POTENTIAL BIKE FACILITIES SUITABLE FOR ROUTE 9

Figure 58 Suitability of the Types of Bike Facilities

Facility Type	Definition	User type	Design Considerations	Impact on villages
Shared Lane (no change)	People biking share lane with motor vehicle traffic, no change in lanes	Recreational	Existing conditions	With the opening of the New NY Bridge's shared use path, the villages along Route 9 will see an increase in the number of people cycling. Encouraging people to cycle in existing vehicle lanes may exacerbate congestion and create hostility.
Side path on one side of the street	People walking and bicycling share a path in the approximate location of the sidewalk	Family	Extra attention to design details at driveways and intersections is needed to increase visibility or separation of people biking against the flow of adjacent or turning traffic	This facility type will require the acquisition of right of way outside of the paved/curbed roadway, and requires sweeping by sidewalk equipment, unless ordinance closes facilities during snow events.
Bike Boulevard	People walking and biking share lane with motor vehicle traffic, traffic volumes and speeds very low	Family	Not suitable for Route 9 because of vehicle volumes	N/A
Bike Lane on each side of the street	Striped lane for one way bike travel, with curb or parking lane on right side and moving traffic on left side	Commuter	Parking adjacent bike lanes place riders in the door zone so are not suitable for location with lots of parking turnover	May be accomplished on sections of Route 9 without parking or lane modifications where 10' of excess roadway exists
Buffered bike lane on each side of the street	Striped lane for one way bike travel, with curb or parking lane on right side and a 2-3 foot buffer from moving traffic on left side	Commuter	Parking adjacent bike lanes place riders in the door zone so are not suitable for location with lots of parking turnover	▪ May be accomplished on sections of Route 9 without parking or lane modifications where 16' of excess roadway exists ▪ Requires sweeping by sidewalk equipment, unless ordinance closes facilities during snow events
1-way Protected Bike Lane on each side of the street	Exclusive use by bicycles, including vertical separation between the bikeway and through motor vehicle traffic, one way travel for people on bikes in same direction of motor	Family	▪ Separation may be accomplished by on-street parking, flexible posts, planters, or grade separation. ▪ 1 way protected bike lanes pose fewer challenges at intersections because people on bikes and motorists are traveling in the same direction	▪ May be accomplished on sections of Route 9 without parking or lane modifications where 12' of excess roadway exists ▪ Requires sweeping of debris and snow as needed, unless ordinance closes facilities during snow events
2-way Protected Bike Lane on one side of the street	Exclusive use by bicycles, including vertical separation between the bikeway and through motor vehicle traffic; two way travel for people on bikes	Family	▪ Separation may be accomplished by on-street parking, flexible posts, planters, or grade separation. ▪ Extra attention to design details at driveways and intersections is needed to increase visibility and separation of people biking against the flow of adjacent or turning traffic	▪ Consistent with side path design for NNYB ▪ May be accomplished on sections of Route 9 without parking or lane modifications where 11' of excess roadway exists ▪ Requires sweeping of debris and snow as needed, unless ordinance closes facilities during snow events

4 DESIGN ALTERNATIVES

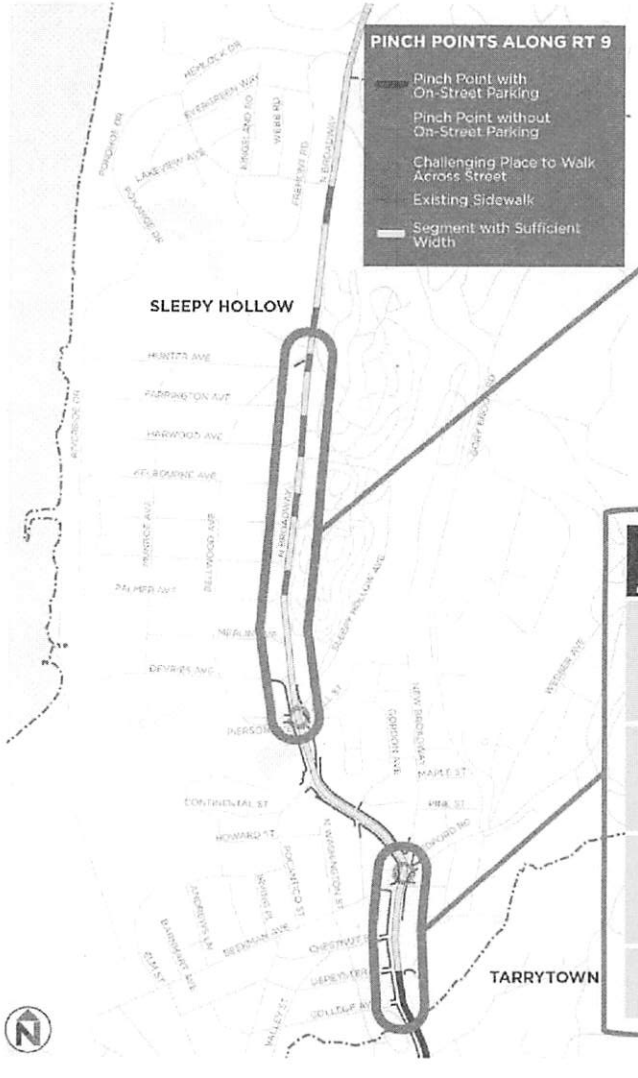
DEVELOPMENT OF THE ALTERNATIVES

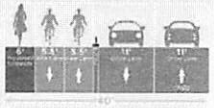
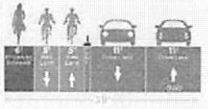
In order to make Route 9 safer, better connected, and more accessible for all its users, the physical layout and design of the Route itself must be reconsidered. Prior to the engineering of any redesign of the Route, it is imperative that a variety of potential Route 9 redesigns are put forward and evaluated by project stakeholders. Accordingly, the following cross-section alternatives were developed to provide project stakeholders with an understanding of potential design modifications to Route 9 that would enhance safety and accessibility. These cross sections were developed and evaluated as follows:

- Two or more alternative cross sections were developed at two typical locations in each village.
- All cross section alternatives were presented to the public for review at public meetings along the Route 9 corridor, and via an online survey.
- In both settings, members of the public were able to vote on their preferred cross-section alternative for each section of the example locations. The results of public voting were tallied to determine the preferred cross-section alternatives for the Route 9 corridor.
- The Steering Committee was presented with a summary of the cross-section alternatives, and public preferences towards them, and selected a preferred option that was extended throughout the corridor.

Figures 59 to 77 display the initial and preferred cross section alternatives for each example location along the corridor, and outline some of the important considerations affecting their design and possible implementation.

Figure 59 **Initial Cross-Section Alternative Options – Sleepy Hollow**



Option	Conceptual Design	Description	Tradeoffs	Vote Results	NN Preferred
1A		One traffic lane in each direction with a two-way protected bike lane and a sidewalk on one side of Route 9	▪ No turning lanes ▪ Does not take grassy areas outside of road bed	60%	Yes
1B		Detour to Pierson/Bellwood with a two-way protected bike lane and a sidewalk on one side, or directional bike lanes on each side	▪ Not on Route 9	40%	

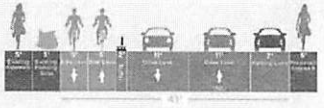
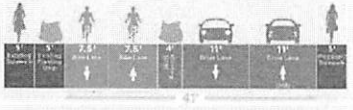
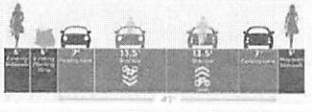
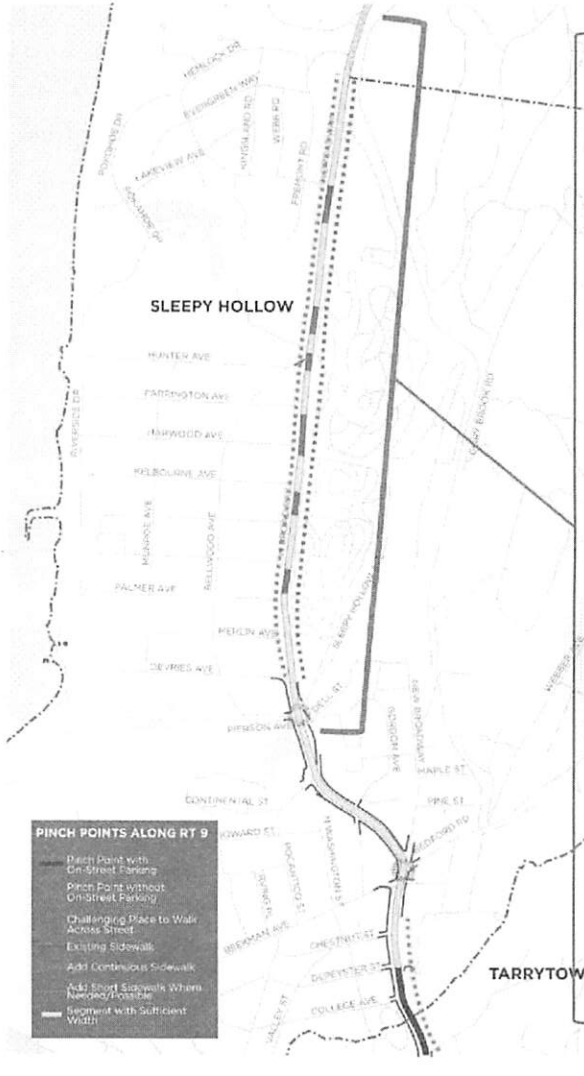
Option	Conceptual Design	Description	Tradeoffs	Vote Results	NN Preferred
2A		One traffic lane in each direction with a two-way protected bike lane on one side, on-street parking on one side, and a sidewalk on both sides	▪ Parking on one side	40%	Yes
2B		One traffic lane in each direction with a two-way protected bike lane on one side, a sidewalk on both sides, and no on-street parking	▪ Wider bike lanes ▪ No parking	29%	
2C		One shared traffic lane in each direction with a sidewalk on both sides and on-street parking on both sides	▪ Parking on both sides ▪ No separated bike path	19%	
2D		Use a parallel on-street route from Pocantico Street to Howard Street to Washington Street to Franklin Street	▪ Not on Route 9	12%	

Figure 60 **Community Preferred Cross-Section for Sleepy Hollow from Phelps Lane to Pierson Ave**



Sleepy Hollow

From Phelps Lane to Pierson Ave

Existing Conditions

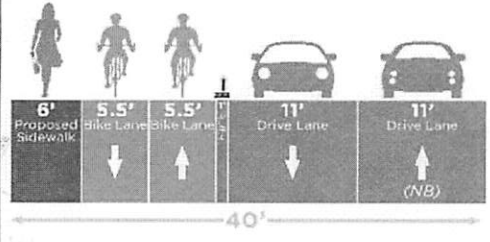
- Total with Sufficient Width: 76%
- Total with Space Constraints: 24%

Ideal Design Characteristics for Areas with Sufficient Width

NB Travel Lanes	SB Travel Lanes	Travel Lane Width	L/R Turn Lane	Turn Lane Width	Bicycle Facilities	Bicycle Facility Type	Bicycle Lane Width	Buffer Width	Sidewalks	Sidewalk Width
1	2	11'	Only where needed	9'	West side	2-way buffered lanes	5'-8' per lane	1'-3'	West side min (both sides if space is available)	4'-10'

Preferred Design Option for Areas with Space Constraints

Option 1A (concept)



Tradeoff: Turning Lanes

- Option 1 – Limit left turns into Philipse Manor to Pierson Ave and north end of Bellwood Ave, retaining right in/right out only at all other locations; limit left turn access to and from Sleepy Hollow cemetery to Pierson Avenue; Keep LT at Hemlock Dr North, and remove it at Hemlock Dr South
- Option 2 – acquire private ROW to accommodate new bike/ped facilities and turn lanes at above locations

Other Consideration: One Way Bike Lanes

- Traffic volumes inappropriate for one way bike lanes without buffer. Insufficient right of way for two buffers
- Proposed continuous sidewalk installations/enhancements may require right of way acquisition
- Proposed locations for short sidewalk connections to trip generators, enhanced crossings, etc. may require right of way acquisition

Figure 61 **Community Preferred Cross-Section for Sleepy Hollow from Pierson Ave to Beekman Ave**

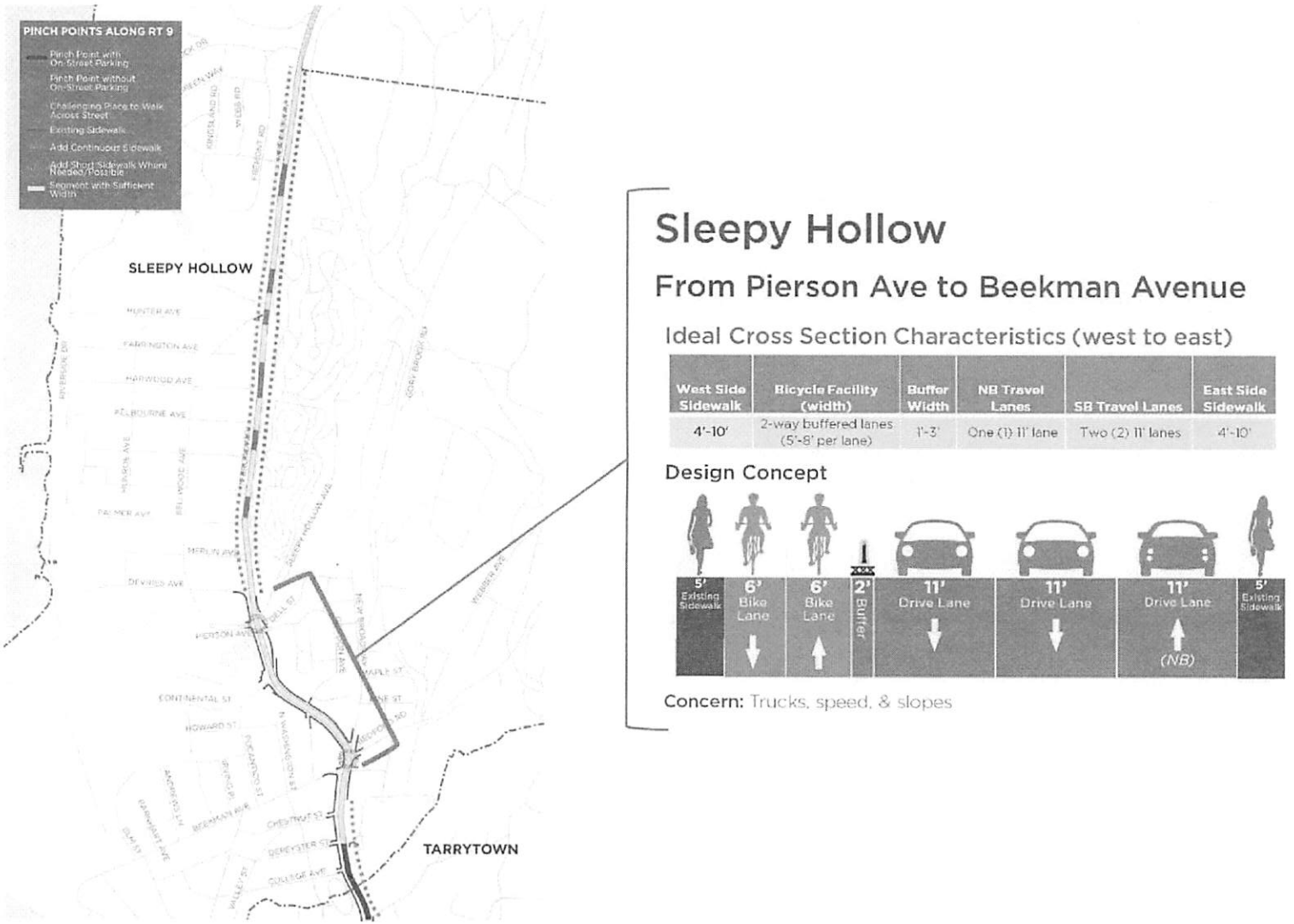
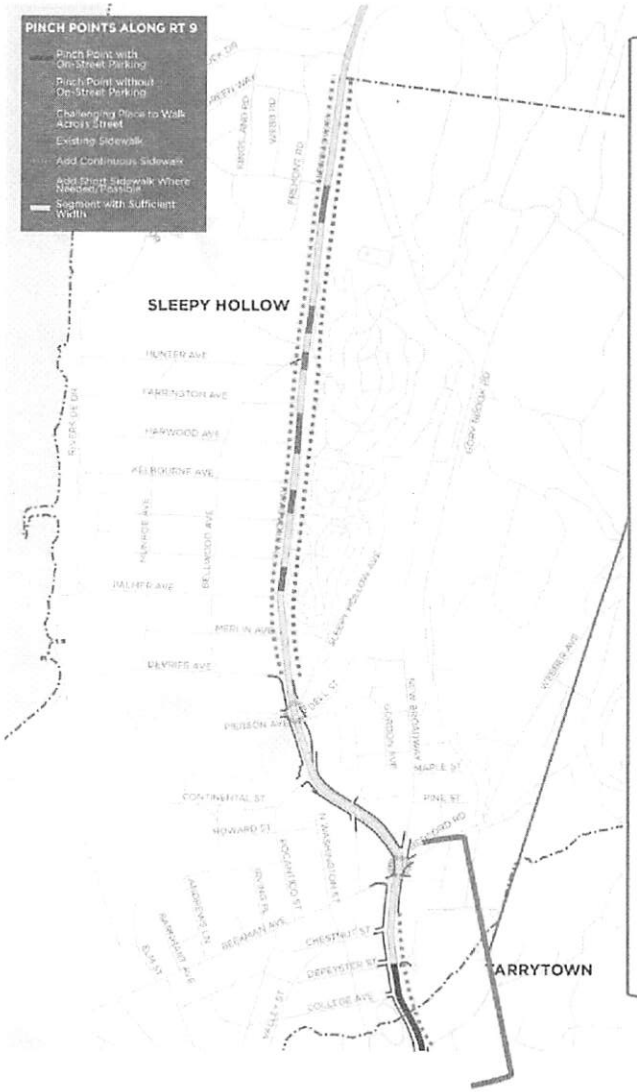


Figure 62 **Community Preferred Cross-Section for Sleepy Hollow from Beekman Ave to Wildey Street (Tarrytown border)**



Sleepy Hollow

From Beekman Avenue to Wildey Street (Tarrytown)

Existing Conditions

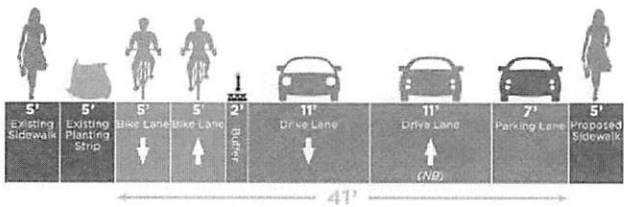
- Total with Sufficient Width: 41%
- Total with Space Constraints: 59%

Ideal Design Characteristics for Areas with Sufficient Width

NB Travel Lanes	SB Travel Lanes	Travel Lane Width	L/R Turn Lane	Turn Lane Width	Bicycle Facilities	Bicycle Facility Type	Bicycle Lane Width	Buffer Width	Sidewalks	Sidewalk Width
1	1	11'	NA	NA	West side	2-way buffered lanes	5'-8" per lane	1'-3'	Both sides	4'-10'

