East Main Street (CR 510) – Mendham Borough
Road Safety Audit

August 2013

Submitted by

Andy Kaplan

SENIOR TRANSPORTATION SAFETY ENGINEER

Sally Karasov

TRANSPORTATION SAFETY ENGINEER

Michael Weber

ENGINEERING RESEARCHER

Center for Advanced Infrastructure & Transportation (CAIT)

RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY

NJDOT Research Project Manager

Robert Desando

In cooperation with

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and
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CAIT's Transportation Safety Resource Center (TSRC) and New Jersey Local Technical Assistance Program (NJ LTAP) offer a statewide Road Safety Audit (RSA) service at no charge to New Jersey towns and counties. Interested parties can request road surveys conducted by a team of engineers, planners, and law-enforcement officers to help municipalities and counties make cost-effective safety improvements.

A multidisciplinary team of professionals offers assessments on roadway issues such as pedestrian and bicycle safety, intersection analyses, rural roads, human factors, speed management, and sign visibility and retro-reflectivity standards.

RSAs include data-driven considerations and analysis of crashes. To determine the best safety solutions, RSA professionals perform incisive crash data evaluations on the target area using Plan4Safety, TSRC's award-winning crash database and software.

The RSA team provides a final report that includes long- and short-term countermeasure recommendations that fit within the requestor's budget. Furthermore, RSAs pay off. According to the Federal Highway Administration (FHWA), countermeasures applied after RSAs can reduce crashes by about 60 percent.

For more information, contact Andy Kaplan, senior engineer researcher, at andy.kaplan@rutgers.edu.

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Introduction

The Rutgers' Transportation Safety Resource Center (TSRC) at the Rutgers' Center for Advanced Infrastructure and Transportation (CAIT) and the North Jersey Transportation Planning Authority (NJTPA) have partnered to provide NJTPA's sub-regions with facilitated Road Safety Audits (RSA) at locations identified by the sub-regions as having safety concerns. To assist the sub-regions in making this determination, NJTPA and TSRC have prepared a ranking of roadway segments based on crash data.

In 2012, Morris County was selected by NJTPA as a sub-region that would benefit from an RSA. Morris County was provided with the following suggested crash locations by an NJTPA and TSRC data run.

County Rank	County	Road Name	Starting Municipality	SRI	Milepost Start	Milepost End	Segment Length	Total Crashes	EPDO	Property	Complaint of Pain	Moderate Injury	Incapacitating	Fatal Injury	Roadway Departure	Young Driver	Older Driver	Motorcycle	Truck	Bus	Bike	Pedestrian
1	Morris	Prospect Street	Dover Town	513	40.63	46.82	6.19	462	703	342	0	119	1	0	3	104	56	3	48	4	7	23
2	Morris	Mendham Road	Morris Twp	510	10.42	12.75	2.33	287	377	242	0	45	0	0	1	41	48	1	29	4	1	10
3	Morris	Ridgedale Avenue	Hanover Twp	14121333	0.51	3.43	2.92	209	316	156	0	52	1	0	3	29	50	1	12	0	1	2
4	Morris	Hanover Avenue	Morris Twp	14000650	4.13	7.08	2.95	180	279	131	0	48	1	0	1	28	44	1	9	3	2	1
5	Morris	Hanover Avenue	Parsippany-Troy Hills Twp	14000650	4.13	7.08	2.95	180	279	131	0	48	1	0	1	28	44	1	9	3	2	1
6	Morris	Mendham Road	Chester Twp	510	0.80	5.92	5.12	183	276	137	0	45	1	0	11	47	29	2	11	1	0	3
7	Morris	Mt Hope Avenue	Dover Town	14000661	0.00	2.32	2.32	187	273	144	0	43	0	0	3	40	41	4	13	1	0	3
8	Morris	North Beverwyck Road	Parsippany-Troy Hills Twp	14291575	0.00	2.33	2.33	177	259	136	0	41	0	0	3	44	33	1	14	2	1	2
9	Morris	Ridgedale Avenue	East Hanover Twp	14000632	2.80	5.55	2.75	145	243	96	0	49	0	0	6	26	34	1	6	2	0	3
10	Morris	Landing Road	Roxbury Twp	14000631	0.03	2.06	2.03	142	213	107	0	34	1	0	3	37	21	3	5	0	0	0

In discussion with the Morris County Department of Public Works, it was noted:

> *The county has been working on various projects for locations 1 through 5.*
>
> *However location 6 kind of surprised [us]. This is County Route 510 from Chester Township through the center of Mendham. A high school exists [sic] that we have had traffic and pedestrian issues with. Would it be possible to extend the section [from Hilltop Road] east to Cold Hill Road? That is the roadway section I would like to review. It's pretty varied, has a school, several school crossings as well as rural sections. We also have never done an overall look at this section of roadway.*
>
> - CORRESPONDENCE FROM MORRIS COUNTY DATED AUGUST 2, 2012

Rutgers' TSRC conducted an in-depth data analysis of this section of roadway to identify crash hot spots both throughout the entire length of roadway identified by NJTPA (MP 0.08–5.92) and between the more specific proposed limits of Hilltop Road and Cold Hill Road (4.83–5.83). Rutgers identified two crash data hot spots in the proposed study area: Mountain Avenue/Hilltop Road (MP 4.7–4.89, 30 crashes) and Tempe Wick Rd/Kings Shopping Center (MP 5.4–5.6, 25 crashes).

TSRC additionally identified two potential hot spots outside the proposed study area. The first was at Milepost 3.4–3.6. This includes the intersection of Roxiticus Road and a sharp curve in the vicinity of the intersection. However it was found that of the 15 crashes, six were classified as animal (deer) crashes. Removing the animal crashes, the location no longer ranked as a hot spot.

The second identified hot spot was in the vicinity of Fox Chase Road and Robinson Lane. Of the 15 crashes identified in the vicinity of these two intersections, five were classified as animal (deer) crashes. Removing the animal crashes, the location no longer ranked as a hot spot.

TSRC, Morris County, and NJTPA subsequently confirmed the location of the RSA to be between Hilltop Road and Cold Hill Road, including the following intersections/areas of concern:

1. Hilltop Road (CR 525)/Mountain Avenue (CR 614)
2. Halstead Road/West Morris Mendham High School
3. Dean Road
4. Tempe Wick Road
5. Mendham Shopping Center
6. Cold Hill Road

Background

The audit focused on six intersections on East Main Street (CR 510), as shown in Figure 1 below, located within Morris County, in Mendham Borough:

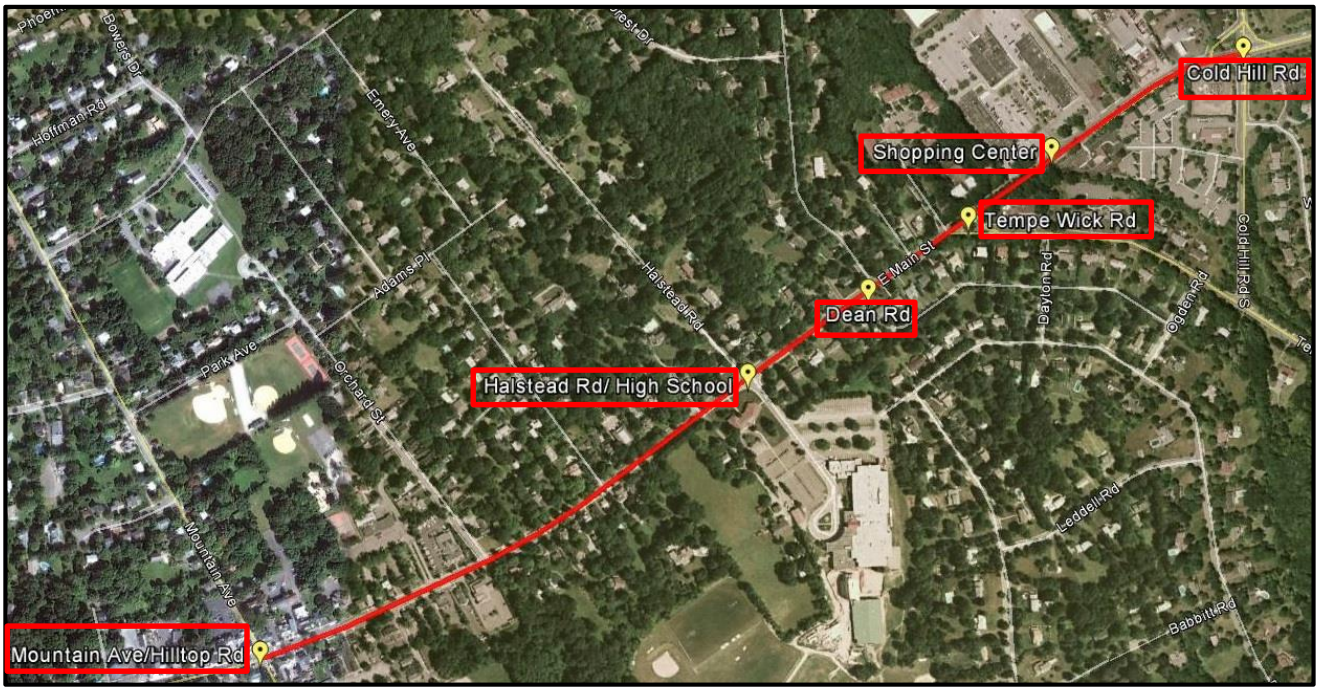


Figure 1 – Map of Intersections in RSA Study

- Hilltop Road (CR 525)/Mountain Avenue (CR 614)
- Halstead Road/High School Entrance
- Dean Road
- Tempe Wick Road (CR 646)
- Mendham Shopping Center
- Cold Hill Road

All of the studied intersections are within a one-mile section; two of the intersections—Hilltop Road and Cold Hill Road—are signalized, and the remainder are stop-controlled on the minor roadways. It is a two-lane road with no shoulders, and the width varies between 30 to 46 feet wide. East Main Street (CR 510) is characterized as suburban and includes residential with some commercial areas, the municipal building, and a high school. There is no NJ Transit bus route service within the RSA corridor. The roadway is designated as an "Urban Minor Arterial" and it's under county jurisdiction.

Main Street (CR 510) connects to Chester in the west and extends past Morristown to the east.

The intersection of **Hilltop Road (CR 525)/Mountain Avenue (CR 614)** is a right angle, four-legged, signalized intersection with **East Main Street (CR 510)**; West Main Street begins west of this intersection. The buildings include the municipal offices, a restaurant, and other small commercial buildings. There are dedicated left turn, right turn, and straight ahead lanes on East Main Street in both directions. There is also significant turning traffic from Hilltop Road and Mountain Avenue, which causes excessive queuing. The buildings are located close to the intersection, being a historic area, and sight distance is restricted. Also, there are significant accessibility issues at this intersection. The southeast corner has stairs accessing the sidewalk with no ramp.

Figure 2 – Hilltop Road/Mountain Avenue and East Main Street

Figure 3 – Halstead Rd., entrance to high school and East Main Street

Halstead Road and the entrance to the High School are slightly offset from each other where they meet Main Street, and they are both stop-controlled. There are dedicated turning lanes from the high school but not on East Main Street. This is a two-lane roadway with shoulders. There is extremely heavy traffic with many pedestrians at the beginning and the end of the school day. A police officer is on site during those times to direct traffic.

The intersection of **Dean Road and East Main Street** is a stop-controlled T-intersection with free flow on Main Street. Especially during heavy volume at the beginning and end of the school day, vehicles have difficulty making the left turn from Dean Road.

