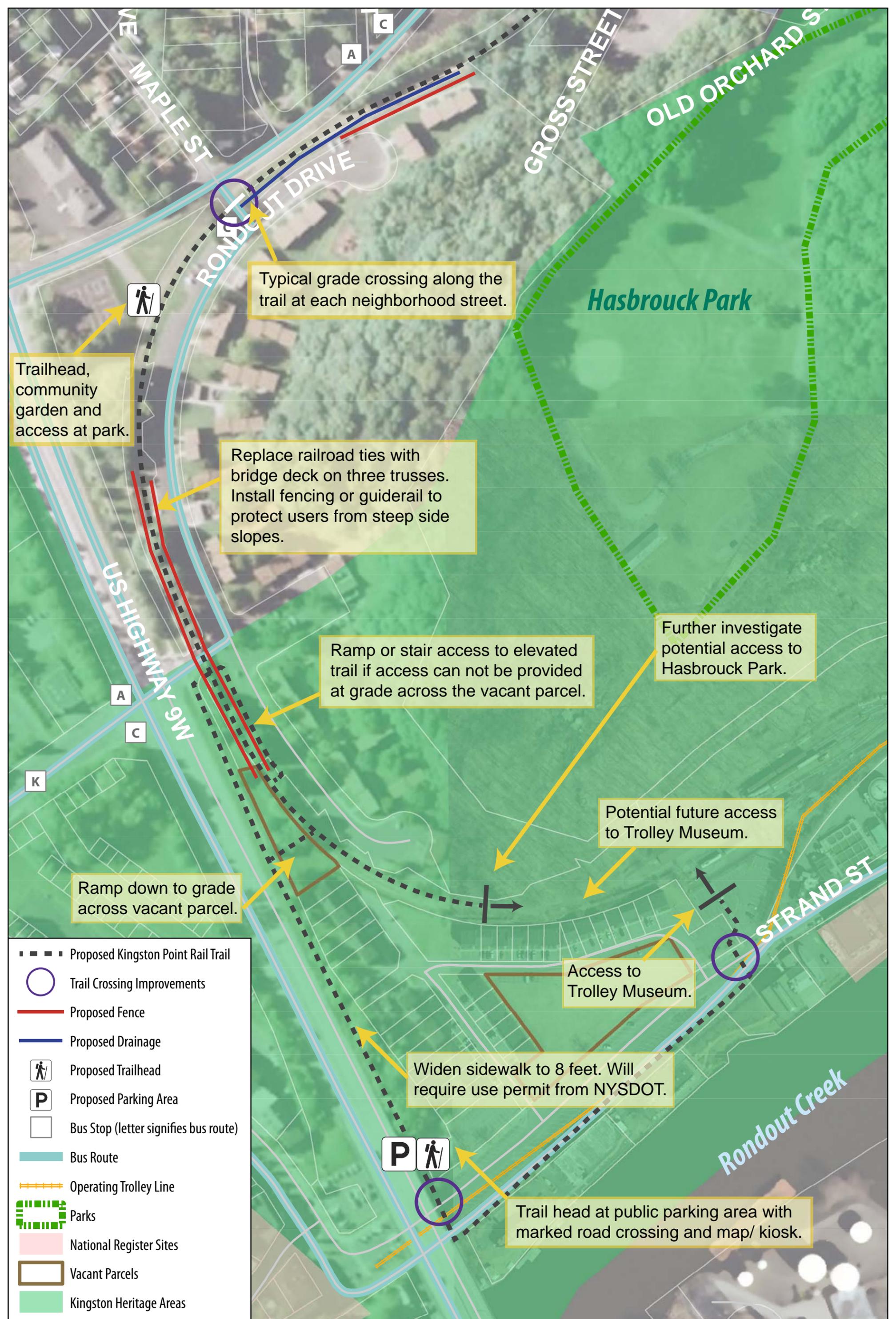
Develop pocket park and trailhead. Work with church to provide parking.

At the tunnel exit:
 - Day-lighting tunnel extension with fencing
 - Provide ADA compliant ramp down to trail
 - Provide parking and kiosk with map and distances

Trail access to and trailhead at JFK School utilizing existing trail.

- Proposed Kingston Point Rail Trail
- Trail Crossing Improvements
- Proposed Fence
- Proposed Drainage
- 🚶 Proposed Trailhead
- P Proposed Parking Area
- Bus Route
- Bus Stop (letter signifies bus route)
- 🚩 Schools
- 🏠 National Register Sites
- 🌳 Kingston Heritage Areas
- 🏡 Vacant Parcels





Trailhead, community garden and access at park.

Typical grade crossing along the trail at each neighborhood street.

Replace railroad ties with bridge deck on three trusses. Install fencing or guiderail to protect users from steep side slopes.

Ramp or stair access to elevated trail if access can not be provided at grade across the vacant parcel.

Further investigate potential access to Hasbrouck Park.

Potential future access to Trolley Museum.

Ramp down to grade across vacant parcel.

Access to Trolley Museum.

Widen sidewalk to 8 feet. Will require use permit from NYSDOT.

Trail head at public parking area with marked road crossing and map/ kiosk.

- Proposed Kingston Point Rail Trail
- Trail Crossing Improvements
- Proposed Fence
- Proposed Drainage
- 🚶 Proposed Trailhead
- P Proposed Parking Area
- Bus Stop (letter signifies bus route)
- Bus Route
- Operating Trolley Line
- ▭ Parks
- ▭ National Register Sites
- ▭ Vacant Parcels
- ▭ Kingston Heritage Areas

4.2 Cross Section

4.2.1 Trail Cross Section

The trail will be 10 feet wide to safely accommodate pedestrians and bicyclists traveling in both directions. A two foot shoulder will be provided on either side of the trail. An 8 to 10 foot vertical clearance also needs to be maintained. Where the railroad ballast has been maintained, this can be utilized as a partial base. The asphalt layer should have a 1.5" thick leveling course and a 1.5" thick wearing course, on top of 6" of compacted stone base.

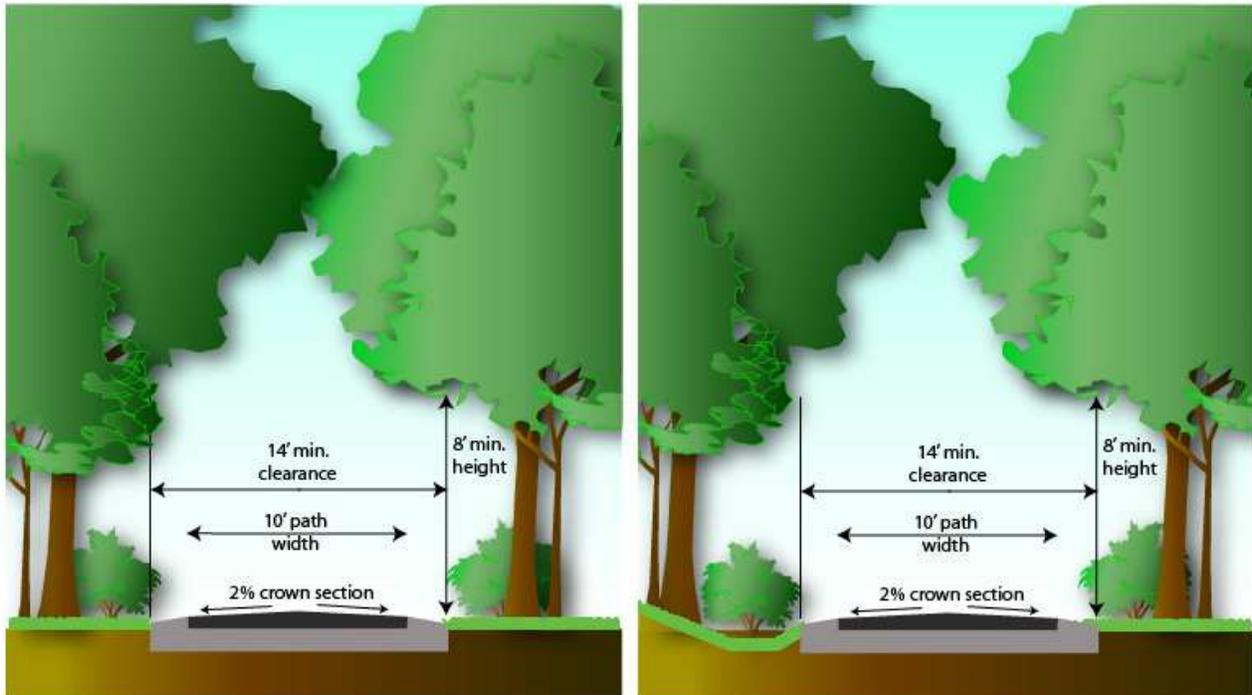


Figure 26 - Kingston Point Rail Trail Cross-sections

4.2.2 Bridge Decks

The railroad ties on the three bridge trusses near the Rondout Apartments will need to be removed. The steel appears to be in good condition and a new concrete deck can be placed on top of the steel girders. The 10' wide path should be continued across the structures with a 2' clearance to the bridge railings on either side. The current bridge railings may need to be modified to meet the 42" height requirement. A wood plank alternative can also be used. Wood is less expensive than concrete; however, it does not last as long or have the same smooth finished surface as concrete.

