

Route 9 Active Transportation Conceptual Design Plan Sleepy Hollow's Steering Committee Recommendations



The Study

The [Route 9 study](#) is an official collaboration of the Villages of Sleepy Hollow, Tarrytown, Irvington, Dobbs Ferry and Hastings-on-Hudson. The goal is to improve safety for people walking, biking and accessing buses along and across Route 9.

The study is managed by a Steering Committee comprised of three people appointed by each village. Sleepy Hollow's representatives were Anthony Giaccio, David Hodgson and Daniel Convissor, who produced the 2018 edition of this report. In 2023, the State Department of Transportation picked up the project as "Route 9 from Sleepy Hollow to Hastings Complete Streets Preliminary Engineering." To help guide this new work, Daniel Convissor has provided updated information, context and suggestions.

The Need

Walking through Sleepy Hollow's major intersections on Broadway is unpleasant and unsafe. To the point that parents don't want their kids crossing at the Pierson Ave, Pocantico St or Beekman Ave areas. Adults aren't thrilled about crossing them either. Several stretches of Broadway lack sidewalks.



Some intrepid residents ride bicycles for transportation. They deserve safer conditions. Our study's public survey (Fall, 2017) found only 5% of Sleepy Hollow residents feel comfortable cycling now on Route 9 (named North Broadway in Sleepy Hollow).

There's tremendous pent up demand from people who want to ride, but are "too scared to bike" (see photos on page 1). We have to adjust our transportation system to serve everybody.

There is no set number of cars that has to be accommodated



Travel choices are shaped by public policy

BIKE TARRYTOWN

Social & Economic Benefits

Providing transportation options is crucial to our village. A community's success depends on how frequently people interact. Walking, biking and transit bring people together, creating social cohesion and business activity. Cars isolate people. And cars are big, devouring land that can be used for personal and commercial relations, thus limiting economic growth and increasing the cost of rent, goods and services.

Downtowns thrive where people feel comfortable walking, cycling and lingering. Such places attract residents from the increasing population of people looking to live without having to use cars. If we play our cards right, we can use active transportation infrastructure to be NYC's nicest suburb. Study after study proves close access to safe biking and walking facilities increases property values.



Making biking and walking safe bolsters economic equity too. Low income families can use inexpensive transportation options to attain job, health care and education opportunities. About 45% of Downtown households don't have a car.

Many people have yet to realize cycling to places is often faster than driving when factoring in congestion and parking delays.



Bikes are the solution to Downtown Sleepy Hollow's parking constraints. 10 people can easily park their bikes on in the space of a car which usually carries just one person.

Good transport facilities also provide equity for people of all ages and abilities, broadening mobility horizons via tricycles and wheel chairs with hand cranks and/or electric assistance.



Sleepy Hollow's schools are on or near Broadway. The vast majority of high school kids don't get bussed. Making intersections safer, adding sidewalks and cycle lanes means kids can get to school on their own, as well as sports at Peabody Field and schools. This takes a chunk of rush hour traffic off the road, builds independence and liberates parents from chauffeur duties.

Health Benefits

Motor vehicles are the #1 cause of injury death for kids and #2 for adults in the United States. Sleepy Hollow has seen around 400 crashes, 200 injuries and 2 fatalities between 2007 and 2016. Crashes impose major financial and emotional hardships on families and communities.

Walking and biking to get places means getting exercise without having to "exercise." The personal and societal benefits of being physically active are well known.



Local air pollution from vehicles is problematic; the American Lung Association just gave Westchester's air quality an "F." Transportation accounts for 45% of carbon emissions in the lower Hudson valley. Local policy has global implications.

Doable

Change is attainable. 50% of trips in the US are less than 3 miles long, 25% are under 1 mile. Our hills will become much smaller obstacles as electric bikes become more popular.

Most of the requested improvements can be made with minor capital investments. Strategic use of paint, planters, barriers and concrete can produce huge returns.

We need to implement new strategies quickly to avoid forcing Edge-on-Hudson residents into cars.