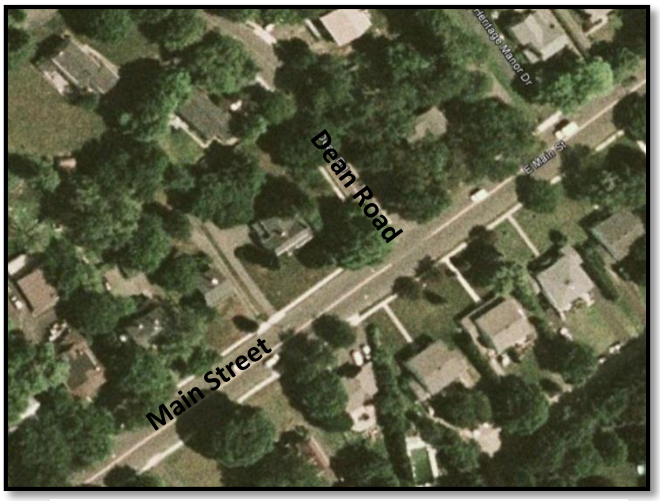


Figure 4 – Dean Road and East Main Street

Figure 5 – Tempe Wick Road and East Main Street

The intersection of **Tempe Wick Road and East Main Street** is a skewed T-intersection with Heritage Manor Drive offset 100 feet to the west. There is an island on Tempe Wick Road with a wide turning radius from Main Street eastbound to Tempe Wick Road. The intersection of Tempe Wick Road at Main Street is very wide and even with the island, the crosswalks are quite long.

The intersection of the **Mendham Shopping Center and East Main Street** is located a few hundred feet east of Tempe Wick Road. The entrance and exit driveways are separated by a median. The roadway width of East Main Street is wide enough for two lanes of traffic in each direction but is not striped. Left turn movements into and out of the shopping center are difficult due to traffic volume. There is a police officer stationed at the intersection to facilitate left turns on Fridays from 4 to 7 p.m. and Saturdays from 10 a.m. to 2 p.m.

Figure 6 – Mendham Shopping Center and East Main Street

Figure 7 – Cold Hill Road and East Main Street

The intersection of **Cold Hill Road and East Main Street** is a signalized intersection. The four segments each have a dedicated left turn lane and one through lane. There are right turn ramps from East Main Street to Cold Hill Road northbound and from Cold Hill Road southbound to East Main Street westbound.

Road Safety Audit Process

The East Main Street RSA followed a process that began with data collection, a crucial task that served as the backbone for recommendations for improvement. At the selected sites, crash data was collected using Plan4Safety, a crash data analysis tool, and consisted of crash types, locations, years, road conditions, and contributing circumstances. Using the crash data, a crash diagram, shown in Appendix B, was produced that showed crash types and locations. The Road Safety Audit occurred on Monday, October 19, 2012. The day began with a pre-audit meeting that involved the definition of a road safety audit and an overview of the intersections. A presentation was shown detailing the crash analysis and aerial images of the different intersections.

Figure 8 – RSA team conducting site visit

Following the presentation, site visits were conducted in which all participants were given a chance to inspect the sites and utilize their various backgrounds to brainstorm recommended improvements. After the site visits, the team was brought back together to discuss the issues observed and recommendations to remedy the issues.

Information Sources

Several sources of information were used in the RSA process. For example, crash data from 2009 to 2011 was examined for trends and patterns. Specific resources used in the analysis include:

- NJDOT Crash Database (2009–2011)
- Plan4Safety Crash Data Analysis Tool
- NJTR-1 Crash Reports
- NJDOT Straight Line Diagrams
- Google Earth

RSA Team

The RSA team consisted of 16 participants, including police officers, engineers, and planners from different agencies across the state.

Name	Representing	Phone	Email
Steven Bolio	Ferriero Engineering (Borough Engineer)	(908) 879-6209	steve.bolio@ferrieroengineering.com
Daniel Callas	TransOptions	(973) 267-7600	dcallas@transoptions.org
Debbie Dellagiacoma	MC Engineering	(973) 285-6509	ddellagiacoma@co.morris.nj.us
Laurie Felber	Mendham Environmental	(973) 543-0663	lorraine.felber@gmail.com
Baher Girgis	NJDOT	(609) 530-2438	baher.girgis@dot.state.nj.us
Jonathan Hawkins	Voorhees Transportation Center	(704) 576-2360	jonathan.hawkins@rutgers.edu
Andy Kaplan	Rutgers' TSRC	(609) 213-6252	andy.kaplan@rutgers.edu
Sally Karasov	Rutgers' TSRC	(848) 445-2898	sally.karasov@rutgers.edu
Pasquale Libertino	Mendham Borough Police	(973) 543-2527	chieflibertino@mendhamnj.org
Patrick McNichol	Mendham Borough Police	(973) 543-2527	McNichol@mendhamnj.org
Christine Mittman	NJTPA	(973) 639-8448	cmittman@njtpa.org
Jennifer Molter	NJDOT Local Aid	(973) 601-6707	jennifer.molter@dot.state.nj.us
Joseph Russo	Morris County DOT	(973) 829-8212	jrusso@co.morris.nj.us
Ellen M. Sandman	Mendham Admin.	(973) 543-7152	esandman@mendhamnj.org
Michael Weber	Rutgers' TSRC	(848) 445-2893	michael.weber@rutgers.edu
Joseph Weiss	TransOptions	(973) 267-7600	jweiss@transoptions.org

Crash Data

As of the date of this report, the crash data reported by the NJDOT shows a total of 76 crashes occurring during the three-year period from 2009 to 2011. The following tables show detailed statistics of the crash data analyzed.

The intersections within Mendham Borough, which were selected for further analyses based on crash data, are as follows:

- Hilltop Road/Mountain Avenue & East Main Street
- Halstead Road/Entrance to High School & East Main Street
- Dean Road & East Main Street
- Tempe Wick Road & East Main Street
- Mendham Shopping Center & East Main Street
- Cold Hill Road & East Main Street

Hilltop Road/Mountain Avenue & East Main Street

As can be seen from the tables below, the predominant crash type at the intersection of Hilltop Road and East Main Street is "Same Direction-Rear End." Three-quarters of the crashes occurred during daylight and dry conditions. A number of the crashes were affected by driver inattention, and many of them occurred while going straight ahead, making a left turn, or stopped in traffic.

Hilltop Road		CRASH TYPE							
		Same Direction-Rear End	Right Angle	Opposite Direction-Head On/Angular	Struck Parked Vehicle	Left Turn/U Turn	Backing	Fixed Object	TOTAL
SEVERITY	Property Damage	7	3		1		1	1	**13**
	Injury	3	1	1	1	1			**7**
	TOTAL	**10**	**4**	**1**	**2**	**1**	**1**	**1**	**20**

Hilltop Road		SURFACE CONDITION		
		Dry	Wet	TOTAL
LIGHT CONDITION	Daylight	15	3	**18**
	Dark (Street Lights On/Continuous)	2		**2**
	TOTAL	**17**	**3**	**20**

Hilltop Road		PRE CRASH VEHICLE ACTION							
		Unknown	Going Straight Ahead	Making Left Turn	Slowing or Stopping	Stopped in Traffic	Parked	Backing	TOTAL
CONTRIBUTING CIRCUMSTANCES	Unknown	1							**1**
	Unsafe Speed		1						**1**
	Driver Inattention		7	7		1			**15**
	Failed to Yield Right of Way to Vehicle/Pedestrian			2					**2**
	Improper Turning			1					**1**
	Following Too Closely		1		1				**2**
	Backing Unsafely							1	**1**
	None (Driver/Pedcycle)		5	1	4	8	2		**20**
TOTAL		**1**	**14**	**11**	**5**	**9**	**2**	**1**	

Halstead Road/Entrance to High School & East Main Street

As can be seen from the tables below, there were very few crashes at the intersection of East Main Street and the high school. The crash data does not reflect the amount of traffic volume and activity at this intersection, especially at the beginning and end of the school day. There is a significant amount of pedestrian activity, and many pedestrians could have been indirectly involved with traffic incidents. Since there is a police officer at the intersection at the periods of heavy volume and activity, many more crashes were probably prevented. Both of the crashes did occur during daylight hours.

High School Entrance		CRASH TYPE		
		Same Direction-Rear End	Right Angle	TOTAL
SEVERITY	Property Damage	1		**1**
	Injury		1	**1**
	TOTAL	**1**	**1**	**2**

High School Entrance		LIGHT CONDITIONS			
		Daylight	Dark (Street Lights Off)	Dark (No Street Lights)	TOTAL
SURFACE CONDITIONS	Dry	2			**2**
	Wet				
	Snowy				
	Icy				
TOTAL		**2**			**2**

Dean Road & East Main Street

As can be seen from the tables below, most of the crashes at the intersection of East Main Street and Dean Road were either "Same Direction-Rear End" or "Right Angle" crashes. Driver inattention was a contributing circumstance for half of the drivers.

Dean Road		CRASH TYPE				
		Same Direction-Rear End	Right Angle	Opposite Direction - Side Swipe	Fixed Object	TOTAL
SEVERITY	Property Damage	2	2			**4**
	Injury	2	1	1	1	**5**
	TOTAL	**4**	**3**	**1**	**1**	**9**

Dean Road		PRE CRASH VEHICLE ACTION				
		Going Straight Ahead	Making Right Turn (not turn on red)	Making Left Turn	Slowing or Stopping	TOTAL
CONTRIBUTING CIRCUMSTANCES	Driver Inattention	5	1	3		**9**
	None (Driver/Pedcycle)	3		3	3	**9**
	TOTAL	**8**	**1**	**6**	**3**	

Tempe Wick Road & East Main Street

As can be seen from the tables below, most of the crashes at the intersection of East Main Street and Tempe Wick Road were either "Same Direction-Rear End" or "Right Angle" crashes. Driver inattention was a significant contributing circumstance. As can be seen in the crash diagram in Appendix B, four crashes were indirectly involved with pedestrians, although the crash data does not reflect this as the pedestrians were not impacted directly.

Tempe Wick Road		CRASH TYPE				
		Same Direction-Rear End	Same Direction-Side Swipe	Right Angle	Animal	TOTAL
SEVERITY	Property Damage	6	1	3	1	**11**
	Injury			1		**1**
	TOTAL	**6**	**1**	**4**	**1**	**12**

Tempe Wick Road		PRE CRASH VEHICLE ACTION						
		Going Straight Ahead	Making Right Turn (not turn on red)	Making Left Turn	Making U Turn	Slowing or Stopping	Stopped in Traffic	TOTAL
CONTRIBUTING CIRCUMSTANCES	Driver Inattention	4	2	2				**8**
	Failed to Yield Right of Way to Vehicle/Pedestrian			1				**1**
	Improper Turning				1			**1**
	Following Too Closely	1						**1**
	None (Driver/Pedcycle)	5	1	2		1	2	**11**
	Animals in Roadway	2						**2**
TOTAL		**13**	**12**	**3**	**5**	**1**	**1**	**2**

Mendham Shopping Center & East Main Street

As can be seen from the tables below, two-thirds of the crashes at the intersection of East Main Street and the shopping center were "Right Angle" crashes. The predominant pre-crash vehicle actions were "Going Straight Ahead" or "Left Turns." As can be seen in the crash diagram in Appendix B, five of the six crashes involved turning movements into and out of the shopping center. The sixth crash was precipitated by pedestrians crossing midblock. (As the pedestrians were not directly impacted by the crash, they do not appear as a crash type.)

