

NEW YORK BICYCLING COALITION
IMPROVING BICYCLING AND PEDESTRIAN SAFETY

chapter

8

THE PROJECT PROPOSAL: CASE STUDIES

Introduction

Current Gaps in Crash Data
Gathering

Selecting Intersections for
Community Safety
Campaigns

Understanding the Case
Studies

Individual Case Studies

The examples in this chapter were done with the assistance of professionals. So regard them as models, not typical advocate products. Still, the advocate should strive for a credible product that conveys the nature of the problem, the relevant facts, and feasible recommendations.

INTRODUCTION

Previous Chapters explained the advocate's role in advancing needed safety projects. Here we give examples of products developed during activities leading to a project proposal. The examples in this chapter are for intersections (where traffic conflicts are most common), but the method is similar for all types of proposals.

The responsible advocate has to do homework before taking a project proposal to the implementing highway agency. As stressed in the previous chapter, the goal is to prepare a case that will persuade the agency's professional there is a high priority problem that can be solved or mitigated within the agency's means.

The general process has several steps.

1. Select the problem and location to work on. There may be dozens of deficiencies in the community road system, so focus where a remedy is thought to give the best "bang for the buck."
2. Gather information on the situation. Be as complete as you can to support the arguments to be made. Anecdotal information is okay, but it is not the most authoritative. Not all the desired information may be readily available, particularly in the area of accident history data, but the idea is to get enough information to show the situation warrants a full engineering investigation.
3. Analyze the information to confirm the problem and refine the recommendations. Recommendations should offer effective and economic fixes. Since the advocate is not necessarily professionally trained in traffic engineering, acknowledge you are presenting "working proposals," subject to subsequent investigation.
4. Organize and package the information for presentation to the petitioned agency. The material has to be intelligible to the agency's professionals and, if well done, the engineer may use it as the preliminary investigation.

CURRENT GAPS IN CRASH DATA GATHERING

Crash data can be very effective for putting together a compelling case for redesigning an intersection. Unfortunately, there are still many gaps in crash data gathering, including:

- Missing or incomplete documentation for bicyclist and pedestrian crashes;
- Missing or incomplete documentation for bicyclist and pedestrian crashes that did not involve a motor vehicle;
- Lack of current information on intersection volumes and turning movements for motor vehicles;

- Lack of information on pedestrian and bicyclist volumes for specific intersections and areas;
- Limited data on total pedestrian and bicycling data at all levels of US planning; and
- Different kinds of data for bicyclist problems versus pedestrian problems.

Seen something new on your travels? Send NYBC your thoughts and pictures so we can put them on our website. nybc@nybc.net

SELECTING INTERSECTIONS FOR COMMUNITY SAFETY CAMPAIGN CASE STUDIES

To aid in the ranking of counties according to bicyclist and pedestrian crash data, NYBC used the report, *An Analysis of Available Bicycle and Pedestrian Accident Data* by Richard Brustman, to analyze the frequency and rate of bicyclist and pedestrian injuries for all sixty-two counties in New York State. Using this report, NYBC narrowed the initial group of counties to the fifteen which had the highest rate of injuries NYBC took into consideration whether the county drew attention from DOT's Surveillance System and then ranked by area type (rural, suburban and upstate metro). The group was further narrowed by a point system based on the standing of the counties within the previously mentioned categories. A pool of 10 candidate counties spread evenly within the area types was then solicited to participate in the grant process. A 1999 report of this county selection process is available from NYBC.

An application was sent to the County Executives, Borough Presidents, and selected Counties Commissioners (e.g., planning, transportation, etc) in each of the candidate counties explaining the grant and requesting they fill out the application to participate. An important aspect of the application process was the county's willingness to be the main facilitator among a variety of interest groups and to gather important information needed to initiate the local site selection process.

Based on the applications received, NYBC selected three counties in year one of the grant (Albany, Suffolk and Monroe) and one New York City borough (Kings County - Brooklyn) in year two. A task force reviewed the local bicycling and pedestrian situation and specific areas known to have high numbers of bicyclist and pedestrian injuries or traffic conflicts. Local working groups, comprised of cycling and pedestrian advocates, law enforcement officials, public health officials, transportation planners, engineers and other constituent groups, led this process. The working groups gathered the data regarding sites or corridors within the counties where high frequencies of injuries or crashes were either documented or anecdotally known. In each county, the working groups tried to select a diverse range of urban, suburban and rural hot spots.



These solutions represent the engineer's perspective, but do not necessarily reflect pioneering work being done on bicycling and pedestrian facilities in the United States and around the world.

Urban bicycling facilities are important. All intersections should eventually be equipped with bicycling facilities, including lanes and intersection controls.

Engineers from Greenman-Pedersen, Inc, aided by David Bulman P.E, and Richard Brustman, Transportation Analyst worked to develop the recommended engineering and education "fixes" for the selected areas.

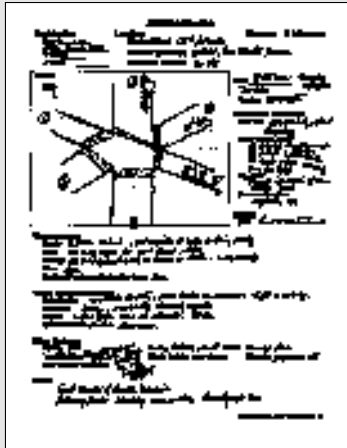
UNDERSTANDING THE CASE STUDIES

Since these case studies were done by professionals, they are not intended to exemplify an "advocates' product". Their utility to advocates is in depicting the way transportation professionals troubleshoot intersections and formulate conclusions. Engineers, in order to be able to give their drawings a professional stamp, must produce designs consistent with the State Highway Design Manual. These designs, however, can create user conflicts. For example, recommendations for a few of the intersections include rumblestrips, which are handy for increasing driver awareness, but tend to destabilize bicyclists and even trap bicycle wheels (and some wheelchair wheels).

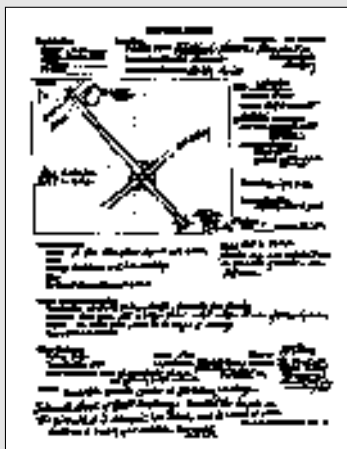
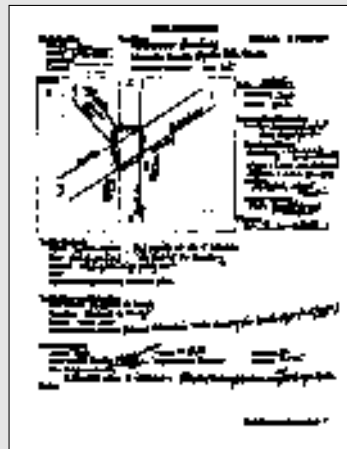
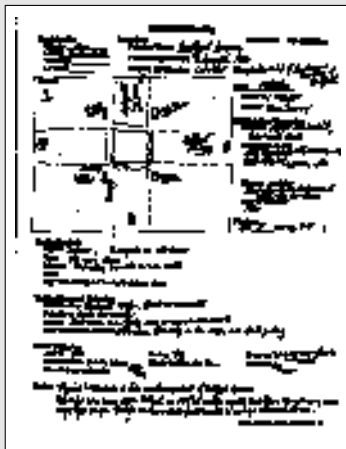
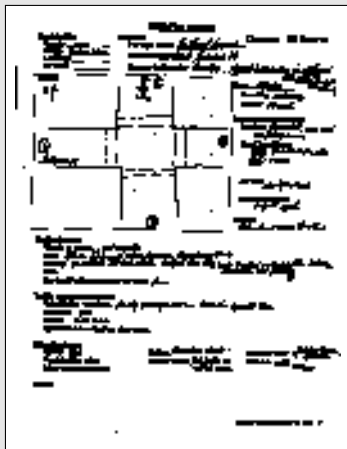
These solutions represent the engineer's perspective, but do not necessarily reflect pioneering work being done on bicycling and pedestrian facilities in the United States and around the world. Meanwhile, standards are continually updated to reflect national and international research, and State and local policies, so even these solutions may warrant update prior to implementation. Advocates can stay informed about these developments through many of the sources listed elsewhere in this manual and by keeping an eye out for new designs when traveling in this country and abroad.