Tradeoffs are required in some locations. Over the past 100 years, when tradeoffs between the safety of people walking or biking and the convenience of people driving were called for, 100% of the decisions have come down in favor of people driving. It's time to balance the equation.

This Document

The Steering Committee studied public input from four public meetings, two public surveys and the consultant's research. The group felt it wise to give the consultants, Nelson\Nygaard, specific instructions on what the study's final report should recommend. Each village's contingent to the Steering Committee independently drafted their recommendations. This is Sleepy Hollow's submission.



Which Type of Mobility Lane

Protected lanes are proven to be what gets the most people cycling, scooting and using wheelchairs; making independent mobility possible for everyone who wants to. 44% of Sleepy Hollow residents said they would cycle if protected lanes are established (Fall 2017 survey).



Given the space constraints and land use in the corridor, our protected facility should be a 2-way lane on one side of the street guarded by a median box beam barrier. NYSDOT recently implemented such on Route 100 in Briarcliff Manor / Ossining (see photo, left).

Properly designed cycling facilities also make things safer for people walking and driving. Converting some motor vehicle space to active transportation space organizes the road so people driving have fewer opportunities to make rash decisions, don't get "stuck" behind people cycling, or worry about having to pass people cycling. People walking benefit from shorter crosswalks and better sight distances.

Which Side of the Street

In Sleepy Hollow, the hospital, Peabody Field, downtown, and majority of residences are on the west side of North Broadway. Thus, the 2-way bike lane needs to be on the west side of the street north of Beekman Ave.

South of Beekman Ave, the 2-way lane needs to be on the east side of North Broadway because:

- That's the side where the High School, Middle School and John Paulding School are
- There are no businesses on the east side of Broadway
- There's on-street parking in this area of the Village. The Route 9 study performed [two counts of parking use](#), both of which found no cars parked on the east side of North Broadway. Years of anecdotal observations also show low utilization of the these parking spaces (photo, above).

Months of Con Ed construction (photo right) eliminated parking on these blocks. Sometimes the whole day.



East side of Broadway, seen from Beekman Ave



No parking on Broadway from 6pm - 7am due to gas construction. Other days had not parking 6am - 7pm

Sometimes the whole night. Everybody figured out how to deal with it. This proves how flexible people are when it comes to parking.

There are occasional occupancy spikes when alternate side parking is in effect on Chestnut St. Adjusting street cleaning routines can minimize disruptions.

The handful of residents who park cars on Broadway overnight have options for storing their private property. Parking lots on school property are available. Permits for the Village lot on Beekman Ave work out to \$1.23 per day. Off-hours access to lots at the two office buildings could probably be negotiated as well.

- Over 50% of Sleepy Hollow residents who responded to the study's fall survey said the trade off of having a protected bike lane here instead of parking is worth it
- Long term plans by the study's Steering Committee representatives from Tarrytown have the 2-way protected bike lane on the east side of Broadway in the downtown area

Transition Point

It's best to keep the 2-way lane on the west side of North Broadway as long as possible to provide a seamless connection between the Manors, Pocantico St and downtown Sleepy Hollow. Taking connections of origins and destinations, hills, road width, intersection complexity, signals and safety upgrades into consideration, the best spot to switch sides is in the vicinity of Beekman Ave.

Alternative locations rejected:

- **Pierson Ave / Bellwood Ave:** would result in crossing Broadway twice for trips between the Manors and downtown
- **Pocantico St:** also makes people cross Broadway twice for many trips
- **Lawrence St:** this location doesn't have traffic signals. Creating a protected crosswalk requires a median refuge, but the street isn't wide enough for two 11' motor vehicle travel lanes, a refuge and two 2-way bike lanes. So installing a new signal system would be necessary, dramatically increasing the project's time line and cost. Also, this spot is on a hill, so switching sides would breaks the momentum of people riding north.

There are two areas in the Beekman Ave / Bedford Rd intersection that have ample space to implement the transition. Both have pros and cons.