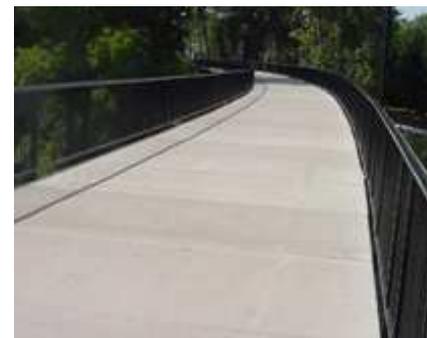


Figure 25 - Concrete deck panels on Union St Bridge, Portland, OR

4.3 Drainage

In the area of the tunnel and along Murray Avenue, the slope of the trail and surrounding topography create drainage issues within the railroad bed. This can be resolved by installing infiltration swales or

pipes just outside the trail shoulder. Infiltration swales, or grassed swales, should have a 3:1 side slope with a minimum of a 2 foot base width. The depth needed to retain the stormwater along the trail corridor should be determined during detailed design. Swales should be located on the uphill side of the trail, where possible. In locations where there is a downward slope towards the trail on both sides, two swales can be installed or water can be piped under the trail periodically. In areas where slopes are steeper, greater than 3%, check dams should be used to slow the flow of water and allow for infiltration. At low points, additional plantings should be used to absorb additional water.

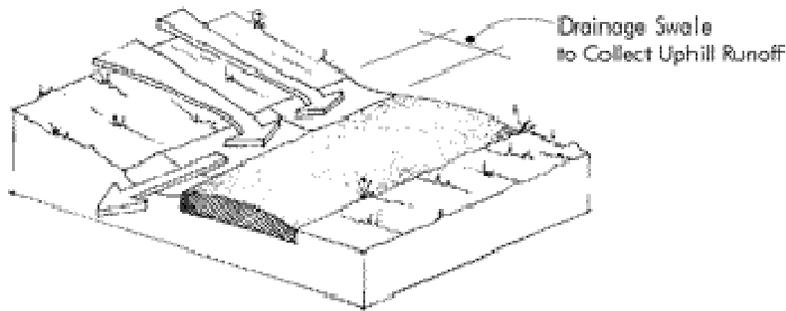


Figure 28 - Drainage swale detail



Figure 27 - Example of a grass swale

Existing soil and water table conditions will need to be analyzed further to ensure that infiltration swales will be appropriate for this area. Other infiltration facilities, such as wet swales or strategically placed dry wells, can also be used in place of grassed swales. Stormwater can also be piped to existing stormwater facilities along the roadways. These facilities, along with the NYSDOT Route 9W Railroad Bridge scuppers will need regular maintenance in order to remain effective.

Porous asphalt, while more expensive, can also be used to reduce drainage issues along the trail by allowing water to infiltrate through the asphalt and stone base. It is important to note that if this trail is to be plowed for winter walking and bicycling use, porous asphalt cannot be sanded or salted. Ice, however, is much less common on porous asphalt.

4.4 Trail Access and Trailheads

Five trailhead locations have been identified. Conceptual designs for each of these trailheads are shown on the following pages. The first trailhead will be located at the intersection of Chester Avenue and Jansen Avenue at the public parking area. The second trailhead will be located at the intersection of Delaware Avenue and Livingston Avenue. Alternatively, a trailhead can be located on Delaware Avenue near the intersection of the Route 9W on-ramp. The third trailhead will be located at the intersection of Delaware Avenue and Murray Avenue, where a pocket park can be created. An agreement with the parking lot owner to provide parking for trail users should be considered. A fourth trailhead will be located at the park near the intersection of Murray Avenue and Route 9W. The fifth trailhead will be located at the trail terminus, the public parking area at Rondout Landing.

Two access trails will allow both the JFK School and Kingston High School to also become trailhead locations. The JFK School access can be developed as a spur trail. Access to the Kingston High School

would be in the form of on-road bicycle and pedestrian accommodations. Although Jansen Avenue is the extension of the railroad corridor, this extension does not provide access to the High School. An on-road connection using Broadway is the most effective way to provide this link. Sidewalks already present on both sides of Broadway. On-road bicycle accommodations should be provided in the form of shared lane markings and share the road signage. The City of Kingston should consider removing on-street parking on one side of the street in this area to provide dedicated bicycle lanes.

Trailhead amenities should include parking and signage. Other additional features will promote the trail and provide amenities to trail users. These include:

Trail map / kiosk

- Interpretive signage
- Picnic tables
- Water fountains
- Trash cans
- Dog stations



CHESTER STREET

EXISTING
PARKING

SEPARATE TRAILHEAD AREA
FROM ADJACENT PROPERTIES
WITH SPLT-RAIL FENCE

PEDESTRIAN LIGHT

BIKE RACKS

HC ACCESSIBLE

CURB

HANDICAP ACCESSIBLE
PICNIC TABLE

WATER FOUNTAIN

PEDESTRIAN LIGHT

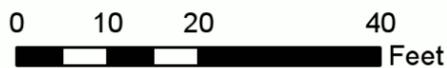
JANSEN AVENUE

SECONDARY ACCESS

TRASH AND

DOG STATION

Kingston Point Rail Trail Engineering Study, Kingston, NY
- Chester Street at Jansen Ave Trailhead -







PROVIDE SAFE CROSSING ZONE

DELAWARE AVENUE

NEIGHBORHOOD PARK WITH FOUNTAIN OR SCULPTURE

BENCH

PEDESTRIAN LIGHTS

TRASH AND DOG STATION

MAP AND INFORMATION SIGNS MOUNTED TO LIGHT

FOUNTAIN

BIKE RACK

PROVIDE DIRECTIONAL SIGNAGE TO JFK ELEMENTARY SCHOOL

MURRAY STREET

PROVIDE SAFE CROSSING ZONE





RAIN GARDEN

COMMUNITY GARDEN

SIDEWALK TO CONTINUE THROUGH DRIVEWAY

MURRAY STREET

MAP AND INFO KIOSK

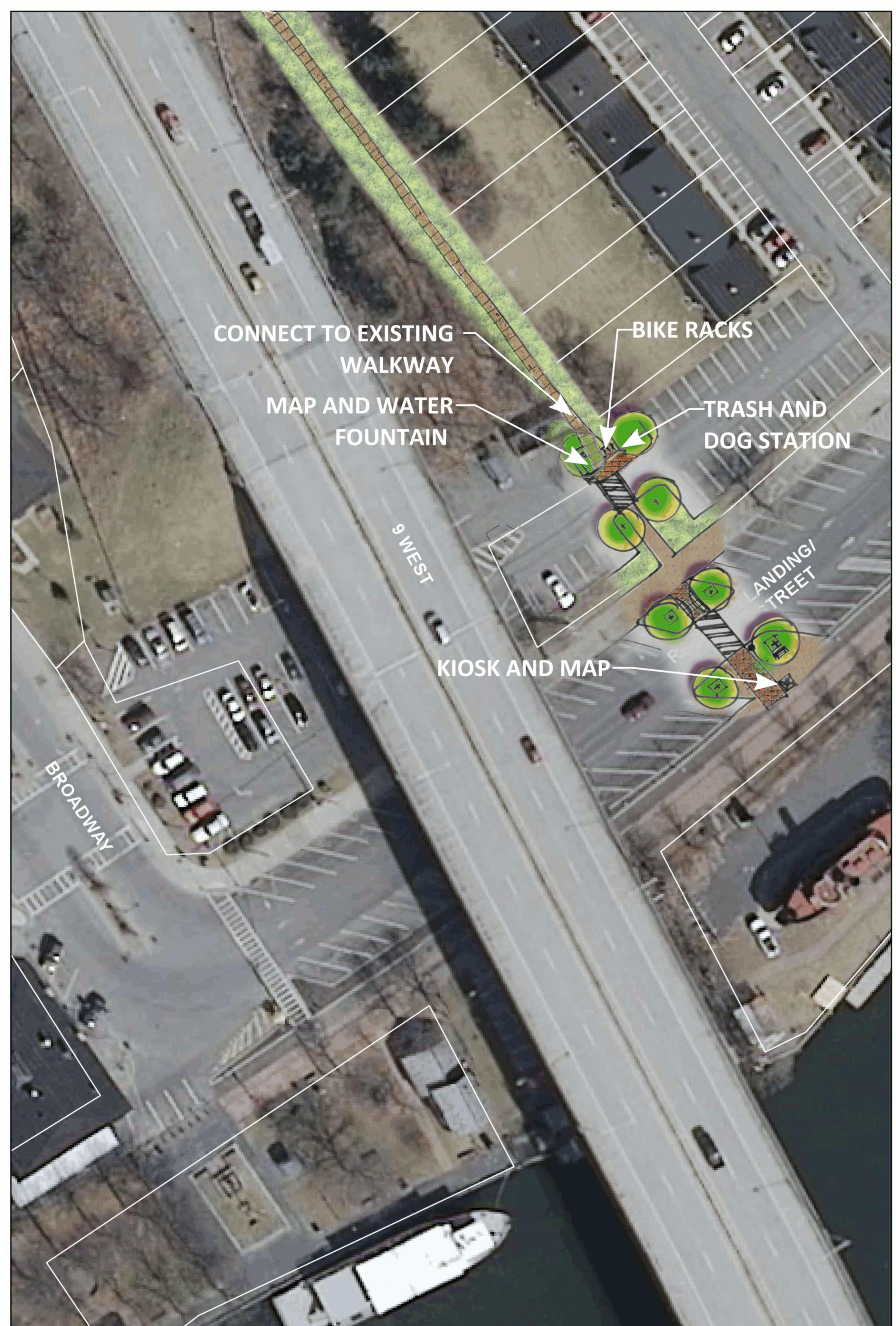
RONDOUT DRIVE

WATER FOUNTAIN WITH HOSE BIB FOR GARDEN NEEDS

BIKE RACK, TRASH AND DOG STATION BENCHES

SITTING AREA WITH BENCHES, TROLLEY LINE LIGHTS, TRASH, ETC.