Additionally, these case study examples are heavily weighted towards pedestrian solutions. This should not be taken as a sign that urban bicycling facilities are insignificant. **Urban bicycling facilities are important.** All intersections should eventually be equipped with bicycling facilities, including lanes and intersection controls. Bicycling facilities are often better designed as longer systems: work on separate intersections did not lend itself to route-level solutions such as systems of bicycle lanes. Future studies should explore the application of good transportation design not only to intersections but also to longer routes. Additional studies may solve problems at troublesome intersections, but also suggest bicycling lanes and other solutions required for safe, comprehensive transportation networks. Part two of the GTSC Community Safety Campaign strives to incorporate work on intersection design and selected routes (see Introduction).





CASE STUDIES



CASE STUDY 1
KINGS COUNTY

FLATBUSH AVENUE
from Myrtle Avenue to Tillary Street

PROBLEM STATEMENT:

Dense commercial and institutional activity, with a heavy volume of automobiles, trucks and transit buses, as well as pedestrians and bicyclists, all competing for the same space.

DETAILED DESCRIPTION:

This is an exceedingly busy stretch of road with the Flatbush Ave./Myrtle Ave. and Flatbush Ave./Tillary St. intersections congested with vehicular and pedestrian traffic. Flatbush Ave. is a major arterial with 8 lanes, 5 northbound (2 reserved for left turns) and 3 southbound, with a 5 ft curbed median.

Tillary St. is a major arterial with 6 lanes and a curbed median and Myrtle Ave. is an arterial with 4 lanes with a wide landscaped median on the west side. The Flatbush Ave./Myrtle Ave. intersection is a five-legged skewed intersection with Gold Street, a one-way low volume road heading northeast from the intersection. The Flatbush Ave./Tillary St. intersection is crossed by Duffield Avenue, a short diagonal road in the southeast corner of the intersection going from Flatbush Ave. to Tillary St. Low volume intersecting roads, Johnson Street and Tech Place, are across from each other midway between the two main intersections. Pedestrian signals are provided. There are no specific provisions for bicyclists. From September 1994 to August 1999, 799 crashes, including 9 bicyclist and 36 pedestrian crashes were reported over this 924 ft stretch of road.

SPECIFIC PROBLEMS FOR PEDESTRIANS:

- Institutional and commercial facilities characterize this busy urban intersection with heavy vehicular and pedestrian traffic.
- Pedestrian errors include jaywalking and crossing against the signal.
- There are no curb ramps at intersections.
- Motorists do not pay attention to pedestrians or yield right of way.

SPECIFIC PROBLEMS FOR BICYCLISTS:

- There is no shoulder on the road, nor any other bicyclist-specific facility.
- Extensive parallel parking of motor vehicles produces possible conflicts with car doors, etc.
- Road surface is irregular with drains and grates in bicyclists' path.
- Utility covers are not flush with road surface.
- Turning radii are large, allowing cars to corner at high rates of speed.
- There is heavy motor vehicle traffic.

SPECIFIC PROBLEMS FOR MOTOR VEHICLES:

- There are a number of institutions with major pedestrian surges, and pedestrians jaywalk extensively.
- There are very heavy turning movements for vehicles on Tillary Street.

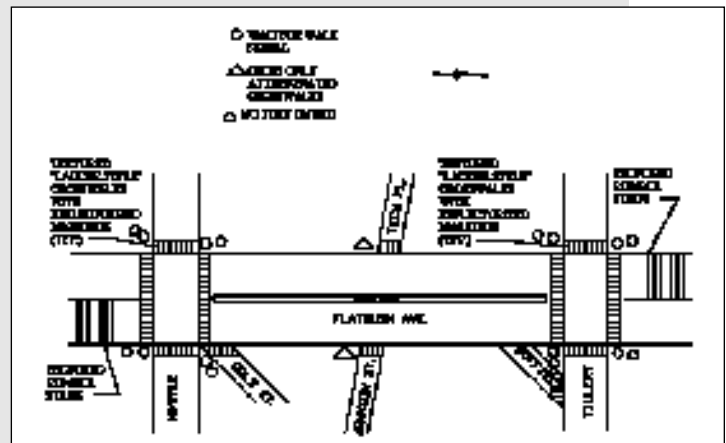


- Plethora of commercial, regulatory and warning signage adds the challenge of safely negotiating this stretch of roadway.
- Motorists not paying attention or yielding right of way to pedestrians and bicyclists have resulted in numerous crashes.

RECOMMENDED SOLUTIONS:

Short-term (cheap & immediate):

- Increase signal time for both Myrtle Ave and Tillary St. will allow pedestrians to cross Flatbush Avenue along with lead timing for pedestrians and bicyclists where appropriate.
- Install "Trailblazer" signs routing bicyclist around Flatbush to avoid section entirely.
- Install raised/textured "ladder style" crosswalks with reflectorized markings across all four legs of Flatbush Ave./Myrtle Ave. and Flatbush Ave./Tillary St. intersections using high quality materials.
- Install enforceable signage for pedestrians on each corner of both intersections, as follows: WAIT FOR WALK SIGNAL.
- At the corners of the intersection with Johnson Street and Tech Place, install enforceable signage for pedestrians as follows: CROSS ONLY AT CROSSWALKS.
- Install NO RIGHT TURN ON RED signage. Since NYC law already prohibits right on red turns, the sign can have "anywhere in NY City" underneath in smaller letters.



Longer-term (more expensive, longer implementation, and possibly further study needed):

- Determine if a crosswalk is warranted at the intersection of Flatbush Avenue with Johnson Street and Tech Place.
- Install pedestrian signals at the corners of Flatbush Avenue/Myrtle Ave. and Flatbush Avenue/Tillary St.
- Install bicycle lanes and intersection controls.

CASE STUDY 2

KINGS COUNTY

**UTICA AVENUE
at Eastern Parkway**

PROBLEM STATEMENT:

Extremely busy intersection with heavy pedestrian use; significant jay walking and crossing against the signal by pedestrians.