South End, Pros:

- Keeps people from the Philipse Manor and Sleepy Hollow Manor neighborhoods on the protected bike lane as long as possible when heading to Village Hall

South End, Cons:

- Residents of the Webber Park neighborhood would need to cross North Broadway twice to get to school and Tarrytown
- North Broadway has a steep hill and is less direct when compared to Lawrence Ave for accessing downtown
- Could reduce green time at the Beekman Ave signal for people driving north on North Broadway

North End, Pros:

- Provides a direct southbound route for people riding from Webber Park. This relatively densely populated neighborhood is filled with families that have kids of all ages, living within easy biking and walking distance of the core of Sleepy Hollow and Tarrytown.

- A dedicated bike crossing phase here could provide extra green time at the Beekman Ave signal head for northbound drivers making lefts to Beekman Ave and rights to Bedford Rd

North End, Cons:

- Manor residents who want to use the protected bike lane to get to Village Hall would need to cross North Broadway twice. This is a minor issue, given the topography actually favors these trips being made by turning off of Broadway earlier at Lawrence St.

Taking everything into account, the best point for the transition is at the north end of the intersection, between New Broadway and Bedford Rd.

Village and DOT Studies of Broadway at Pierson Ave & Pocantico St

Prior to our Route 9 study, Sleepy Hollow engaged TRC (now named DTS Provident) to do a [traffic analysis and propose conceptual designs](#) for two complex, multi-leg intersections along North Broadway:

- Pierson Ave / Bellwood Ave / Gordon Ave / Old Broadway
- Pocantico St / Old Broadway / Philipsburg Manor driveway

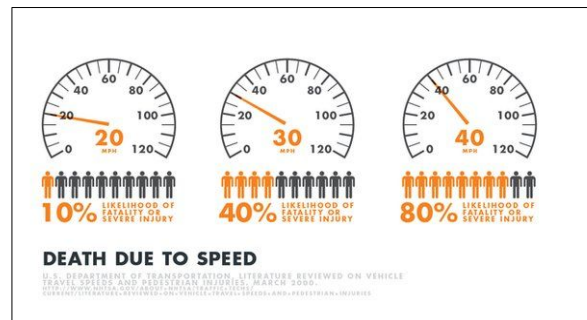
Several crosswalks had 200 to 300 people walking in them per hour for the Halloween festivities.

The traffic analysis found people on bicycles are about 2% of the vehicles observed. The average day saw 340 people riding bikes. On the peak day, Saturday 10/10/15, there were 580 people cycling.

Motor vehicle counts were between 15,000 and 20,000 vehicles per day in the study period, which took place during the Halloween tourist season, our yearly peak traffic time.

People speeding is a significant problem on North Broadway. On a given day, the study found 43% of people drove over the 30 MPH speed limit. 703 vehicles were observed exceeding 40 MPH.

Speeding is problematic in two ways. First, vehicle speed increases the likelihood of crashes and the severity of them (see graphic). Second, people walking, cycling and using wheelchairs avoid places where people are driving too fast.



TRC made drawings of various options for these two intersections. The State Department of Transportation picked up some of TRC's concepts at both intersections in the conceptual drawings they produced 2017.

Next, the Village of Sleepy Hollow engaged Hardesty Hanover to further analyze traffic data and lane striping changes on this block. A report was produced in July, 2021.

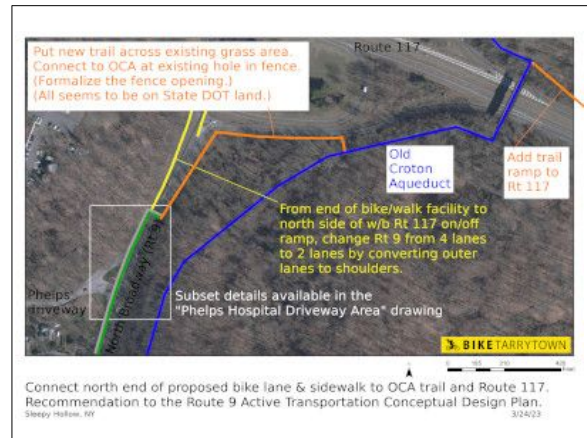
In September 2022, the DOT released a Final Design Report draft. This design for Pierson Ave has the northward island extension from the earlier proposals, but all geometric changes considered earlier were dropped at Pocantico St. Local advocates have suggested some minor edits to the DOT's latest drawings ([Pocantico](#), [Pierson](#)).