9 WEST



CONNECT TO EXISTING
WALKWAY

MAP AND WATER
FOUNTAIN

BIKE RACKS

TRASH AND
DOG STATION

9 WEST

KIOSK AND MAP

LANDING/
TREET

BROADWAY



4.5 Trail Crossings

There are ten at-grade roadway crossings along the trail alignment. Sight distance is sufficient at a majority of the corridor at-grade crossings. Vehicle volumes are also low allowing for adequate gaps in traffic for those crossing the trail. All crossings need to include a marked crosswalk, crosswalk warning signs, trail stop signs. A trail barrier can be added if there is a concern with vehicles using the path. Additional features, such as in road “yield to pedestrian” signs, speed tables, and hawk signals will increase driver awareness of trail users, calm traffic, and increase crossing safety.



www.pedbikeimages.org / Dan Burden

Figure 29 - Speed Table Crosswalk



Figure 30- Sight distance to the north at Delaware Avenue

Three trail crossing concepts are illustrated. The first is the crossing at Delaware Avenue near the Route 9W interchange. There is currently no crosswalk located at this intersection. The trail alignment should be adjusted to travel through the NYSDOT right-of-way to cross at the intersection. Pedestrian signals should be installed with a crosswalk. The channelized right turn lane currently allows vehicles to pass through the intersection at high speeds and should be considered for removal. This intersection treatment is shown in Figure 7.

The crossings through the residential neighborhoods are mid-block crossings on roadways that already encourage higher speeds. High visibility crosswalks that include speed tables are strongly encouraged at each of these crosswalks. Speed tables are proven to reduce speeds by 3 mph, greater in some instances. Warning signs for the crossings need to be provided for both motorists and trail users. It is also important to clear vegetation surrounding these crossings to provide adequate sight distance of 300 feet or more. The same intersection treatment shown in Figure 8 for Second Avenue should be used at all remaining crossings.

Additional emphasis is placed on the crossings at Delaware Avenue and Murray Avenue. To stay within the right-of-way and maintain the alignment of the railroad line, these crossings are at a skewed angle and not perpendicular to the roadway. For this reason, the speed tables proposed are wider. This will encourage vehicles to slow down even more, providing safer conditions within close proximity to the school.

Trail Crossing Option 1 Delaware Ave @ 9W Ramp

Potential Conflicts

- vehicles may exceed speed limit on Delaware Avenue due to proximity to highway
- free right hand turn on Delaware Avenue encourages faster speeds for right turning vehicles

Recommendations

- install crossing as shown. Use high visibility continental style crosswalks, ADA accessible pedestrian ramps, tactile pads, and pedestrian countdown signals with accessible pedestrian signals (APS)
- make intersection alignment improvements as shown. Remove pork chop and free right hand turn, and reduce turning radius to 60' to maintain bus and truck access while reducing speed and improving crossing safety
- install turning vehicles yield to pedestrians sign prior to intersection on Delaware Ave (MUTCD R10-15)
- install bicycle and pedestrian crossing sign ahead of intersection on Delaware Ave (MUTCD W11-15)
- route trail to crossing as shown. Add fence where shown to prevent crossing in undesignated areas

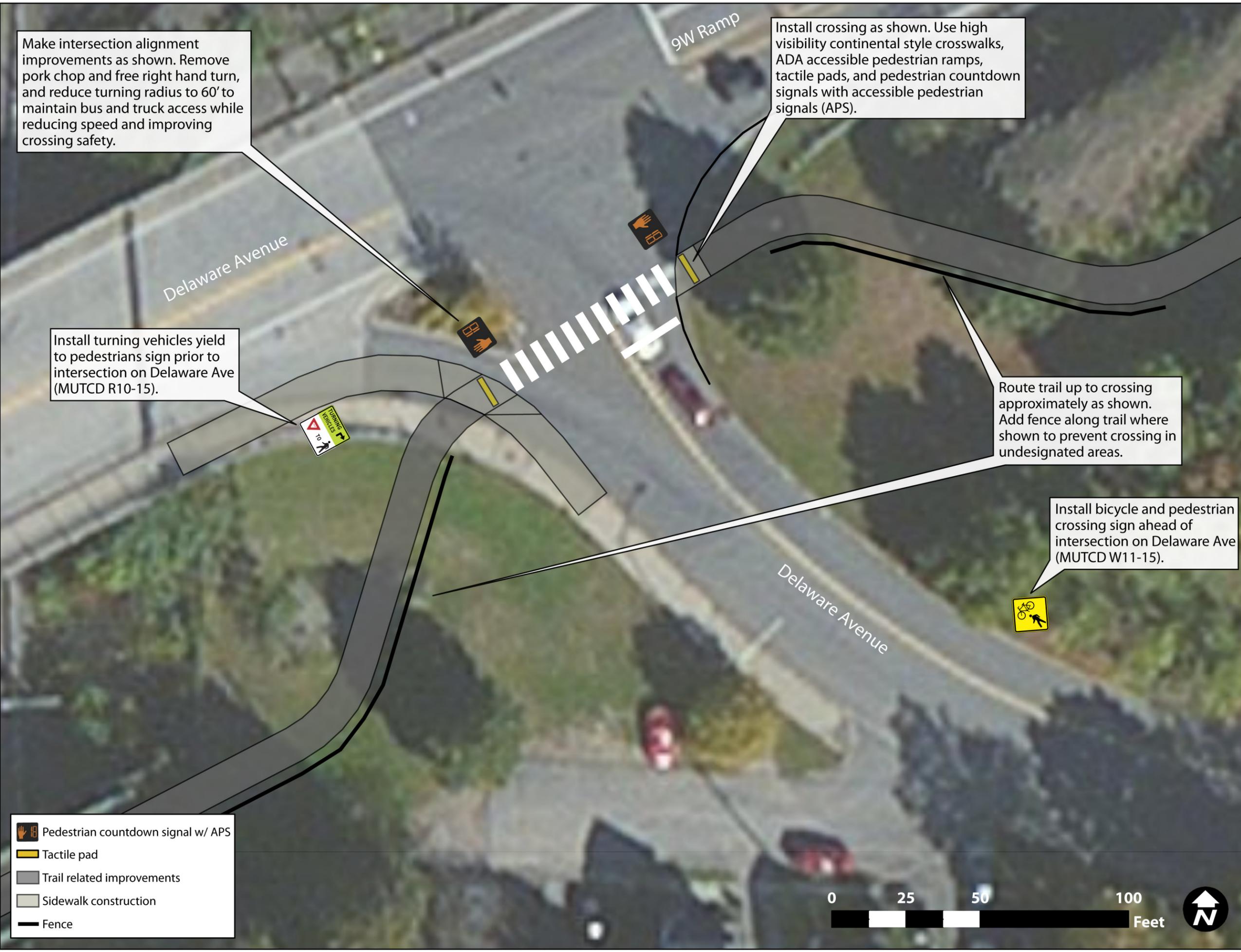
Make intersection alignment improvements as shown. Remove pork chop and free right hand turn, and reduce turning radius to 60' to maintain bus and truck access while reducing speed and improving crossing safety.

Install turning vehicles yield to pedestrians sign prior to intersection on Delaware Ave (MUTCD R10-15).

Install crossing as shown. Use high visibility continental style crosswalks, ADA accessible pedestrian ramps, tactile pads, and pedestrian countdown signals with accessible pedestrian signals (APS).

Route trail up to crossing approximately as shown. Add fence along trail where shown to prevent crossing in undesignated areas.

Install bicycle and pedestrian crossing sign ahead of intersection on Delaware Ave (MUTCD W11-15).