Preferred Design Option for Areas with Space Constraints

Option 2A (concept)



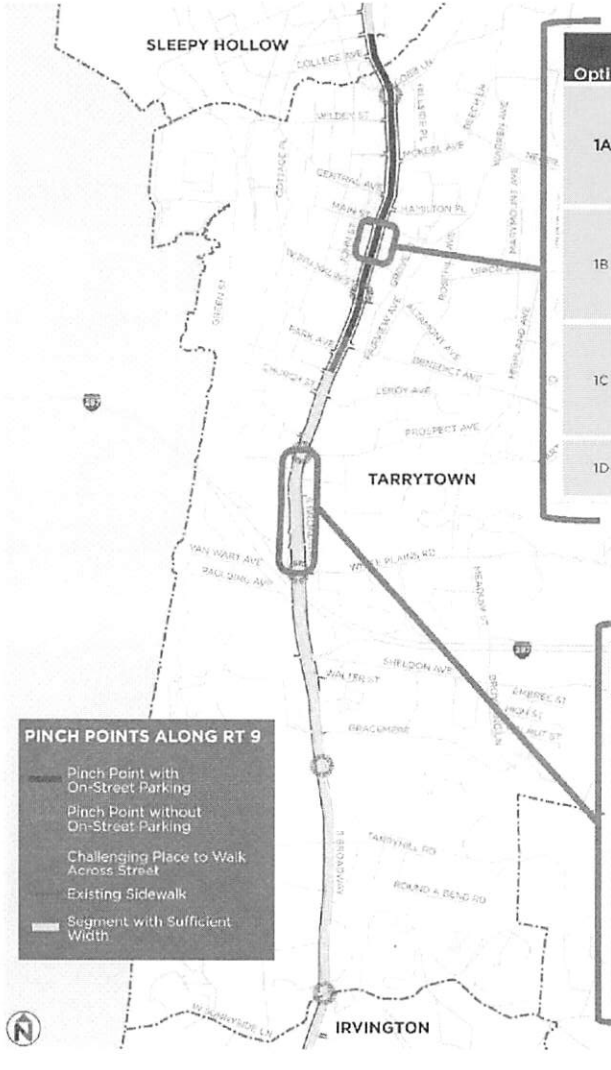
Tradeoff: Parking

- Remove lane of parking between Beekman Avenue and College Avenue
  - 28 spaces on the west side
- Over 100 off-street spaces nearby

Other Considerations: One Way Bike Lanes

- Traffic volumes inappropriate for one way bike lanes without buffer. Insufficient right of way for two buffers. With parking, one way bike lanes result in door zone bike lanes
- Proposed continuous sidewalk installations/enhancements may require right of way acquisition

Figure 63 **Initial Cross-Section Alternative Options – Tarrytown**



Option	Conceptual Design	Description	Tradeoffs	Vote Results	NN Preferred
1A		**One traffic lane in each direction with a two-way protected bike lane on one side, a sidewalk on both sides, and on-street parking one one side**	**• Bike lanes are too narrow to be used safely** **• Parking on one side**	32%	No
1B		One traffic lane in each direction with a two-way protected bike lane on one side, a sidewalk on both sides, and no on-street parking	• No parking	27%	LONG TERM SOLUTION
1C		One shared traffic lane in each direction with a sidewalk on both sides and on-street parking on both sides	• Parking on both sides • No separated bike path	24%	INTERIM SOLUTION
1D		Use the OCA trail from Cobb Lane to Franklin Street	• Not on Route 9 • May require paving the OCA Trail	17%	

Option	Conceptual Design	Description	Tradeoffs	Vote Results	NN Preferred
2A		Two traffic lanes in each direction with a two-way protected bike lane on one side, a sidewalk on both sides, and no on-street parking	• No turning lane • 2 lanes in both directions	30%	
2B		**One northbound traffic lane, two southbound traffic lanes, and a turning lane, with a two-way protected bike lane on one side, a sidewalk on both sides, and no on-street parking**	**• Turning lane** **• Two lanes SB, one lane NB**	50%	Yes
2C	OCA Trail	Use the OCA Trail from Leroy Avenue to Route 119	• Not on Route 9 • May require paving the OCA Trail	20%	

Figure 64 **Community Preferred Cross-Section for Tarrytown from Wildey Street to Elizabeth Street**

Tarrytown

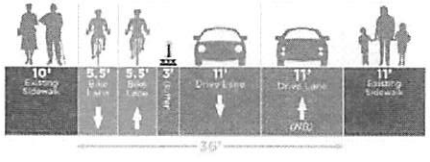
From Wildey Street to Elizabeth Street

Existing Conditions

- Total with Space Constraints: 100%

Preferred Design Options

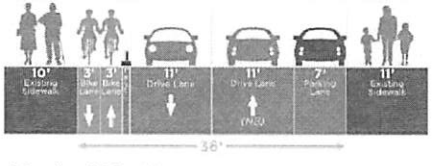
NN Preferred Option: 1B (concept)



Tradeoff: Parking

- Remove both lanes of parking between Wildey Street and Elizabeth Street
  - ❖ 66 spaces on west side, 51 spaces on east side
- Over 300 off-street spaces nearby

Public Preferred Option: 1A (concept)



Tradeoff: Parking

- Remove lane of parking between Wildey Street and Elizabeth Street
  - ❖ 66 spaces on west side
- Over 300 off-street spaces nearby
- Substandard bikeway width

Other Considerations – One Way Bike Lanes

- Traffic volumes inappropriate for one way bike lanes without buffer. Insufficient right of way for two buffers

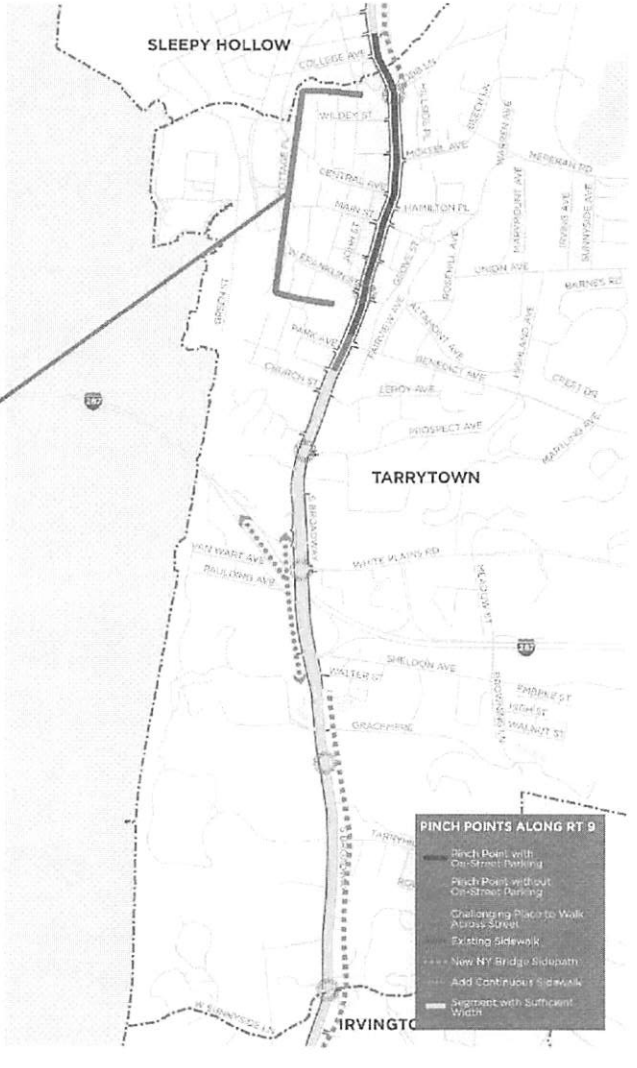


Figure 65 **Community Preferred Cross-Section for Tarrytown from Elizabeth Street to Prospect Ave**

Tarrytown

From Elizabeth Street to Prospect Avenue

Existing Conditions

- Total with Sufficient Width: 43%
- Total with Space Constraints: 57%

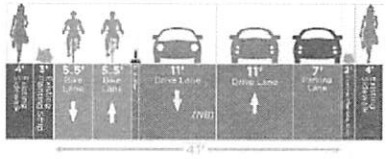
Ideal Design Characteristics for Areas with Sufficient Width

NB Travel Lanes	SB Travel Lanes	Travel Lane Width	L/R Turn Lane	Turn Lane Width	Bicycle Facilities	Bicycle Facility Type	Bicycle Lane Width	Buffer Width	Sidewalks	Sidewalk Width
1	1	11'	NA	NA	West side	2-way buffered lanes	5'-8' per lane	1'-3'	Both sides	4'-10'

Preferred Design Option for Areas with Space Constraints

NB Travel Lanes	SB Travel Lanes	Travel Lane Width	L/R Turn Lane	Turn Lane Width	Bicycle Facilities	Bicycle Facility Type	Bicycle Lane Width	Buffer Width	Sidewalks	Sidewalk Width
1	1	11'	NA	NA	West side	2 way buffered lanes	5' 8' per lane	1' 3'	Both sides	4' 10'

Design Concept



Tradeoff: Parking

- Remove lane of parking between Elizabeth Street and Park Avenue
  - 6 spaces on west side
- Acquire additional ROW to keep the RT dedicated lane to access Benedict Ave and have a 5'+5'+1' bike lane on the West side (there are only 7' to do it with the current section)

Other Considerations: One Way Bike Lanes

- Traffic volumes inappropriate for one way bike lanes without buffer. Insufficient right of way for two buffers. With parking leads to door zone bike lanes.

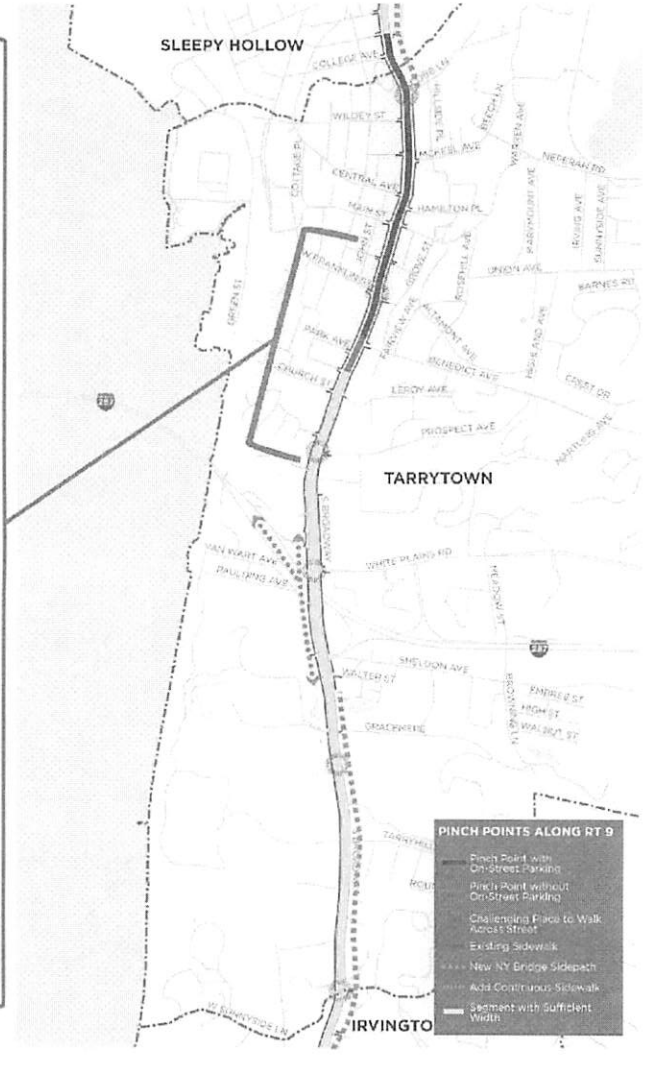
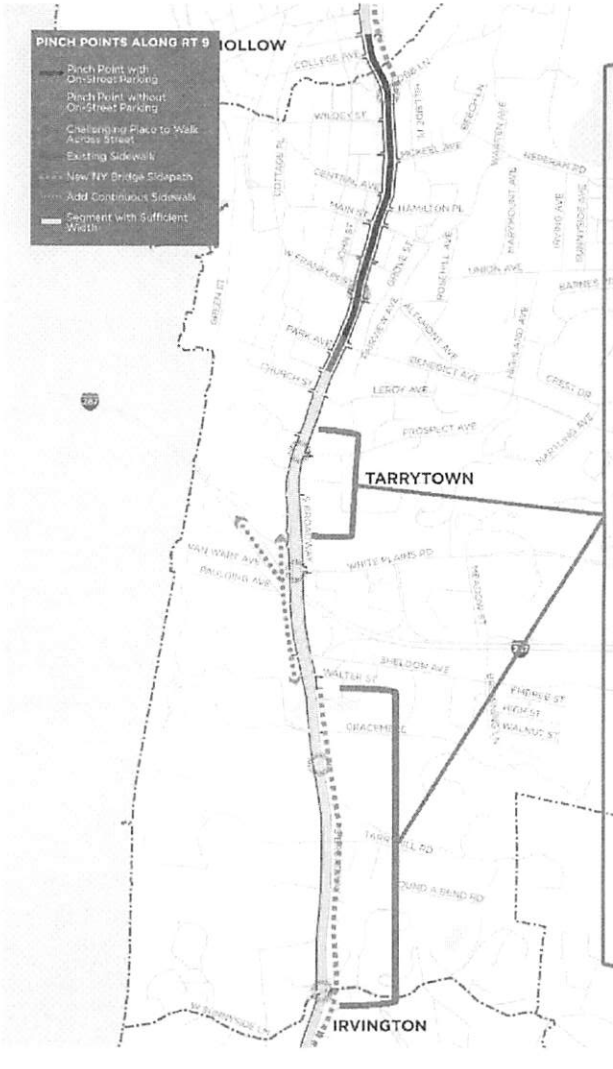


Figure 66 **Community Preferred Cross-Section for Tarrytown from Prospect Ave to Sunnyside Lane**



Tarrytown

From Prospect Avenue to Sunnyside Lane (incl. NNYB Sidepath)

Existing Conditions

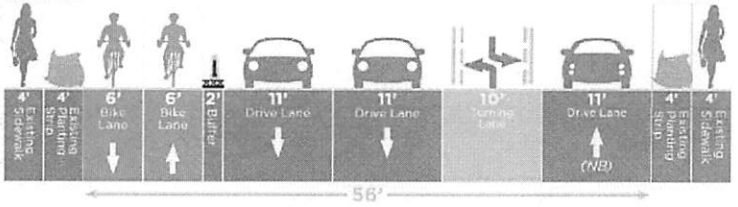
- Total with Sufficient Width: 100%

Ideal Design Characteristics

NB Travel Lanes	SB Travel Lanes	Travel Lane Width	L/R Turn Lane	Turn Lane Width	Bicycle Facilities	Bicycle Facility Type	Bicycle Lane Width	Buffer Width	Sidewalks	Sidewalk Width
1	2	11'	Where needed	9' 10"	West side	2-way buffered lanes	5' 8" per lane	1' 3"	Both sides	4' 10"

Preferred Design Option

Option 2B (concept)



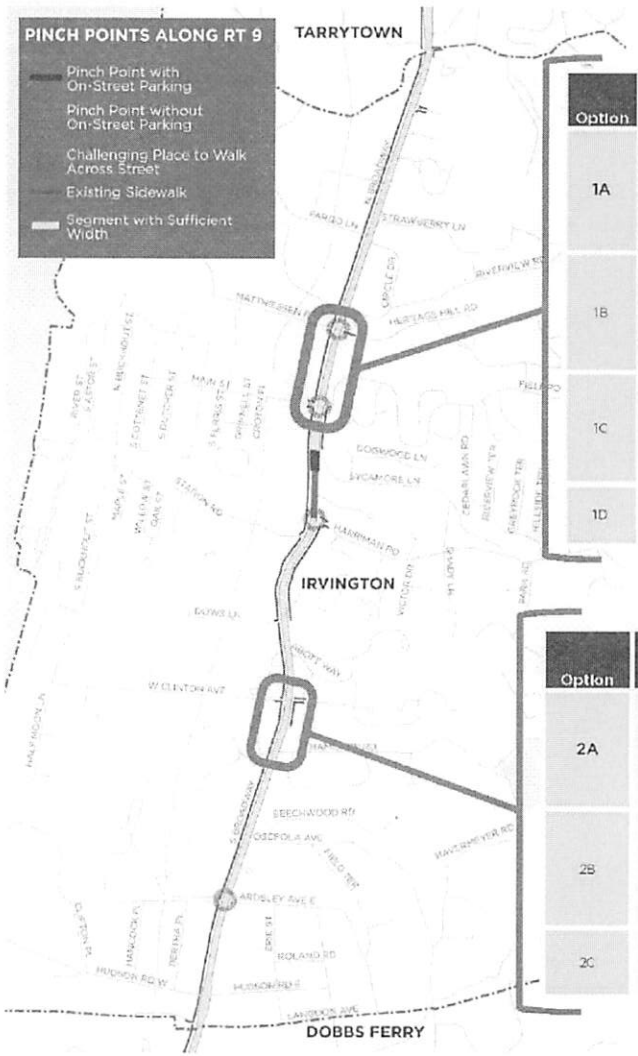
Tradeoff: Travel Lanes

- Only one northbound lane

Other Considerations

- Traffic volumes inappropriate for one way bike lanes without buffer. Insufficient right of way for two buffers.
- Two-Way NNYB Sidepath will be on west side of Route 9
- Design of Route 9 at Exit 9 currently underway. Active Transportation Corridor project will have to coordinate recommended design with final consideration
- Proposed continuous sidewalk installations/enhancements may require right of way acquisition

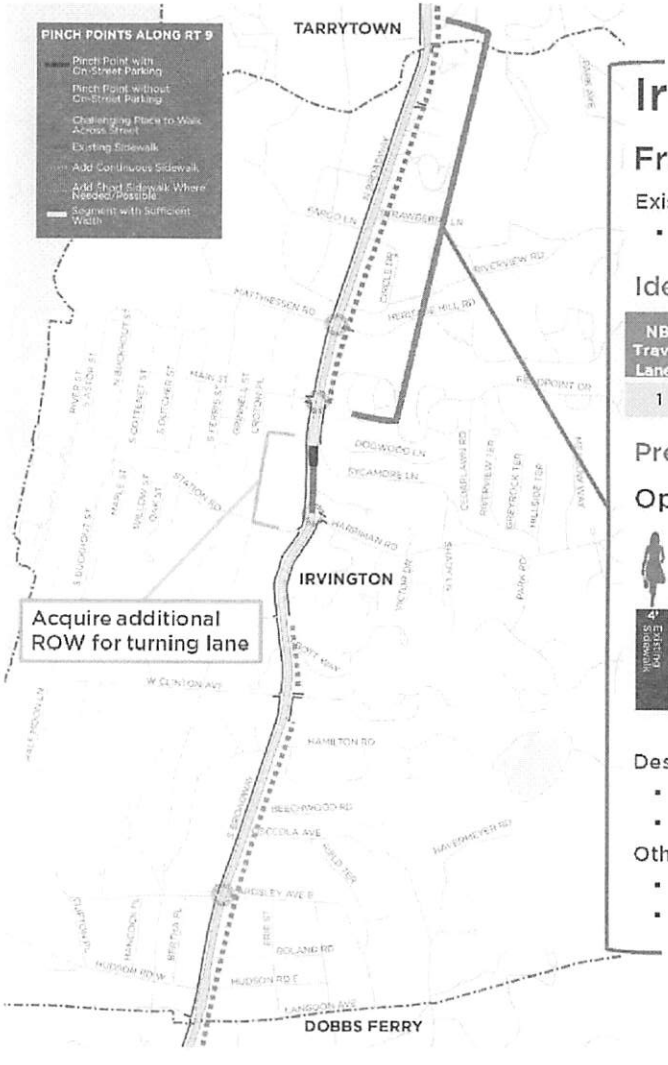
Figure 67 Initial Cross-Section Alternative Options – Irvington