Segment Details

Route 117

This area of US Route 9 (North Broadway) is a 4-lane highway, plus turn lanes for getting on to Route 117. There are no shoulders and a 40 mph speed limit, with most people driving faster than that. The exits and entrances for Route 117 are all unsignalized and on the east side of Route 9. This means people using southbound Route 9 that are going to/from Route 117 must cross two lanes of northbound vehicles.

The modest motor vehicle volumes here make it easy to have the outermost lanes converted into shoulders. This will reduce speeding and simplify interactions between through and turning movements. And it sets up the conditions needed to create the protected mobility lane on North Broadway south of Route 117 (explained in more detail, below).



Create a connection to the Old Croton Aqueduct at the trail's low point next to Route 117. A hole in the fence already exists there. Build a small bridge over the gully. The path would then head west, along the south side of the Route 117 on ramp from North Broadway, and turn south along the east side of North Broadway. (See diagram. [Image file.](#))

After reaching the south end of the turn lane to the above mentioned on ramp, create a protected crosswalk for people to get to the west side of North Broadway. Have one motor vehicle travel lane in each direction plus a median refuge.

This, and all crosswalks, should have R1-5 “yield here to pedestrians” signs.



South of that crossing, on the west side of North Broadway, begin:

- an on-street 2-way protected bike lane
- a sidewalk

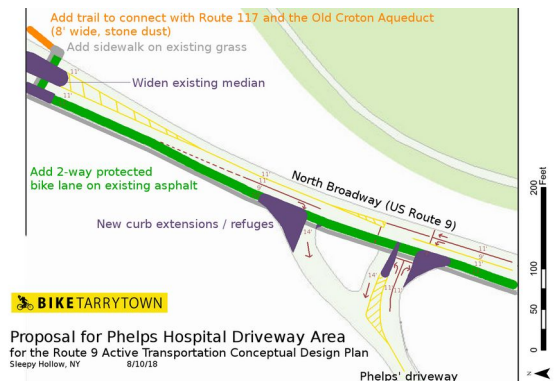
The road in the area of the crossing and south of it should be 1 lane in each direction with a painted median / turn lane. That's the safety treatment which already exists along the Cemetery.

Continue this configuration to the northern end of Bellwood Ave.

Phelps Hospital Driveway

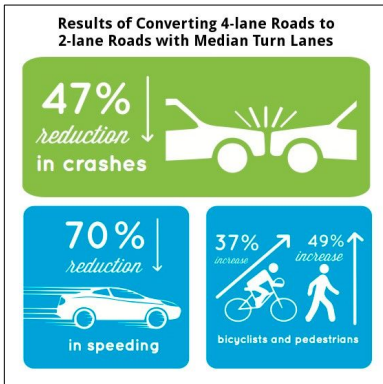
The northern leg of the driveway to Phelps Medical Center is a high-speed ramp for people driving south on North Broadway. Re-engineer the driveway to be narrower and entering it more of a right turn. Add a right turn lane on North Broadway to allow deceleration and prevent rear end crashes, making it safe and comfortable for people driving to yield to people walking and biking.

On the southern leg of Phelps' driveway, add a refuge between the inbound and outbound lanes.