Kingston Point Rail Trail Engineering Study

City of Kingston, NY
Authors: JC/LZ
1"=30'
October 2012



Trail Crossing Second Ave

Potential Conflicts

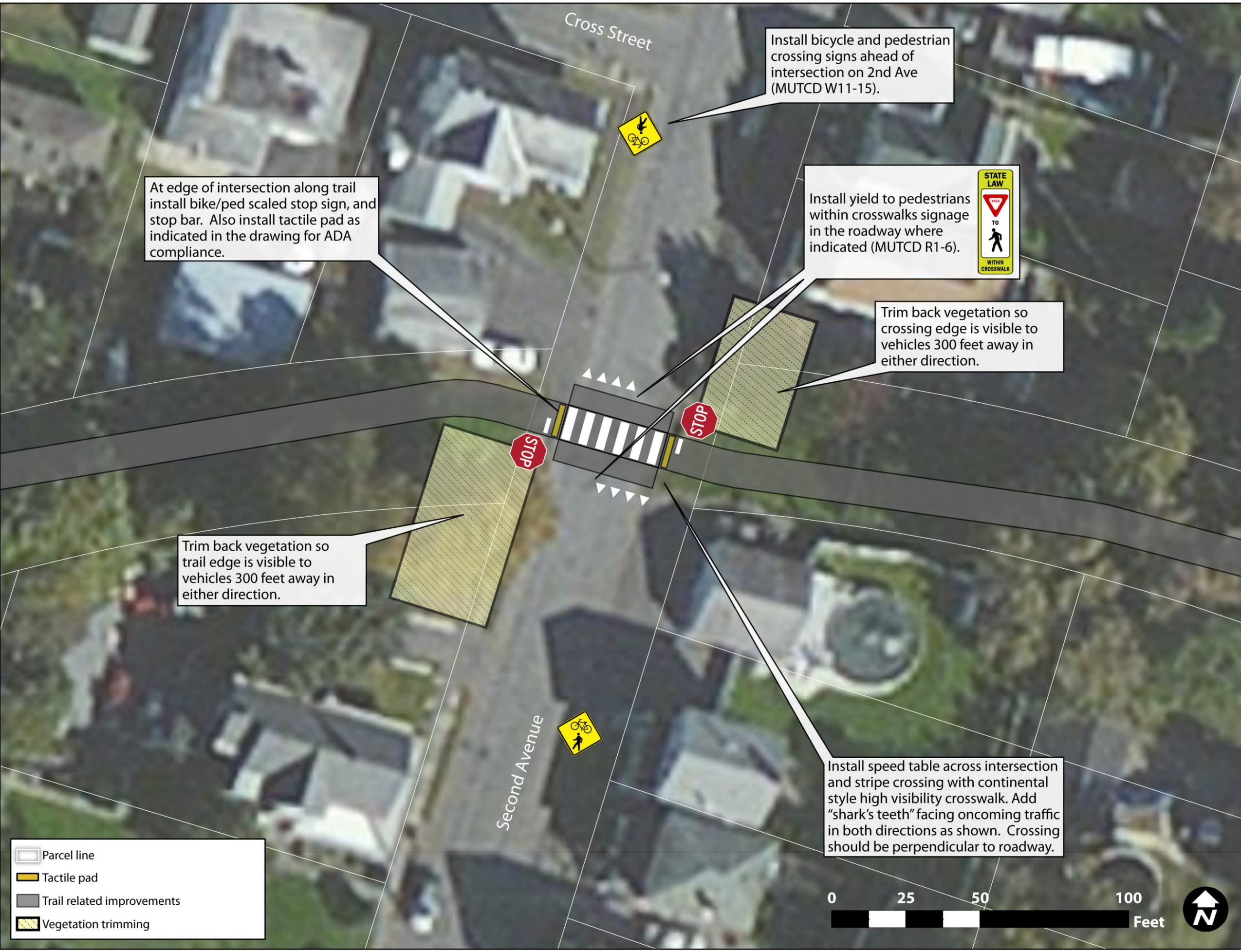
- vehicles may exceed speed limit on neighborhood street due to long, straight, uninterrupted corridor
- vehicular visibility may be limited due to vegetation
- vehicles may not be expecting mid-block crossing if visual indicators are not present

Recommendations

- install ADA compliant pedestrian ramp at indicated crossings
- trim back vegetation so trail edge is visible to vehicles 300 feet away in either direction
- Install speed table across intersection and stripe crossing with continental style high visibility crosswalk. Add "shark's teeth" facing oncoming traffic in both directions as shown. Crossing should be perpendicular to roadway
- at edge of intersection along trail install bike/ped scaled stop sign, and stop bar. Also install tactile pad as indicated in the drawing for ADA compliance
- install bicycle and pedestrian crossing signs ahead of intersection on 2nd Ave (MUTCD W11-15)
- install yield to pedestrians within crosswalks signage in the roadway where indicated (MUTCD R1-6)

Kingston Point Rail Trail Engineering Study

City of Kingston, NY
Authors: JC/LZ
1"=30'
October 2012



At edge of intersection along trail install bike/ped scaled stop sign, and stop bar. Also install tactile pad as indicated in the drawing for ADA compliance.

Install bicycle and pedestrian crossing signs ahead of intersection on 2nd Ave (MUTCD W11-15).

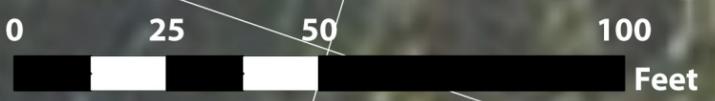
Install yield to pedestrians within crosswalks signage in the roadway where indicated (MUTCD R1-6).

Trim back vegetation so crossing edge is visible to vehicles 300 feet away in either direction.

Trim back vegetation so trail edge is visible to vehicles 300 feet away in either direction.

Install speed table across intersection and stripe crossing with continental style high visibility crosswalk. Add "shark's teeth" facing oncoming traffic in both directions as shown. Crossing should be perpendicular to roadway.

- Parcel line
- Tactile pad
- Trail related improvements
- Vegetation trimming



Trail Crossings

Delaware Ave and Murray

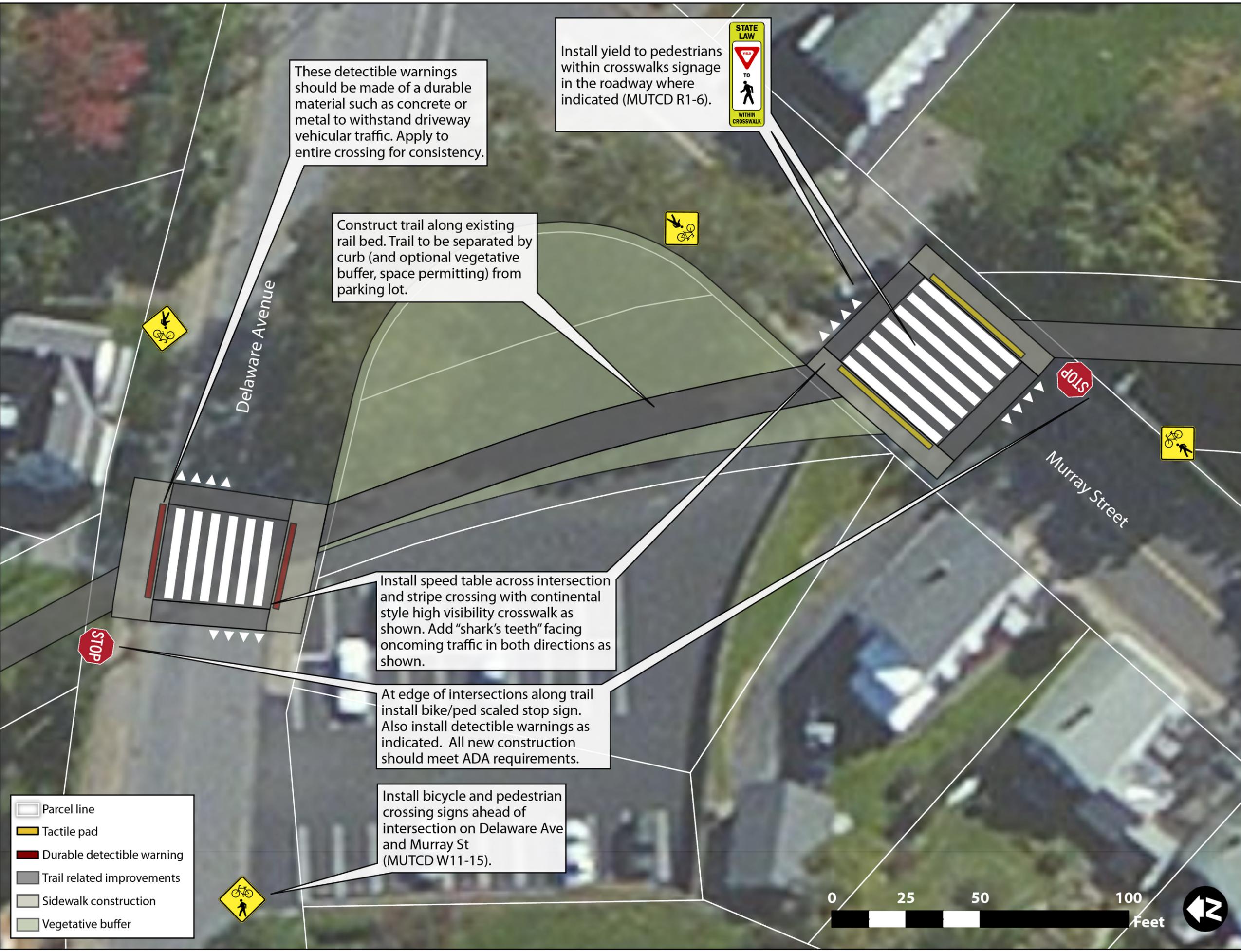
Option 1

Potential Conflicts

- vehicles may exceed speed limit on Murray St due to long, straight, uninterrupted corridor.
- vehicles may not be expecting mid-block crossing if visual indicators are not present