Mendham Shopping Center		CRASHTYPE		
		Same Direction-Rear End	Right Angle	TOTAL
SEVERITY	Property Damage	1	4	**5**
	Injury	1		**1**
	TOTAL	**2**	**4**	**6**

Mendham Shopping Center		PRE CRASH VEHICLE ACTION					
		Going Straight Ahead	Making Right Turn (not turn on red)	Making Left Turn	Starting in Traffic	Stopped in Traffic	TOTAL
CONTRIBUTING CIRCUMSTANCES	Driver Inattention	1		2			**3**
	Failed to Yield Right of Way to Vehicle/Pedestrian		1	2			**3**
	None (Driver/Pedcycle)	4			1	1	
	TOTAL	**5**	**1**	**4**	**1**	**1**	**6**

Cold Hill Road & East Main Street

As can be seen from the tables below, the majority of the crashes at the intersection of East Main Street and Cold Hill Road were "Same Direction-Rear End" crashes. Most of the crashes occurred during daylight and almost all occurred in dry conditions. The predominant pre-crash vehicle actions were "Going Straight Ahead" or "Stopped in Traffic."

Cold Hill Road		CRASH TYPE			
		Same Direction-Rear End	Same Direction-Side Swipe	Backing	TOTAL
SEVERITY	Property Damage	7	1	1	**9**
	Injury				**0**
	TOTAL	**7**	**1**	**1**	**9**

Cold Hill Road		LIGHT CONDITION			
		Daylight	Dusk	Dark (Street Lights On/ continuous)	TOTAL
SURFACE CONDITION	Dry	6	1	1	**8**
	Null	1			**1**
	TOTAL	**7**	**1**	**1**	**9**

Cold Hill Road		PRE CRASH VEHICLE ACTION						
		Going Straight Ahead	Making Right Turn (not turn on red)	Making Left Turn	Slowing or Stopping	Stopped in Traffic	Backing	TOTAL
CONTRIBUTING CIRCUMSTANCES	**Unsafe Speed**		1					**1**
	Driver Inattention	4		1	2			**7**
	Backing Unsafely						2	**2**
	None (Driver/Pedcycle)	1	1			6		**8**
	TOTAL	**5**	**2**	**1**	**2**	**6**	**2**	

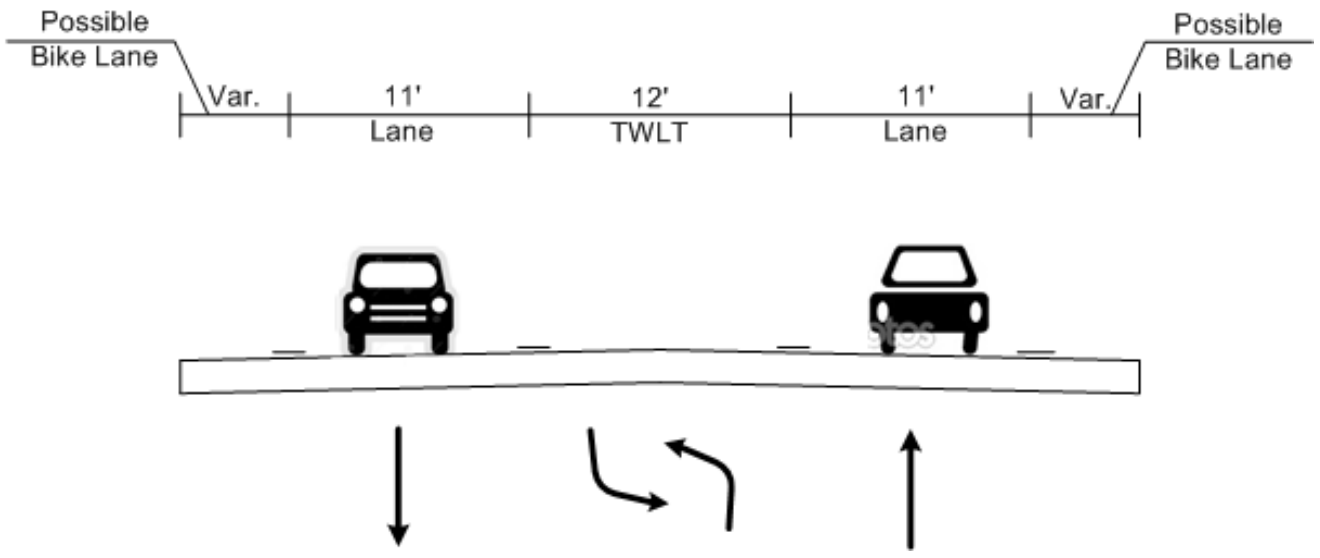
Corridorwide

RSA Team Findings

The following represents the specific findings and recommendations made by the RSA team.

All recommendations and designs should be thoroughly evaluated with due diligence and designed as appropriate by the roadway owner and/or a professional engineer for conformance to codes, standards, and best practices.

Issue: Traffic Operations (Corridorwide)	Safety Risk	
Description: There is a significant number of left turn crashes along the project corridor.	Medium/High	
RSA Team's Recommendation	**Cost**	**Potential Safety Benefit**
Evaluate adding a two-way left turn lane throughout the project corridor.(1)	Medium/Low	Medium/High



Proposed Cross Section

Issue: Pedestrian Accommodations (Corridorwide)	Safety Risk
Description: Pedestrian accommodations, such as ramps and detectable warning surfaces, are not fully ADA compliant.	Medium

RSA Team's Recommendation	Cost	Potential Safety Benefit
Plan for full ADA compliance by scheduling upgrades of existing ramps and curbs at crosswalks. (2)	Medium	Medium

Issue: Roadway Markings (Corridorwide)	Safety Risk
Description: Many of the roadway markings and striped crosswalks are faded and not clearly visible to vehicles and pedestrians.	Medium/High

RSA Team's Recommendation	Cost	Potential Safety Benefit
Regular maintenance should keep the roadway markings clearly visible to pedestrians and vehicles.(3)	Low	Medium/High

Issue: Signs (Corridorwide)	Safety Risk
Description: Traffic signs are not MUTCD compliant; font and size of signs are not standard.	Medium/Low
Description: Some of the sign posts are not breakaway.	Medium

RSA Team's Recommendation	Cost	Potential Safety Benefit
Professional engineering staff should review the use and application of signage to ensure standardized application throughout the corridor. (4)	Low	Medium
Ensure that the sign posts are breakaway. (5)	Low	Medium

Issue: Street Name Signs (Corridorwide)	Safety Risk
Description: The concrete street identification markers are not easily readable.	Medium

RSA Team's Recommendation	Cost	Potential Safety Benefit
Consider replacing the concrete name markers with standard MUTCD-compliant street signs. (6)	Low	Medium

Issue: Bicycles (Corridorwide)	Safety Risk	
Description: There are no accommodations for bicycle travel along East Main Street.	Medium	
RSA Team's Recommendation	**Cost**	**Potential Safety Benefit**
Evaluate the possibility of installing bicycle accommodations along East Main Street. (7)	Medium/Low	Medium/High

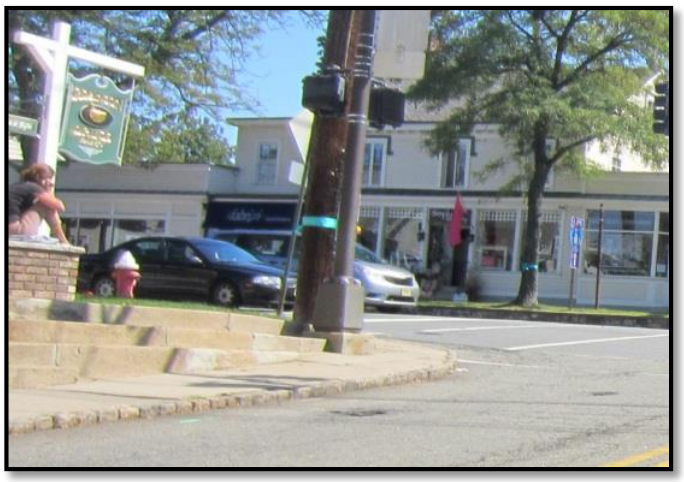
Hilltop Road (CR 525)/Mountain Avenue (CR 614) & East Main Street (CR510)

RSA Team Findings

The following represents the specific findings and recommendations made by the RSA team.

All recommendations and designs should be thoroughly evaluated with due diligence and designed as appropriate by the roadway owner and/or a professional engineer for conformance to codes, standards, and best practices.

Issue: Pedestrian Accommodations (Hilltop Road)	Safety Risk
Description: Pedestrian accommodations, such as ramps and detectable warning surfaces, are not fully ADA compliant.	Medium
Description: Southeast corner of the intersection is not ADA compliant as there is a set of stairs required to access the sidewalk.	Medium/High
Description: The orientation and direction of pedestrian push buttons are not correct.	Medium/Low
Description: The pedestrian accommodations in the northeast corner are not ADA compliant.	Medium/High
Description: There are no countdown pedestrian heads.	Medium



RSA Team's Recommendation	Cost	Potential Safety Benefit
Plan for full ADA compliance by scheduling upgrades of existing ramps and curbs at crosswalks. (2)	Medium	Medium
Evaluate possible solutions for pedestrian accessibility in order to ensure full ADA compliance at the stairs on the southeast corner of the intersection. (8)	High	Medium/High
Consider realignment of the pedestrian push buttons. (9)	Low	Medium
Ensure that pedestrian push button signage conveys clear information for pedestrians in the crosswalk. (10)	Low	Medium
Evaluate possible solutions for pedestrian accessibility in order to ensure full ADA compliance at the stairs on the northeast corner of the intersection. (11)	High	Medium/High
Consider the installation of countdown pedestrian heads. (12)	Low	Medium

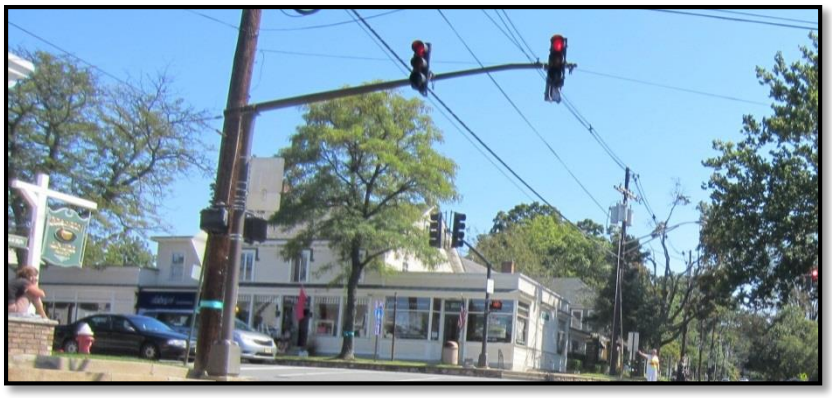
Issue: Parking (Hilltop Road)	**Safety Risk**
Description: Parking adjacent to the intersection can interfere with sight distance.	Medium-High

RSA Team's Recommendation	**Cost**	**Potential Safety Benefit**
Consider the installation of additional roadway marking to delineate areas of parking prohibition at the intersection. (13)	Low	Medium/High
Review signage adjacent to the intersection to determine if "NO PARKING" zones are clearly marked. (14)	Low	Medium

Issue: Traffic Operations (Hilltop Road)	Safety Risk
Description: There is a high volume of left turning vehicles at Hilltop Road northbound to Main Street westbound, which creates significant queuing.	Medium
Description: There is excessive vehicle speed on right turn from Main Street eastbound to Hilltop Road southbound.	Medium/High
Description: Left turns from restaurant on northwest corner are often difficult to make.	Medium/High

RSA Team's Recommendation	Cost	Potential Safety Benefit
Investigate revising the signal timing in order to reduce the backup by allowing for a lead left. (15)	Medium	Medium/High
Consider installing split phasing to the traffic signal timing. (16)	Medium	Medium/High
Improvement to the geometry of the southwest corner would decrease the turning radius and, consequently, would encourage a slower turning speed. (17)	High	Medium/High
Consider prohibiting left turns from restaurant and diverting the exit to Mountain Avenue driveway. (49)	Low	Medium/High