Option	Conceptual Design	Description	Tradeoffs	Vote Results	NN Preferred
1A		**One traffic lane in each direction and a turning lane, with a two-way protected bike lane on one side, a sidewalk on one side, and no on-street parking**	• **Turning lane** • **Narrow Bike lanes** • **Sidewalk on one side**	**46%**	**Yes, with alterations. Bike lanes should be moved to the west side of the roadway.**
1B		One traffic lane in each direction with a two-way protected bike lane on one side, a sidewalk on one side, and no on-street parking	• No turning lane • Wider bike lanes • Sidewalk on one side	24%	
1C		One traffic lane in each direction with a two-way protected bike lane on one side, a sidewalk on both sides, and no on-street parking	• No turning lane • Sidewalk on both sides	19%	
1D		Use OCA Trail from Sunnyside Lane to Main Street	• Not on Route 9 • May require paving the OCA Trail	11%	

Option	Conceptual Design	Description	Tradeoffs	Vote Results	NN Preferred
2A		**One traffic lane in each direction with a two-way protected bike lane on one side, a sidewalk on both sides, and no on-street parking**	• **No parking** • **Sidewalk on both sides** • **Wider bike path**	**46%**	**Yes, with alterations. Bike lanes should be moved to the west side of the roadway.**
2B		One traffic lane in each direction and a turning lane, with a two-way protected bike lane on one side, a sidewalk on one side, and no on-street parking	• Turning lane • Sidewalk on one side only • Very narrow bike path	35%	
2C		Use OCA Trail from Clinton Avenue to Ardsley Avenue	• Not on Route 9 • May require paving the OCA Trail	21%	

Figure 68 **Community Preferred Cross-Section for Irvington from Sunnyside Lane to Main Street**



Irvington

From Sunnyside Lane to Main Street

Existing Conditions

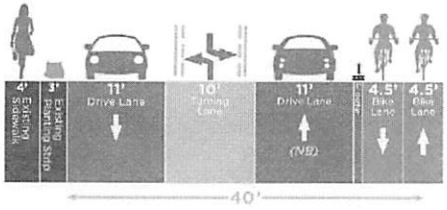
- Total with Sufficient Width: 100%

Ideal Design Characteristics

NB Travel Lanes	SB Travel Lanes	Travel Lane Width	L/R Turn Lane	Turn Lane Width	Bicycle Facilities	Bicycle Facility Type	Bicycle Lane Width	Buffer Width	Sidewalks	Sidewalk Width
1	1	11'	Where needed	9'-10'	West side	2-way buffered lanes	5'-8' per lane	1'-3'	Both sides	4'-10'

Preferred Design Option

Option 1A (concept)



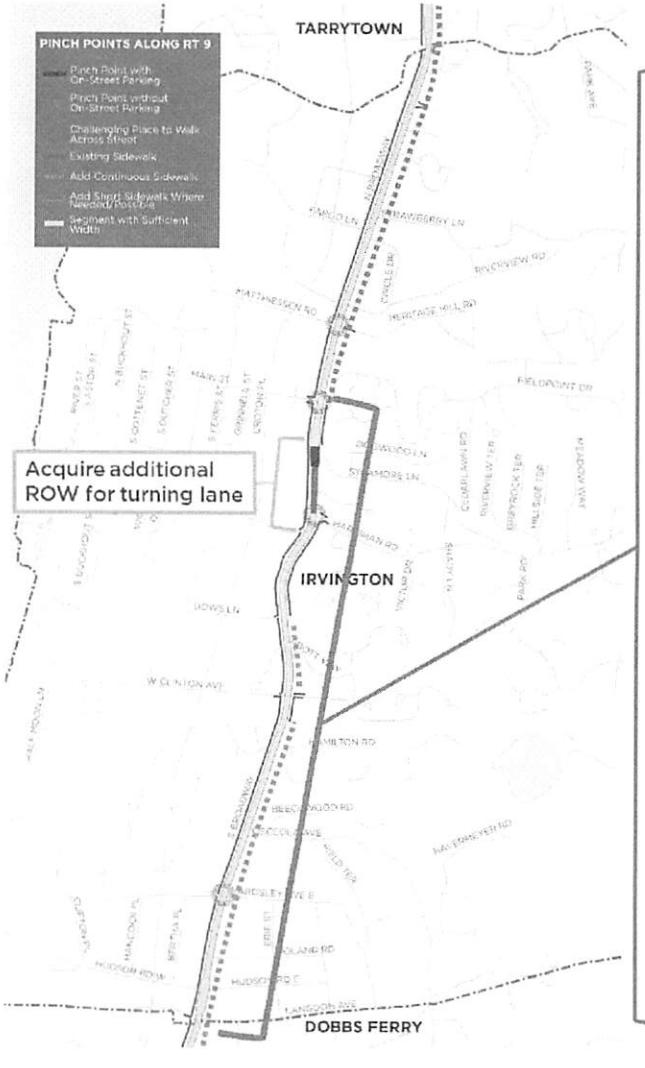
Design Consideration

- Bicycle facilities in Option 1A will be moved to the western side of the corridor
- Add sidewalks to east side where there is no need for a turning lane

Other Considerations: One Way Bike Lanes

- Traffic volumes inappropriate for one way bike lanes without buffer. Insufficient right of way for two buffers
- Proposed locations for short sidewalk connections to trip generators, enhanced crossings, etc. may require right of way acquisition

Figure 69 Community Preferred Cross-Section for Irvington from Main Street to Langdon Ave



Irvington

From Main Street to Langdon Avenue

Existing Conditions

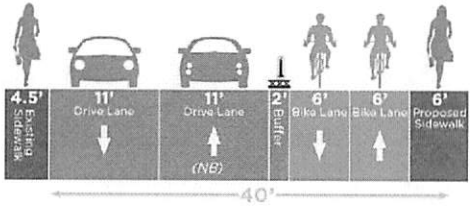
- Total with Sufficient Width: 89%
- Total with Space Constraints: 11%

Ideal Design Characteristics for Areas with Sufficient Width

NB Travel Lanes	SB Travel Lanes	Travel Lane Width	L/R Turn Lane	Turn Lane Width	Bicycle Facilities	Bicycle Facility Type	Bicycle Lane Width	Buffer Width	Sidewalks	Sidewalk Width
1	1	11'	NA	NA	West side	2-way buffered lanes	5'-8' per lane	1'-3'	Both sides	4'-10'

Preferred Design Option for Areas with Space Constraints

Option 2A (concept)



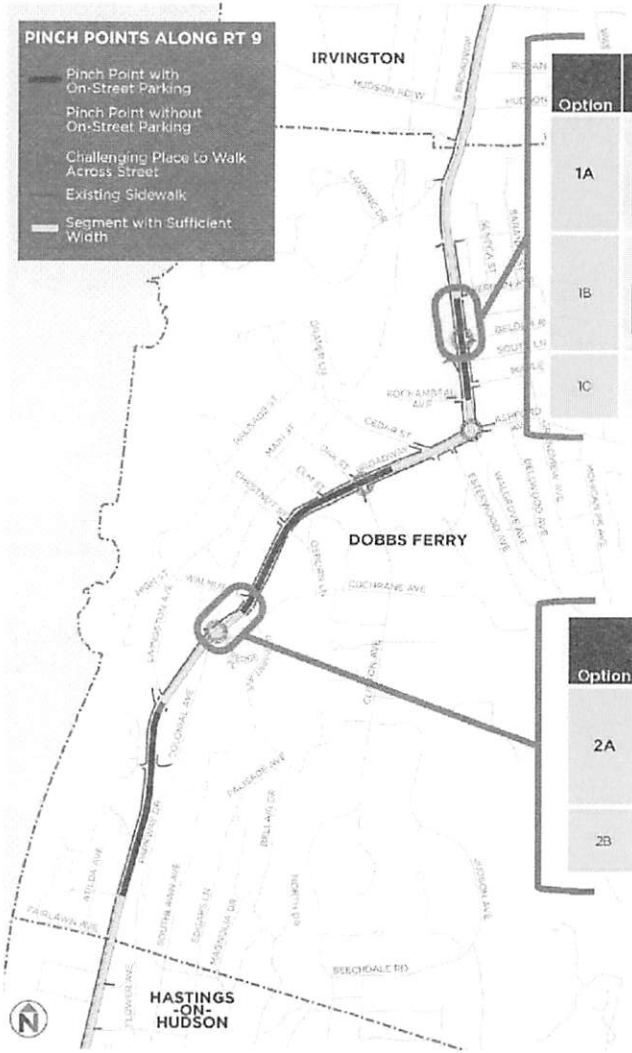
Tradeoff: Parking

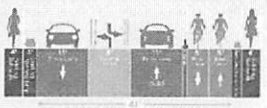
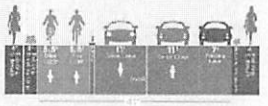
- Remove lane of parking between Main Street and Harriman Road
  - 16 spaces on the west side

Tradeoff: Turning Lane

- Keeping turning lane at Main Street would require acquisition of additional Right-of-Way
- Proposed continuous sidewalk installations/enhancements may require right of way acquisition

Figure 70 Initial Cross-Section Alternative Options – Dobbs Ferry



Option	Conceptual Design	Description	Tradeoffs	Vote Results	NN Preferred
1A		**One traffic lane in each direction and a turning lane, with a two-way protected bike lane on one side, a sidewalk on both sides, and no on-street parking**	**▪ Turning lane ▪ No parking**	50%	**Yes, with alterations. Bike lanes should be moved to the west side of the roadway.**
1B		One traffic lane in each direction with a two-way protected bike lane on one side and a sidewalk on both sides, and on-street parking on one side	▪ No turning lane ▪ Parking on one side only	31%	
1C		Use OCA Trail from Landing Drive to Cedar Street	▪ Not on Route 9 ▪ May require paving the OCA Trail	19%	

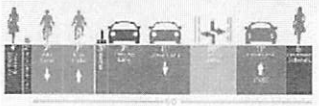
Option	Conceptual Design	Description	Tradeoffs	Vote Results	NN Preferred
2A		**One traffic lane in each direction and a turning lane, with a two-way protected bike lane on one side, a sidewalk on both sides, and on-street parking on one side**	**▪ Turning lane ▪ Parking on one side ▪ Wider bike lanes**	75%	Yes
2B		Use the OCA Trail from the Route 9 Crossing To Colonial Avenue	▪ Not on Route 9 ▪ May require paving the OCA Trail	25%	

Figure 71 **Community Preferred Cross-Section for Dobbs Ferry from Langdon Ave to Oliphant Ave**

Dobbs Ferry

From Langdon Avenue to Oliphant Avenue

Existing Conditions

- Total with Sufficient Width: 53%
- Total with Space Constraints: 47%

Ideal Design Characteristics for Areas with Sufficient Width

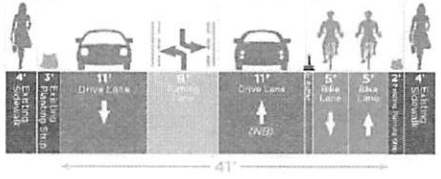
NB Travel Lanes	SB Travel Lanes	Travel Lane Width	L/R Turn Lane	Turn Lane Width	Bicycle Facilities	Bicycle Facility Type	Bicycle Lane Width	Buffer Width	Sidewalks	Sidewalk Width
1	1	11'	Where needed	9'-10'	West side	2-way buffered lanes	5'-8' per lane	1'-3'	Both sides	4'-10'

Preferred Design Option for Areas with Space Constraints

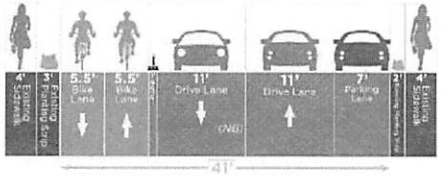
Mixed Design Area

- Option 1A where a turning lane is needed (no parking)
- Option 1B where no turn lane is needed (keep parking on east/south side)

Option 1A (concept)



Option 1B (concept)



Design Consideration

- Bicycle facilities in Option 1A should be moved to the western side of the street

Other Considerations: One Way Bike Lanes

- Traffic volumes inappropriate for one way bike lanes without buffer. Insufficient right of way for two buffers without eliminating parking or turn lanes
- Proposed continuous sidewalk installations/enhancements may require right of way acquisition

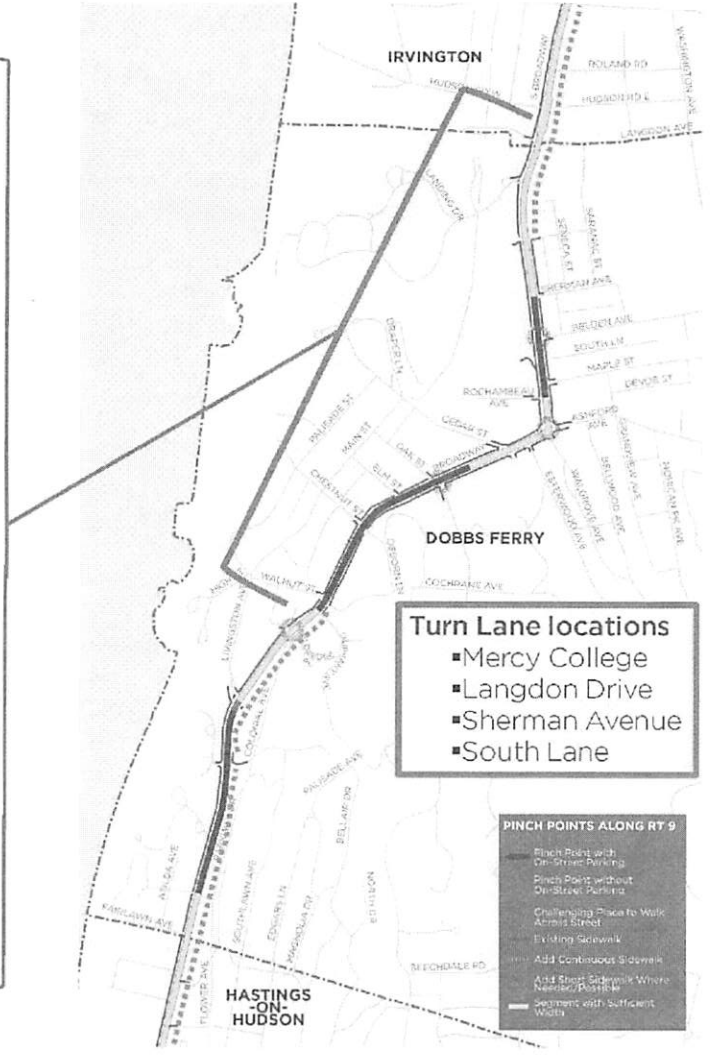


Figure 72 **Community Preferred Cross-Section for Dobbs Ferry from Oliphant Ave to Eldridge Place**

Dobbs Ferry

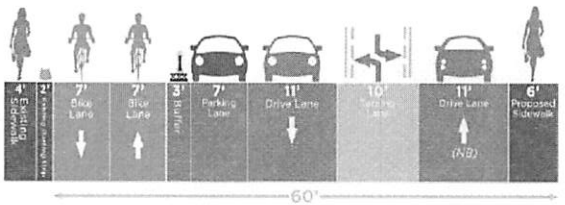
From Oliphant Avenue to Eldridge Place

Existing Conditions

- Total with Sufficient Width: 100%

Preferred Design

Option 2A (concept)



Other Considerations: One Way Bike Lanes

- Traffic volumes inappropriate for one way bike lanes without buffer. Two buffers can fit in this section

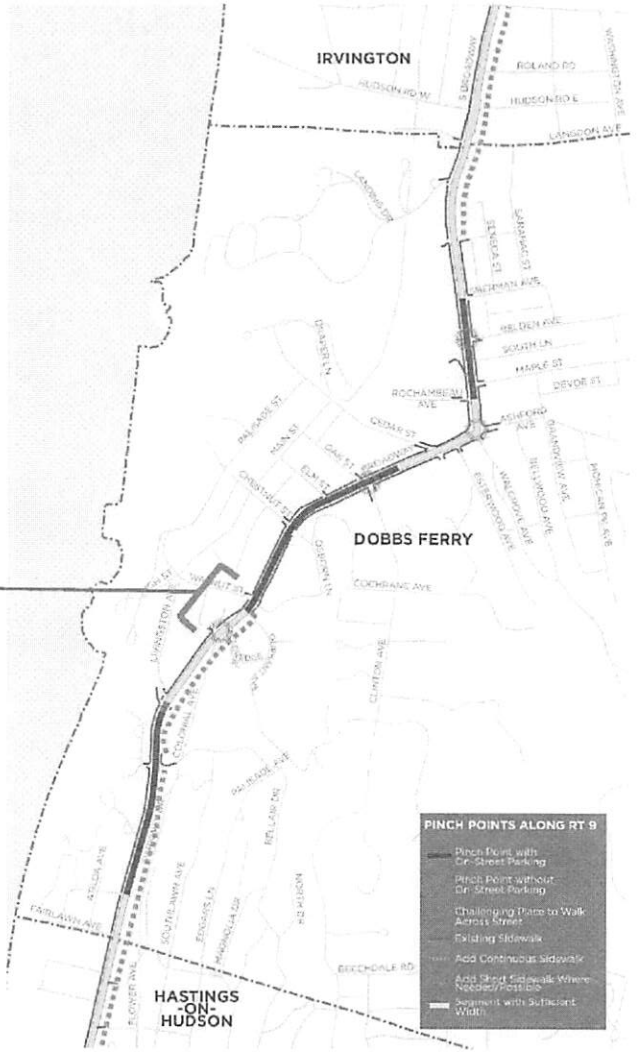


Figure 73 Community Preferred Cross-Section for Dobbs Ferry from Eldridge Place to Main Street (Hastings-on-Hudson)

Dobbs Ferry

From Eldridge Place to Main Street (Hastings-On-Hudson)

Existing Conditions

- Total with Sufficient Width: 73%
- Total with Space Constraints: 27%

Ideal Design Characteristics for Areas with Sufficient Width

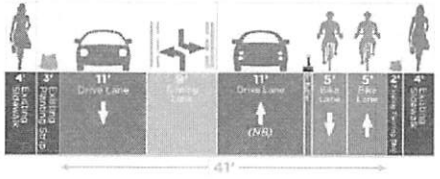
NB Travel Lanes	SB Travel Lanes	Travel Lane Width	L/R Turn Lane	Turn Lane Width	Bicycle Facilities	Bicycle Facility Type	Bicycle Lane Width	Buffer Width	Sidewalks	Sidewalk Width
1	1	11'	Where needed	9'-10'	West side	2-way buffered lanes	5'-8' per lane	1'-3'	Both sides	4'-10'