Recommendations

- ensure crossing is ADA compliant
- install speed table across intersections and stripe crossing with continental style high visibility crosswalk as shown. Add "shark's teeth" facing oncoming traffic in both directions as shown.
- at edge of intersections along trail install bike/ped scaled stop sign. Also install tactile pads as indicated.
- install bicycle and pedestrian crossing signs ahead of intersection on both roadways (MUTCD W11-15)
- install yield to pedestrians within crosswalks signage in the roadway where indicated (MUTCD R1-6)
- construct trail related improvements as indicated in callouts
- detectible warnings at Delaware Ave should be made of a durable material such as concrete or metal to withstand driveway vehicular traffic. Apply to entire crossing for consistency.

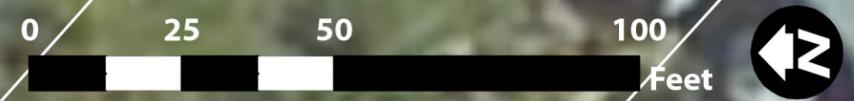


Kingston Point Rail Trail Engineering Study

City of Kingston, NY
 Authors: JC/LZ
 1"=30'
 October 2012



- Parcel line
- Tactile pad
- Durable detectible warning
- Trail related improvements
- Sidewalk construction
- Vegetative buffer



4.6 User Safety

The tunnel creates an isolated area with no existing egress or ingress for over 800 feet. The Tunnel itself is over 230 feet, with no available lighting. Safety concerns can be mitigated through this section by providing additional stair access at Livingston Avenue, lighting, and an emergency blue light phone.

The tunnel extension on the south side of Delaware avenue can be removed to 'day-light' this portion of the tunnel. This can increase user comfort, reduce the need for lighting, and reduce security concerns. This also provides additional interest for the trail, making the original portions of the tunnel visible from the park and trailhead.

Vegetative screening is already present in much of the residential neighborhoods, providing both security and privacy for neighbors of corridor. Much of this screening can and should be maintained.

Fencing along steep slopes leading down the railroad corridor will need to be maintained or replaced. If the distance between the trail and a slope of 1:3 or greater is less than 5', fencing should be installed to protect trail users. Fencing should be a minimum of 42" in height. Chain link fencing can be used or decorative fencing, with horizontal elements excluded to prevent climbing.



Figure 31 - Blue light phone

4.7 Adjacent Uses



Figure 32 - Residential properties along ROW

A majority of the adjacent land along the corridor is developed. The northern section and the southern termini are located in commercial districts. The majority of the corridor travels through residential neighborhoods. The corridor is screened by natural vegetation. Clearing and grubbing should be limited to the immediate corridor to maintain as much of this natural barrier as possible. Clearly defined and well placed access trails will prevent the development of cut-through paths and breaks in the screening.

Trail oriented development should be strongly considered. There are various areas with commercial uses. Businesses should be encouraged to provide access directly to and from the trail. Incentives for uses such as bike shops and cafes that complement the trail can also be considered.

4.8 Trolley Use

Integrating Trolley Use

Trolleys played an important role in the development of the Hudson Valley, and are of notable historical significance in the City of Kingston, the history of which is celebrated at the Trolley Museum. There is potential to reintroduce trolley service into this corridor in the future, jointly with the shared use trail. There are a multitude of examples of trolley cars that operate on streets across American, from San

Francisco, CA to Charlotte, SC. There are fewer examples of trolley cars that operate along shared use trails, but of these examples, all have been very successful. There are two primary options for integrating a trolley service into the trail way: 1. Running a trolley rail line adjacent to trail, and 2. Running a trolley bus on the trail itself.

4.8.1 Rail-Trolley with Trail

Trail with Rail involves the construction of a shared used path, and adjacent to the path, the operation of a rail line. There are many successful case studies where trails have been added along active railroad corridors. Due to the large size and speed of trains, these rail-trail corridors require a larger distance between the two uses, and sometimes, fencing and grade differentials between the railway bed and the trail. These features require significant investment in planning, time, and financial resources. These guidelines are outlined in the FHWA's *Rails-with-Trails: Lessons Learned*. Trolleys, alternatively, are smaller than rail cars and travel much slower. Therefore, the separation between the two uses does not need to be as intense.

In Astoria, Oregon, the Astoria Riverfront Trolley provides a trolley service immediately parallel to a shared-use path, with no fencing and only a small buffer separating the two uses. . The trolley runs daily from noon to 7:00 p.m., and travelers pay a nominal fee to climb aboard for the one-hour ride. The cross-section of the corridor, illustrated below, is a 10' path and a 10' railroad bed, with 2-3' buffer separating the rail line from the trail, for a total cross section of 22-23 feet. The existing right of way for the Kingston Point Rail Trail is 35-45 feet, a distance that is more than sufficient to accommodate both a shared use path and trolley line. This option provides dedicated space for trail users as well as transit riders, providing the least conflict and highest degree of safety of the two options presented.



Figure 33 - Astoria Riverfront Trolley

The Astoria Riverfront Trolley serves as a case study to illustrate the successful implementation of a trail with an adjacent trolley that has minimal separation between the two uses. If this option is pursued, intersections should be analyzed individually and properly signed and lighted to indicate to motorists, pedestrians and bikers of all rail crossings. Also, the distance between the rail and trail should conform to any and all local regulations, including but not limited to, fencing, bollards, or other means to formally separate the two uses, if such standards exist.

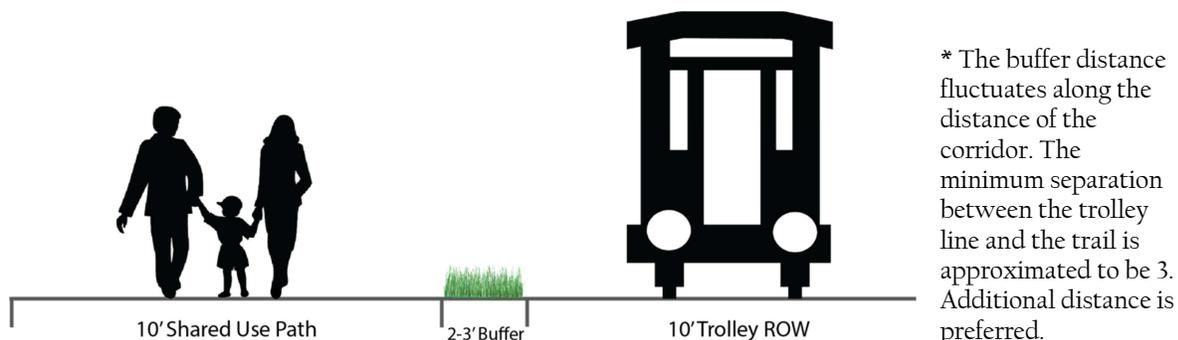


Figure 34 - Astoria Riverfront Trolley cross section

“We walked most of the trail, down to Pier 39, and then picked up the trolley for the ride back. You can ride as much as you want for just a buck — a bargain — and the volunteers who run it tell stories about the history of the waterfront as it rumbles and creaks along the rusty rails.” - Trolley and Trail user

Table 3: Rail-Trolley with Trail	
Positives	Negatives
Low degree of separation between the trail and trolley	The cost of reconstructing and maintaining the rail line
Consistent with the historical legacy of Kingston’s trolley service	Several key bridge crossings will need to be widened to accommodate both a rail and adjacent trail or alternative routes will need to be found
Will provide a unique and memorable way to travel along the trailway	Signage and lighting would need to be installed at all at grade crossings
Provides mobility impaired trail users with another option to travel	Rail could produce unwanted noise for property owners near the trail
	Bridges will need to be able to carry both the trail and trolley loads



Figure 35 - Astoria Riverfront Trolley

4.8.2 Bus – Trolley with Trail

Another option for consideration would be running a bus trolley on the shared use path itself. This also provides the ability to provide service beyond the trail. There are two known examples of this type of service from which the City can draw best practices.