Issue: Traffic Signals (Hilltop Road)	Safety Risk
Description: The traffic signals are antiquated and may be contributing to a significant number of crashes.	Low
Description: Sun glare may increase traffic crashes.	Medium



RSA Team's Recommendation	Cost	Potential Safety Benefit
Consider upgrading the traffic signals including the addition of traffic cameras for image detection. (18)	Medium/High	Medium/Low
Increased visibility of signal heads would be enhanced by installing retro-reflective backplates. (19)	Low	Medium

Issue: Drainage (Hilltop Road)	Safety Risk
Description: There is severe puddling at base of steps (as seen on day of heavy rain).	Medium-Low

RSA Team's Recommendation	Cost	Potential Safety Benefit
Maintenance of the drainage basins and keeping them free of debris will facilitate drainage and improve safety. (20)	Low	Medium

Halstead Road/High School Entrance & East Main Street

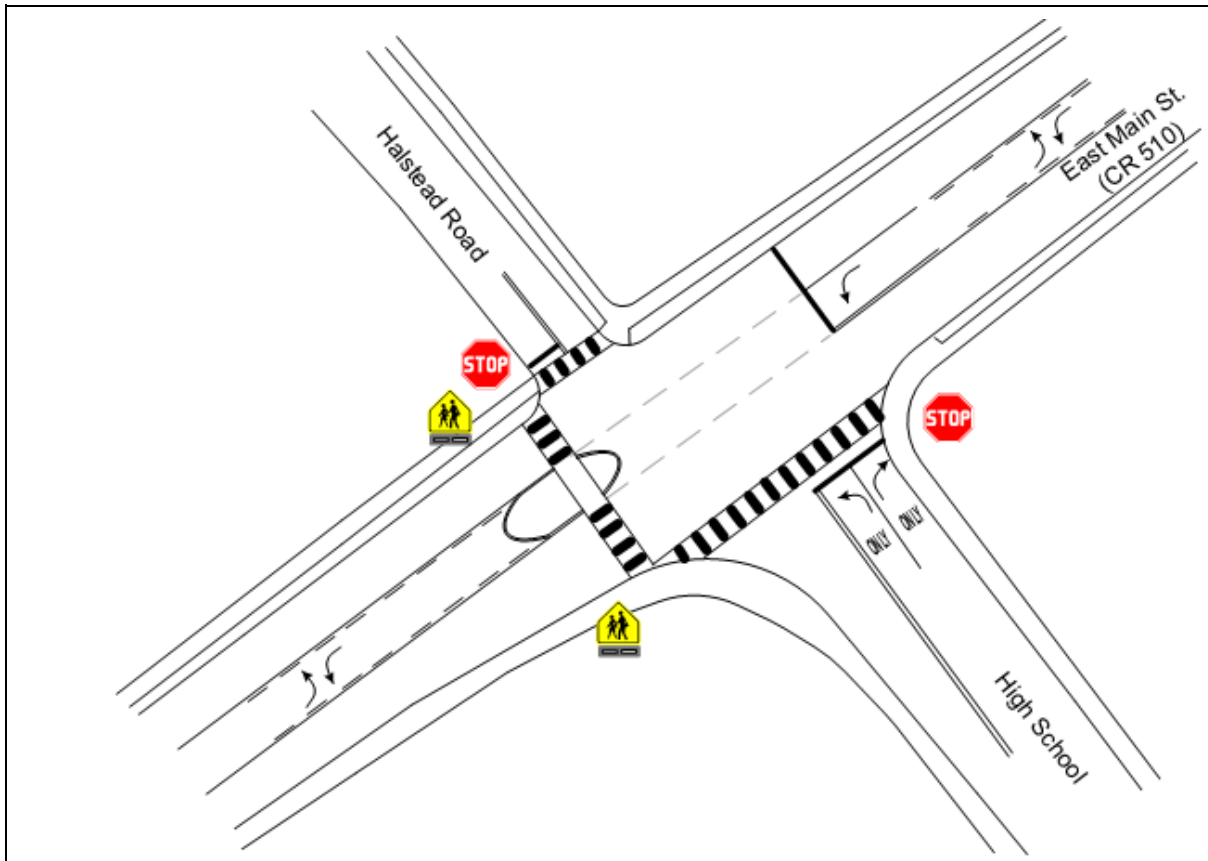
RSA Team Findings

The following represents the specific findings and recommendations made by the RSA team.

All recommendations and designs should be thoroughly evaluated with due diligence and designed as appropriate by the roadway owner and/or a professional engineer for conformance to codes, standards, and best practices.

Issue: High School Operations (High School)	Safety Risk
Description: There is a high volume of pedestrian activity to and from the high school at the beginning and end of the school day.	Medium/High
Description: During the periods of high traffic volume, a police officer is stationed in the middle of the road.	Medium
Description: There are a significant number of left turns into high school road.	Medium/High

RSA Team's Recommendation	Cost	Potential Safety Benefit
Consider the installation of a pedestrian refuge island (painted or permanent) with a painted crosswalk and a dedicated left turn lane into the high school. (21)	Low (Painted); Medium/High (Permanent)	High
Investigate the installation of active warning beacons, such as the Rectangular Rapid Flash Beacon, in order to increase pedestrian visibility. (22)	Medium	High
Consider implementation of reduced speed in the school zone. (23)	Low	Medium/High
Consider the installation of head-to-head left turn lanes on East Main Street as an alternative to a pedestrian refuge island.(24)	Low	Medium/High
Consider the installation of a dedicated left turn lane on East Main Street. (25)	Low	Medium/High
A marked crosswalk across the road to the high school would increase pedestrian visibility. (26)	Low	Medium
The presence of a physical island would provide the police officer protection from the East Main Street through traffic.(27)	Medium/High	High



Proposed Improvements to Halstead Road/High School Entrance & East Main Street

Issue: Pedestrian Accommodations (High School)	Safety Risk
Description: The access ramps on the southwest corner of the intersection are not ADA compliant.	Medium
Description: The ramp is not aligned with the crosswalk in the southwest corner.	Medium/Low
Description: There is no marked crosswalk across Halstead Road or the high school driveway.	Medium
Description: The stop bar across the high school entrance is too close to the crosswalk.	Medium/High
	

RSA Team's Recommendation	Cost	Potential Safety Benefit
Plan for full ADA compliance by scheduling upgrades of existing ramps and curbs at crosswalks. (2)	Medium	Medium
Consider the installation of a pedestrian refuge island (painted or permanent) with a painted crosswalk and a delineated left turn lane into the high school. (21)	Low (Painted); Med/High (Permanent)	High
Ensure that the crosswalk is aligned with the ramps. (28)	Medium	Medium
Consider installation of a marked crosswalk across Halstead Road.(29)	Low	Medium/High
Consider installation of a marked crosswalk at the entrance to the high school and ensure that the stop bar is aligned with the crosswalk in compliance with the MUTCD. (30)	Low	Medium

Dean Road & East Main Street (CR 510)

RSA Team Findings

The following represents the specific findings and recommendations made by the RSA team.

All recommendations and designs should be thoroughly evaluated with due diligence and designed as appropriate by the roadway owner and/or a professional engineer for conformance to codes, standards, and best practices.

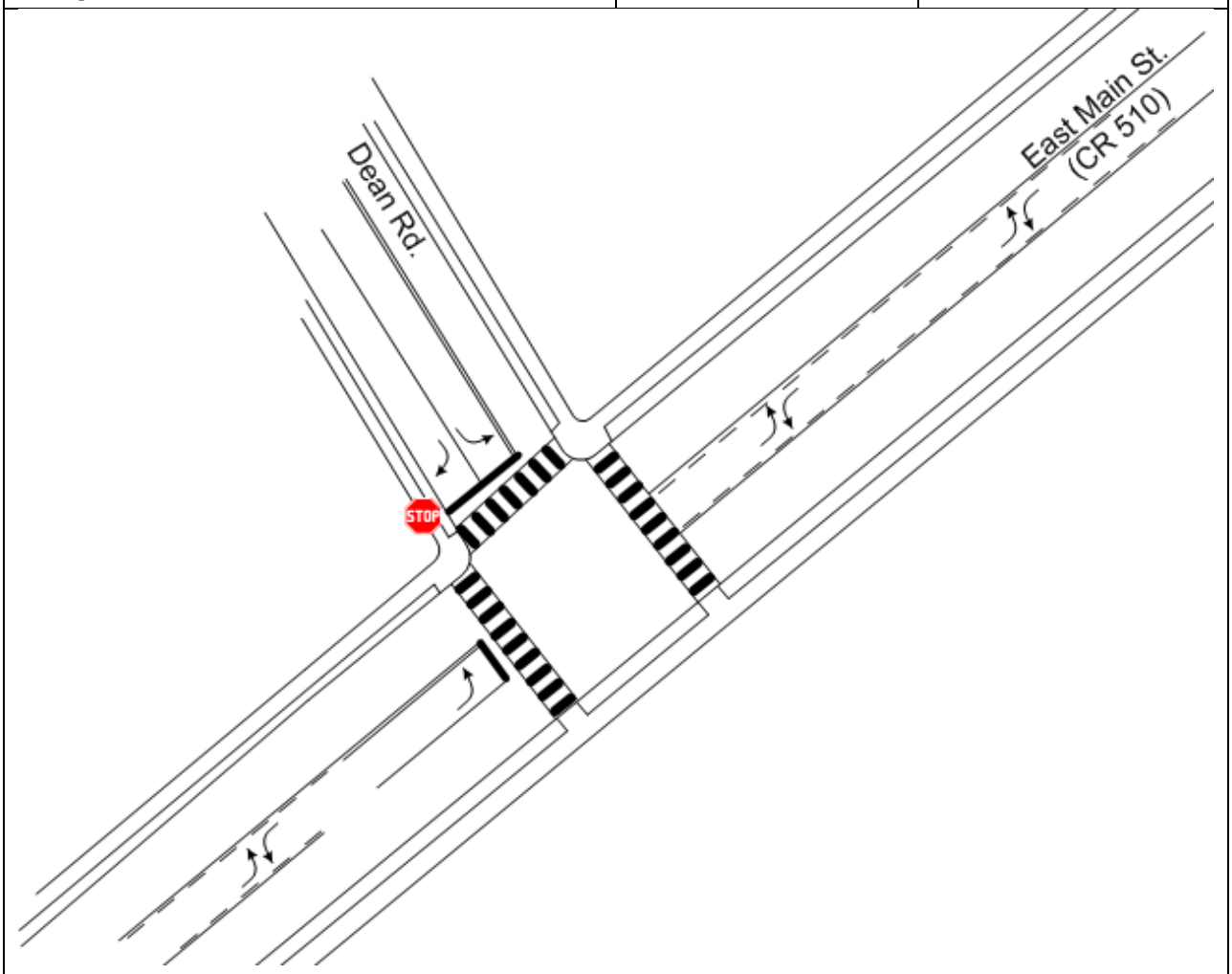
Issue: Traffic Operations (Dean Road)	Safety Risk
Description: Left turns from Dean Road are difficult due to few gaps in traffic during peak periods.	Medium
Description: The lane use on Dean Road is unclear and confusing.	Medium

RSA Team's Recommendation	Cost	Potential Safety Benefit
Consider the delineation of right and left turn lanes on Dean Road. (31)	Low	Medium/Low
Consider the installation of two-way left turn lanes in order to provide for pedestrian refuge from through traffic on East Main Street. (32)	Low	Medium/High

Issue: Signs (Dean Road)	Safety Risk	
Description: The stop sign is not aligned with the stop bar.	Medium	
		
RSA Team's Recommendation	**Cost**	**Potential Safety Benefit**
Ensure proper alignment of the stop sign and stop bar according to the MUTCD. (33)	Low	Medium/High

Issue: Pedestrians (Dean Road)	Safety Risk
Description: There are no delineated crosswalks across either East Main Street and on Dean Road.	Medium-High
	

RSA Team's Recommendation	Cost	Potential Safety Benefit
The addition of marked crosswalks would alert drivers for possible pedestrian activity. (34)	Low	Medium/High
Consider the installation of two-way left turn lanes in order to provide for pedestrian refuge from through traffic on East Main Street. (32)	Low	Medium/High



Proposed Improvements to Dean Road & East Main Street

Tempe Wick Road (CR 646) & East Main Street (CR 510)

RSA Team Findings

The following represents the specific findings and recommendations made by the RSA team.