Preferred Design Option for Areas with Space Constraints

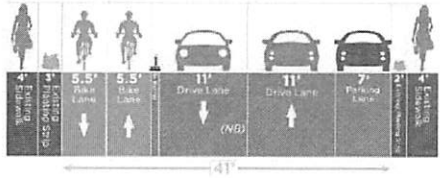
Mixed Design Area

- Option 1A where a turning lane is needed (no parking)
- Option 1B where no turn lane is needed (keep parking on east/south side)

Option 1A (concept)



Option 1B (concept)



Design Consideration

- Bicycle facilities in Option 1A will be moved to the western side of the street

Other Considerations: One Way Bike Lanes

- Traffic volumes inappropriate for one way bike lanes without buffer. Insufficient right of way for two buffers without removing turn or parking lane
- Proposed continuous sidewalk installations/enhancements may require right of way acquisition

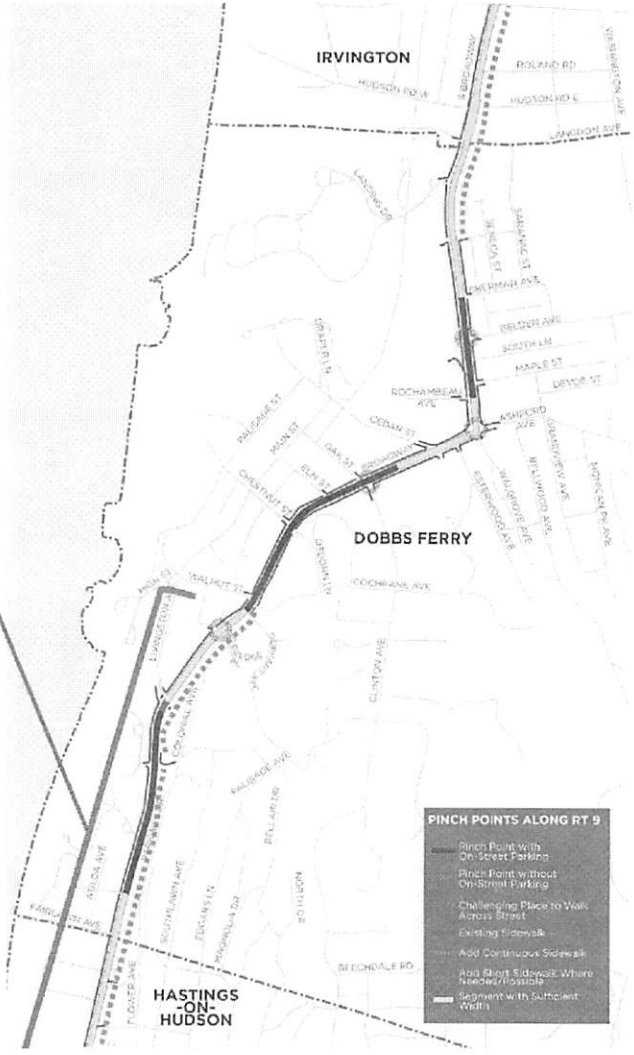
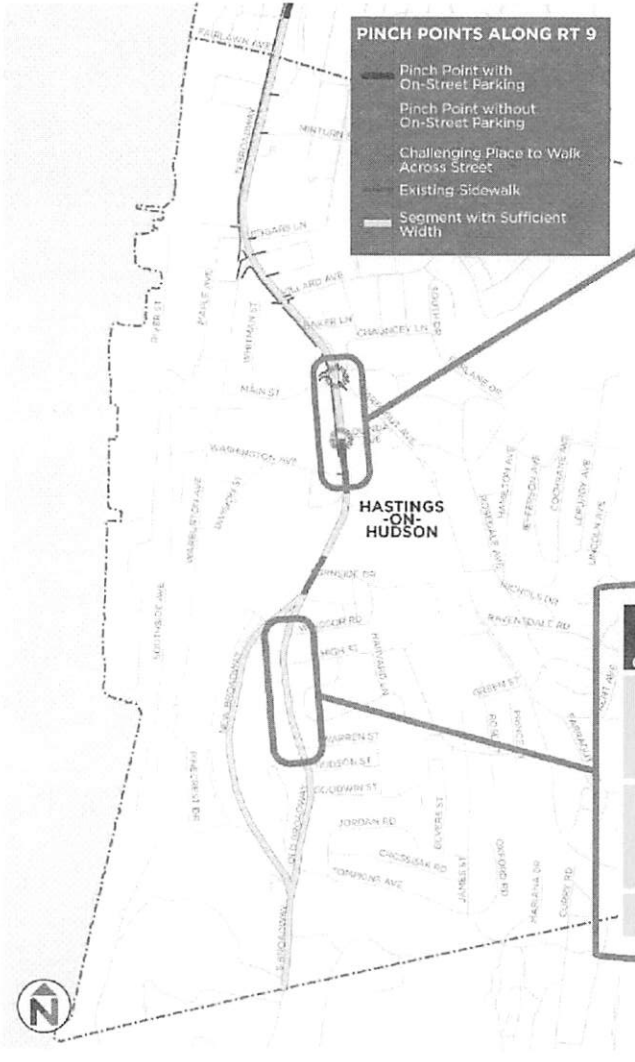
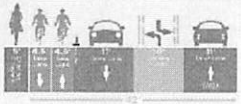


Figure 74 **Initial Cross-Section Alternative Options – Hastings-on-Hudson**



Option	Conceptual Design	Description	Tradeoffs	Vote Results	NN Preferred
1A		**One traffic lane in each direction and a turning lane, with a two-way protected bike lane on one side, a sidewalk on one side, and no on-street parking**	• **Turning lane** • **Narrow bike lanes**	**76%**	**Yes**
1B		Use the OCA Trail from Chauncey Lane to Washington Avenue	• Not on Route 9 • May require paving the OCA Trail	24%	

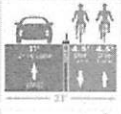
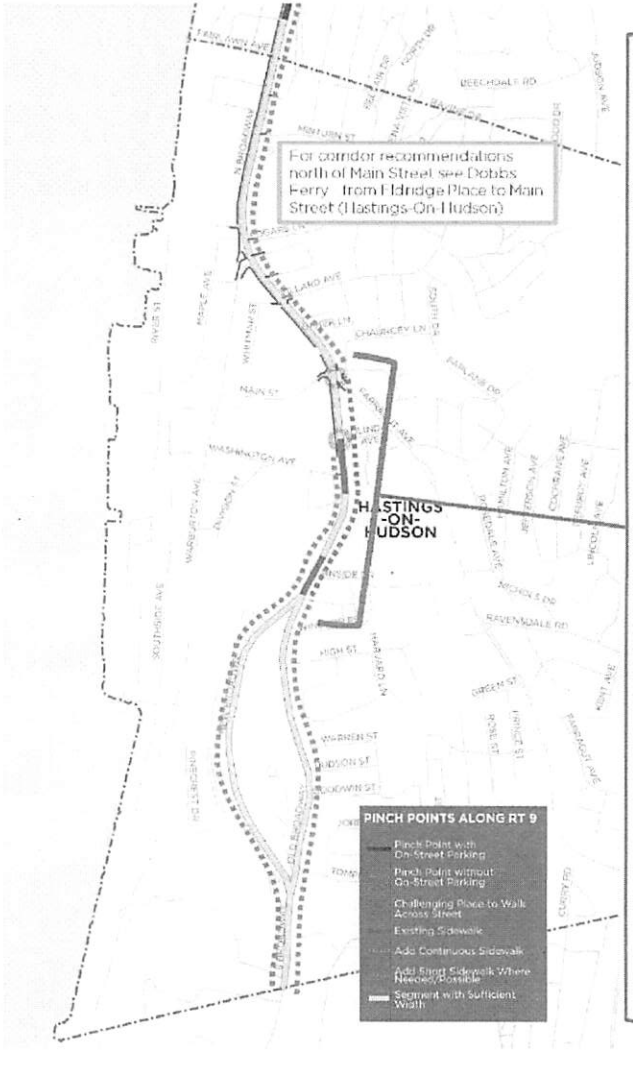
Option	Conceptual Design	Description	Tradeoffs	Vote Results	NN Preferred
2A		One traffic lane with a two-way protected bike lane on one side, no sidewalks, and no on-street parking	• Sidewalk on eastern branch • No sidewalk on western branch • Bike lanes on western branch • No bike lanes on eastern branch	15%	
2B		**One traffic lane with a one-way protected bike lane on one side, a sidewalk on one side, and no on-street parking**	• **Sidewalk on both branches** • **SB bike lane on western branch** • **NB bike lanes on eastern branch**	**65%**	**Yes**
2C		Use the OCA Trail from Washington Avenue to Pinecrest Drive	• Not on Route 9 • May require paving the OCA Trail	20%	

Figure 75 Community Preferred Cross-Section for Hastings-On-Hudson from Main Street to Devon Way



Hastings-On-Hudson

From Main Street to Devon Way

Existing Conditions

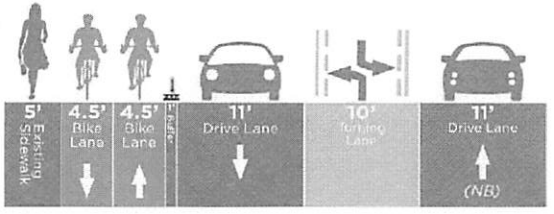
- Total with Sufficient Width: 59%
- Total with Space Constraints: 41%

Ideal Design Characteristics for Areas with Sufficient Width

NB Travel Lanes	SB Travel Lanes	Travel Lane Width	L/R Turn Lane	Turn Lane Width	Bicycle Facilities	Bicycle Facility Type	Bicycle Lane Width	Buffer Width	Sidewalks	Sidewalk Width
1	1	11'	Where needed	9' 10'	West side	2-way buffered lanes	5' 8' per lane	1' 3'	Both Sides	4' 10'

Preferred Design Option for Areas with Space Constraints

Option 1A (concept)



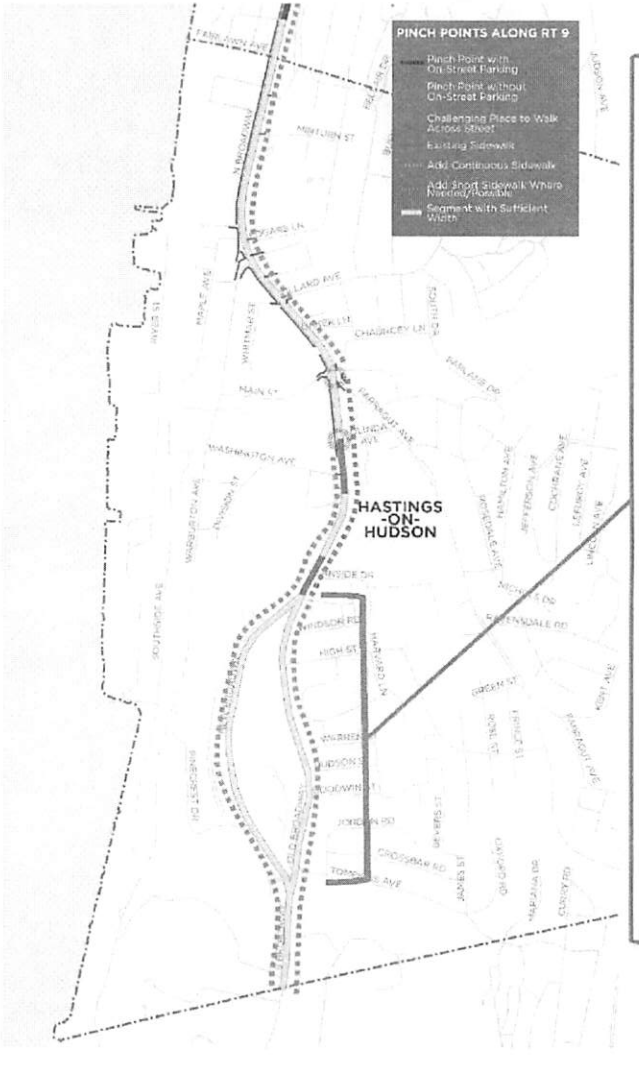
Design Consideration

- Add sidewalks to east side where there is no need for a turning lane
- Where there is a need for a turning lane acquire additional ROW, or remove LT in Washington Ave, and force all vehicles to use Main St intersection to access Washington Ave

Other Considerations: One Way Bike Lanes

- Traffic volumes inappropriate for one way bike lanes without buffer. Insufficient right of way for two buffers without removing turn or parking lane
- Proposed continuous sidewalk installations/enhancements may require right of way acquisition
- Proposed locations for short sidewalk connections to trip generators, enhanced crossings, etc. may require right of way acquisition

Figure 76 **Community Preferred Cross-Section for Hastings-On-Hudson from Devon Way to Tompkins Ave**



Hastings-On-Hudson

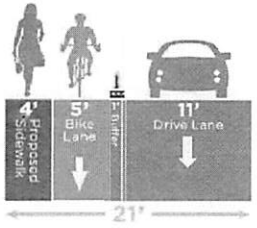
From Devon Way to Tompkins Avenue

Ideal Design Characteristics for Each Branch

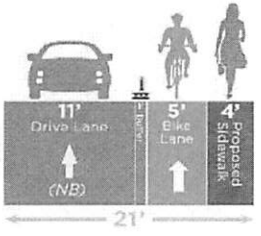
Travel Lanes	Travel Lane Width	Travel Lane Direction	Bicycle Facilities	Bicycle Facility Type	Bicycle Lane Width	Bicycle Lane Direction	Buffer Width	Sidewalks	Sidewalk Width
1	11'	North on eastern branch, South on western Branch	Outside shoulder of travel lane	1-way buffered lane	5' 8"	North on eastern branch, South on western Branch	1' 3"	Outside shoulder of bicycle lane	4' 10"

Preferred Design Option

Option 2A – Western Branch (concept)



Option 2A – Eastern Branch (concept)



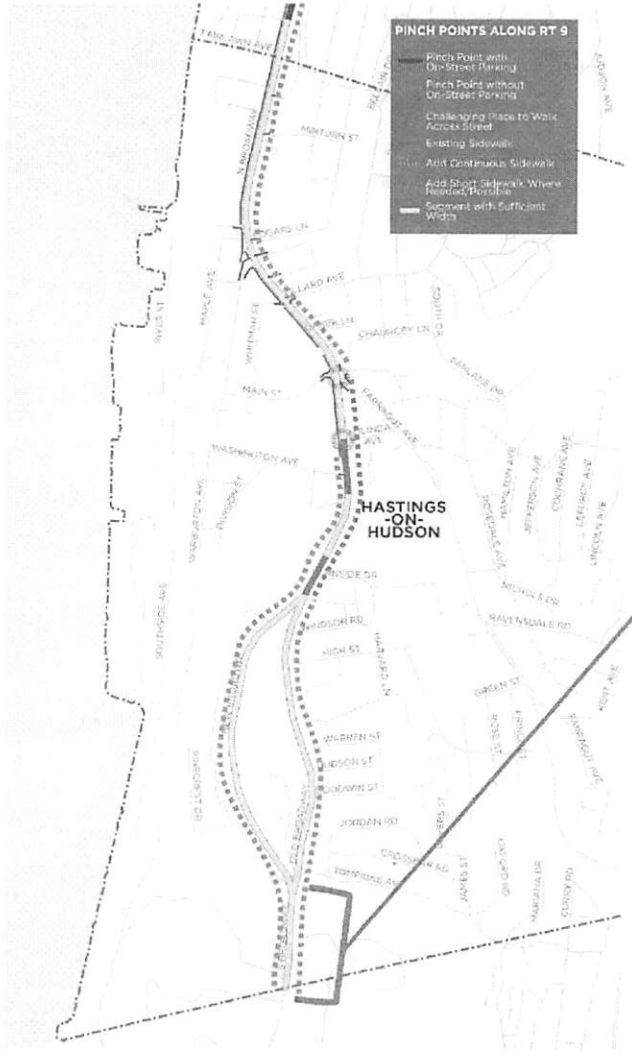
Design Consideration

- Dudley Street intersection will require further design to allow northbound bicycle riders to safely transfer from bicycle facilities on the eastern branch to bicycle facilities on the western side of the corridor

Other Considerations: One Way Bike Lanes

- This is a suitable location for one way bike lanes
- Proposed continuous sidewalk installations/enhancements may require right of way acquisition

Figure 77 **Community Preferred Cross-Section for Hastings-On-Hudson from Tompkins Ave to Dudley Street**



Hastings-On-Hudson

From Tompkins Avenue to Dudley Street

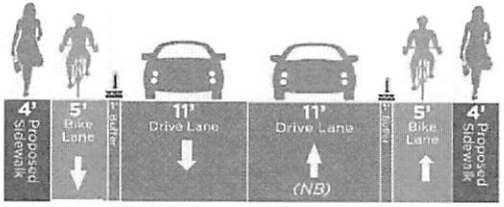
Existing Conditions

- Total with Sufficient Width: 100%

Ideal Cross Section Characteristics (west to east)

West Side Sidewalk	West Side Bicycle Facility (width)	Buffer Width	NB Travel Lanes	SB Travel Lanes	Buffer Width	East Side Bicycle Facility (width)	East Side Sidewalk
4'-10'	1-way buffered lane (5'-8")	1'-3'	One (1) 11' lane	One (1) 11' lane	1'-3'	1-way buffered lane (5'-8")	4'-10'

Design Concept



Other Considerations: One Way Bike Lanes

- This is a suitable location for one way bike lanes
- Proposed continuous sidewalk installations/enhancements may require right of way acquisition

5 CONCEPTUAL DESIGN

The recommended Conceptual Design is the result of technical analyses, public engagement, Steering Committee meetings, and consultation with elected and appointed officials. While the corridor is continuous throughout the study area, and within some segments due to the different conditions of the roadway and villages priorities.