DETAILED DESCRIPTION:

The Utica Avenue intersection with Eastern Parkway, located in the Crown Heights, north central section of Brooklyn (Kings County), is a mix of intense commercial use on Utica and high rise apartments on Eastern. Utica Avenue carries a high volume mix of cars, trucks, transit busses and school busses. No commercial traffic is allowed on Eastern Parkway, which is striped for three lanes eastbound and two lanes westbound separated by a striped median. A sidewalk with benches is located between the service roads and Eastern Parkway. A bicycle lane is provided along the sidewalk between the eastbound service road and Eastern Parkway. Traffic counts were unavailable. From September 1994 to August 1999, 489 crashes, including 68 pedestrian and 6 bicyclist crashes, were reported. Though well-thought-out traffic control devices currently exist at this intersection, additional safety measures are warranted to reduce the number of reported crashes.

SPECIFIC PROBLEMS FOR PEDESTRIANS:

- This is an extremely busy intersection with heavy traffic volumes and surging pedestrian flows, exacerbated by boarding and alighting subway passengers and multiple roadway crossings to traverse.
- Pedestrian signals are in place for pedestrians crossing Eastern Parkway only. None are available to guide and control pedestrian flow across Utica Avenue or the service roads.
- Pedestrians were observed jay walking across Eastern, Utica and the service roads, increasing the potential for serious pedestrian crashes at this location.
- Eleven of the reported 68 pedestrian crashes involved pedestrians crossing against the signal, which is dangerous, but not uncommon, where pedestrian volumes are high.

SPECIFIC PROBLEMS FOR BICYCLISTS:

- Intensely busy intersection, heavy vehicular and pedestrian traffic.
- Pedestrian conflict area in vicinity of bicycle path and subway station entrance.
- Bicycle path users experience high risk crossing Utica Avenue.

SPECIFIC PROBLEMS FOR MOTOR VEHICLES:

- Utica avenue is a heavily used north-south commercial corridor with a mixture of autos and trucks (some making on-street deliveries), transit busses, school busses and crowds of pedestrians.
- Commercial vehicles are prohibited on Eastern Parkway; auto traffic is heavy but generally smooth flowing.
- Jay walking pedestrians require motorists to be especially alert.
- Nearly chronic congestion exists at the intersection of Utica Avenue and Eastern Parkway. "Blocking the box" traffic conditions are frequent.



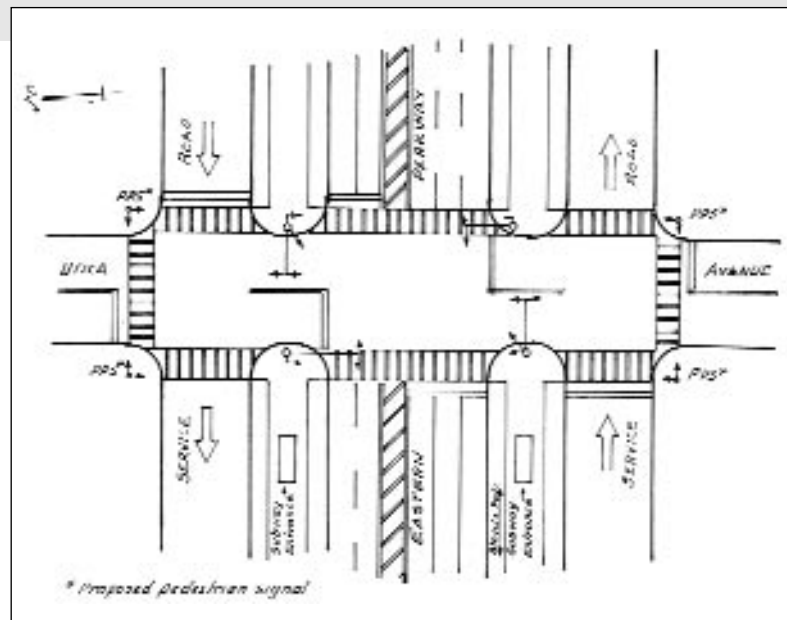
RECOMMENDED SOLUTIONS:

Short-term (cheap & immediate):

- Add two new signs, appropriately placed, to reduce jay walking and crossing against the signal, that read: DO NOT JAY WALK: USE CROSSWALKS and WAIT FOR WALK SIGNAL

Longer-term (more expensive, longer implementation, and possibly further study needed):

- Add pedestrian signals at each of the four outer corners of the intersection of Utica Avenue and the eastbound and westbound service roads to guide and control pedestrian movements (primarily across Utica Avenue).
- Surface treatments, such as color pigmented pavement, will better indicate the bicycle path crossings at major Eastern Parkway intersections, including Utica Ave., and will alert motorists to the upcoming crossings.
- Install bicycle lanes and intersection controls.



CASE STUDY 3
KINGS COUNTY
BROADWAY
at Flushing

PROBLEM STATEMENT:

Multiple uses, including dense commercial activity, and a heavy volume of automobiles, trucks and transit buses as well as pedestrians and bicyclists are competing for the same space. Driver inattention and failure to yield the right of way are compounded by pedestrian jaywalking and crossing against the signal.

DETAILED DESCRIPTION:

The Broadway at Flushing intersection in King's County is a five-legged skewed intersection under an elevated subway line with intense pedestrian activity. All five legs of the intersection are considered major arterials. Pedestrian signals are provided. There are no provisions for bicyclists. In the past five years, 122 accidents, including 6 bicyclist and 21 pedestrian accidents were reported.

SPECIFIC PROBLEMS FOR PEDESTRIANS:

- Subway entrances, bus stops and intense commercial retail shopping characterize this busy urban intersection with heavy vehicular and pedestrian traffic
- Pedestrians are waiting in the street for the walk signal or a gap in traffic to jay walk across the street
- Jaywalking, walking along the roadway and crossing against the signal
- Lack of curb ramps at intersections
- Obstructions in sidewalk

SPECIFIC PROBLEMS FOR BICYCLISTS:

- No shoulder on road or any other bicyclist facility
- Extensive parallel parking of motor vehicles
- Road surface is irregular with drains and grates in bicyclists' way
- Utility covers not flush with road surface
- Cause of all reported accidents was motorist inattention to bicyclists
- Large turning radius allows cars to turn corner at high speed
- Heavy motor vehicle traffic
- Poor drainage that traps water on roadway or at intersection
- Extensive commercial activity

SPECIFIC PROBLEMS FOR MOTOR VEHICLES:

- Influence of elevated subway accesses, bus stops and the medical center
- Heavy congestion, significant pedestrian activity, a multitude of commercial businesses and related signing
- Overabundance of regulatory and warning signing and pavement marking impede motorists' ability to safely navigate intersection
- Motorists' inattention to bicyclists and pedestrians resulted in numerous accidents



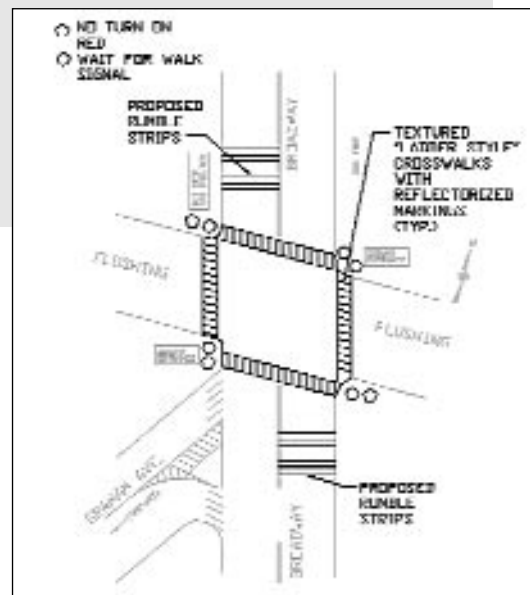
RECOMMENDED SOLUTIONS:

Short-term (cheap & immediate):

- Remove obstructions in sidewalk or keep obstructions near the curb in a confined space.
- Reduce area speed limit to allow all vehicles to more safely negotiate through the confusing and heavily regulated intersection.
- Install raised/textured “ladder style” crosswalks with reflectorized markings across all four legs of the intersection using high quality materials
- Install enforceable signing for pedestrians on each corner, as follows: WAIT FOR WALK SIGNAL
- Install enforceable signing for motorists as follows: NO TURN ON RED

Longer-term (more expensive, longer implementation time or possibly further study needed):

- Installations of curb neckdowns to reduce right turn speed and lessen the street space to be crossed by a pedestrian.
- Installation of curb ramps at corners.
- Repave roadway surface, fixing drainage problem.
- Bring utility covers and grates flush with the road surface, or move out of direct bicycle path.
- Install bicycle lanes and intersection controls.