All recommendations and designs should be thoroughly evaluated with due diligence and designed as appropriate by the roadway owner and/or a professional engineer for conformance to codes, standards, and best practices.

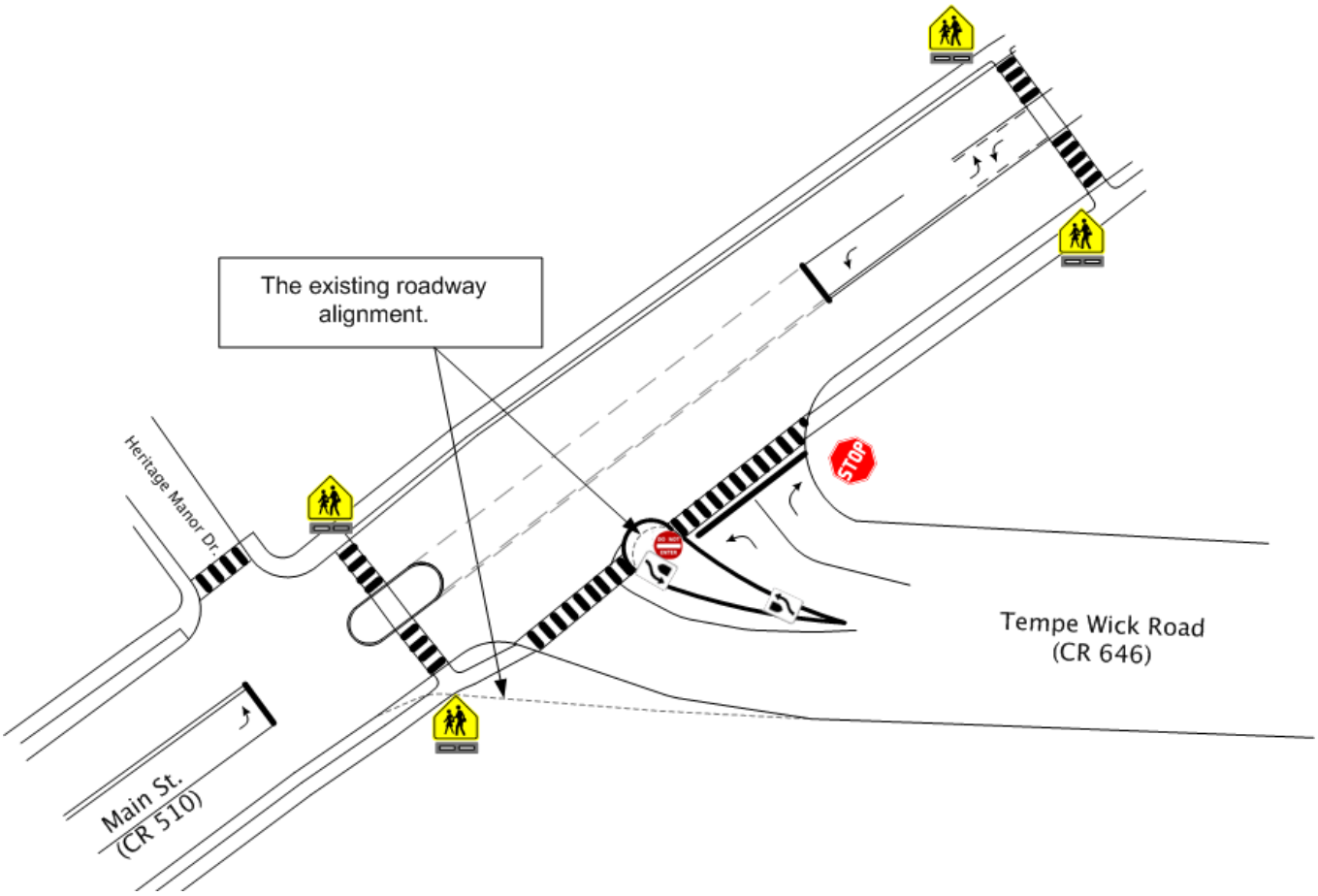
Issue: Traffic Operations (Tempe Wick Road)	Safety Risk
Description: A significant number of right turns from Main Street eastbound to Tempe Wick Road are made with excessive speed.	High
Description: The crash history indicates a significant number of right angle crashes.	Medium/High

RSA Team's Recommendation	Cost	Potential Safety Benefit
Improvement to the geometry, by reducing the turning radius, would promote decreased turning speed. (35)	High	Medium/High
Consider the installation of a dedicated left turn lane from westbound East Main Street. (36)	Low	Medium/High

Issue: Pedestrians (Tempe Wick Road)	Safety Risk
Description: Crash history indicates a significant number of pedestrian crashes at this intersection, especially crossing East Main Street.	High
Description: The length of the crosswalk on Tempe Wick Road makes it difficult for pedestrians to cross.	Medium/High
Description: Pedestrian accommodations, such as ramps and detectable warning surfaces, are not fully ADA compliant.	Medium

RSA Team's Recommendation	Cost	Potential Safety Benefit
Evaluate moving the East Main Street crosswalk away from the intersection and closer to the shopping center. (37)	Low	Medium/High
Consider adding a crosswalk across East Main Street west of the intersection and the installation of a refuge island (painted or permanent). (38)	Low (Painted); Med/High (Permanent)	Medium/High
Investigate the installation of active warning beacons, such as the Rectangular Rapid Flash Beacon, in order to increase pedestrian visibility. (22)	Medium	High
Consider prohibiting left turns from Tempe Wick Road to East Main Street and reorienting them to the signalized intersection of Cold Hill Road as per the town's master plan. (39)	Low	Medium/High

RSA Team's Recommendation (continued)	Cost	Potential Safety Benefit
The length of the pedestrian crosswalk across Tempe Wick Road could be reduced by decreasing the radius on the western side of the crossing. (40)	High	High
Plan for full ADA compliance by scheduling upgrades of existing ramps and curbs at crosswalks. (2)	Medium	Medium



Proposed Improvements to Tempe Wick Road & East Main Street

Mendham Shopping Center & East Main Street (CR 510)

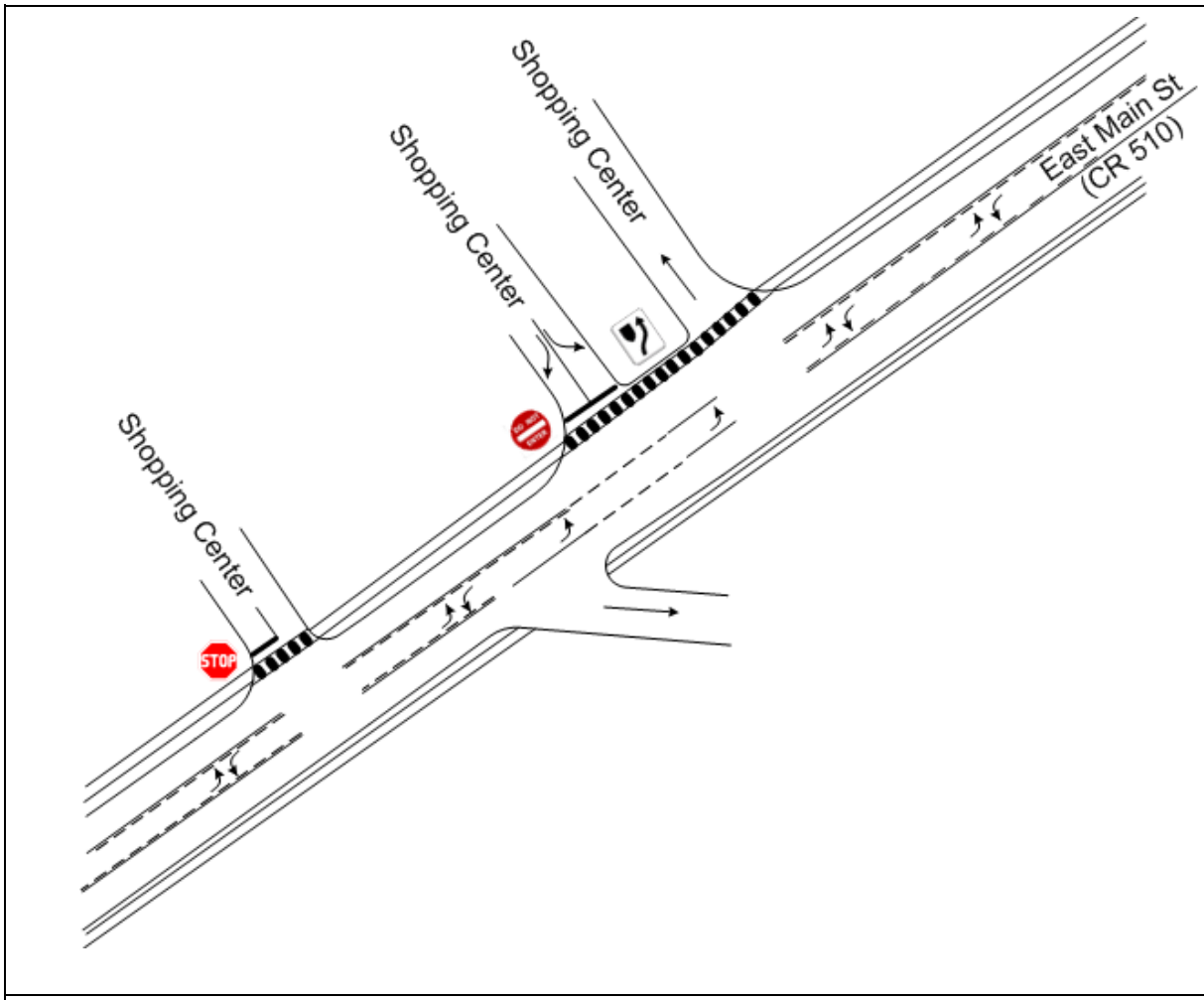
RSA Team Findings

The following represents the specific findings and recommendations made by the RSA team.

All recommendations and designs should be thoroughly evaluated with due diligence and designed as appropriate by the roadway owner and/or a professional engineer for conformance to codes, standards, and best practices.

Issue: Traffic Operations (Shopping Center)	Safety Risk
Description: Main Street is wide, and there isn't clear lane use for through traffic and for turning traffic.	Medium/High
Description: There is no lane delineation for turning vehicles into and out of the shopping center driveways.	Medium

RSA Team's Recommendation	Cost	Potential Safety Benefit
Evaluate instituting a road diet on Main Street by clearly delineating the travel lane. (41)	Low	Medium/High
Delineation of the right and left turn lanes into and out of the shopping center driveway would more clearly direct drivers. (42)	Low	Medium
In addition to two-way left turn lanes, as noted in the corridorwide section, consider dedicated right and left turn lanes into the shopping center if traffic volumes warrant. (43)	Low	Medium/High



Proposed Improvements to Mendham Shopping Center & East Main Street

Cold Hill Road & East Main Street (CR 510)

RSA Team Findings

The following represents the specific findings and recommendations made by the RSA team.

All recommendations and designs should be thoroughly evaluated with due diligence and designed as appropriate by the roadway owner and/or a professional engineer for conformance to codes, standards, and best practices.