The George S. Mickelson Trail in Leas, South Dakota, a non-motorized shared use path, offers several opportunities for handicapped trail users to experience the trail during its high season. Five times yearly the Trolley on Trails Program provides trolley service directly on the shared use path to those with limited mobility. The Mickelson Trail office was contacted to ask how conflicts with oncoming non-



Figure 36 - Trolley on the Trails Program

motorized travelers were handled, and the trail representative said that the trail users move aside and let the trolley pass, saying that “there have not been any major issues.” She noted that this is a very popular service, and is provided free of charge to those with a handicapped parking permit. The trail ranges in width from 10-12 feet, and the trail surface varies from paved to crushed stone.



Figure 37 - Historical Trolley Tour

Making Trolley-Bus Service an Annual Event

For the past nine years, the non-motorized Ironton Rail Trail in Whitehall, Pennsylvania has hosted the *Annual Historical Trolley Tour*. On the day of the event the trolley-bus departs every hour. The trolley travels directly upon the surface of the shared-use trail, over both paved and unpaved surfaces. It travels slowly, and non-motorized trail users are permitted to follow the trolley.

Table 4: Bus- Trolley Trail	
Positives	Negatives
Cost effective way to integrate trail use and trolley service	Would pose conflicts with non-motorized trail users
Emissions free electric busses could be used, that are both environmentally friendly and quiet – so as not to disturb adjacent property owners	The trail should be widened to a minimum of 14 feet for more regular trolley use, to allow safe passage of trail users
Provides mobility impaired trail users with another option to travel the trail	May only be feasible as an infrequent “special circumstance” service
	Bridges will need to be able to carry both the trail and bus-trolley loads



Figure 38 - Ironton Rail Trail

5 Implementation Plan

The KPRT Implementation Plan outlines the steps needed to build the trail through the City of Kingston. Required permits and approvals are considered, along with the planning-level costs for implementing the conceptual design outlined in Technical Memo 3. Maintenance tasks are also described in detail. Funding sources are identified on federal, state and local levels.

5.1 Implementation Steps

1. **Public Support:** The first step to implementing the Kingston Point Rail Trail is to gather public support. The Kingston Land Trust has already formulated a strong committee in support of the trail. Committee members and volunteers should continue their efforts to clean and clear the corridor. The trail is already in use by some residents which may encourage additional funding to resolve safety concerns as soon as possible.
2. **Funding:** The Kingston Land Trust should utilize this existing study and conceptual plan to apply for federal, state, local, and grant funding. Additional information regarding funding sources is included in section 1.6.
3. **Detailed Design:** A detailed design of the trail, to the level of construction documents, should be developed. This will include details for modifying the tunnel and rehabilitation of the bridges along the trail corridor. Coordination between the City of Kingston and the funding agency will determine whether or not a full survey is warranted to implement the trail. The funding source(s) will help to determine the level of documentation that will be required. For example, funding through NYSDOT may require a design report.
4. **Permits:** Several permits and approvals will be required to implement the trail. Approvals will be required by the City of Kingston and NYSDOT. Additional permits or approvals may be warranted if dictated by the funding source.
5. **Construction:** Trail construction will be fairly straightforward, requiring grading, compaction, and paving. Asphalt trails are often constructed by local departments of public works. Bridge and tunnel repairs and improvements will more than likely require a contractor. Depending on funding, it could be just as cost effective to bid the project as a whole.
6. **Performance Measures:** In addition to trail maintenance, there are several other activities that can be beneficial. A trail website and events will promote the trail and encourage more users. User counts, area economics, land uses, and land values should be examined annually or biannually to continue to evaluate the benefits of the trail. This type of information can help to gain additional support and funding for improvements to the KPRT and other local trail projects.

5.2 Permits

NYSDEC does not require a full Stormwater Pollution Prevention Plan, only an Erosion and Sediment Control Plan during construction for trails. The City of Kingston has been designated as an MS4 region and has jurisdiction over these requirements. A Use and Occupancy Permit will need to be obtained for several portions of the trail from NYSDOT - Office of Right of Way. This permit can be obtained by submitting the design to NYSDOT for approval.

5.3 Cost Estimates

Planning level cost opinions associated with the Kingston Point Rail Trail are presented in the tables below. Cost opinions are based on the NYSDOT pay item catalog and costs of similar projects in New England. Design and contingency costs have also been included. If funding to replace the bridge decks is not available, the Kingston Land Trust should consider working with NYSDOT to widen the existing sidewalk into a shared-use path for an extended section of Route 9W, approximately 1000 feet. This would reduce the overall cost of the project by approximately \$400,000.

Table 5: Trail Costs			
Item	Quantity	Price	Cost
Asphalt trail	79200 SF	\$1.5	\$118,800
Stone base	79200 SF	\$0.6	\$47,520
Drainage	LS	\$30,000	\$30,000
Bridge Decks	3600 SF	\$100	\$360,000
Bridge railings	600 LF	\$100	\$60,000
Structural Repairs	3 EA	\$20,000	\$60,000
Tunnel modifications	LS	\$50,000	\$50,000
Blue light phone	1 EA	\$3,000	\$3,000
Stairs	1 EA	\$3,000	\$3,000
Cross walks	2 EA	\$750	\$1,500
Speed tables with crosswalks	6 EA	\$3,000	\$18,000
Fencing	300 LF	\$15	\$4,500
Pedestrian Gates	2 EA	\$200	\$400
Lighting (inc. wiring)	4 EA	\$2,400	\$9,600
On-road bicycle accommodations	1600 LF	\$1	\$1,600
Signs	36 EA	\$300	\$10,800
10% Detailed Design			\$77,872
10% Mobilization/Traffic Mngt			\$77,872
20% Contingency			\$155,744
Total			\$1,090,208

Table 6: Trailhead Costs			
Item	Quantity	Price	Cost
Benches	16 EA	\$1,200	\$19,200
Map sign	6 EA	\$2,700	\$16,200
Picnic Tables	9 EA	\$800	\$7,200
Bike Rack	6 EA	\$1,500	\$9,000
Shade Trees	22 EA	\$800	\$17,600
Flowering/ Fruit trees	10 EA	\$375	\$3,750
Dog Station	7 EA	\$500	\$3,500
Water Fountain	6 EA	\$4,200	\$25,200
Trash Receptacle	10 EA	\$800	\$8,000
Tree grates	2 EA	\$2,500	\$5,000
Decorative paving	1300 SF	\$14	\$18,200
Concrete	8300 SF	\$10	\$83,000
Fountain	2 EA	\$50,000	\$100,000
Lighting (inc. wiring)	22 EA	\$2,400	\$52,800
Access Trail Improvements (JFK)	LS	\$8,000	\$8,000
Pavilion	1 EA	\$35,000	\$35,000
Access trail (Livingston)	950 LF	\$14	\$13,300
Curb	300 LF	\$18	\$5,400
Kiosk	1 EA	\$4,000	\$4,000
Split Rail Fence	180 LF	\$15	\$2,700
10% Detailed Design			\$43,705
10% Mobilization			\$43,705
20% Contingency			\$87,410
Total			\$611,870

5.4 Maintenance

If the system is well maintained and cared for, it will assure both the safety and enjoyment of the residents and visitors who use it. A proper maintenance program will reduce long-term costs by extending the life of the components and it will also win the continued support of the residents, homeowners, and businesses.

Routine maintenance refers to the day-to-day regimen of litter pick-up, trash and debris removal, weed and dust control, trail sweeping, sign replacement, tree and shrub trimming, and other regularly scheduled activities. Routine maintenance also includes minor repairs and replacements such as fixing cracks and potholes or repairing a broken section of fence. Major maintenance includes regularly scheduled improvements and upgrades to the shared-use path system. Following is a summary of typical recommended routine maintenance tasks:

5.4.1 Trails and Trail-Related Corridors

- Inspection
- Trail surface maintenance/sweeping
- Snow removal and grooming
- Vegetation management
- Litter and trash removal
- Graffiti and vandalism control
- Repairing trail structures/erosion
- Maintaining rest areas, shelters, and water stations
- Remedy “social trails” (also known as shortcuts, demand trails)
- Maintain connecting on-street and sidewalk routes
- Patrol, security, enforcement, and safety hazard reduction
- Accident and incident data tracking

5.4.2 Trailheads and Amenities

- Inspection and citizen response
- Mowing/vegetation/pest management
- Litter and trash removal
- Graffiti and vandalism control
- Fixture repair
- Parking lot repair

5.4.3 Seasonal Management Issues

Specific concerns include winter trail grooming, freeze/thaw cycles, spring runoff of sand and gravel at trail/roadway sections, and flooding conditions in both spring and summer. These concerns are combined with a limited construction and maintenance season that limits trail projects to approximately six months of the year. These issues can also be seen as opportunities, especially since residents and visitors are able to enjoy the bikeways and trails in different ways, with a variety of experiences throughout the seasons. Consideration should be made to either:

- Plowing the trail during the winter months, which would require that bridges be designed for safe vehicle passage
- Do not plow the trail and leave it open for snow shoeing or groom for cross country skiing

5.4.4 Risk Management

All public facilities require a careful effort to maximize public safety and minimize exposure to liability. For Kingston Point Rail Trail high-quality design, ongoing maintenance, and existing municipal liability protection provided by the City’s policies all minimize liability exposure. New sections of trails generally do not add significantly to liability insurance since these policies are generally written based on land area, and recommended facilities are on long, narrow corridors of public rights-of-way that do not account for significant acreage when compared to larger public lands and facilities. However, the best practice to minimize potential legal actions is to manage trail in a coordinated program that identifies safety issues and acts to remedy them efficiently.