Figure 78 Conceptual Design – Sleepy Hollow – Sheet 1

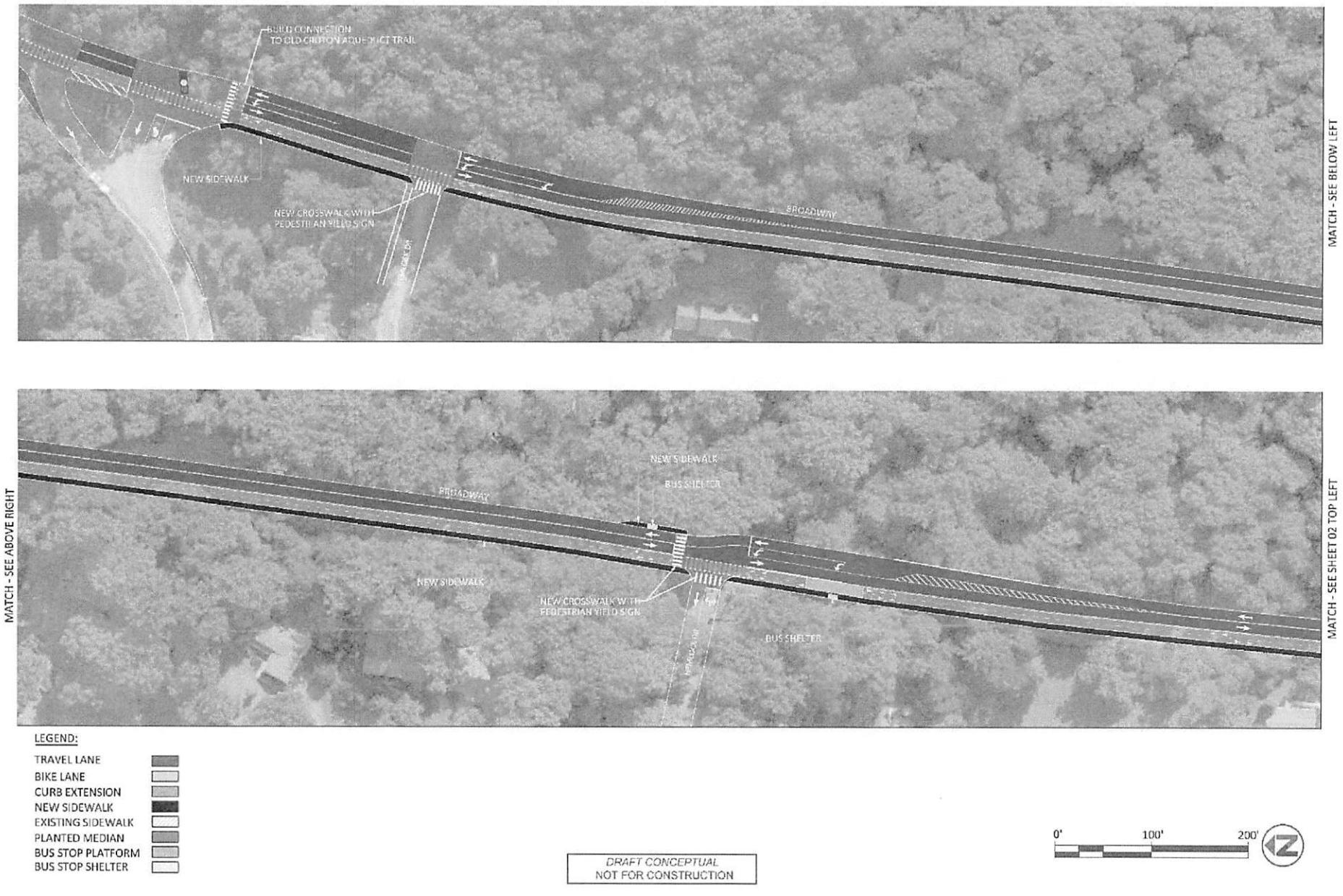


Figure 79 Conceptual Design – Sleepy Hollow – Sheet 2

Figure 80 **Conceptual Design – Sleepy Hollow – Sheet 3**

LEGEND:

- TRAVEL LANE
- BIKE LANE
- CURB EXTENSION
- NEW SIDEWALK
- EXISTING SIDEWALK
- PLANTED MEDIAN
- BUS STOP PLATFORM
- BUS STOP SHELTER

DRAFT CONCEPTUAL
NOT FOR CONSTRUCTION

0 100 500

Figure 81 Conceptual Design – Sleepy Hollow – 4

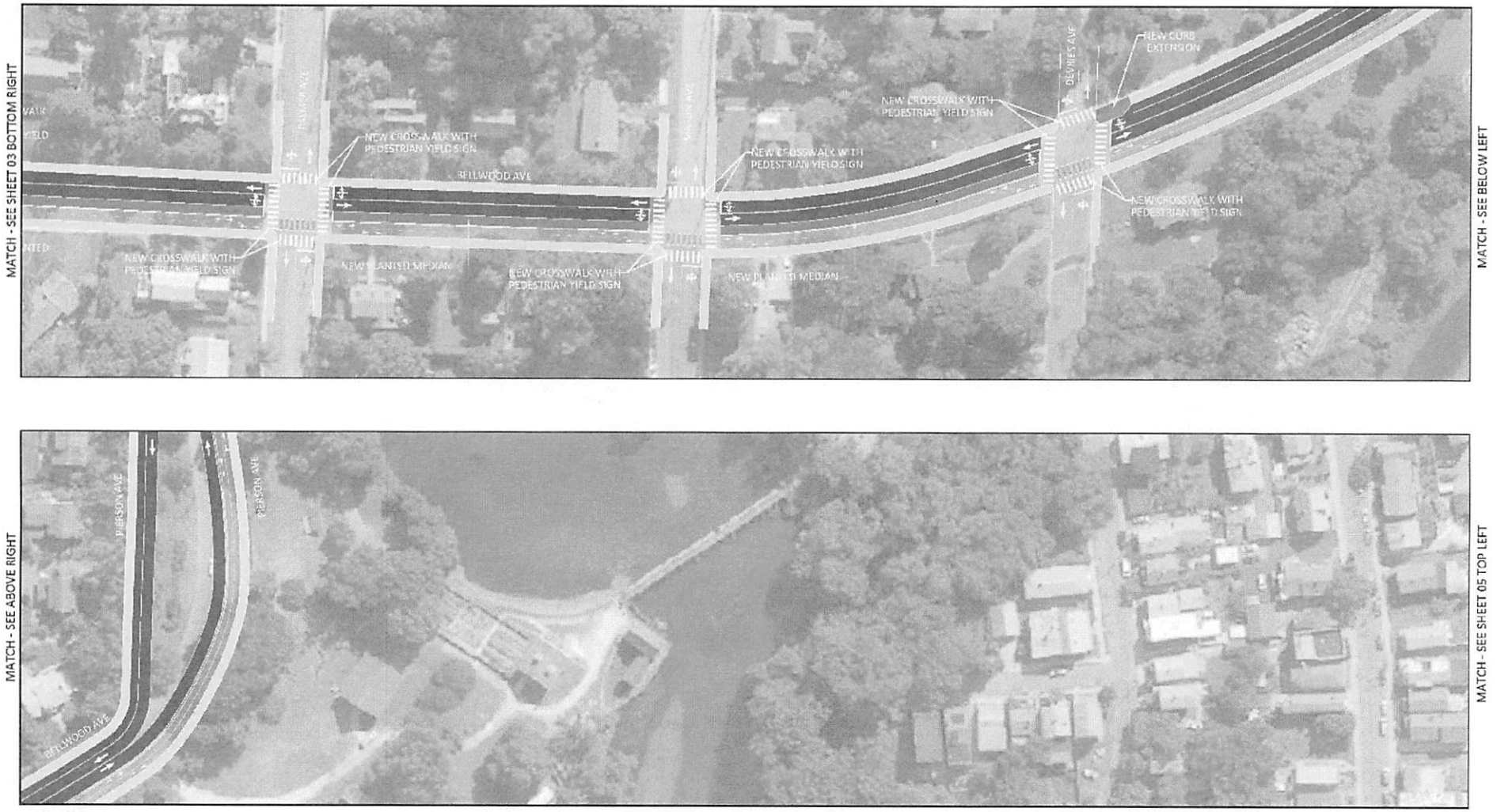


Figure 82 Conceptual Design – Sleepy Hollow – 5

Figure 83 Conceptual Design – Sleepy Hollow – 6

Figure 84 Conceptual Design – Sleepy Hollow – 7

Figure 85 Conceptual Design – Tarrytown – 8

Figure 86 Conceptual Design – Tarrytown – 9

Figure 87 Conceptual Design – Tarrytown – 10

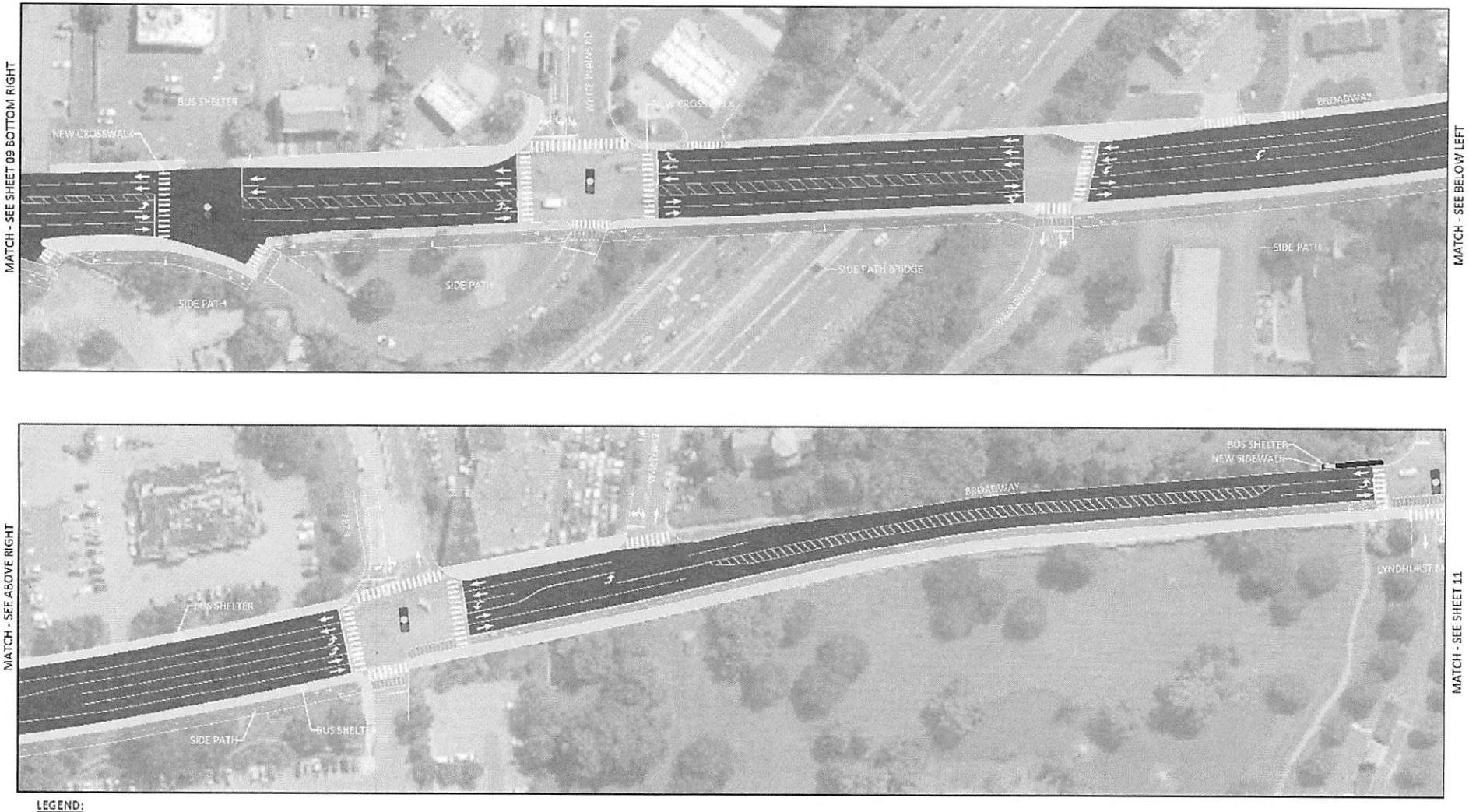


Figure 88 Conceptual Design – Tarrytown – 11

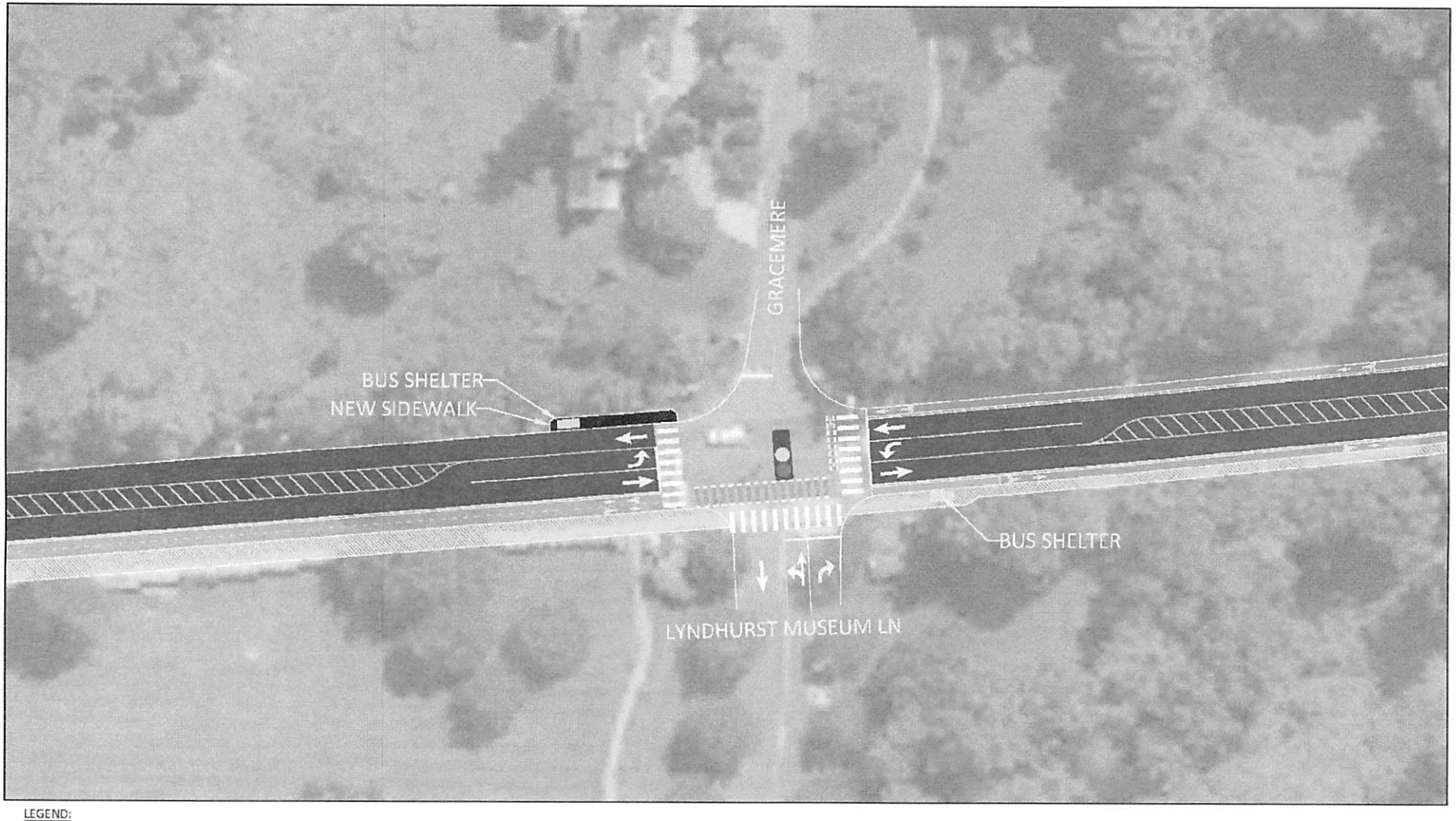


Figure 89 Conceptual Design – Tarrytown – 12

Figure 90 Conceptual Design – Tarrytown – 13

LEGEND:

- TRAVEL LANE
- BIKE LANE
- CURB EXTENSION
- NEW SIDEWALK
- EXISTING SIDEWALK
- PLANTED MEDIAN
- BUS STOP PLATFORM
- BUS STOP SHELTER

DRAFT CONCEPTUAL
NOT FOR CONSTRUCTION

0' 100' 200'