Issue: Pedestrians (Cold Hill Road)	Safety Risk
Description: The intersection is not ADA compliant as there are no pedestrian ramps.	Medium
Description: There are no pedestrian heads.	Medium

RSA Team's Recommendation	Cost	Potential Safety Benefit
Plan for full ADA compliance by scheduling upgrades of existing ramps and curbs at crosswalks. (2)	Medium	Medium
Consider the installation of pedestrian heads. (44)	Medium	Medium/High

Issue: Traffic Operations (Cold Hill Road)	Safety Risk	
Description: Crash history indicates a significant number of right angle crashes.	Medium	
RSA Team's Recommendation	**Cost**	**Potential Safety Benefit**
Increased visibility of signal heads would be enhanced by installing retro-reflective back plates. (19)	Low	Medium
Ensure that the traffic signal has 12-inch LED heads. (45)	Low	Medium/High

Issue: Slip Ramp (Cold Hill Road)	Safety Risk	
Description: The stop bar is missing on the ramp from Cold Hill Road southbound to East Main Street westbound.	Low	
Description: There are no curb ramps or marked crosswalk.	Medium	
		
RSA Team's Recommendation	**Cost**	**Potential Safety Benefit**
The stop bar on ramp from Cold Hill Road to Main Street westbound should be added. (46)	Low	Low/Medium
Install curb ramps and a marked crosswalk. (47)	Medium	Medium

Implementing Recommendations

The RSA Team's recommendations suggested in this report should improve the safety of the East Main Street (CR 510) corridor and specifically the six intersections selected for investigation in Mendham Borough. All of the recommendations fall under the jurisdiction of Morris County, and any potential projects generated from this report would be led by Morris County.

Many of the recommendations contained within this report can be implemented through routine maintenance; trimming vegetation, maintaining sign/pavement conditions, etc., while others will take more time and investment. Recognizing limited resources and developing partnerships can help to extend the impact of safety efforts. Rutgers' TSRC can provide support to counties in identifying partnership opportunities. North Jersey Transportation Planning Authority (NJTPA) staff also provides a great partnership to assist with analysis with respect to crash data, capacity analysis, or any other related assistance.

Some of the recommendations may require sizable capital investment to obtain a long-term safety benefit. It is understood that larger projects may require funding assistance from noncounty funds. In the section following the recommendations, various potential funding sources are listed.

However, physical improvements alone will not eliminate the safety issues identified. A combined effort of public education and police enforcement is necessary to make this corridor a safer place for all its users. In terms of public education, the NJTPA provides support through various programs focused on seatbelt usage and child seats. In addition, education about traffic safety in public schools, such as drivers' education courses in high school, and distributing informational pamphlets to pedestrians are just a sample of the different educational campaigns that can benefit road users. Enforcement can go a long way in reducing crashes and alerting drivers of the seriousness of being safety conscious. Officers may also hand out pamphlets during routine traffic stops to educate motorists of changes in traffic laws.

Short Term Solutions

Corridorwide

1 Evaluate adding a two-way left turn lane throughout the project corridor.

3 Regular maintenance should keep the roadway markings clearly visible to pedestrians and vehicles.

4 Professional engineering staff should review the use and application of signage to ensure standardized application throughout the corridor.

5 Ensure that the sign posts are breakaway.

6 Consider replacing the concrete name markers with standard MUTCD-compliant street signs.

7 Evaluate the possibility of installing bicycle accommodations along East Main Street.

Hilltop Road

9 Consider realignment of the pedestrian push buttons.

10 Ensure that pedestrian push button signage conveys clear information for pedestrians in the crosswalk.

12 Consider the installation of countdown pedestrian heads.

13 Consider the installation of additional roadway marking to delineate areas of parking prohibition at the intersection.

14 Review signage adjacent to the intersection to determine if “NO PARKING” zones are clearly marked.

19 Increased visibility of signal heads would be enhanced by installing retro-reflective backplates.

20 Maintenance of the drainage basins and keeping them free of debris will facilitate drainage and improve safety.

49 Consider prohibiting left turns from restaurant and diverting the exit to the Mountain Avenue driveway.

Halstead Road/High School Entrance

21 Consider the installation of a pedestrian refuge island (painted) with a painted crosswalk and a dedicated left turn lane into the high school.

23 Consider implementation of reduced speed in the school zone.

24 Consider the installation of head-to-head left turn lanes on East Main Street as an alternative to a pedestrian refuge island.

25 Consider the installation of a dedicated left turn lane on East Main Street.

26 A marked crosswalk across the road to the high school would increase pedestrian visibility.

29 Consider installation of a marked crosswalk across Halstead Road.

30 Consider installation of a marked crosswalk at the entrance to the high school and ensure that the stop bar is aligned with the crosswalk in compliance of the MUTCD.

Dean Road

31 Consider the delineation of right and left turn lanes on Dean Road.

32 Consider the installation of two-way left turn lanes in order to provide for pedestrian refuge from through traffic on East Main Street.

33 Ensure proper alignment of the stop sign and stop bar according to the MUTCD.

34 The addition of marked crosswalks would alert drivers for possible pedestrian activity.

Tempe Wick Road

36 Consider the installation of a dedicated left turn lane from westbound East Main Street.

37 Evaluate moving the East Main Street crosswalk away from the intersection and closer to the shopping center.

38 Consider adding a crosswalk across East Main Street west of the intersection and the installation of a refuge island (painted).

39 Consider prohibiting left turns from Tempe Wick Road to East Main Street and reorienting them to the signalized intersection of Cold Hill Road as per the town's master plan.

Mendham Shopping Center

41 Evaluate instituting a road diet by clearly delineating the travel lane.

42 Delineation of the right and left turn lanes into and out of the shopping center would more clearly direct drivers.

43 In addition to two-way left turn lanes, as noted in the corridorwide section, consider dedicated right and left turn lanes into the shopping center if traffic volumes warrant.

Cold Hill Road

19 Increased visibility of signal heads would be enhanced by installing retro-reflective back plates.

45 Ensure that the traffic signal has 12-inch LED heads.

46 The stop bar on ramp from Cold Hill Road to Main Street westbound should be added.

Medium Term Solutions

Corridorwide

2 Plan for full ADA compliance by scheduling upgrades of existing ramps and curbs at crosswalks.

Hilltop Road

2 Plan for full ADA compliance by scheduling upgrades of existing ramps and curbs at crosswalks.

8 Evaluate possible solutions for pedestrian accessibility in order to ensure full ADA compliance at the stairs on the southeast corner of the intersection.

11 Evaluate possible solutions for pedestrian accessibility in order to ensure full ADA compliance at the stairs the northeast corner of the intersection.

15 Investigate revising the signal timing in order to reduce the backup by allowing for a lead left.

16 Consider installing split phasing to the traffic signal timing.

17 Improvement to the geometry of the southwest corner would decrease the turning radius and consequently would encourage a slower turning speed.

18 Consider upgrading the traffic signals including the addition of traffic cameras for image detection.

Halstead Road/High School Entrance

2 Plan for full ADA compliance by scheduling upgrades of existing ramps and curbs at crosswalks.

21 Consider the installation of a pedestrian refuge island (permanent) with a painted crosswalk and a dedicated left turn lane into the high school.

22 Investigate the installation of active warning beacons, such as the Rectangular Rapid Flash Beacon, in order to increase pedestrian visibility.

27 The presence of a physical island would provide the police officer protection from the East Main Street through traffic.

28 Ensure that the crosswalk is aligned with the ramps.

Tempe Wick Road

2 Plan for full ADA compliance by scheduling upgrades of existing ramps and curbs at crosswalks.

22 Investigate the installation of active warning beacons, such as the Rectangular Rapid Flash Beacon, in order to increase pedestrian visibility.

35 Improvement to the geometry, by reducing the turning radius, would promote decreased turning speed.

38 Consider adding a crosswalk across East Main Street west of the intersection and the installation of a refuge island (permanent).

40 The length of the pedestrian crosswalk across Tempe Wick Road could be reduced by decreasing the radius on the western side of the crossing.

Cold Hill Road

2 Plan for full ADA compliance by scheduling upgrades of existing ramps and curbs at crosswalks.

44 Consider the installation of pedestrian heads.

47 Install curb ramps and a marked crosswalk

Potential Funding Sources

In this economy, budget constraints may hamper the implementation of some of these recommendations. Finding alternative funding sources is critical to ensuring the investment in the safety of the intersections' users.

Local Funding Sources:

Roadway Owner's Maintenance and Operation Budget:

Existing funds from local and county sources, as appropriate, which are allocated for investment in maintenance and operational activity, can be used to implement the above suggestions. Many of the above countermeasures may be eligible for the appropriate use of these existing funds. The manager of these funds who understands the full budget picture should be consulted.

State Funding Sources:

LOCAL AID

Contact:

NJDOT Local Aid District 1, Mt. Arlington (Morris, Passaic, Sussex, Warren)
Roxbury Corporate Center
200 Stierli Court
Mount Arlington, NJ 07856
Phone: (973) 601-6700
Fax: (973) 601-6709

MUNICIPAL AID/URBAN AID PROGRAM (NJDOT Local Aid):

http://www.state.nj.us/transportation/business/localaid/municaid.shtm

This program has been a significant resource for municipalities in funding local transportation projects. All municipalities are eligible. The department continues to encourage municipalities to consider using the Municipal Aid Program to fund projects such as resurfacing, rehabilitation, or reconstruction and signalization.

LOCAL AID INFRASTRUCTURE FUND (Discretionary Aid):

http://www.state.nj.us/transportation/business/localaid/descrfunding.shtm

Subject to funding appropriation, a discretionary fund is established to address emergencies and regional needs throughout the state. Any county or municipality may apply at any time. These projects are approved at the discretion of the commissioner. Payment of project costs is the same as the Municipal Aid Program. Under this program a county or municipality may also apply for funding for local pedestrian safety and bikeway projects.

HIGHWAY SAFETY FUND (Safe Corridors):

The Safe Corridors grant program targets resources to segments of several highways that have a history of high crash rates. Grants are supported by fines that are doubled in designated Safe Corridors for a variety of moving violations, including speeding. FY 12 Safe Corridors funding is being allocated based on crash data, with higher amounts of funding going to areas demonstrating the greatest need for continued enhanced enforcement measures. The link to a website is still in development.

Contact:
Shukri Abuhuzeima
Supervising Engineer
NJDOT Local Aid
Phone: 609-530-4680

BIKEWAY:

http://www.state.nj.us/transportation/business/localaid/bikewaysf.shtm

The NJDOT Bikeway Grant Program provides funds to counties and municipalities to promote bicycling as an alternate mode of transportation in New Jersey. A primary objective of the Bikeway Grant Program is to support the state's goal of constructing 1,000 new miles of dedicated bike paths. This program is available to every municipality and county throughout New Jersey.

NEW JERSEY DEPARTMENT OF COMMUNITY AFFAIRS

MAIN STREET NEW JERSEY

http://www.nj.gov/dca/divisions/dhcr/offices/msnj.html

Main Street New Jersey provides selected communities with technical assistance and training of proven value in revitalizing historic downtowns. The program helps municipalities improve the economy, appearance, and image of their central business districts through the organization of local citizens and resources.

Contact:
Main Street New Jersey
NJ Department of Community Affairs - Office of Smart Growth
P.O. Box 204
Trenton, NJ 08625-0204
Jef Buehler
Phone: 609-633-9769
Email: jef.buehler@dca.state.nj.us

COMMUNITY DEVELOPMENT BLOCK GRANT (CDBG)

http://www.nj.gov/dca/divisions/dhcr/offices/cdbg.html

This grant provides funds for economic development, housing rehabilitation, community revitalization, and public facilities designated to benefit people of low and moderate income; to prevent or eliminate slums and blight; or to address recent local needs for which no other source of funding is available.