Add a dedicated left turn lane from northbound North Broadway to the Phelps driveway. (See diagram. [Image file.](#))

Bellwood Ave (northern end)

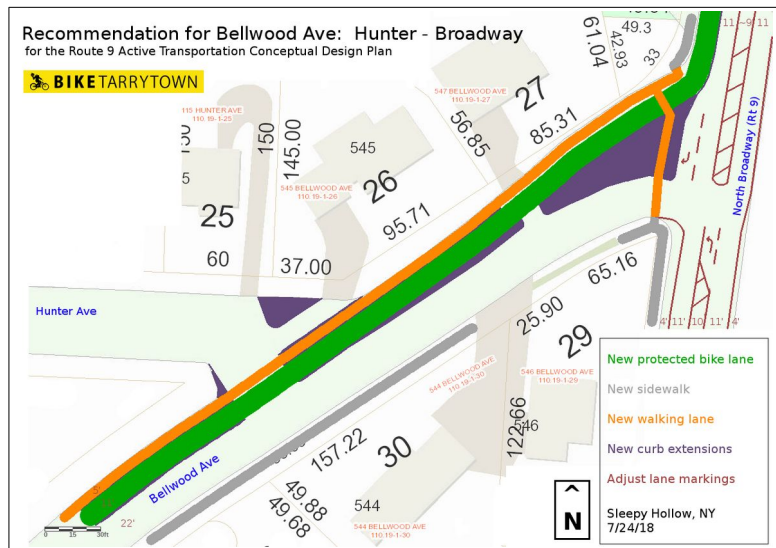


The present configuration of Broadway from the north end of Bellwood Ave to Pierson Ave (2 lanes plus painted median/turn lanes) was implemented around 2014 as a safety enhancement. (See graphic, left). The Village is reluctant to dramatically change this layout.

This segment has a large hill, peaking at Highland Ave. Vehicles drive fairly fast through here. No one lives on this stretch of road.

Thus, the on-street 2-way protected bike lane should proceed south along the western edge of Bellwood Ave. (See diagram. [Image file.](#))

This routing benefits residents of the Philipse Manor neighborhood in multiple ways. This transportation facility will be where they live, providing safe access to major village destinations. While Bellwood Ave is a neighborhood street that wouldn't need a protected bike lane, it is the neighborhood's primary street and is excessively wide. Bellwood Ave sees significant volumes of people driving, many at excessive speed.



People already comfortable riding bikes are OK on Bellwood Ave as it is. But we need to create a transportation system for people who *aren't* comfortable riding now. A protected bike lane on Bellwood Ave will fix several problems:

- Many people drive too fast. The difference between 20 MPH and 30 MPH, let alone 40 MPH is life and death (see graphic on page 6). Bike lanes keep people driving away from people biking. And bike lanes narrow the road a bit, improving adherence to speed limits.
- People driving are often distracted (phones, media centers, radios, kids, etc) so don't see people walking or biking in front of them
- Cycling around parked cars brings people biking into the car travel lanes. Such maneuvers require more skills than meets the eye and introduce stress. Children under the age of 14 haven't attained the full developmental capabilities to even cross streets without incident. (Yes, parking isn't allowed in the Manors, but people do it anyway.)
- Bike lanes clearly indicate to people riding where they're supposed to be, helping kids not veer into the path of motor vehicles
- Designated space eliminates conflict situations that lead to harassment and road rage



- As a bonus, bike lanes make it easier for people walking by shortening crossing distances

An on-street walking lane should be added on Bellwood Ave between the bike lane and Bellwood Ave's western curb until it meets the existing sidewalk at Harwood Ave.

Bellwood Ave's eastern sidewalk should be completed between North Broadway and Farrington Ave.

The width and angle of Bellwood Ave's northern end at North Broadway is problematic. North Broadway has a 40 MPH speed limit here and the turn for southbound drivers to Bellwood Ave is so slight that many people don't reduce their speed. Bellwood Ave's speed limit is 25 MPH.

The layout also makes it difficult for people heading north on Bellwood Ave who are continuing north on Broadway. They have a hard time turning their heads far enough to see traffic coming from the right.

Also, the crossing of Bellwood Ave is 87' long for people walking on North Broadway.

The Hunter Ave intersection of Bellwood Ave has similar issues. There were 2 car crashes and 1 crash where a person driving hit a person riding a bicycle at this location during the past 10 years.

Therefore, these two intersections need significant safety upgrades in the form of curb extensions to create right angle turns. A right turn lane should be established on North Broadway for people driving south who are turning to Bellwood Ave, providing a safe way for people driving to slow down and carefully turn without having to worry about drivers behind them.