CASE STUDY 4
ALBANY COUNTY

DELAWARE AVENUE
at Madison Avenue and Lark Street

PROBLEM STATEMENT:

Complex signalized intersection with heavy traffic volumes and long, unsignalized pedestrian crosswalks.

DETAILED DESCRIPTION:

The Madison Avenue intersection with Delaware Avenue and Lark Street, located in a commercial area of the City of Albany, experiences heavy peak hour traffic of nearly 2,000 vehicles. Pedestrian traffic is significant during peak times, and even at off peak hours. A two-phased fixed time traffic signal controls the intersection traffic. There are no pedestrian signals. From September 1994 to August 1999, 95 crashes were reported at this intersection, including three pedestrian and one bicyclist crash.

SPECIFIC PROBLEMS FOR PEDESTRIANS:

- Multi-leg intersection with heavy turning traffic.
- On west side of intersection, long crosswalk across Madison Avenue have no pedestrian refuge.
- On southeast side of intersection, long crosswalk across Lark Street/Delaware Avenue.
- There are no pedestrian signals to guide and control safe pedestrian crossings.
- The crosswalks are minimally visible to approaching motorists.

SPECIFIC PROBLEMS FOR BICYCLISTS:

- No specific provisions for bicyclists.
- Heavy volumes of turning traffic through the complex intersection.

SPECIFIC PROBLEMS FOR MOTOR VEHICLES:

- Complex multi-leg intersection geometry.
- Heavy through and turning vehicular traffic volumes.
- Significant pedestrian traffic.
- Minimally visible crosswalks.



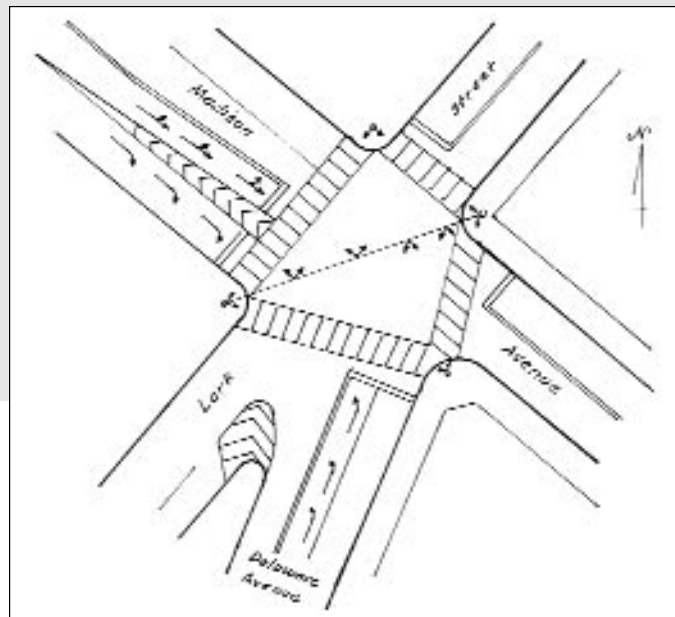
RECOMMENDED SOLUTIONS:

Short-term (cheap & immediate):

- Relocate the crosswalk across the southerly leg of the intersection to provide a safe crossing between the southwest corner of the intersection of Madison and Lark to the southeast corner of Delaware and Madison, and to shorten the pedestrian waiting time in the intersection.
- Install “ladder style” crosswalks across all four legs of the intersection to increase their visibility to the motorists. Use high quality permanent materials for all pavement markings.
- Adjust traffic signal head for eastbound Madison Avenue traffic.
- Install pedestrian signals on each of the four corners.

Longer-term (more expensive, longer implementation, and possibly further study needed):

- Channelize, with pavement markings, the west side Madison Avenue approach to provide a pedestrian refuge and to better direct 1) eastbound traffic into the narrower Madison Avenue east of the intersection and 2) left-turning vehicles into northbound Lark Street.
- Install pavement markings and new turning arrows.
- Stripe, with pavement markings, a bullnose to channelize and guide eastbound right turning traffic from Madison into Delaware and to delineate a parking bay on the east side of Lark Street south of the intersection.
- Install bicycle lanes and intersection controls.



CASE STUDY 5

ALBANY COUNTY

DELAWARE AVENUE

at Second Avenue, Whitehall Road and Ten Eyck Avenue

PROBLEM STATEMENT:

Heavy peak hour through and turning traffic volumes with minimal pedestrian provisions and no specific provisions for bicyclists.

DETAILED DESCRIPTION:

The Delaware Avenue intersection with Whitehall Road, Second Avenue and Ten Eyck Avenue is located in a commercial area on the south edge of the City of Albany. This intersection experiences heavy through and turning traffic volumes. A nearby senior center, nursing homes and a park contribute to special crossing needs. A three-phase traffic signal controls the intersection. Fixed time pedestrian signals only on three corners. From September 1994 to August 1999, 61 crashes, including three pedestrian crashes, were reported at this intersection.

SPECIFIC PROBLEMS FOR PEDESTRIANS:

- Heavy left and right turn movements between northbound Delaware and eastbound Whitehall across crosswalk on west side of intersection, especially during peak hours of traffic flow.
- Heavy eastbound and westbound peak hour traffic flow between Whitehall and Second Avenue.
- No pedestrian signal on southwest corner of Delaware and Second Avenue.
- Traffic from Delaware and Second Avenue splits without guidance or control into Whitehall and Ten Eyck Avenue.
- No channelization to guide traffic or pedestrians in the open area between Whitehall and Ten Eyck.

SPECIFIC PROBLEMS FOR BICYCLISTS:

- No specific provisions for bicyclists.
- Complex intersection geometry and heavy through and turning traffic volumes.
- Three phase traffic signal operation.
- Busy driveways into Mobil station in the southeast quadrant of the intersection.

SPECIFIC PROBLEMS FOR MOTOR VEHICLES:

- Awkward and difficult intersection geometry.
- Heavy peak hour traffic volumes.
- Minimally visible crosswalks.
- No pedestrian signal in southeast quadrant, thus no pedestrian guidance or control.
- No stop line at any approach to the intersection.