Contact:
New Jersey Department of Community Affairs
101 South Broad Street
PO Box 811, 5TH Floor
Trenton, NJ 08625-0800
Terry Schrider
Phone: 609-633-6283
Email: terence.schrider@dca.state.nj.us

Federal Funding Sources – via NJDOT Office of Local Aid:

Contact (see details under State Funding section):
NJDOT Local Aid District 1, Mt. Arlington (Morris, Passaic, Sussex, Warren)

SAFE ROUTES TO SCHOOLS (SRTS):

http://www.state.nj.us/transportation/business/localaid/srts.shtm

The Safe Routes to Schools Program (SRTS) is a federally funded program and is administered by the State Departments of Transportation. This program provides funds to substantially improve the ability of primary and middle school students to walk and bicycle to school safely.

The purposes of the program are:

- to enable and encourage children, including those with disabilities, to walk and bicycle to school;
- to make bicycling and walking to school a safer and more appealing transportation alternative, thereby encouraging a healthy and active lifestyle from an early age; and
- to facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity (approximately two miles) of primary and middle schools (Grades K–8).

The program establishes two distinct types of funding opportunities: infrastructure projects (the planning, design, and construction of engineering improvements) and non-infrastructure related activities (such as education, enforcement, and encouragement programs).

Contact:
Elise M Bremer-Nei
Supervising Planner Transportation
NJDOT Statewide Planning
Phone: 609-530-2765

Federal Funding Sources – via North Jersey Transportation Planning Authority (NJTPA):

Contact:
North Jersey Transportation Planning Authority
One Newark Center, 17th Floor
Newark, NJ 07102
Phone: 973-639-8400
Fax: 973-639-1953

LOCAL SAFETY PROGRAM:

http://www.njtpa.org/Project/Devel/local_safety/default.aspx

The federally funded Local Safety Program (LSP) is a component of wider safety planning at the NJTPA, supporting construction of quick-fix, high-impact safety improvements on county and local roadway facilities in the NJTPA region. Projects supported by this program include new and upgraded traffic signals, signage, pedestrian indications, crosswalks, curb ramps, pavement markings, and other improvements to increase the safety of drivers, bicyclists, and pedestrians.

The Local Safety Program:

- typically addresses NJTPA and/or NJDOT derived high priority crash locations on county or local roadways;
- supports quick-fix projects, backed with detailed crash data, with minimal or no environmental or cultural resource impacts (eligible for programmatic categorical exclusion from FHWA); and
- funds the construction phase of work only—planning, design, and right-of-way acquisition are the responsibility of the sponsor.

LOCAL CMAQ MOBILITY INITIATIVES:

http://www.njtpa.org/Project/Mobility/Default.aspx

The NJTPA has established the CMAQ Local Mobility Initiatives Program to promote a variety of initiatives to lessen the level of pollutants and greenhouse gases generated through the use of fossil fuels including ridesharing, transit usage, travel demand management, and traffic mitigation projects. Proposals must implement strategies and policies in the Regional Transportation Plan, Plan 2040.

THE HIGH RISK RURAL ROADS PROGRAM

http://www.njtpa.org/Project/Devel/local_safety/default.aspx

High Risk Rural Roads Program (HRRRP) provides federal funds for construction improvements to address safety problems *ONLY on roadways that are functionally classified as rural major collector, rural minor collector or rural local roads* **and** *have a crash rate that exceeds the statewide average for those functional classes of roadways.* Projects supported by this program have included skid-resistant surface treatments, guiderails, reflective pavement markings, rumbles strips and rumble stripes, safety edge, and enhanced and advanced warning signs.

This program funds the construction phase of work only, and therefore planning, design, and right-of-way acquisition are the responsibility of the sponsor.

LOCAL CONCEPT DEVELOPMENT PHASE OF THE LOCAL CAPITAL PROJECT DELIVERY PROGRAM

http://www.njtpa.org/Project/Devel/local_capital_program/local_concept/default.aspx

The Local Capital Project Delivery Program (LCPD) provides federal funding for priority local projects. The LCD Phase involves drafting a well defined and well justified Purpose and Need Statement focusing on the primary transportation need to be addressed. The LCD Phase elements include, but are not limited to: data collection, coordination, development of a reasonable number of prudent and feasible conceptual alternatives, and investigation of all aspects of a project: environmental, right-of-way (ROW), access, utilities, design, community involvement, constructability, etc. at a "planning level of effort," and addressing requirements of the NJTPA Congestion Management Process (CMP).

SUB-REGIONAL STUDIES PROGRAM

http://www.njtpa.org/Plan/Subregion/subregional_studies/default.aspx

This is a competitive program that provides two-year grants to individual sub-regions or sub-regional teams. The program is designed to assist sub-regions in refining and developing transportation improvement strategies rooted in the NJTPA's Regional Transportation Plan (RTP). Ultimately, the program aims to generate project concepts ready for further development or implementation consistent with the RTP and/or other transportation planning activities in the region.

TRANSPORTATION ALTERNATIVES PROGRAM

This is new under MAP-21 and is currently under development at the NJDOT.
http://www.fhwa.dot.gov/map21/guidance/guidetap.cfm

The Transportation Alternatives Program (TAP) provides funding for programs and projects defined as transportation alternatives, including on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation and enhanced mobility, community improvement activities, and environmental mitigation; recreational trail

program projects; safe routes to school projects; and projects for the planning, design, or construction of boulevards and other roadways largely in the right-of-way of former interstate system routes or other divided highways.

Federal Funding Sources – via NJDOT Department of Highway Traffic Safety (NJDHTS):

http://www.nj.gov/oag/hts/grants/index.html

The NJ Division of Highway Traffic Safety offers, on an annual basis, federal grant funding to agencies that wish to undertake programs designed to reduce motor vehicle crashes, injuries, and fatalities on the roads of New Jersey. Municipal, county, state government, and law enforcement agencies, as well as nonprofit organizations, are encouraged to apply for NJDHTS grant funding to address specific, local traffic safety issues.

Contact:
Bob Gaydosh, North Region Supervisor
Phone: 609-633-9022
robert.gaydosh@lps.state.nj.us

Appendix A – Raw Crash Data

Hilltop Road/Mountain Avenue & East Main Street

CRASH DATE	CRASH TIME	CRASH TYPE	LIGHT CONDITION	SEVERITY	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
1/15/2009	9:40 AM	Same Direction-Rear End	Daylight	Property Damage	Wet	0	3
3/11/2009	7:02 AM	Same Direction-Rear End	Daylight	Property Damage	Dry	0	2
9/16/2009	2:36 PM	Struck Parked Vehicle	Daylight	Property Damage	Dry	0	2
11/23/2009	12:20 PM	Same Direction-Rear End	Daylight	Property Damage	Dry	0	2
3/23/2010	3:33 PM	Fixed Object	Daylight	Property Damage	Dry	0	1
4/19/2010	9:32 AM	Same Direction-Rear End	Daylight	Property Damage	Dry	0	2
4/22/2010	6:42 AM	Backing	Daylight	Property Damage	Dry	0	2
5/9/2010	10:17 AM	Same Direction-Rear End	Daylight	Injury	Dry	1	2
5/9/2010	9:28 PM	Opposite Direction-Head On/Angular	Dark (Street Lights On/ continuous)	Injury	Dry	1	2
6/22/2010	3:06 PM	Left Turn / U Turn	Daylight	Injury	Dry	2	2
9/12/2010	12:07 PM	Right Angle	Daylight	Property Damage	Wet	0	2
10/9/2010	1:05 PM	Same Direction-Rear End	Daylight	Property Damage	Dry	0	2
10/13/2010	2:06 PM	Struck Parked Vehicle	Daylight	Injury	Dry	1	2
1/10/2011	9:00 AM	Same Direction-Rear End	Daylight	Injury	Dry	1	4
1/19/2011	8:23 AM	Same Direction-Rear End	Daylight	Property Damage	Wet	0	2
2/17/2011	9:04 PM	Same Direction-Rear End	Dark (Street Lights On/ continuous)	Property Damage	Dry	0	2
4/25/2011	8:26 AM	Right Angle	Daylight	Property Damage	Dry	0	2
5/23/2011	8:50 AM	Right Angle	Daylight	Property Damage	Dry	0	2
6/15/2011	7:12 PM	Right Angle	Daylight	Injury	Dry	2	2
0/11/2011	2:38 PM	Same Direction-Rear End	Daylight	Injury	Dry	2	3

Halstead Road/High School Entrance & East Main Road

CRASH DATE	CRASH TIME	CRASH TYPE	LIGHT CONDITION	SEVERITY	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
5/30/2009	12:50 PM	Right Angle	Daylight	Injury	Dry	2	2
5/24/2011	3:01 PM	Same Direction-Rear End	Daylight	Property Damage	Dry	0	2

Dean Road & East Main Street

CRASH DATE	CRASH TIME	CRASH TYPE	LIGHT CONDITION	SEVERITY	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
1/9/2009	8:43 AM	Right Angle	Daylight	Property Damage	Dry	0	2
1/15/2009	8:30 AM	Right Angle	Daylight	Property Damage	Snowy	0	2
10/19/2009	4:10 PM	Same Direction-Rear End	Daylight	Injury	Dry	1	2
5/26/2010	3:05 PM	Same Direction-Rear End	Daylight	Injury	Dry	1	3
7/6/2010	11:09 AM	Same Direction-Rear End	Daylight	Property Damage	Dry	0	2
7/16/2010	2:27 PM	Fixed Object	Daylight	Injury	Dry	2	1
10/29/2010	4:30 PM	Opposite Direction-Side Swipe	Daylight	Injury	Dry	1	2
1/13/2011	2:49 PM	Same Direction-Rear End	Daylight	Property Damage	Dry	0	2
11/4/2011	3:45 PM	Right Angle	Daylight	Injury	Dry	1	2

Tempe Wick Road & East Main Street

CRASH DATE	CRASH TIME	CRASH TYPE	LIGHT CONDITION	SEVERITY	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
2/23/2009	2:54 PM	Same Direction-Rear End	Daylight	Property Damage	Dry	0	2
5/5/2009	3:50 PM	Same Direction-Rear End	Daylight	Property Damage	Wet	0	2
6/5/2009	11:20 AM	Right Angle	Daylight	Property Damage	Wet	0	2
8/19/2009	12:52 PM	Right Angle	Daylight	Property Damage	Dry	0	2
10/27/2009	12:05 PM	Same Direction-Rear End	Daylight	Property Damage	Wet	0	2
4/30/2010	3:00 PM	Same Direction-Rear End	Daylight	Property Damage	Dry	0	2
5/20/2010	3:15 PM	Right Angle	Daylight	Injury	Dry	1	2
11/19/2010	11:02 AM	Right Angle	Daylight	Property Damage	Dry	0	2
1/19/2011	12:01 PM	Same Direction-Side Swipe	Daylight	Property Damage	Wet	0	2
1/14/2011	7:28 AM	Same Direction-Rear End	Daylight	Property Damage	Dry	0	2
2/10/2011	3:00 PM	Same Direction-Rear End	Daylight	Property Damage	Dry	0	2
3/27/2011	3:27 PM	Same Direction-Rear End	Daylight	Property Damage	Dry	0	2
11/12/2011	7:30 PM	Animal	Dark (Street Lights On/ continuous)	Property Damage	Dry	0	2