The new sidewalk along the west side of North Broadway, discussed in earlier sections, should continue all the way to Pierson Ave. Add protected crosswalks at bus stops and the Cemetery's entrance by Harwood Ave.

On North Broadway, the lane striping needs minor modifications from Bellwood Ave to Pierson Ave:

- Travel lanes should be 10.5'
- Fog lines should be at least 4' from the curb. They're too close to the curb in many locations. These provide space for people comfortable riding on the road who desire a direct route.
- The median should narrow between intersections. Horizontal deflections reduce speeding by removing the mental image of a straight road.

Bellwood Ave (south end) / Pierson Ave

Both Bellwood Ave / Pierson Ave and North Broadway are very wide, resulting in unsafe conditions for people walking, especially where left turning drivers cross their paths. NYC DOT's research found left turns are particularly dangerous due to higher speeds, cars passing through a larger area of the crosswalk, drivers having to pay attention for gaps in oncoming traffic and poor visibility from inside cars due to the pillar between the windshield and driver side window. ([Don't Cut Corners](#), NYC DOT, August 2016)

This intersection saw 12 crashes with 7 injuries over the past 10 years.

Improve safety and smooth the flow of traffic at this location by creating a “priority square,” which makes traffic signals unnecessary. (See diagram. [Image file.](#))

Vehicles on Route 9 get priority. The ~70 vehicles/hr that turn left from Route 9 to Pierson Ave and the ~20/hr turning left from Route 9 to Gordon Ave / Old Broadway get turn lanes which go slightly past the side street, from which turning

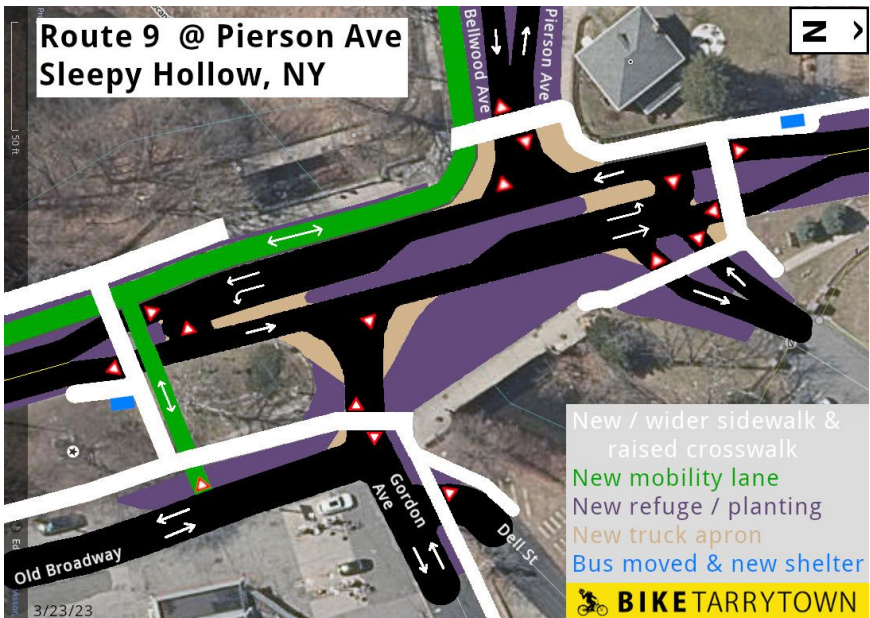
drivers yield to oncoming vehicles then head back to their turn, and have a right turn pocket where people driving pause to observe people walking across the side street. This configuration is incredibly safe because each of the major conflicting movements occur in distinct spots (out of the way of through traffic) so all users can negotiate one interaction at a time without inhibiting vehicle flows on the main road.

This configuration is based on the intersection of ['t Goylaan at Constant Erzeijstraat](#) in Utrecht, NL. The City reconstructed 't Goylaan from a 4 lane road to a 2 lane road in 2016. Then they rebuilt this intersection again in 2020 to further improve flow and safety.