Risk management recommendations include:

- Implement an emergency response protocol working with law enforcement, EMS agencies, and fire and rescue department that includes mapping of trail and open space access points, design of trail, and an “address system” such as mile markers to identify locations. These trail markers are not included in the current cost estimate. Costs vary depending on size and materials.
- Implement a database management system in cooperation with law enforcement agencies for tracking specific locations and circumstances of all crashes, crime incidents, and safety reports, and create a safety follow-up task force to address any problems that develop.
- Routinely inspect for safety hazards, defective structures, missing safety signs, etc.
- Post and enforce safe user behavior and pathway speed limits in congested areas.
- Trim trees/brush/tall grass to address sight distance issues.

Maintaining good relations with adjacent property owners involves:

- Providing contact information for reporting problems.
- Maintaining facilities regularly.
- Distributing or publish maintenance schedule.
- Responding to illegal or disturbing activity quickly.
- Meeting periodically with neighbors and providing other feedback means.
- Responding promptly and effectively to complaints, concerns and suggestions.¹

5.4.5 Performance Measures

Performance measures are a means of gauging the effectiveness the trail. They can be used to evaluate progress towards adopted goals. The performance measures should be based on the following principles:

- A process that is policy-driven and can be supported by data.
- The measures reflect the users’ experience on the system.
- The results are understandable to the general public.
- The application of the performance measures to programs and projects result in data that can be projected into the future.

The key to a successful benchmarking program is to have data that can be collected within the available resources, that is consistently available over time, and is reported in a format that allows year-to-year comparisons. With careful planning, the data system can serve as a core tool for system management in the long term, both to track performance and to ensure that resources are available and well managed.

Performance measures can be collected through user counts, user surveys, land use, and land values. Vehicle miles traveled and vehicle counts on adjacent streets can also help to determine if vehicle trips are being replaced by trail use.

5.5 Funding Opportunities

The following section outlines sources of funding for bicycle and pedestrian projects in New York State. Federal, state, local, and private sources of funding are identified. The following descriptions are intended to provide an overview of available options and do not represent a comprehensive list. Funding sources can be used for a variety of activities, including: planning, design, implementation and maintenance. It should be noted that this section reflects the funding available at the time of writing. The

¹ Source: Flink, Searns and Olka—Trails for the 21st Century

funding amounts, fund cycles, and even the programs themselves are susceptible to change without notice.

Federal transportation funding is typically directed through state agencies to local governments either in the form of grants or direct appropriations, independent from state budgets. Federal funding typically requires a local match of 20%, although there are sometimes exceptions, such as the recent American Recovery and Reinvestment Act stimulus funds, which did not require a match.

The following is a list of possible Federal funding sources that could be used to support construction of many pedestrian and bicycle improvements. Most of these are competitive, and involve the completion of extensive applications with clear documentation of the project need, costs, and benefits. However, it should be noted that the FHWA encourages the construction of pedestrian and bicycle facilities as an incidental element of larger ongoing projects. Examples include providing paved shoulders on new and reconstructed roads, or building sidewalks, on-street bikeways, trails and marked crosswalks as part of new highways.

5.5.1 Moving Ahead for Progress in the Twenty-First Century (MAP-21)

The largest source of federal funding for bicycle and pedestrian is the US DOT's Federal-Aid Highway Program, which Congress has reauthorized roughly every six years since the passage of the Federal-Aid Road Act of 1916. The latest act, Moving Ahead for Progress in the Twenty-First Century (MAP-21) was enacted in July 2012 as Public Law 112-141. The Act replaces the Safe, Accountable, Flexible, Efficient Transportation Equity Act – a Legacy for Users (SAFETEA-LU), which was valid from August 2005 - June 2012.

MAP-21 authorizes funding for federal surface transportation programs including highways and transit for the 27 month period between July 2012 and September 2014. It is not possible to guarantee the continued availability of any listed MAP-21 programs, or to predict their future funding levels or policy guidance. Nevertheless, many of these programs have been included in some form since the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991, and thus may continue to provide capital for active transportation projects and programs.

In New York State, federal monies are administered through the New York State Department of Transportation (NYSDOT) and metropolitan planning organizations (MPOs). Most, but not all, of these programs are oriented toward transportation versus recreation, with an emphasis on reducing auto trips and providing inter-modal connections. Federal funding is intended for capital improvements and safety and education programs, and projects must relate to the surface transportation system.

There are a number of programs identified within MAP-21 that are applicable to bicycle and pedestrian projects. These programs are discussed below.

More information: <http://www.fhwa.dot.gov/map21/summaryinfo.cfm>

Transportation Alternatives

Transportation Alternatives (TA) is a new funding source under MAP-21 that consolidates three formerly separate programs under SAFETEA-LU: Transportation Enhancements (TE), Safe Routes to School (SR2S), and the Recreational Trails Program (RTP). These funds may be used for a variety of pedestrian, bicycle, and streetscape projects including sidewalks, bikeways, multi-use paths, and rail-

trails. TA funds may also be used for selected education and encouragement programming such as Safe Routes to School, despite the fact that TA does not provide a guaranteed set-aside for this activity as SAFETEA-LU did. Unless the Governor of a given state chooses to opt out of Recreational Trails Program funds, dedicated funds for recreational trails continue to be provided as a subset of TA. MAP-21 provides \$85 million nationally for the RTP.

Complete eligibilities for TA include:

1. **Transportation Alternatives** as defined by Section 1103 (a)(29). This category includes the construction, planning, and design of a range of bicycle and pedestrian infrastructure including “on-road and off-road trail facilities for pedestrians, bicyclists, and other non-motorized forms of transportation, including sidewalks, bicycle infrastructure, pedestrian and bicycle signals, traffic calming techniques, lighting and other safety-related infrastructure, and transportation projects to achieve compliance with the Americans with Disabilities Act of 1990.” Infrastructure projects and systems that provide “Safe Routes for Non-Drivers” is a new eligible activity. For the complete list of eligible activities, visit: http://www.fhwa.dot.gov/environment/transportation_enhancements/legislation/map21.cfm
2. **Recreational Trails.** TA funds may be used to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses. Examples of trail uses include hiking, bicycling, in-line skating, equestrian use, and other non-motorized and motorized uses. These funds are available for both paved and unpaved trails, but may not be used to improve roads for general passenger vehicle use or to provide shoulders or sidewalks along roads.

Recreational Trails Program (RTP) funds may be used for:

- Maintenance and restoration of existing trails
- Purchase and lease of trail construction and maintenance equipment
- Construction of new trails, including unpaved trails
- Acquisition or easements of property for trails
- State administrative costs related to this program (limited to seven percent of a state’s funds)
- Operation of educational programs to promote safety and environmental protection related to trails (limited to five percent of a state’s funds)

Under MAP-21, dedicated funding for the RTP continues at FY 2009 levels – roughly \$85 million annually. New York State will receive \$2.2 million in RTP funds per year through FY2014.

3. **Safe Routes to School.** The purpose of the Safe Routes to Schools eligibility is to promote safe, healthy alternatives to riding the bus or being driven to school. All projects must be within two miles of primary or middle schools (K-8). Eligible projects may include:
 - *Engineering improvements.* These physical improvements are designed to reduce potential bicycle and pedestrian conflicts with motor vehicles. Physical improvements may also reduce motor vehicle traffic volumes around schools, establish safer and more accessible crossings, or construct walkways, trails or bikeways. Eligible improvements include sidewalk improvements, traffic calming/speed reduction, pedestrian and bicycle crossing

- improvements, on-street bicycle facilities, off-street bicycle and pedestrian facilities, and secure bicycle parking facilities.
- *Education and Encouragement Efforts.* These programs are designed to teach children safe bicycling and walking skills while educating them about the health benefits, and environmental impacts. Projects and programs may include creation, distribution and implementation of educational materials; safety based field trips; interactive bicycle/pedestrian safety video games; and promotional events and activities (e.g., assemblies, bicycle rodeos, walking school buses).
 - *Enforcement Efforts.* These programs aim to ensure that traffic laws near schools are obeyed. Law enforcement activities apply to cyclists, pedestrians and motor vehicles alike. Projects may include development of a crossing guard program, enforcement equipment, photo enforcement, and pedestrian sting operations.
4. Planning, designing, or constructing roadways within the right-of-way of former Interstate routes or divided highways. At the time of writing, detailed guidance from the Federal Highway Administration on this new eligible activity was not available.