Figure 91 Conceptual Design – Irvington – 14

Figure 92 Conceptual Design – Irvington – 15

Figure 93 Conceptual Design – Irvington – 16

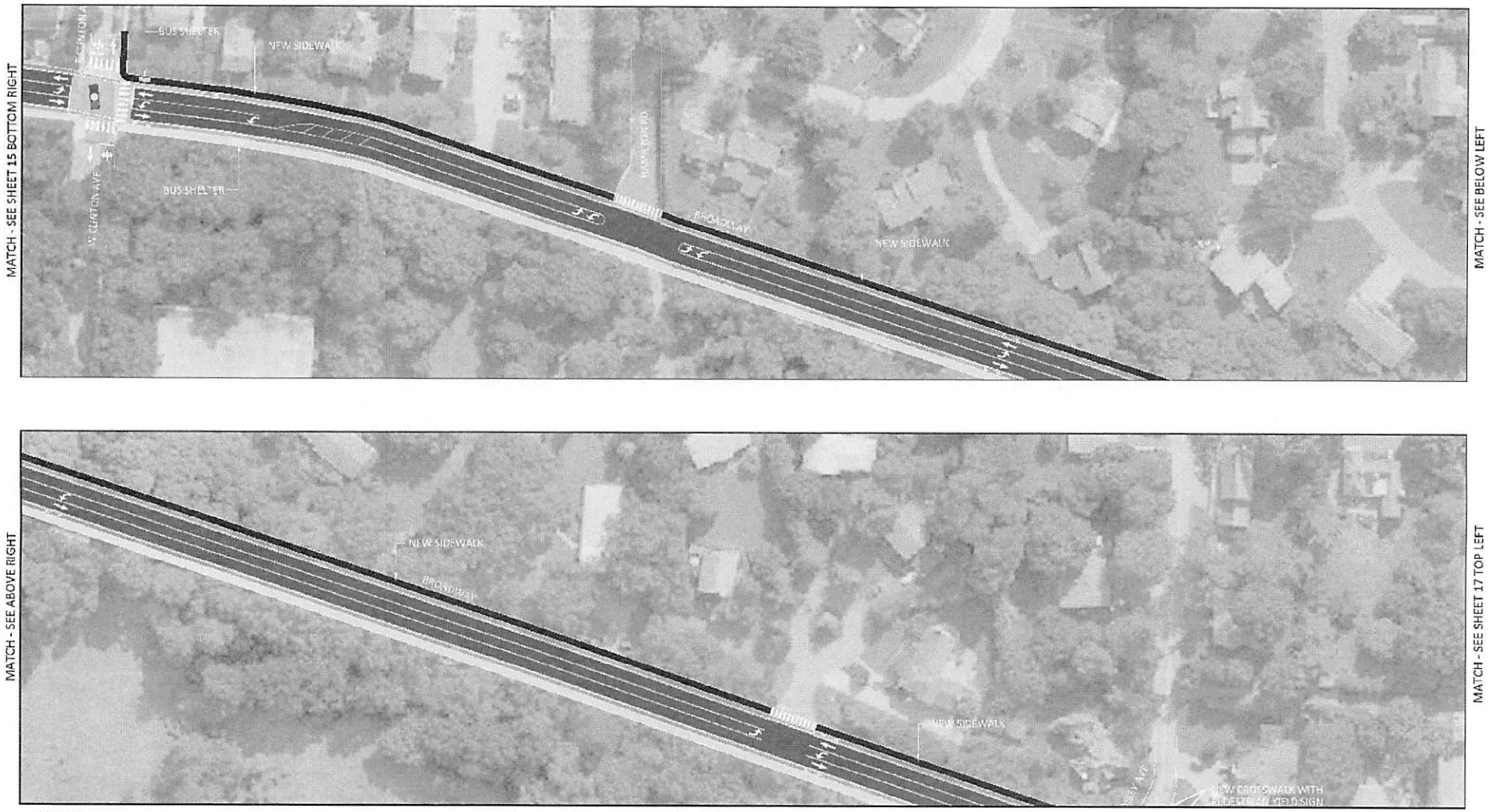
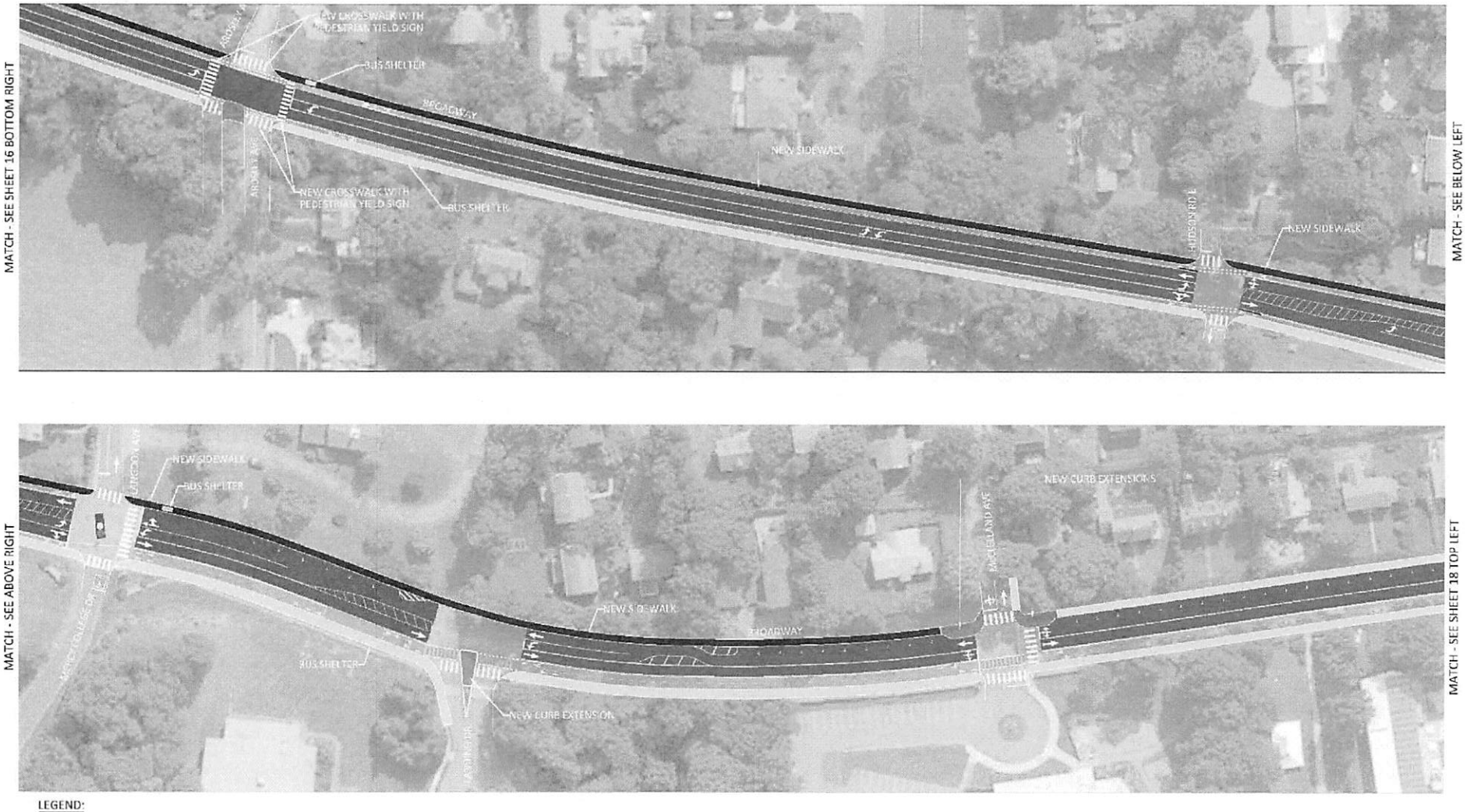


Figure 94 Conceptual Design – Irvington – 17



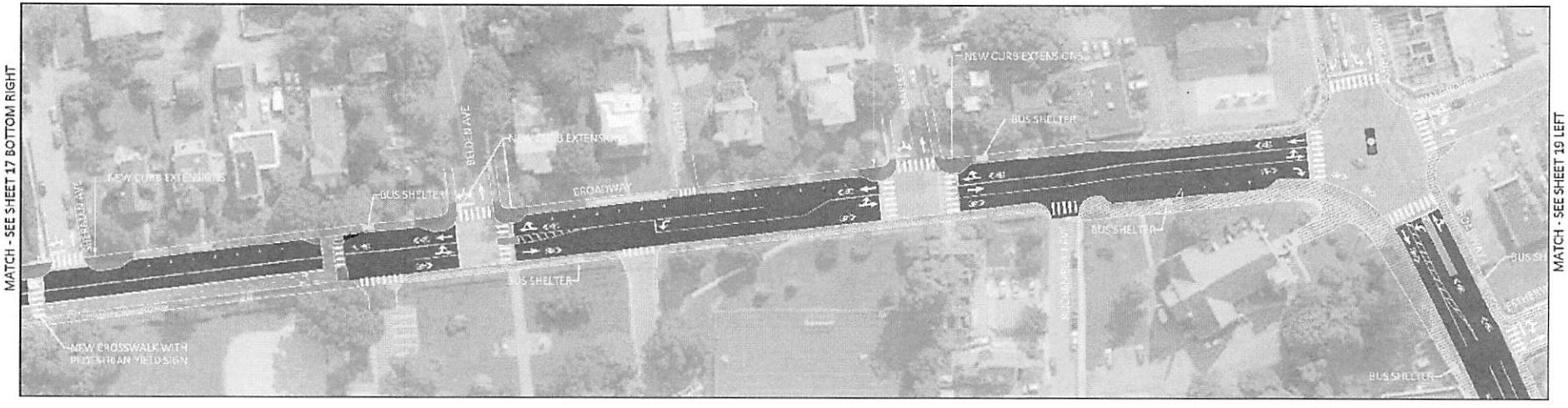
LEGEND:

- TRAVEL LANE
- BIKE LANE
- CURB EXTENSION
- NEW SIDEWALK
- EXISTING SIDEWALK
- PLANTED MEDIAN
- BUS STOP PLATFORM
- BUS STOP SHELTER

DRAFT CONCEPTUAL
NOT FOR CONSTRUCTION

0' 100' 200'

Figure 95 Conceptual Design – Dobbs Ferry – 18



LEGEND:

- TRAVEL LANE
- BIKE LANE
- CURB EXTENSION
- NEW SIDEWALK
- EXISTING SIDEWALK
- PLANTED MEDIAN
- BUS STOP PLATFORM
- BUS STOP SHELTER

DRAFT CONCEPTUAL
NOT FOR CONSTRUCTION

0 100 500

Figure 96 Conceptual Design – Dobbs Ferry – 19

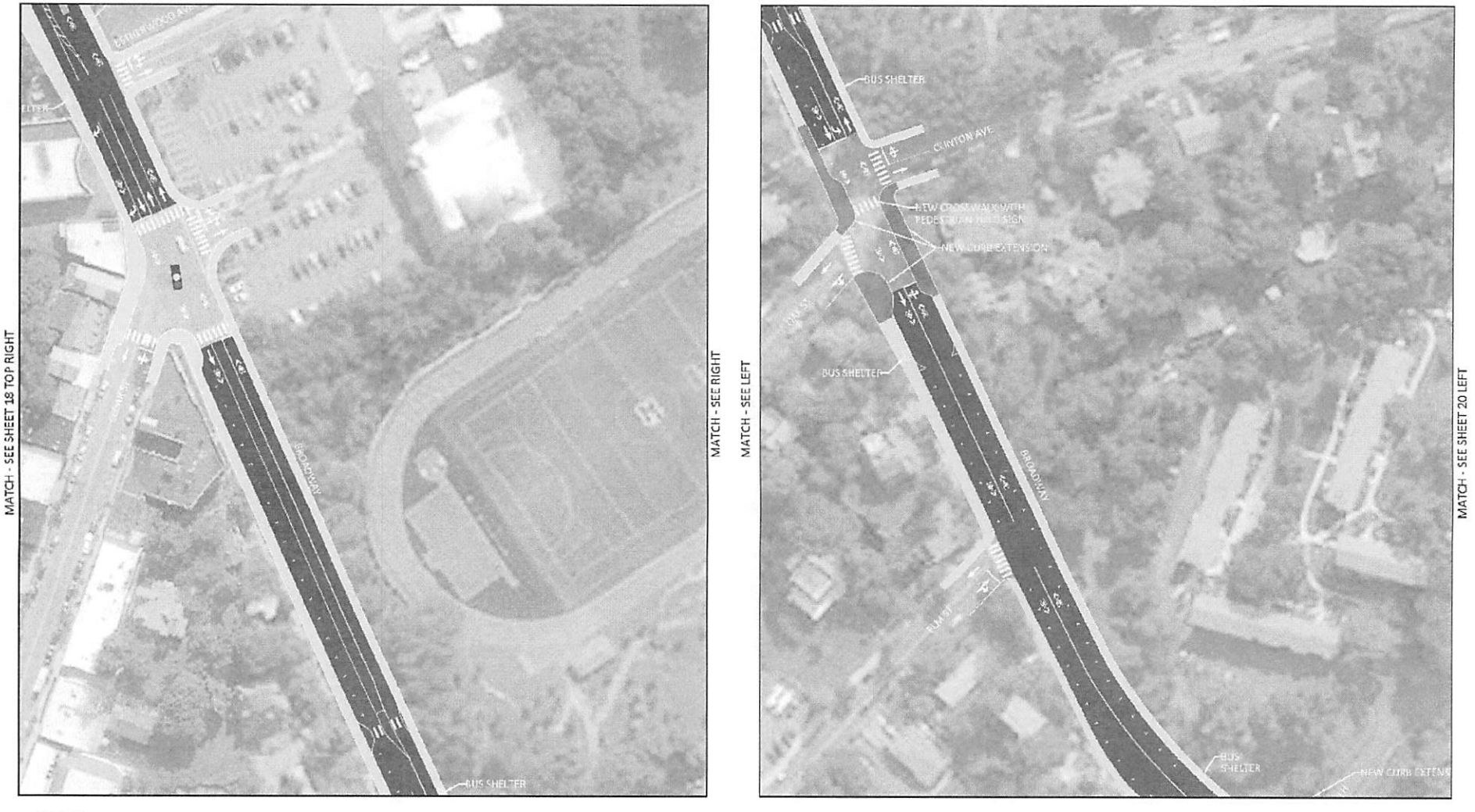


Figure 97 Conceptual Design – Dobbs Ferry – 20

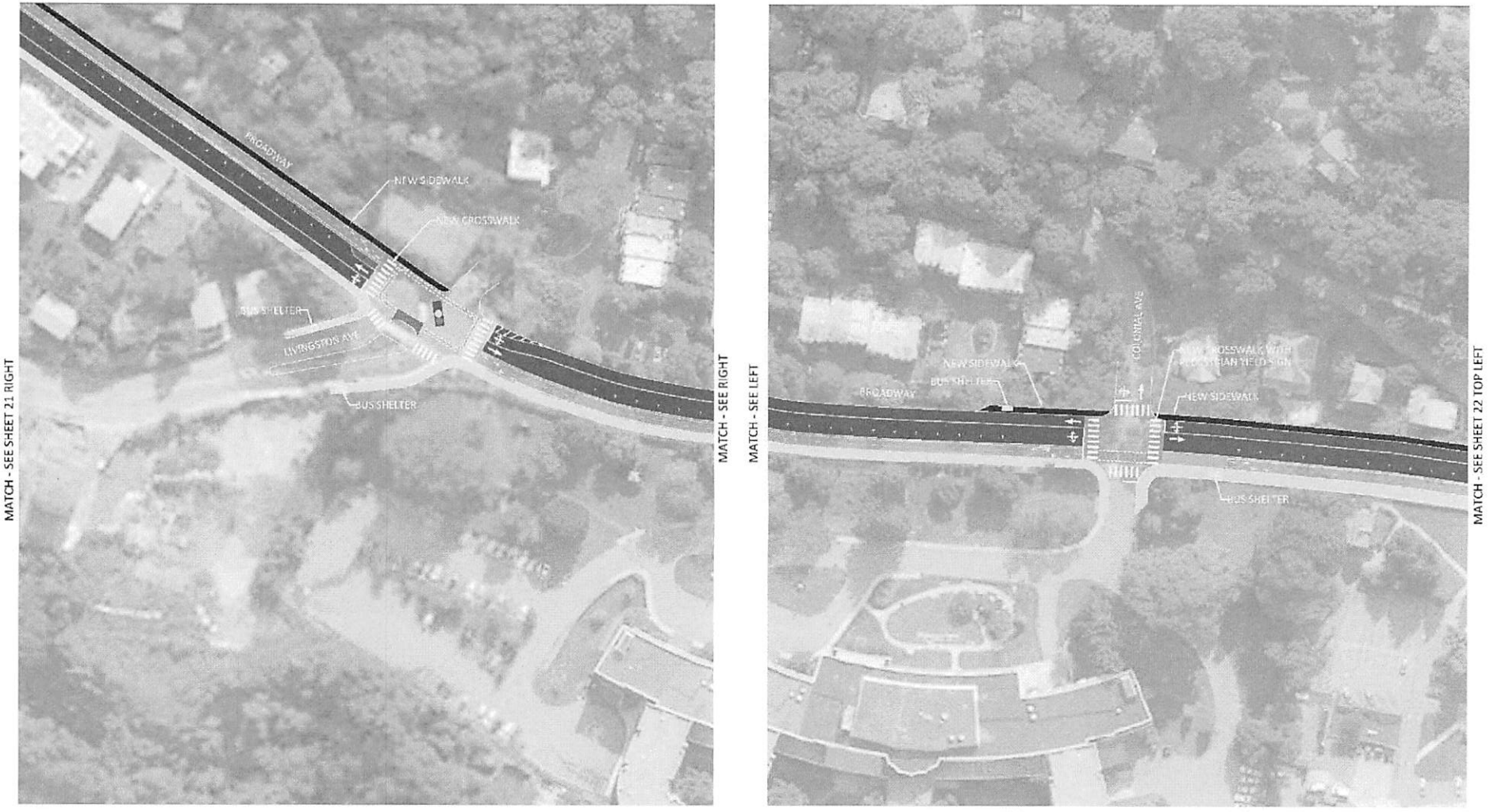
LEGEND:

- TRAVEL LANE
- BIKE LANE
- CURB EXTENSION
- NEW SIDEWALK
- EXISTING SIDEWALK
- PLANTED MEDIAN
- BUS STOP PLATFORM
- BUS STOP SHELTER

DRAFT CONCEPTUAL
NOT FOR CONSTRUCTION

0 100 200

Figure 98 Conceptual Design – Dobbs Ferry – 21



LEGEND:

- TRAVEL LANE
- BIKE LANE
- CURB EXTENSION
- NEW SIDEWALK
- EXISTING SIDEWALK
- PLANTED MEDIAN
- BUS STOP PLATFORM
- BUS STOP SHELTER

DRAFT CONCEPTUAL
NOT FOR CONSTRUCTION

0' 100' 200'

Figure 99 Conceptual Design – Dobbs Ferry – 22

Figure 100 Conceptual Design – Dobbs Ferry – 23

LEGEND:

- TRAVEL LANE
- BIKE LANE
- CURB EXTENSION
- NEW SIDEWALK
- EXISTING SIDEWALK
- PLANTED MEDIAN
- BUS STOP PLATFORM
- BUS STOP SHELTER