As for continuing the bike lane, it's on the west side of Bellwood Ave, though as Bellwood curves to the east as it approaches Broadway, the 2-way protected bike lane follows that curve, “ending up” on the south side of Bellwood Ave.

At North Broadway, the cycle lane should wrap around the corner onto the west side of North Broadway and continue south to Pocantico St.

(Note: Our recommendations for this intersection have changed since the Nelson\Nygaard report was produced in 2018. If you are curious, [what we suggested at the time](#) was a set of modifications to a drawing by NYSDOT.)



Pocantico St

This intersection saw 13 crashes and 11 injuries in 10 years. The odd angles of Pocantico St and Old Broadway, combined with these two streets getting green signal phases at the same time, leads to awkward interactions between people driving.

This is another intersection that will benefit from a “priority square” treatment. (See diagram. [Image file.](#))

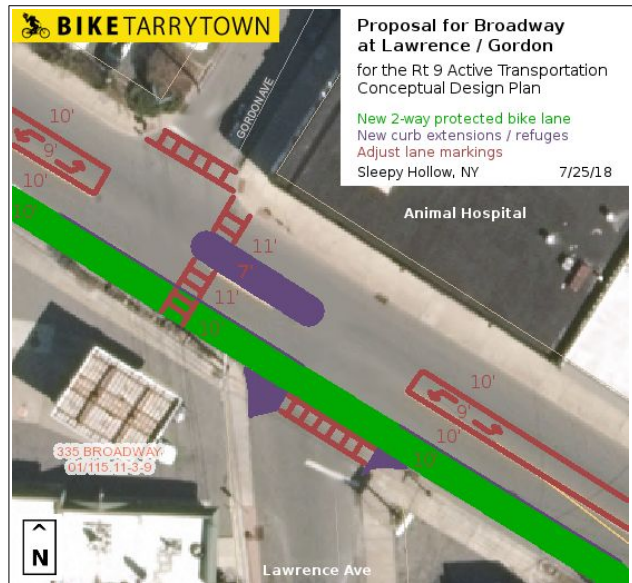
(Note: Our recommendations for this intersection have changed since the Nelson\Nygaard report was produced in 2018. If you are curious, [what we suggested at the time](#) was a set of modifications to a drawing by NYSDOT.)



Lawrence Ave / Gordon Ave (southern end)

This intersection has seen 18 crashes with 4 injuries in 10 years. People speeding here is a significant problem due wide lanes and industrial appearance. That conflicts with the awkward sight lines experienced by people entering North Broadway from the side streets.

This location needs safety upgrades. The stretch of Route 9 from Pocantico St to New Broadway should be one 10' travel lane in each direction plus a 9' median turn lane. At the Lawrence/Gordon intersection, add a solid median refuge between the two travel lanes, filling the length between the two streets. Add curb extensions on Lawrence Ave. (See diagram. [Image file.](#))



Lawrence Ave connects to Sleepy Hollow's downtown, so needs traffic calming measures, such as chicanes and speed humps. Add a “Narrow Lane Assembly” sign (see image on left) at both ends of Lawrence Ave. See NYS DOT's [TSMI 13-07](#) for specifications.

Beekman Ave / Bedford Rd / et al

This wretchedly complex intersection has the highest incidence of crashes in the Village: 28 crashes with 14 injuries over the 10 year period.

Our proposal balances the needs and safety of all road users. It has:

- Shorter crossing distances
- New crosswalks
- New 2-way protected bike lane
- Shorter waits for everybody
- New dedicated turn lanes for northbound drivers to Beekman Ave & Bedford Rd
- Smoother flow for people driving southbound. It adds a turn lane to Bedford Rd / New Broadway. Presently, people in the left lane who are going straight get stuck behind people making left turns. They then try to squeeze into the right hand lane, delaying people there and introducing crash risks.
- Less speeding by people driving in/out of New Broadway



Further details:

- No turn on red
- Implement a dynamic traffic signal controller. Include sensors and signal heads for each lane, bike lane and crosswalks. Program the signals like a railway interlocking: straight routes get greens by default, but when a someone needs to diverge across another route, they can't proceed until that other route gets a red signal. (Some information about smart signals: [“Why the Dutch Wait Less at Traffic Lights”](#) and [“How to Shorten Red Light Clearances Without Reducing Safety”](#).)
- Default to green for Broadway's north/south movements. But promptly provide greens for people crossing / entering Broadway.
- Add NYS DOT “Narrow Lane Assembly” signs on Beekman Ave, particularly westbound by North Broadway and eastbound just east of North Washington St
- Traffic calming and “Narrow Lane Assembly” signs will prove useful on New Broadway due to its narrow width and neighborhood density

School Campus

As discussed on page 4, the on-street 2-way protected bike lane here should be on the east side of Route 9.

A sidewalk is needed on the east side of North Broadway from the Korean Church to Cobb Ln.

Crosswalks should be added at Cottage St and at College Ave. Another should be created at the Korean Church's driveway, where many people cross while going to/from the High School. A cycling and walking crossing is needed from the bike lane to Patriots Park's driveway. All of these crossings should use Vision Zero best practices like raising them and adding curb extensions.

There is a gas station on the corner of Depeyster St, across from the John Paulding (Pre-K, K), Middle School and High School. The sidewalks are continually being driven on and parked on. Walking by there is uncomfortably risky, especially for kids. The station's southern driveway facing Broadway should be closed. Bollards and barriers should be deployed to keep cars off the sidewalk.

The Depeyster St intersection experienced 10 crashes and 6 injuries over the past 10 years.

It could prove useful to add a left turn lane on southbound North Broadway for people turning to the school driveway. A left turn signal should be established, and controlled via sensors in the turn lane and bike lane to eliminate conflicts with people using the bike lane.

Work with Tarrytown to extend the protected bike lane to Wildey St so people can safely ride to the Warner Library and the C-Town supermarket.

Change Log

March 12, 2018:

- Initial version

April 9, 2018:

- Remove recommending hill passing lane for the 1 block north of Pierson Ave
- Provide drawing for the Lawrence Ave intersection, suggest curb extensions there
- Suggest traffic calming for Lawrence Ave and New Broadway
- Add Narrow Lane Assembly signs on New Broadway
- Add a left turn lane at Depeyster St
- Add turning movement counts for Pocantico St and rights at Pierson Ave
- Add crash data for several intersections
- General editing and grammar

April 24, 2018:

- Add text and images regarding need for a protected lane on Bellwood Ave
- Add text about path connecting the OCA near the Phelps driveway
- Mention results of public opinion survey about school campus area
- Add sentence about working with Tarrytown to extend the lane to Wildey St

April 25, 2018:

- Update crash data

May 4, 2018

- Edit Pierson Ave drawing: indicate moving the bus stop, adjust left turn lane
- Add cover collage and other images
- Add "The Need" section

May 6, 2018

- Mention Peabody Field and sports

May 7, 2018

- Minor tweaks

May 9, 2018

- Explicitly discuss parking benefits
- EAC wording

May 10, 2018

- Mention property values

July 25, 2018

- Add Route 117, Phelps and Beekman drawings
- Add dimensions to earlier drawings
- Reword Beekman intersection text to reflect added drawing

August 14, 2018

- Refine drawings

September 12, 2018

- Refine Beekman Ave drawing

October 23, 2018

- Refine OCA & Pierson drawings

- Mention Con Ed construction by High School

March 24, 2023

- Update Route 117 section to convert outer lanes of Route 9 to shoulders
- Change Pierson and Pocantico intersections to be “priority squares”
- Update grammar in various parts

March 31, 2023

- Edit the introduction to explain reason for these updates
- Describe barrier type and use case in Which Type of Mobility Lane section
- Update status of Village and DOT studies of Pierson/Pocantico intersections
- New drawing for the Bedford/Beekman intersection, as well as improved text
- Refine text in the School Campus section
- Update grammar in various parts

April 14, 2023

- Links to videos about smart signals

April 22, 2023

- Edit Beekman Ave drawing to add barrier between sidewalk and northbound traffic on Broadway