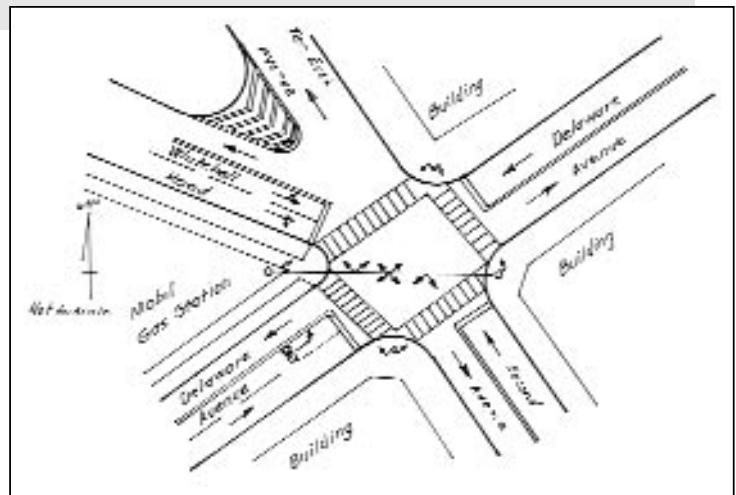
RECOMMENDED SOLUTIONS:

Short-term (cheap & immediate):

- Install pedestrian actuated signal on southwest corner of Delaware Avenue and Second Avenue.
- Install "ladder style" crosswalks across each approach to the intersection, using high quality, permanent, reflective pavement marking materials.
- Install stop lines on each approach, using high quality, permanent, reflective pavement marking materials.
- Install painted bullnose channelization between Whitehall Road and Ten Eyck Avenue, using high quality, permanent, reflective pavement marking materials.

Longer-term (more expensive, longer implementation, and possibly further study needed):

- Install bicycle lanes and intersection controls.



CASE STUDY 6

ALBANY COUNTY

**WASHINGTON AVENUE
at Eagle Street, Pine Street and Maiden Lane**

PROBLEM STATEMENT:

Poorly defined vehicular traffic control, especially given the heavy volume of mass transit, coupled with a lack of provisions for pedestrians and bicyclists in an area characterized by a historic statue in front of the historic Albany City Hall and the State Capitol and part of the central business district and government center.

DETAILED DESCRIPTION:

The intersection of Washington Avenue with Eagle Street, Pine Street and Maiden Lane in Albany's Central Business District presents a difficult intersection for motorists and is daunting to pedestrians and bicyclists. Washington Avenue is considered a minor arterial. Eagle Street and Pine Street are collectors and Maiden Lane is a local road. The project area is the busiest bus route on Washington Avenue. There are two handicap accessible ramps, one on the corner of the State Capitol and the other on the corner of the park across from the northeast corner of City Hall, but no crosswalks. There are no provisions for bicyclists. In the past five years, there have been six accidents, including 1 involving a pedestrian.

SPECIFIC PROBLEMS FOR PEDESTRIANS:

- No crosswalks
- Two handicap accessible ramps that dump pedestrians, physically impaired or otherwise, into the travel way
- Obstructions in sidewalk
- Pedestrians must cross substantive distances of unmarked pavement

SPECIFIC PROBLEMS FOR BICYCLISTS:

- Lack of shoulder on road or any other bicyclist facility
- Diagonal parking along Eagle Street in front of City Hall
- Bicyclists must navigate with motorists through an intersection with scarce pavement markings

SPECIFIC PROBLEMS FOR MOTOR VEHICLES:

- Scarcity of pavement markings makes it unclear how best to navigate through the intersection
- Lack of crosswalks and other pedestrian amenities indicates a de-emphasis of the pedestrian and bicyclist environment.



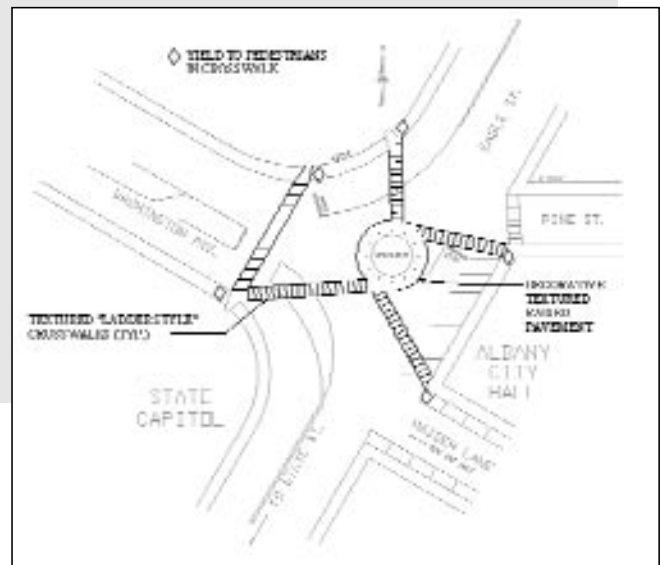
RECOMMENDED SOLUTIONS:

Short term (cheap and immediate):

- Install textured “ladder style” crosswalks, as shown, including one across Washington Avenue where there is an existing handicap ramp on the south side of Washington Avenue using high quality materials
- Install handicap ramp on the north side of Washington Avenue (eliminating one parallel parking place)

Longer-term (more expensive, longer implementation time or possibly further study needed):

- Install a curb cut on the north side of Washington Avenue by eliminating one parallel parking place.
- Install a raised and textured band around the monument of three foot width beyond concrete posts.
- Install raised and textured band around the monument of three foot width beyond concrete posts
- Install YIELD TO PEDESTRIANS signs, as shown
- Install bicycle lanes and intersection controls.



CASE STUDY 7

MONROE COUNTY

**MAIN STREET
at Alexander Street**

PROBLEM STATEMENT:

Dense commercial activity and a heavy volume of automobiles, trucks and transit buses, as well as pedestrians and bicyclists competing for the same space. Driver inattention and failure to yield the right of way are compounded by pedestrian jaywalking and crossing against the signal. A de-emphasis of the pedestrian environment within the Central Business District sends the wrong message to motorists.

DETAILED DESCRIPTION:

The Main Street at Alexander Street intersection in Monroe County is a four-legged intersection in the middle of Rochester's Central Business District with average traffic of 27,400 vehicles per day. The south leg of Alexander Street and both legs of Main Street are considered minor arterials. Bus stops are provided along Main Street. Pedestrian signals are provided for crossing Main Street only. There are no specific provisions for bicyclists. Between September 1994 and August 1999, 57 crashes, including 1 bicyclist and 5 pedestrian crashes, were reported.

SPECIFIC PROBLEMS FOR PEDESTRIANS:

- Poorly defined crosswalks.
- No pedestrian phase to cross either leg of Alexander Street.
- Obstructions in sidewalk.
- Pedestrians must cross six lanes of traffic to cross Main Street.

SPECIFIC PROBLEMS FOR BICYCLISTS:

- Lack of shoulder on road or any other bicycling facility.
- Road surface is irregular with drains and grates in bicyclists' path.
- All of the reported crashes were a result of motorists' inattention to bicyclists.
- Turning radii are large, allowing cars to corner at a high rate of speed.
- Heavy motor vehicle traffic.
- Extensive commercial activity.

SPECIFIC PROBLEMS FOR MOTOR VEHICLES:

- Bus stops, in combination with other features of an urban central business district, have potential to obstruct view.
- Poorly defined crosswalks do not capture the motorists' attention.