DRAFT CONCEPTUAL
NOT FOR CONSTRUCTION

0 100 500

Figure 101 Conceptual Design – Hastings-on-Hudson – 24

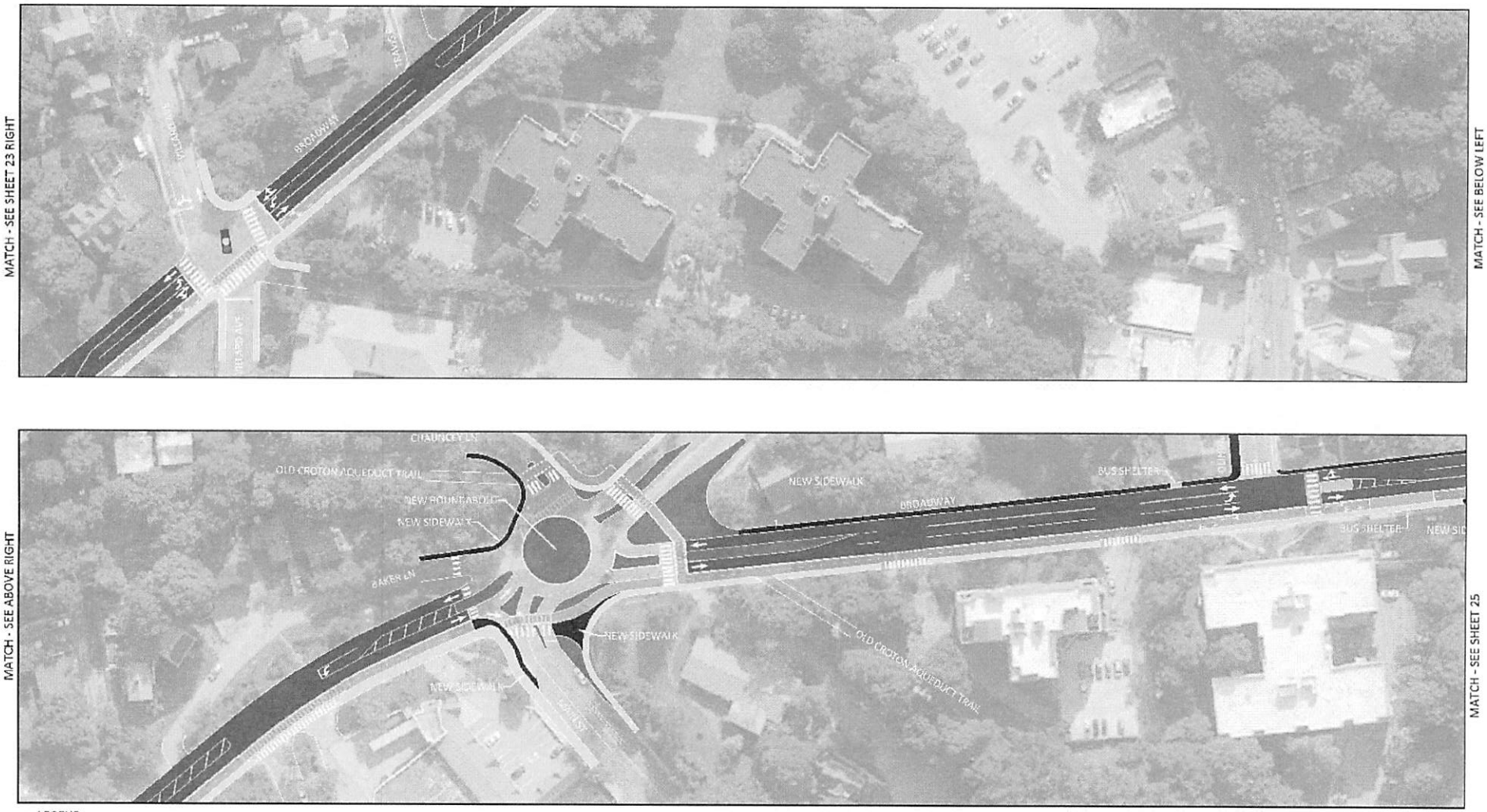


Figure 102 Conceptual Design – Hastings-on-Hudson – 25

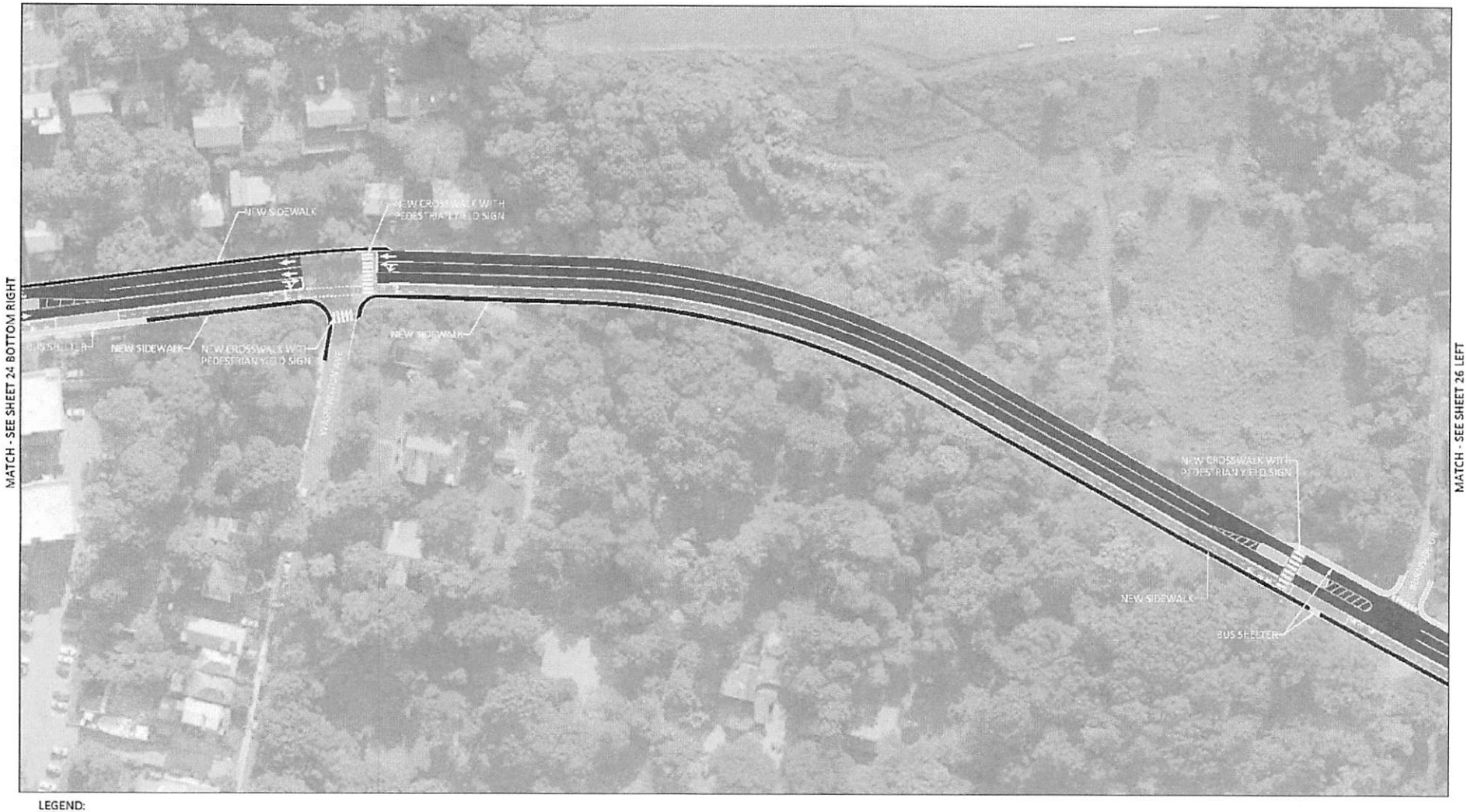


Figure 103 Conceptual Design – Hastings-on-Hudson – 26

Figure 104 Conceptual Design – Hastings-on-Hudson – 27

Figure 105 Conceptual Design – Hastings-on-Hudson – 28

Preliminary Cost Estimates

The preliminary cost estimates provided as part of the Implementation Plan were broken down into the categories and Village of Walk Infrastructure, Bike Infrastructure, Traffic Operations and Transit, and include the following elements and units:

Figure 106 Description of Elements and Units Incorporated in the Preliminary Cost Estimate

Category	Description	Unit
Walking facilities	New Concrete Sidewalk	Linear ft
	High Visibility Crosswalk	Square ft
	Curb Extensions/Median Islands	Square ft
	HAWK Signal	Ea
Traffic operations	Traffic Lane Restriping	Linear ft
Bike Facilities	Bike Lane	Linear ft
	Bike Lane Separation	Ea
	Sharrows	Ea
	Pre-Fabricated Boarding Platform with Integrated Bike Lane	Ea
Transit facilities	Bus Shelter	Ea

A current unit cost was assigned to components of the network. Unit costs are based on experience implementing these facility types nationwide. When implementing an on-street facility, the street resurfacing required to remove previously existing striping is a significant cost associated with implementation. The cost estimates as part of the Implementation Plan and do not include the cost of resurfacing. However, coordination and prioritization of the street resurfacing program represents a significant opportunity to reduce the overall cost of this network investment.

The construction is estimated to cost between $6M to $36M. Appendix D contains a detail cost estimate broken by Village. See below for the total costs by Village.

Figure 107 Total cost estimates per Village (2018)

Village	Low cost estimate	High cost estimate
Sleepy Hollow	$945,387	$4,966,069
Tarrytown	$1,440,800	$9,221,151
Irvington	$1,263,079	$6,847,179
Dobbs Ferry	$1,270,238	$5,790,165
Hastings-on-Hudson	$1,589,881	$9,413,282
Total	$6,509,385	$36,237,846

Impact on Parking Supply

The implementation of the proposed active transportation corridor will require removing some on-street parking spaces in some segments along Route 9. With the exception of Irvington, the parking utilization analysis performed for this project show that maximum utilization during peak periods is lower that the on-street parking supply of the proposed design. In Irvington, although all on-street parking spaces would be removed, there is sufficient adjacent underutilized off-street parking supply that can supplement that (See Figure 109).

Figure 108 Balance of On-Street Parking Supply in the Proposed Design and Current Parking Utilization

Village	On-Street Supply	On-Street Weekend Peak Utilization	On-Street Weekday Peak Utilization	Off-Street Supply	Off-Street Weekend Utilization	Off-Street Weekday Utilization	Repurposed On-Street Spaces	On-Street Supply After Implementation
Sleepy Hollow	57	20	7	726	275	350	29	28
Tarrytown	136	83	67	667	237	319	2	134
Irvington	24	15	12	452	117	92	24	0
Dobbs Ferry	280	124	120	339	32	25	40	240
Hastings-On-Hudson	0	0	0	374	227	191	0	0

Impact on Traffic Operations

As indicated in the Existing Conditions analysis, some intersections in the study area operate outside of this minimum standard during the peak hour. With the addition of the Active Transportation corridor as indicated in the Conceptual Design, those intersections operating below the NYSDOT threshold will continue operating similarly, while some others will increase the vehicle delay due to the changes in the road and intersection configurations.

During the weekday PM Peak, the intersections that experienced a Level of Service below the NYSDOT threshold as explained in the Existing Conditions chapter with the addition of the active transportation facilities include Pierson Avenue/Gordon Avenue (Sleepy Hollow), Beekman Avenue (Sleepy Hollow), I-87 WB (Tarrytown), Livingston Avenue (Dobbs Ferry), Ashford Avenue (Dobbs Ferry), and Farragut Avenue (Hastings-on-Hudson). As with the AM Peak, most of these intersections operate beyond acceptable levels during existing conditions as well as with the active transportation facilities, with the exception of Ashford Avenue which shifted from an LOS D in existing conditions to an LOS E with the addition of the active transportation facilities.

Finally, Livingston Avenue (Dobbs Ferry) and Farragut Avenue (Hastings-on-Hudson) experienced LOS F during the midday Saturday period. As with the AM and PM conditions, both of these intersections operate beyond acceptable levels during existing conditions as well as with the active transportation facilities.

Appendix E contains details on the methodology used and the results by intersection.

Additional Improvements to the Transit Network

Below is a list of improvements to the transit network, additional to those indicated in the Conceptual Design Plan and listed below in the Action Plan:

- In Tarrytown:
  - On Central Ave, remove two on-street car spaces eastbound to provide more space for the bus to stop (Routes 1 and 13)
  - Tappan Zee Express (TZx) to stop at the bus stop of Routes 1 and 13 adjacent to the SUP landing southbound and south of Prospect Ave northbound to improve transfer between the bicycle and transit network. Add bike racks in both stations
  - Lengthen the bus stop on Route 9 north of Neperan Road from 40' to 60' by removing one metered space
- In all villages:
  - add new shelters with benches to the any bus stops marked with a pole

6 ACTION PLAN

The primary goal of the Village Consortium is to create a continuous Active Transportation corridor that makes Route 9 safer and is accessible and welcoming for people of all ages and bicycling abilities. Building the entire corridor will require a sustained commitment over the coming years. This section includes specific recommendations categorized as follows:

- Making new connections for biking
- Making it easier to walk along Route 9
- Making Route 9 easier to cross
- Supporting Transit
- Road configuration improvement and parking supply changes

These design concepts, and their corresponding projects, are suitable for securing future funding for engineering design and construction.

PROJECT LIST AND KEY ACTIONS

The following tables describes the facilities improvement by category, road segment and Village, and specifies the Implementation Term (IT) as:

- Short = 1-2 years
- Medium = 3-9 years

Note that some of the improvements are interrelated, in particular in road segments where a protected bike lane has been proposed, which requires restriping and specific intersection design where the bike lane crosses the pedestrian crossings. As a result, the IT considered for both improvements is the same.

Figure 109 Active Transportation Facilities Improvements – Sleepy Hollow

Segment	Making new connections for biking	Make it easier to walk along Route 9	Make it easier to cross Route 9	Supporting Transit	Improvements in the roadway configuration and changes in the parking supply
North of Bellwood Ave north entrance	2-way protected bike lane on the west side of the street on Route 9	▪ New sidewalks on the west side of Route 9 from Phelps Ln to Bellwood Ave north entrance ▪ New sidewalks at Helmock Dr bus stop NB	▪ New crosswalks along Route 9 at the intersections of intersecting streets ▪ New curb extension on the north corner of Bellwood Ave crossing	Hemlock Dr bus stop NB: new sidewalk and new crosswalk across Route 9	▪ Restriped to two lanes with painted center line: 11' wide travel lanes ▪ Left turn lanes at Phelps Ln, Hemlock Dr: 10' wide turning lanes
Implementation Term	Medium	Medium	Short	Short	Medium
Bellwood Avenue to Pierson Ave	2-way protected bike lane on the west side on Bellwood Ave	▪ New sidewalks on both sides on Bellwood Ave from Route 9 to Farrington Ave ▪ New sidewalk on the west side on Bellwood Ave from Farragut Ave to Hardwood Ave	▪ New Crosswalks in all four legs of each intersection ▪ New Curb extension on the south-east corner of Devris Ave intersection ▪ Pierson Ave intersection is improved with new crossings and curb-extensions	-	Restriped to two lanes with painted center line: 11' wide travel lanes
Implementation Term	Medium	Short	Medium	-	Medium
Pierson Ave to New Broadway	2-way protected bike lane on the west side of the street	New sidewalk to access the bus stop NB south of Pierson Ave intersection	▪ New crosswalk to access the bus stop NB south of Pierson Ave intersection ▪ New crosswalks at Pocantico St and Lawrence Ave ▪ Intersection improvements with curb extensions and new crosswalks (Pocantico St, Lawrence Ave)	New sidewalk and crosswalk to access the bus stop NB south of Pierson Ave intersection	Restripe to the east: 11' wide lanes, one NB and two SB
Implementation Term	Medium	Short	Short	Short	Medium
South of New Broadway	▪ 2-way protected bike lane on the east side of the street ▪ Transition point in a new crosswalk south of New Broadway	New sidewalk on the east side of Route 9 from the Korean Church to the Village south border	▪ New crosswalks in all legs of the intersections and curb extensions on Route 9 to narrow the crossings ▪ Intersection improvements with curb extensions and pedestrian islands in Beekman Ave	-	▪ Remove 5 on-street parking spaces on the west side from Beekman Ave to the Korean Church new crossing ▪ Remove 23 on-street parking spaces on the east side from Hudson Terrace to the High School entrance on the east side ▪ Restripe to two 11' lanes NB and one 11' lane SB from Beekman Ave to the new crossing at the Korean Church
Implementation Term	Medium	Short	Short	-	Short-Medium

Figure 110 Active Transportation Facilities Improvements – Tarrytown

Segment	Making new connections for biking	Make it easier to walk along Route 9	Make it easier to cross Route 9	Supporting Transit	Improvements in the roadway configuration and changes in the parking supply
North border to Benedict Ave	Sharrows	-	▪ New crosswalks at Central Ave and Elizabeth St ▪ Intersection improvements with curb extensions and additional crosswalks	Extend the bus bay for NB routes at the stop north of Neperan St intersection	Remove 3 on-street car spaces on the east side south of the Neperan St crossing
Implementation Term	Short	-	Short	Short	Short
Benedict Ave to Prospect Ave	▪ Separated protected bike lane on each side of Route 9 ▪ Transition point at Prospect Ave intersection	-	New crosswalk at Leroy Ave	-	▪ Restripe to 11' lane, one in each direction, with 10' right turn lane on Benedict Ave, from Benedict Ave to Tappan Landing Rd ▪ Restripe to 11' lane, one in each direction, with 10' center turn lane, from Tappan Landing Rd to Prospect Ave
Implementation Term	Short-Medium	-	Short	-	Short-Medium
Prospect Ave to SUP landing (Governor Mario M. Cuomo Bridge Planned Shared-Use Path)	2-way protected bike lane on the west side of the street	Crosswalks connecting sidewalks in adjacent access points	▪ New sidewalk to access the bus stop NB south of Pierson Ave intersection ▪ Intersection improvements with curb extensions and new crosswalks	New sidewalk and crosswalk to access the bus stop NB south of Pierson Ave intersection	Restripe to 11' lane, one in each direction, and 10' turning lane NB left on Quay of Tarrytown and both ways on 303 entrance
Implementation Term	Medium	Short	Short	Short-Medium	Short-Medium
SUP landing to I-287 intersection	2-way side path west of the sidewalk	Crosswalks connecting sidewalks in adjacent access points	New crosswalk at the shopping plaza traffic light, between the SUP landing and White Plain Rd EB entrance	Move NB bus stop at the shopping plaza south of the entrance	NYSDOT design
Implementation Term	Short-Medium	Short-Medium	Short-Medium	Short	Short-Medium
I-287 intersection to Lyndhurst Museum Ln	▪ 2-way protected bike lane on the west side on Route 9 ▪ Transition point at Lyndhurst Museum Ln	New sidewalk at the NB bus stop at Lyndhurst Museum	▪ New crosswalk on Route 9 to access the NB bus stop at Lyndhurst Museum ▪ New crosswalks, islands and HAWK signal at the OCA crossing ▪ Crosswalks at all legs of the intersections	Accessibility improvements to the NB bus stop at Lyndhurst Museum	Restripe to 11' lane, one in each direction, and 10' painted median/turning lane
Implementation Term	Short-Medium	Short	Short	Short	Short-Medium
Lyndhurst Museum Ln to Sunnyside Ln	Separated protected bike lane on each side of Route 9	-	Pedestrian Island and new crossing at East Belvedere	-	Restripe to 11' lane, one in each direction, and 10' painted median/turning lane
Implementation Term	Short-Medium	-	Short	-	Short-Medium

Figure 111 Active Transportation Facilities Improvements – Irvington

Segment	Making new connections for biking	Make it easier to walk along Route 9	Make it easier to cross Route 9	Supporting Transit	Improvements in the roadway configuration and changes in the parking supply
Sunnyside Ln to Langdon Ave	Separated protected bike lane on each side of Route 9	New sidewalk on the east side from Sunnyside Ln to the Immaculate Conception Church, from Sycamore Ln to Harriman Rd, and from Clinton Ave to Langdon Ave	▪ New crosswalks along Route 9 at all the intersections ▪ Intersection improvements with curb extensions	▪ Remove bus stops at Irvington Gardens due to its proximity to Sunnyside Ln bus stops ▪ New bus stop north of the crossing at Circle Dr	▪ Road diet to 11' lane, one in each direction, and 10' painted median/turning lane ▪ Remove on-street parking on Route 9 (25 spaces)
Implementation Term	Short-Medium	Short	Short	Short-Medium	Short-Medium

Figure 112 Active Transportation Facilities Improvements – Dobbs Ferry

Segment	Making new connections for biking	Make it easier to walk along Route 9	Make it easier to cross Route 9	Supporting Transit	Improvements in the roadway configuration and changes in the parking supply
Langdon Ave to the High School entrance	▪ 2-way protected bike lane on the west side on Route 9 ▪ Transition point at Langdon Ave	New sidewalk on the east side from Langdon Ave to McCelland Ave	▪ Crosswalks paired with pedestrian islands/curb extensions to always be on the other side of the intersection from the stop bar for the left turn lane, which will reduce the number of crosswalks ▪ Intersection improvements with curb extensions and pedestrian islands: McCelland Ave, Sherman Ave	Improvements to access the NB stop at Ardsley Ave	Road diet to 11' lane, one in each direction, and 10' painted median/turning lane
Implementation Term	Short-Medium	Short	Short	Short	Short-Medium
High School entrance to OCA crossing	▪ Sharrows on Route 9 ▪ OCA trail as an alternative (intensify Wayfinding to indicate the continuity of the protected bike lane)	New sidewalk on the east side from Oliphant Ave to the OCA trail	▪ New HAWK signal at the OCA crossing ▪ Improvements with curb extensions and pedestrian islands: Belden Ave, Maple Ave, Clinton Ave, OCA crossing	▪ New proposed NB bus stop south of the intersection with Estherwood Ave ▪ New proposed bus stops, one in each direction, at Clinton Avenue/Oak Street	
Implementation Term	Short	Short	Short	Short-Medium	
OCA crossing to Livingstone Ave	▪ 2-way parking protected bike lane on the east side on Route 9 ▪ Transition point in Livingston Ave		Improvements with curb extensions and pedestrian islands: Livingstone Ave		▪ Restripe to 11' lanes, one per direction. ▪ Remove on-street parking on the west side
Implementation Term	Short-Medium				Short-Medium
Livingstone Ave to Fairlawn Ave	2-way parking protected bike lane on the west side on Route 9	New sidewalks from north Colonial Avenue to southern border	▪ New crossings with pedestrian yield signs north of the southbound bus stop at Fairlawn Ave and Flower Ave ▪ Improvements with curb extensions and pedestrian islands: Colonial Ave	New sidewalk to access the northbound bus stop north of Colonial Avenue	▪ Restripe to 11' lanes, one per direction. ▪ Remove 29 on-street parking spaces on the east side south of Colonial Ave
Implementation Term	Short-Medium	Short	Short	Short-Medium	Short-Medium

Figure 113 Active Transportation Facilities Improvements – Hastings-on-Hudson

Segment	Making new connections for biking	Make it easier to walk along Route 9	Make it easier to cross Route 9	Supporting Transit	Improvements in the roadway configuration and changes in the parking supply
Fairlawn Ave to Devon Way (Route 9 split)	▪ 2-way protected bike lane on the west side on Route 9 ▪ Transition point at Devon Way	▪ New sidewalk on the east side from northern border to Flower Ave, from Minturn St to Wagner Pl, from Edgars Ln to Elm Pl, from the 5 corners to Washington Ave ▪ New sidewalks on the west side from the existing sidewalk north of Washington Ave to Devon Way	▪ Crosswalks paired with pedestrian islands/curb extensions at 5 Corners and Devon Way ▪ New crosswalks with pedestrian yield signs north of Flower Ave, at Fraser Pl, and at Devon Way	Improve access to all bus stops	▪ Road diet/Restripe to 11' lane, one in each direction, and 10' painted median/turning lane ▪ Roundabout at 5 Corners
Implementation Term	Short-Medium	Short	Short	Short	Short-Medium
From Devon Way to south of Tompkins Ave (Route 9 reunites)	Protected bike lane in each direction	New sidewalks in east and west of the proposed bike lanes	▪ Crosswalks paired with pedestrian islands/curb extensions at Tompkins Ave ▪ Improvements with curb extensions and pedestrian islands: Devon Way and Tompkins Ave	Improve access to all bus stops	
Implementation Term	Short-Medium	Short	Short	Short	Short-Medium
Tompkins Ave (Route 9 reunites) to south border	Protected bike lane in each direction	New sidewalks in east and west of the proposed bike lanes		Improve access to all bus stops	Road diet/Restripe to 11' lane, one in each direction, and 10' painted median/turning lane
Implementation Term	Short-Medium	Short		Short	Short-Medium

Further Actions

In addition to these infrastructure projects, the Villages should also address the following needed improvements and actions in the city.