Average annual funds available through TA over the life of MAP-21 equal \$814 million nationally, which is based on a 2% set-aside of total MAP-21 authorizations. Projected apportionments for New York State total \$32.4 million for FY 2013 and \$32.7 million for FY 2014. Note that state DOT's may elect to transfer up to 50% of TA funds to other highway programs, so the amount listed above represents the maximum potential funding. 50% of TA funds for the Ulster County region are automatically allocated directly to Ulster County Transportation Council based on population. The Ulster County Transportation Council distributes funds to local communities through a competitive grant program. Remaining TA funds (those monies not re-directed to other highway programs) are disbursed through a separate competitive grant program administered by NYSDOT. Local governments, school districts, tribal governments, and public lands agencies are permitted to compete for these funds.

Surface Transportation Program

The Surface Transportation Program (STP) provides states with flexible funds which may be used for a variety of highway, road, bridge, and transit projects. A wide variety of bicycle and pedestrian improvements are eligible, including on-street bicycle facilities, off-street trails, sidewalks, crosswalks, bicycle and pedestrian signals, parking, and other ancillary facilities. Modification of sidewalks to comply with the requirements of the Americans with Disabilities Act (ADA) is also an eligible activity. Unlike most highway projects, STP-funded bicycle and pedestrian facilities may be located on local and collector roads which are not part of the Federal-aid Highway System. 50% of each state's STP funds are suballocated geographically by population; the remaining 50% may be spent in any area of the state.

Highway Safety Improvement Program

MAP-21 doubles the amount of funding available through the Highway Safety Improvement Program (HSIP) relative to SAFETEA-LU. HSIP provides \$2.4 billion nationally for projects and programs that help communities achieve significant reductions in traffic fatalities and serious injuries on all public roads, bikeways, and walkways. MAP-21 preserves the Railway-Highway Crossings Program within HSIP but discontinues the High-Risk Rural roads set-aside *unless* safety statistics demonstrate that

fatalities are increasing on these roads. Bicycle and pedestrian safety improvements, enforcement activities, traffic calming projects, and crossing treatments for non-motorized users in school zones are eligible for these funds. NYS DOT estimates that they will receive an average of \$92.8 million annually for this program through the lifetime of MAP-21.

Congestion Mitigation/Air Quality Program

The Congestion Mitigation/Air Quality Improvement Program (CMAQ) provides funding for projects and programs in air quality non-attainment and maintenance areas for ozone, carbon monoxide, and particulate matter which reduce transportation related emissions. States with no nonattainment areas may use their CMAQ funds for any CMAQ or STP eligible project. These federal dollars can be used to build bicycle and pedestrian facilities that reduce travel by automobile. Purely recreational facilities generally are not eligible.

New Freedom Initiative

MAP-21 continues a formula grant program that provides capital and operating costs to provide transportation services and facility improvements that exceed those required by the Americans with Disabilities Act. Examples of pedestrian/accessibility projects funded in other communities through the New Freedom Initiative include installing Accessible Pedestrian Signals (APS), enhancing transit stops to improve accessibility, and establishing a mobility coordinator position.

More information: <http://www.hhs.gov/newfreedom/>

Pilot Transit-Oriented Development Planning

MAP-21 establishes a new pilot program to promote planning for Transit-Oriented Development. At the time of writing the details of this program are not fully clear, although the bill text states that the Secretary of Transportation may make grants available for the planning of projects that seek to “facilitate multimodal connectivity and accessibility,” and “increase access to transit hubs for pedestrian and bicycle traffic.”

5.5.2 Partnership for Sustainable Communities

Founded in 2009, the Partnership for Sustainable Communities is a joint project of the Environmental Protection Agency (EPA), the U.S. Department of Housing and Urban Development (HUD), and the U.S. Department of Transportation (USDOT). The partnership aims to “improve access to affordable housing, more transportation options, and lower transportation costs while protecting the environment in communities nationwide.” The Partnership is based on five Livability Principles, one of which explicitly addresses the need for bicycle and pedestrian infrastructure (“Provide more transportation choices: Develop safe, reliable, and economical transportation choices to decrease household transportation costs, reduce our nation’s dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health”).

The Partnership is not a formal agency with a regular annual grant program. Nevertheless, it is an important effort that has already led to some new grant opportunities (including both TIGER I and TIGER II grants). The Kingston Land Trust should track Partnership communications and be prepared

to respond proactively to announcements of new grant programs. Initiatives that speak to multiple livability goals (such as partnerships with Citibus, or with affordable housing groups) are more likely to score well than initiatives that are narrowly limited in scope to bicycle and pedestrian efforts.

More information: <http://www.sustainablecommunities.gov/grants.html>

5.5.3 Community Development Block Grants

The Community Development Block Grants (CDBG) program provides money for streetscape revitalization, which may be largely comprised of pedestrian improvements. Federal CDBG grantees may “use Community Development Block Grants funds for activities that include (but are not limited to): acquiring real property; reconstructing or rehabilitating housing and other property; building public facilities and improvements, such as streets, sidewalks, community and senior citizen centers and recreational facilities; paying for planning and administrative expenses, such as costs related to developing a consolidated plan and managing Community Development Block Grants funds; provide public services for youths, seniors, or the disabled; and initiatives such as neighborhood watch programs.”

Pedestrian and Bicycle Master Plan projects that enhance accessibility are the best fit for this funding source. CDBG funds could also be used to write an ADA Transition Plan for the city.

More information: www.hud.gov/cdbg

5.5.4 Community Transformation Grants

Community Transformation Grants administered through the Center for Disease Control support community-level efforts to reduce chronic diseases such as heart disease, cancer, stroke, and diabetes. Active transportation infrastructure and programs that promote healthy lifestyles are a good fit for this program, particularly if the benefits of such improvements accrue to population groups experiencing the greatest burden of chronic disease.

More info: <http://www.cdc.gov/communitytransformation/>

5.5.5 Land and Water Conservation Fund

The Land and Water Conservation Fund (LWCF) provides grants for planning and acquiring outdoor recreation areas and facilities, including trails. Funds can be used for right-of-way acquisition and construction. The program is administered by the NYS Office of Parks, Recreation, and Historical Preservation as a grant program. Any Pedestrian and Bicycle Master Plan projects located in future parks could benefit from planning and land acquisition funding through the LWCF. Trail corridor acquisition can be funded with LWCF grants as well.

More info: <http://www.nps.gov/lwcf/>

5.5.6 Rivers, Trails, and Conservation Assistance Program

The Rivers, Trails, and Conservation Assistance Program (RTCA) is a National Parks Service (NPS) program providing technical assistance via direct NPS staff involvement to establish and restore greenways, rivers, trails, watersheds and open space. The RTCA program provides only for planning

assistance—there are no implementation monies available. Projects are prioritized for assistance based on criteria including conserving significant community resources, fostering cooperation between agencies, serving a large number of users, encouraging public involvement in planning and implementation, and focusing on lasting accomplishments. This program may benefit trail development in the City of Kingston indirectly through technical assistance, particularly for community organizations, but should not be considered a future capital funding source.

More info: <http://www.nps.gov/pwro/rtca/who-we-are.htm>

5.5.7 Additional Federal Funding

The landscape of federal funding opportunities for bicycle and pedestrian programs and projects is always changing. A number of Federal agencies, including the Bureau of Land Management, the Department of Health and Human Services, the Department of Energy, and the Environmental Protection Agency have offered grant programs amenable to bicycle and pedestrian planning and implementation, and may do so again in the future. For up-to-date information about grant programs through all federal agencies, see <http://www.grants.gov/>

5.5.8 New York State Funding

NYSDOS – Local Waterfront Revitalization Program (LWRP)

The Department of State works with communities in the Hudson Valley Region through the Local Waterfront Revitalization Program to promote community revitalization and resource protection through community-based plans and projects. The Department of State provides funding through the Environmental Protection Fund for projects that enhance public access to waterways and state lands, promote sustainable economic development, protect and improve water quality, and revitalize hamlets and downtowns. Eligible activities include planning, feasibility, design and construction of trails, blueways and streetscape enhancements.

Consolidated Local Street and Highway Improvement Program (CHIPS)

A New York State-funded program administered through the NYSDOT to assist localities in financing the construction, reconstruction or improvement of local highways, bridges, highway-railroad crossings and other local facilities. Eligible CHIPS bicycle and pedestrian projects include: bike lanes and wide curb lanes, shoulder improvements, roundabouts, new signs, new or upgraded traffic signals and traffic calming installations (www.dot.ny.gov/programs/chips).

NYS Department of Health- Preventative Health and Health Services (PHHS) Block Grant

The Preventive Health and Health Services (PHHS) Block Grant provides funding for health problems in the state of New York that range from tuberculosis to adult physical activity. PHHS Block Grant dollars fund a total of 19 different New York State health programs, including the Healthy Heart Program. PHHS Block Grant funds are used to promote and evaluate increases in the number of adults participating in regular sustained physical activity. From 1995-2004, nearly 1.2 million New York State residents received help from local HHP contractors to increase their physical activity levels (www.health.ny.gov/funding/grants/block_grant.htm).

5.5.9 Private Foundations

Private foundations are an increasingly important source of funds for bicycle and pedestrian planning and implementation.

More info: <http://www.foundationcenter.org/>