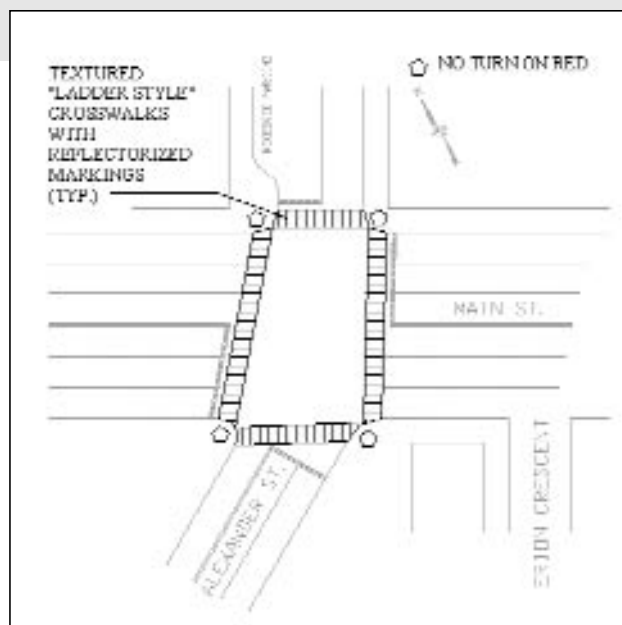
RECOMMENDED SOLUTIONS:

Short-term (cheap & immediate):

- Install raised/textured "ladder style" crosswalks with reflectorized markings across all four legs of the intersection using high quality materials.
- Install enforceable signing for motorists as follows: NO RIGHT TURN ON RED.
- Increase light phase on Alexander Street to allow for easier pedestrian crossing of Main St.

Longer-term (more expensive, longer implementation, and possibly further study needed):

- Determine if pedestrian signal is warranted to cross Alexander St.
- Reduce turning radii to reduce the speed of turning cars.
- Repave roadway, bringing the grates flush with the road surface.
- Install shoulder.
- Install bicycle lanes and intersection controls.



CASE STUDY 8

MONROE COUNTY

**EAST AVENUE
at Alexander Street**

PROBLEM STATEMENT:

Dense commercial activity, and a heavy volume of automobiles, trucks and transit buses, as well as pedestrians and bicyclists are competing for the same space. Driver inattention and failure to yield the right of way are evident as the cause of reported crashes. A de-emphasis of the pedestrian environment within the Central Business District sends the wrong message to motorists.

DETAILED DESCRIPTION:

The East Avenue at Alexander Street intersection in Monroe County is a four-legged intersection in the middle of Rochester's Central Business District with average traffic of 26,900 vehicles per day. During the morning and afternoon peak hours, approximately 160 pedestrians cross Alexander Street and approximately 65 cross East Avenue. Both East Avenue and Alexander Street are considered minor arterials. Bus stops are provided along East Avenue. There are automatic pedestrian signals provided but no pedestrian buttons. There are no specific provisions for bicyclists. Between September 1994 and August 1999, 71 crashes, including 5 bicyclist and 1 pedestrian crash, were reported.

SPECIFIC PROBLEMS FOR PEDESTRIANS:

- Poorly defined crosswalks.
- No pedestrian phase to cross either of the minor arterials.
- Obstructions in sidewalk.

SPECIFIC PROBLEMS FOR BICYCLISTS:

- Lack of shoulder on road or any other bicycling facility.
- Road surface is irregular with drains and grates in bicyclists' way.
- All of the reported crashes were a result of motorists' inattention to bicyclists.
- Turning radii are large, allowing cars to corner at high rate of speed.
- Heavy motor vehicle traffic.
- Extensive commercial activity.

SPECIFIC PROBLEMS FOR MOTOR VEHICLES:

- Poorly defined crosswalks and a lack of bicycling facilities. Motorists are not alerted to pedestrian and bicyclist presence.



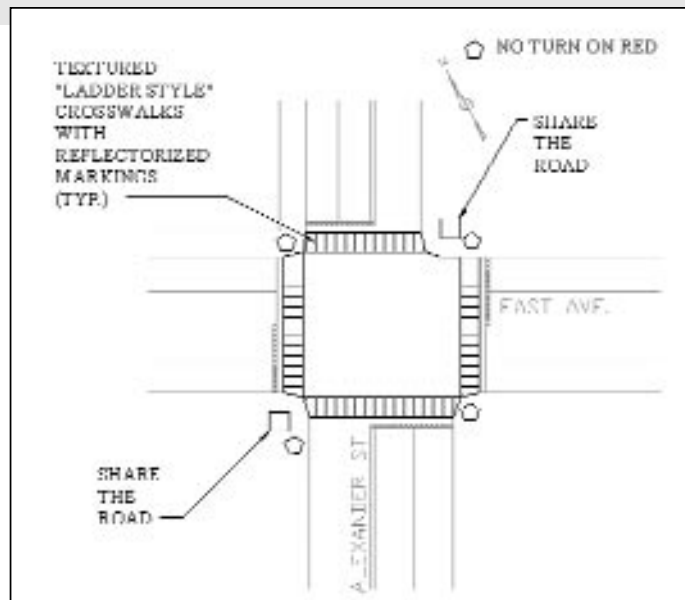
RECOMMENDED SOLUTIONS:

Short-term (cheap & immediate):

- Install raised/textured "ladder style" crosswalks with reflectorized markings across all four legs of the intersection using high quality materials.
- Install SHARE THE ROAD signs at the northeast and southwest corners of the intersection.
- Install enforceable signing for motorists as follows: NO RIGHT TURN ON RED.
- Change right lane north bound on Alexander Street at East Avenue intersection to RIGHT TURN ONLY, NO RIGHT TURN ON RED.

Longer-term (more expensive, longer implementation, and possibly further study needed):

- Repave roadway, paying attention to bring the grates flush with the road surface.
- Reduce turning radii to slow the speed of turning cars.
- Install bicycle lanes and intersection controls.



CASE STUDY 9

MONROE COUNTY

**AVENUE D
at Hollenbeck Street**

PROBLEM STATEMENT:

Significant collector street traffic on Avenue D conflicting with pedestrian and bicyclist traffic and vehicles traversing the Hollenbeck Street dog leg.

DETAILED DESCRIPTION:

The Avenue D intersection with Hollenbeck Street is located in the northerly urban residential area of Rochester. During morning and afternoon peak periods, the intersection experiences moderately heavy traffic volume on Avenue D and a strong north/south movement on Hollenbeck across Avenue D. Between September 1994 and August 1999, four bicyclist crashes were reported at this intersection.

SPECIFIC PROBLEMS FOR PEDESTRIANS:

- No striped crosswalks.
- No advance warning of pedestrian crossing across Avenue D.
- Confusing traffic pattern- dog leg intersection geometry.

SPECIFIC PROBLEMS FOR BICYCLISTS:

- No specific provisions for bicyclists.
- Bicyclists ride on the sidewalks.
- Inadequate sight distance for bicyclists and motorists in the northwest corner of Hollenbeck Street and Avenue D.

SPECIFIC PROBLEMS FOR MOTOR VEHICLES:

- No pavement markings.
- No centerline striping on Avenue D or Hollenbeck Street.
- No stop lines on Hollenbeck Street at Avenue D.
- No crosswalk across Avenue D.
- No crosswalks across Hollenbeck Street at Avenue D.
- Dog leg intersection for through traffic on Hollenbeck Street crossing Avenue D.
- No advance warning of pedestrians crossing Avenue D.
- Limited sight distance for southbound Hollenbeck Street traffic approaching Avenue D.