- **Ongoing Maintenance:** Regular maintenance of the bicycle and pedestrian network should be planned and budgeted. Well-maintained facilities are crucial to ensuring these important investments remain accessible to riders of all experience levels, and that people feel confident they can rely on the network for their regularly-scheduled trips. Proper maintenance also extends the life of infrastructure, limiting the need for expensive repairs.
- **Coordinated Implementation:** Coordinating implementation across Villages departments will help to improve efficiency in project delivery and speed the delivery of complete streets and other complementary infrastructure. It is recommended to coordinate plans and project prioritization to support multi-plan implementation.
- **Crash Data:** Better bicycle and pedestrian-involved crash data would provide the Villages with a more complete picture of the causes of crashes and help to inform the solutions needed to make Route 9 safer for bikers and pedestrians.
- **Bicycle and Pedestrian Counts:** counts can be collected effectively with machines that automatically record the number of people on bikes and walk that pass by a specific location. While effective, these machines are expensive and cover only a limited area of the city. By partnering with community groups or Advisory Councils, the Villages could recruit volunteers for manual counts over a larger geographic area. This would provide a better estimate of bicyclists and pedestrians and would be useful in validating assumptions and analyses used in developing the network.

POTENTIAL FUNDING SOURCES

There are many funding sources that can be used to support the Route 9 Active Transportation Plan's implementation, including leveraging existing resources; local, regional, state, and federal grant funding opportunities; private funding; and partnership opportunities. While many of these funding sources are competitive—particularly the public grant sources—the villages have been very successful at competing for grant funds. By matching projects to the funding sources for which they are best suited (and for which they can be most competitive), the area can continue to use a variety of funding mechanisms to build projects and implement new programs.

This section is organized into public funding sources and private funding sources. The public sources are further categorized into local, regional, state, and federal programs.

Public Funding Sources

Public funding sources include local, regional, state, and federal funds and grant opportunities. The regional, state, and federal sources are distributed through regular funding competitions, and the amount available in a given year depends on a wide range of factors. The majority of the projects identified below will be competitive for public funding given the benefits they provide to specific communities and their focus on improving comfort and safety.

Figure 114 Public Funding Sources

Source	Description	Eligible Agencies
Local		
Advertising	Paid advertisements on agency properties	Subject to local regulations
Naming Rights / Sponsorships	Selling naming rights has become more common among organizations and some transit agencies	Subject to local regulations
Public-Private Partnerships and Joint Development	A mutually beneficial agreement between public and private entities that seek to improve the value of an asset or property	Subject to local regulations
Property Assessments	Voluntary or codified property assessments can be attributed to programs and services that directly benefit the assessed property or business	Subject to local regulations
General Municipal and Capital Improvement Funds	Where possible, project elements can be implemented into existing funding mechanisms, particularly in cases of ROW maintenance	
Parking Meter Revenues	Increasingly, surplus parking revenues are used by municipalities to fund non-motorized transportations investments and streetscape improvements	
State/Regional		
Community Development Block Grant Funds	Funds are available for technical assistance and implementation grants for neighborhood revitalization and community development projects	Local government
Hudson River Valley Greenway Grants	Greenway Communities are eligible to receive up to $10,000 to develop plans or projects consistent with the five Greenway criteria Greenway Compact communities are eligible to receive more than $10,000 for projects that develop, approve, and implement a compact strategy consistent with the Greenway criteria and the Greenway Act.	Greenway or Compact communities
Westchester Community Foundation	Where appropriate, will provide funding for tax-exempt 501(c)(3) organizations operating or proposing to operate programs for the benefit of Westchester residents and communities, including school districts.	Any tax-exempt entity
NYSDOT State Dedicated Fund (SDF)	Provide funds for transit system improvements and innovative capital transit projects	Counties, cities, and non-MTA transit authorities
Transportation Alternatives Program Set-Aside	Provides up to 80 percent of project-related cost funding for programs and projects defined as transportation alternatives	▪ Any local or regional governmental entity ▪ MPO's and State agencies are not eligible
NYSOCR New York Main Street Program	Provides financial resources and technical assistance to communities to strengthen the economic vitality of the State's traditional Main Streets and neighborhoods	Local government
NYSOPRHP Recreational Trails Program	Provides funds to states to develop and maintain recreational trails for both motorized and non-motorized recreational trail use. Grants can fund up to 80% of the total project cost.	Any public entity in NYS
NYSDEC Climate Change Grants	Funding for projects that help communities reduce greenhouse gas emissions and prepare for a changing climate	Any public or private entity registered in the NYS Grants Gateway
Federal		
TIGER/Build Grant	Provides investments in road, rail, transit and port projects that promise to achieve national objectives; including safety, economic competitiveness, quality of life, environmental protection, state of good repair, innovation, partnership, and additional non-Federal revenue for future transportation investments	Any public entity
FTA Capital Investment Grants	Bicycle and pedestrian improvements that are components of transit investments are eligible for funding through this program.	State or local governments
Transportation Infrastructure Finance and Innovation Act	Provides credit assistance for qualified projects of regional and national significance	Any public or private entity

Private Funding Sources

Private funding sources are increasingly used to supplement public funds, particularly in areas that are experiencing a great deal of growth and development. While private funding is most often the "last dollar in" for a project—rather than the seed money for an improved bike crossing, for example—leveraging private investment is a powerful way for cities to implement more projects and build stronger partnerships with community members.

Partnerships with local businesses can generate support and funding for bike network projects in specific places or as a part of larger neighborhood initiatives. Projects funded through public-private partnerships may include green streets and pedestrian plazas, pedestrian tunnels, bike share programs, and multi-use trails. Working proactively with corporate stakeholders—which often occurs as a part of large redevelopment projects or within the scope of a specific community benefits agreement—can also lead to a partnership for funding bike projects.

Non-profit organizations, community groups, and advocacy organizations also offer funding for bike infrastructure projects in the form of grants. For example, PeopleForBikes is an advocacy group that administers a Community Grant Program, funding for a variety of bike network projects, including shared-use paths, trails, and protected bike lanes.

Finally, a number of national foundations have begun to play important roles in supporting pedestrian infrastructure improvements and programming. National foundations that have funded urban health and active transportation investments in the recent past include the following:

- Bloomberg Philanthropies' Sustainable Cities and Initiative for Global Road Safety, respectively, grants aim to tackle climate change at the city and local level and reduce traffic deaths and injuries.
- The Kresge Foundation has supported planning (not construction) for bicycle and pedestrian facilities.
- Outside the Box is a grant program funded by Redbox and managed by the Online Computer Library Center (OCLC) in partnership with the Project for Public Spaces to support libraries and their communities in carrying out free, fun events in the public right-of-way to activate spaces.
- The Robert Wood Johnson Foundation funds projects and research related to the health impacts of active transportation and the built environment.
- Southwest Airlines' Heart of the Community Program grants provide financial and technical assistance to local community partners who seek to bring new life to public spaces and transform them into vibrant places that connect people and strengthen communities.
- The Surdna Foundation's Sustainable Transportation Networks and Equitable Development Patterns Grant supports efforts to boost sustainable transportation networks.

Development Fees

Some jurisdictions have implemented impact fees that can be used to fund various types of infrastructure. For example, a fee may be adopted for each peak hour vehicle trip that is generated by a new residential project. In most cases, this funding is combined with funds from other projects to establish a pool of money to construct the improvements that are on an adopted project list which can include projects that serve many travel modes.

As part of approval for new projects, the Villages could require developers to fund or build bicycle infrastructure in right-of-way adjacent to their project. Codifying bike parking requirements in zoning rules is another way that local governments can incorporate bicycle facilities in new development.

Business Improvement Districts and Community Benefit Districts

Bicycle infrastructure can be funded as part of a local benefit assessment district, which is based on the concept that those who benefit from a service should help to fund it. One common example is the Business Improvement District (BID), where business owners pay directly into a common fund to provide improved infrastructure, support operations to maintain clean and safe streets, and enhance wayfinding and placemaking elements in the district. These districts may fund bike improvements along with ongoing maintenance, placemaking, and landscaping projects.

7 SUPPORTIVE PROGRAMS, POLICIES, & PROCEDURES

Walking and cycling-supportive programs, policies, and procedures complement the low-stress walking and bicycle network. Developing a culture of active transportation that makes biking a fun, efficient and attractive travel option for people of all ages and abilities takes years of commitment and engagement by stakeholders at all levels. Programs like Safe Routes to School, policies such as Vision Zero, and regular maintenance of bike infrastructure are essential components of a sustainable, high-ridership network.

The sections below introduce select programs to support people riding bikes, policies to help make Route 9 a bike-friendly corridor, and procedures that the Villages should implement to support development of the Active Transportation network.

PROGRAMS

Programs are targeted, actively managed, village-led initiatives that include collaboration with partners and the involvement of community members to elevate biking as a primary mode of transportation and to improve safety and comfort for people.

Encouragement

- **Community rides** such as monthly bike parties or bike-based tours help expose new riders to a bike network. Low-speed, relaxed group rides are particularly effective at building family ridership, and these group rides can be used as an economic development tool when trips are routed through shopping areas.
- **Bike races** and other competitions build community and draw committed cyclists from across the region. Bike-based competitions are excellent for involving youth, and both spectators and participants bring tourist dollars to competition sites.
- **Open streets events,** also known as ciclovías, close down major community thoroughfares for a day, opening the street for people to walk, bike, roller blade, and use other non-motorized transportation. These events help build a sense of community and neighborhood pride and can be targeted economic development tools that coincide with holidays, festivals, or other special events.

Figure 115 Bicycle Race in Crystal City, VA

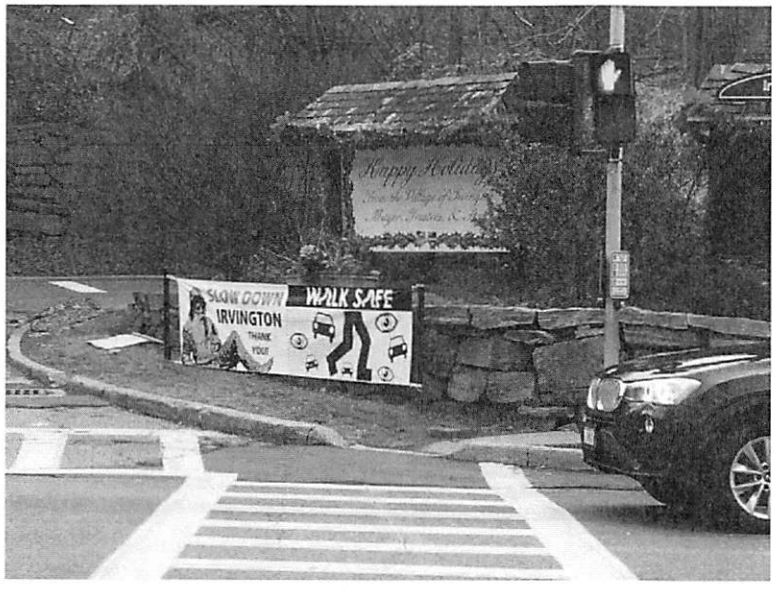
Education

- Building a world-class bike network means familiarizing drivers with the growing number of bikes in the area. Adding **bike awareness training** to driver's education programs helps normalize auto interactions with bikes and teach people driving about bicycle infrastructure. Adding bike awareness training to commercial licensing and other large vehicle operator training is particularly important, as these vehicles pose the greatest danger to people on bikes.
- **Safe Routes to School** is a nationwide program that creates safe, simple, and fun opportunities for children to walk or bike to school. This program encourages important physical activity before and after school and can reduce traffic caused by vehicles dropping off and picking up students. A bike rodeo, an on-bike clinic with stations focusing on bike skills, bike maintenance, rules of the road, and helmet fit. Bike Rodeos are a fun, active and hands on activity for elementary students to learn biking and safety skills in a safe and comfortable environment. See below an advertisement of Walk Safe in Irvington NY, who offer programs to teach students to walk to school, such as the Walking School Bus.

Figure 116 Awareness Training for Compactor Truck Operators and Cyclists in Cambridge, MA

Source: Nelson\Nygaard

Figure 117 Walk Safe in Irvington NY Offers Walk to School Education Programs



Advocacy/Support Groups

- Building a positive, collaborative relationship with **local advocacy groups** such as Bike Tarrytown helps bring more community members into the bike planning processes and can streamline project delivery by drawing stakeholder engagement into earlier phases of project and plan review.
- **Community groups** that support bike network implementation can help produce the special events and community rides that build familiarity with a bike network. They can also serve as an intermediary between local businesses and bike-based events, thereby channeling economic development to bike-friendly shopping events and corridors.

Bicycle Parking

- **Safe, secure, bike parking** ensures that the beginning and end of every cycling trip is comfortable and stress-free. Incentivizing easily-accessible, well-lit, and sheltered bicycle parking at major destinations and trip generators can increase ridership, and prominently-located bike parking facilities can encourage people who drive to try biking to regular destinations.
- Mandating high-quality **bicycle parking sites in large residential and commercial developments** ensures that future residents have access to safe, clean, and sheltered parking for their bikes.
- **Valet bike parking at special events** is a fun and novel way to encourage cycling to large events.

Figure 118 Bike Locker at BART Station in the Bay Area, CA

Source: Nelson\Nygaard

Wayfinding

- **Good wayfinding** is crucial to successful bike network implementation. Signs that provide the distance and direction to major destinations, transit connections, and places of interest help new riders build familiarity with bike routes and the larger network.
- Wayfinding can be used as an **economic development tool,** directing people on bikes towards shopping sites such as retail corridors, farmers markets, and special events.

POLICIES

Policies translate plan goals into operational standards, guidelines, and practices, and establish street design, operational, and maintenance standards to increase safety and reduce collisions.

Eliminating Traffic Deaths

- Establishing a **Towards Zero Death** or **Vision Zero policy** formalizes a city's commitment to eliminating traffic deaths. By operating under the belief that every death in a traffic crash is preventable, the Villages along Route 9 can work to produce the safest possible outcomes with every infrastructure project. A key component of the Vision Zero mission is the reduction of auto speed in places where people walk and bike.

Design Criteria

- Building an accessible low-stress bike network is a **context-sensitive undertaking** that is carried out differently along the corridor. Appropriate design guidelines can be developed from general principles but must take into account the unique needs of the community for which they are produced and the neighborhoods in which they are applied.
- **Infrastructure design guidelines** that separate people biking from moving vehicles are the cornerstone of a bike network with low levels of traffic stress. Successful guidelines are produced for network segments and nodes, thereby protecting people on bikes at both intersections and along rights-of-way.
- In many places, rights-of-way are generous enough to support auto lanes, sidewalks, and protected bike infrastructure. In instances where protected bike infrastructure is missing, road diets may be necessary to reduce the width or number of auto lanes. This type of **"roadway recanalization"** reduces speeds to improve safety and reflects the transportation goals and priorities of a multimodal city.

Dedicated Funding

- A commitment of **dedicated and sustained infrastructure funds** is essential to the successful implementation of the Active Transportation network. A baseline financial commitment provides assurance to public, private, and non-profit partners that their investments will be matched and their partnership is valued. Funding commitments can come in the form of grant programs, capital investment programs, or budget allocations to relevant departments.

PROCEDURES

Procedures are the day-to-day practices that can make Route 9 streets safe and comfortable for walking and biking. Procedures can be staffing changes to street management to project delivery that have a profound impact on the quality of the bicycle network along Route 9.

Pedestrian Facilities Maintenance Standards

- Defining **maintenance** and developing **standards for pedestrian facilities maintenance** that are integrated into regular maintenance cycles helps establish the point in which maintenance ends and higher forms of project development takes form and removes ambiguity about when or how this type of infrastructure is to be maintained. Good maintenance practices also reduce long-term capital costs by extending the lifespan of expensive infrastructure.
- Establish a **model maintenance program** for pedestrian facilities to be able to respond quickly to a hazard or frequent complaints, and to address sidewalk issues in a manageable and predictable fashion. Maintenance can be a partnership between public, private, and advocacy organizations and can be facilitated by issue-reporting apps such as SeeClickFix.

Bikeway Maintenance Standards

- Developing **standards for bikeway maintenance** that are integrated into regular maintenance cycles removes ambiguity about when or how a bikeway is to be maintained. Good maintenance practices also reduce long-term capital costs by extending the lifespan of expensive infrastructure.
- Encouraging regular ridership on a bike network means the **network must be well maintained,** with regular sweeping and short response times for repairs. Commuter ridership, in particular, requires that routes to major workplaces are consistently clear of snow and debris, and pavement is free from cracks, potholes, and other defects. Maintenance can be a partnership between public, private, and advocacy organizations and can be facilitated by issue-reporting apps such as SeeClickFix.

Tracking Progress

- Developing and using **performance measures** is an important step in monitoring progress toward meeting the goals of this corridor. Performance measures should be clear and easily understandable, related to community values and goals, and reported on an annual basis. Metrics are valuable for tracking progress, such as the number of miles of biking lanes added each year, and for establishing targets for the future, such as increasing bicycle commute mode share.