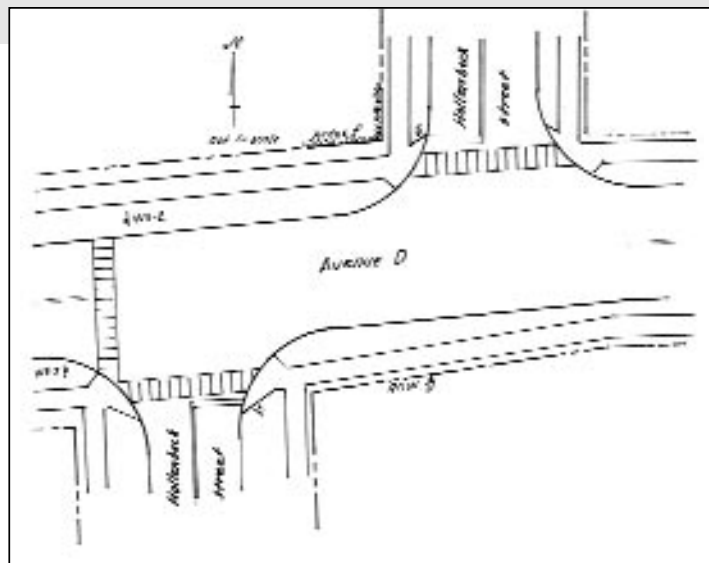
RECOMMENDED SOLUTIONS:

Short-term (cheap & immediate):

- Install high visibility “ladder style” crosswalks across Hollenbeck Street on the north and south side of Avenue D.
- Install stop lines in advance of crosswalks on Hollenbeck Street.
- Install approach double yellow no passing markings on north and south legs of Hollenbeck Street (minimum of 50 feet).
- Install double yellow no passing centerline markings on Avenue D (minimum of 100 feet).
- Install yellow-lime colored WS-2 pedestrian crosswalk signs for eastbound and westbound Avenue D traffic approaching the new pedestrian crosswalk across Avenue D.

Longer-term (more expensive, longer implementation, and possibly further study needed):

- Open the sight distance triangle on the northwest corner of Hollenbeck Street and Avenue D.
- Install bicycle lanes and intersection controls.



CASE STUDY 10
SUFFOK COUNTY

SUFFOLK AVENUE (CR-100)
at Carleton Avenue (CR-17)

PROBLEM STATEMENT:

An intersection that focuses on the efficient movement of motor vehicles at the expense of bicyclist and pedestrian traffic. The intersection has expansive pavement widths to maintain excellent levels of service, high speeds and high volumes of motor vehicle traffic, but the intersection is intimidating for pedestrians and bicyclists.

DETAILED DESCRIPTION:

The Suffolk Avenue at Carleton Avenue intersection is a four-legged intersection of two major county arterials. Suffolk Avenue (CR 100) is an east-west arterial while Carleton Avenue (CR 17) provides north-south travel from the south shore of Long Island to the Long Island Expressway. Near its intersection with Carleton Avenue, Suffolk Avenue is a high-speed four-lane highway with left turn lanes and shoulders. The east-west traffic volume entering the intersection exceeds 26,000 vehicles per day. This segment of Suffolk Avenue is designated as an on-road bicycling route. Carleton Avenue provides corridor access to County and Federal court complexes, major retail and housing developments and the County minor league sports stadium; the Central Islip Central Business District is along Carleton Avenue, just south of its intersection with Suffolk Avenue. The Long Island Rail Road crosses Carleton Avenue. The Central Islip station is less than half mile away. Between September 1994 and August 1999, 173 crashes, including 3 bicyclist and 4 pedestrian crashes, were reported.

SPECIFIC PROBLEMS FOR PEDESTRIANS:

- In all but one of the crashes involving pedestrians, the pedestrians crossed against the signal or jaywalked.
- Expansive pavement widths to cross with many actuated turn lanes minimize pedestrians' time to cross the highway.
- High speed traffic.
- Turning radius is large with dedicated turn lanes, allowing cars to make high speed turns.

SPECIFIC PROBLEMS FOR BICYCLISTS:

- Lack of shoulder on Carleton Avenue and narrow shoulders on Suffolk Avenue.
- Motorists' failure to yield right of way to bicyclists resulted in two of the three reported crashes.
- Turning radius is large with dedicated turn lanes, allowing cars to make high speed turns.
- Heavy motor vehicle traffic.
- Railroad tracks cross Carleton Avenue.

SPECIFIC PROBLEMS FOR MOTOR VEHICLES:

- Intense commercial area.
- Heavy traffic volumes.
- Poorly defined crosswalks.
- Railroad tracks cross Carleton Avenue.
- Central Islip railroad station less than half mile away.



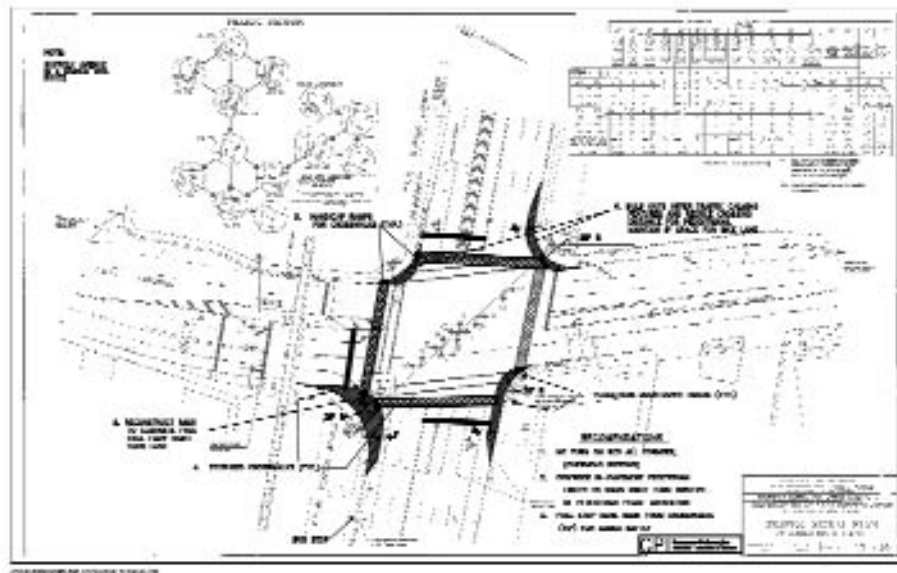
RECOMMENDED SOLUTIONS:

Short-term (cheap & immediate):

- Install enforceable signing for motorists as follows: NO RIGHT TURN ON RED.
- Move stop bars away from crosswalks for added safety.
- Install textured crosswalks, as shown, using high quality materials.
- Install "Share the Road" signs along Suffolk Ave to alert motorists to the presence of bicyclists sharing roadway.

Longer-term (more expensive, longer implementation, and possibly further study needed):

- Consider in-pavement pedestrian lights to warn right-turning drivers of pedestrian phase activation.
- Install curb cuts for crosswalks.
- Install neckdowns that offer traffic calming features and reduce crossing distance for pedestrians while maintaining five ft. width for bicycle lane.
- Install pedestrian countdown timers.
- Consider reconstruction of radii to eliminate free flow right turn lane.
- Install bicycle lanes and intersection controls.



CASE STUDY II

SUFFOLK COUNTY

STRAIGHT PATH (CR-2)

from Acorn Street and Merritt Avenue to Long Island Avenue

PROBLEM STATEMENT:

Dense commercial activity, a crossing of the Long Island Railroad, proximity to a train station and a heavy volume of motor vehicles, as well as pedestrians and bicyclists competing for the same space, contribute to a dangerous stretch of road.

DETAILED DESCRIPTION:

Straight Path is a major north-south arterial through the Town of Babylon that, in between its intersections with Acorn Street/Merritt Avenue and Long Island Avenue, provides for two through lanes that carry approximately 26,000 vehicles per day and nearly 2,000 vehicles during the evening peak. The Long Island Railroad crosses Straight Path at grade approximately 100 feet from the Acorn Street/Merritt Avenue intersection and approximately 70 feet from Long Island Avenue. Exclusive left turn lanes are provided at the Acorn Street intersection. Straight Path passes through the business district hamlet of Wyandanch, which is also a low-income community that tends to generate a significant amount of bicyclist and pedestrian activity.

The intersection of Straight Path and Acorn Street/Merritt Avenue is a five-leg intersection with Andrews Avenue, a one-way low volume road heading north away from the intersection. Acorn Street/Merritt Avenue is a Town of Babylon-maintained local collector that provide access to most of the parking lots for the Wyandanch train station, approximately 100 feet from Straight Path. Long Island Avenue is a Town of Babylon-maintained two-lane local collector that widens to provide left turn lanes at Straight Path. It is a designated bicycle route. A health clinic located on the southwest corner of the Straight Path/Long Island Avenue intersection generates significant turning movements and pedestrian activity. The intersections generate considerable turning movement, as vehicles cross the tracks to their destination on parallel roadways. Between September 1994 and August 1999, 163 crashes, including 8 bicyclist and 8 pedestrian crashes, were reported.

SPECIFIC PROBLEMS FOR PEDESTRIANS:

- Poorly defined crosswalks.
- Pedestrians cross against the signal and jaywalk extensively.

SPECIFIC PROBLEMS FOR BICYCLISTS:

- Lack of shoulder on road or any other specific bicycling facility except on Long Island Avenue.
- Crossing of railroad tracks.
- In all but one of the reported crashes, bicyclists were crossing against the signal or otherwise inappropriately.
- Heavy motor vehicle traffic.
- Extensive commercial activity.

SPECIFIC PROBLEMS FOR MOTOR VEHICLES

- Railroad crossing.
- Proximity of Wyandanch railroad station.



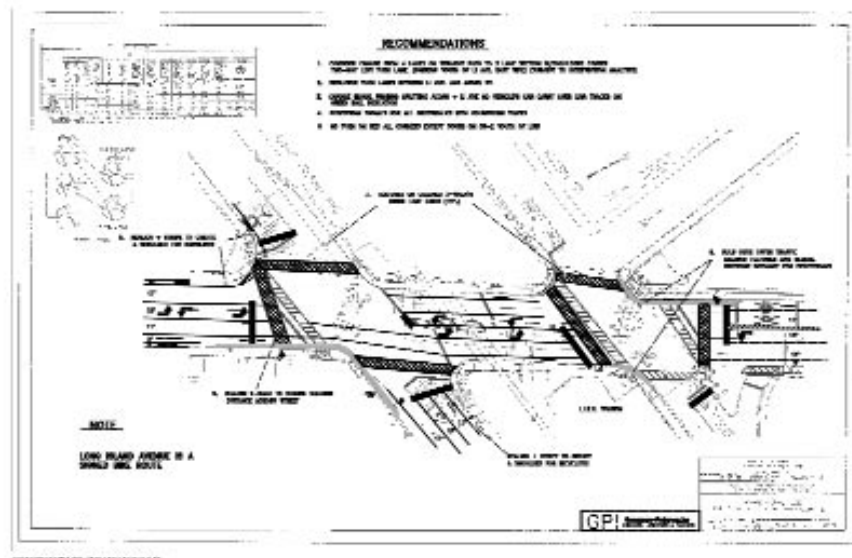
RECOMMENDED SOLUTIONS:

Short-term (cheap & immediate):

- Install enforceable signing for motorists on all corners except south on CR-2 (Straight Path) south of the Long Island Railroad as follows: NO RIGHT TURN ON RED.
- Install pedestrian signals for all crosswalks with countdown timers.
- Install textured/colored crosswalks inside the limit lines, as shown, using high quality materials.
- Realign crosswalk across Straight Path at its intersection with Long Island Avenue to reduce walking distance across street, as shown.
- Change signal phasing splitting Acorn Street and Long Island Avenue so vehicles can carry over the Long Island Railroad track on the green signal.

Longer-term (more expensive, longer implementation , and possibly further study needed):

- Change from four lanes on Straight Path to three-lane section with shoulders and center two-way left turn lane (subject to a detailed intersection analysis).
- Exclusive turn lanes between Long Island Avenue and Acorn Street.
- Consider installation of bulbouts that offer traffic calming features and reduce crossing distance for pedestrians.
- Install bicycle lanes and intersection controls.



CASE STUDY 12

SUFFOLK COUNTY

**NORTH ROAD (CR-39)
at Sandy Hollow Road (CR-52)**

PROBLEM STATEMENT:

Preference by bicyclists and pedestrians for crossing a high speed road at a convenient location rather than at a traffic signal controlled, safer location 100 feet away.

DETAILED DESCRIPTION:

The intersection of North Road at Sandy Hollow Road is actually a merging of two county roads into one road approximately 80 feet west of an intersection with Sebonac Road. North Road is primarily used as an east-west bypass of downtown Southampton. At its merge with Sandy Hollow Road, in the eastbound direction, it has one through lane and one left turn lane onto Sandy Hollow Road; in the westbound direction, North Road has two through lanes and one turning lane. North Road is a high-speed road with traffic volumes slightly over 35,000 vehicles per day with an evening peak hour volume of 2,420 in the area of its merge with Sandy Hollow Road. Sandy Hollow Road has three lanes in the westbound direction, including an exclusive right turn lane onto Sebonac Road and two through lanes going into the merge; Sandy Hollow Road has one lane in the eastbound direction. There is no access to eastbound North Road from Sandy Hollow Road. Traffic volumes along Sandy Hollow Road entering the merge with North Road are approximately 4,500 vehicles per day with an evening peak of 250. Between September 1994 and August 1999, there have been 4 crashes, none of which involved pedestrians or bicyclists. This intersection was chosen by the Suffolk County working group based upon residents' letters.

SPECIFIC PROBLEMS FOR PEDESTRIANS:

- Not convenient to cross road at signal-controlled location. Anecdotally, there seems to be a high volume of jaywalking.

SPECIFIC PROBLEMS FOR BICYCLISTS:

- Not convenient to cross road at signal-controlled location.

SPECIFIC PROBLEMS FOR MOTOR VEHICLES:

- Pedestrians and bicyclists cross unexpectedly, and have the potential to surprise motorists along this merge of two county highways in a relatively rural, bucolic area.



RECOMMENDED SOLUTIONS:

Short-term (cheap & immediate):

- Install signs that encourage pedestrians and bicyclists to cross at traffic signals.
- Install new crosswalks, as shown, at the intersection of Sandy Hollow Road and Sebonac Road, using high quality materials.
- Install textured/colorized crosswalks inside limit lines, as shown, using high quality materials.
- Pull stop bar back from existing crosswalk, as shown, for added safety.

Longer-term (more expensive, longer implementation time or possibly further study needed):

- Construct curb cuts at all existing and proposed crosswalk locations.
- Add speed tables or humps, as shown.
- Install bicycle lanes and intersection controls.