Mendham Shopping Center & East Main Road

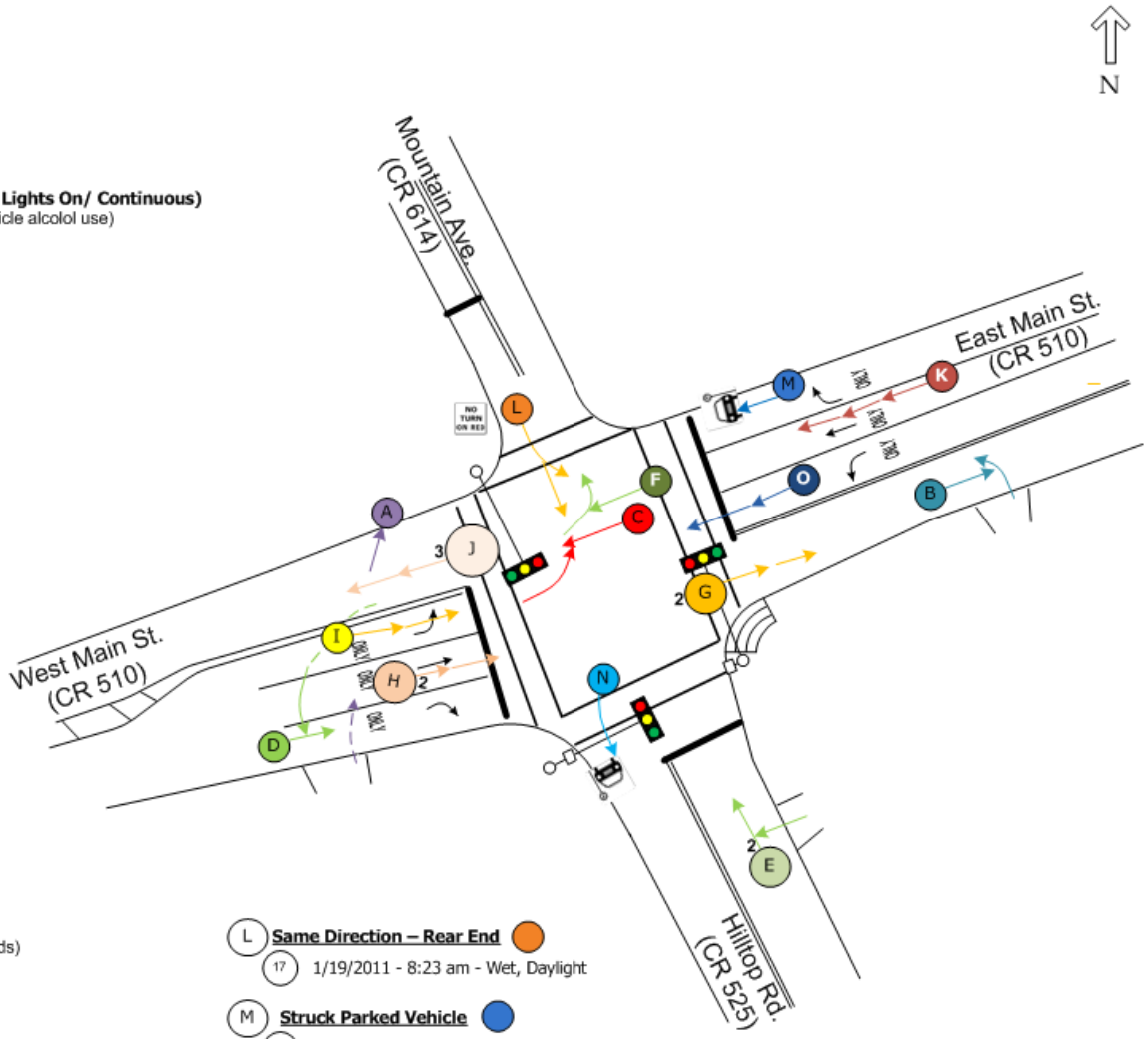
CRASH DATE	CRASH TIME	CRASH TYPE	LIGHT CONDITION	SEVERITY	SURFACE CONDITION	TOTAL INJURED	TOTAL PEDESTRIANS INVOLVED	TOTAL VEHICLES INVOLVED
2/10/2011	3:00 PM	Same Direction-Rear End	Daylight	Property Damage	Dry	0	0	2
12/13/2011	1:41 PM	Right Angle	Daylight	Property Damage	Dry	0	0	2
5/7/2011	11:03 AM	Same Direction-Rear End	Daylight	Injury	Dry	1	0	2
4/26/2011	5:45 PM	Right Angle	Daylight	Property Damage	Dry	0	0	2
4/5/2011	2:14 PM	Right Angle	Daylight	Property Damage	Dry	0	0	2
2/19/2010	2:45 PM	Right Angle	Daylight	Property Damage	Dry	0	0	2

Cold Hill Road & East Main Street

CRASH DATE	CRASH TIME	CRASH TYPE	LIGHT CONDITION	SEVERITY	SURFACE CONDITION	TOTAL INJURED	TOTAL VEHICLES INVOLVED
4/7/2009	8:33 AM	Same Direction-Rear End	Daylight	Property Damage	NULL	0	2
6/24/2009	10:38 PM	Same Direction-Rear End	Dark (Street Lights On/ continuous)	Property Damage	Dry	0	2
8/14/2009	5:58 PM	Same Direction-Rear End	Daylight	Property Damage	Dry	0	2
9/20/2009	5:08 PM	Same Direction-Rear End	Daylight	Property Damage	Dry	0	2
7/23/2010	3:07 PM	Same Direction-Rear End	Daylight	Property Damage	Dry	0	2
10/10/2010	12:55 PM	Same Direction-Rear End	Daylight	Property Damage	Dry	0	2
1/1/2011	5:02 PM	Same Direction-Side Swipe	Dusk	Property Damage	Dry	0	2
6/6/2011	3:03 PM	Backing	Daylight	Property Damage	Dry	0	2
9/10/2011	12:57 PM	Same Direction-Rear End	Daylight	Property Damage	Dry	0	2

Appendix B – Crash Diagrams

Hilltop Road (CR 614)/Mountain Avenue (CR 525) & East Main Street (CR 510)



A **Fixed Object**
1 3/23/2010 - 3:33 pm - Dry, Daylight

B **Left Turn / U Turn**
2 **6/22/2010 - 3:06 pm - Dry, Daylight**

C **Opposite Direction - Head On/Angular**
3 **5/9/2010 - 9:28 pm - Dry, Dark (Street Lights On/ Continuous)**
(WB vehicle was speeding; EB vehicle alcolol use)

D **Right Angle**
4 9/12/2010 - 12:07 pm - Wet, Daylight

E **Right Angle**
5 4/25/2011 - 8:26 am - Dry, Daylight
6 5/23/2011 - 8:50 am - Dry, Daylight
(heavy volume)

F **Right Angle**
7 **6/15/2011 - 7:12 pm - Dry, Daylight**

G **Same Direction – Rear End**
8 1/15/2009 - 9:40 am - Wet, Daylight
(driver inattention; involved 3 cars)
9 4/19/2010 - 9:32 am - Dry, Daylight
(distracted by emergency vehicle)

H **Same Direction – Rear End**
10 **5/9/2010 - 10:17 am - Dry, Daylight**
11 3/11/2009 - 7:02 am - Dry, Daylight

I **Same Direction – Rear End**
12 11/23/2009 - 12:20 pm - Dry, Daylight
(driver error, car rolled backwards)

J **Same Direction – Rear End**
13 10/9/2010 - 1:05 pm - Dry, Daylight
(heavy volume)
14 2/17/2011 - 9:04 pm - Dry, Dark (Street Lights On/ Continuous)
(heavy volume)
15 **1/10/2011 - 9:00 am - Dry, Daylight**
(3 cars involved; front car waiting to make LT turn))

K **Same Direction – Rear End**
16 **10/11/2011 - 2:38 pm - Dry, Daylight**

L **Same Direction – Rear End**
17 1/19/2011 - 8:23 am - Wet, Daylight

M **Struck Parked Vehicle**
18 9/16/2009 - 2:36 pm - Dry, Daylight

N **Struck Parked Vehicle**
19 **10/13/2010 - 2:06 pm - Dry, Daylight**

O **Backing**
20 4/22/2010 - 6:42 am - Dry, Daylight
(backed up to allow tractor trailer to turn from Mountain to EB Main)

LEGEND
Injury (bold)
5
X No. of crashes by type (if >1)

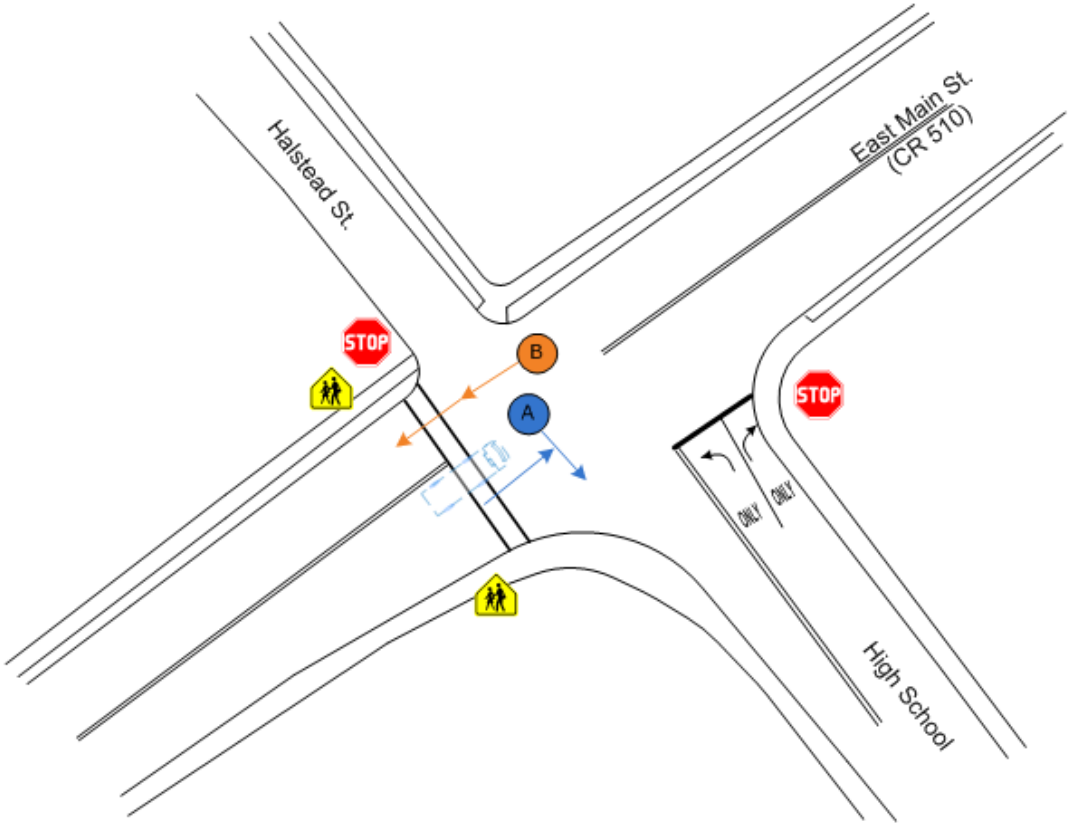
Halstead Road/High School Entrance & East Main Street (CR 510)

(A) **Right Angle**

(1) **5/30/2009 - 12:50 pm - Dry, Daylight**
(EB Truck waiting to turn Left
onto Halstead created blind spot)_

(B) **Same Direction - Rear End**

(2) 5/24/2011 - 3:01 pm - Dry, Daylight
(heavy Volume)



LEGEND
Injury (bold)

Dean Road & East Main Street

(A) **Fixed Object**
(1) **7/16/2010 - 2:27 pm - Dry, Daylight**
(hit pole)

(B) **Opposite Direction - Side Swipe**
(2) **10/29/2010 - 4:30 pm - Dry, Daylight**
(Lost Control)

(C) **Right Angle**
(3) 1/9/2009 - 8:43 am - Dry, Daylight

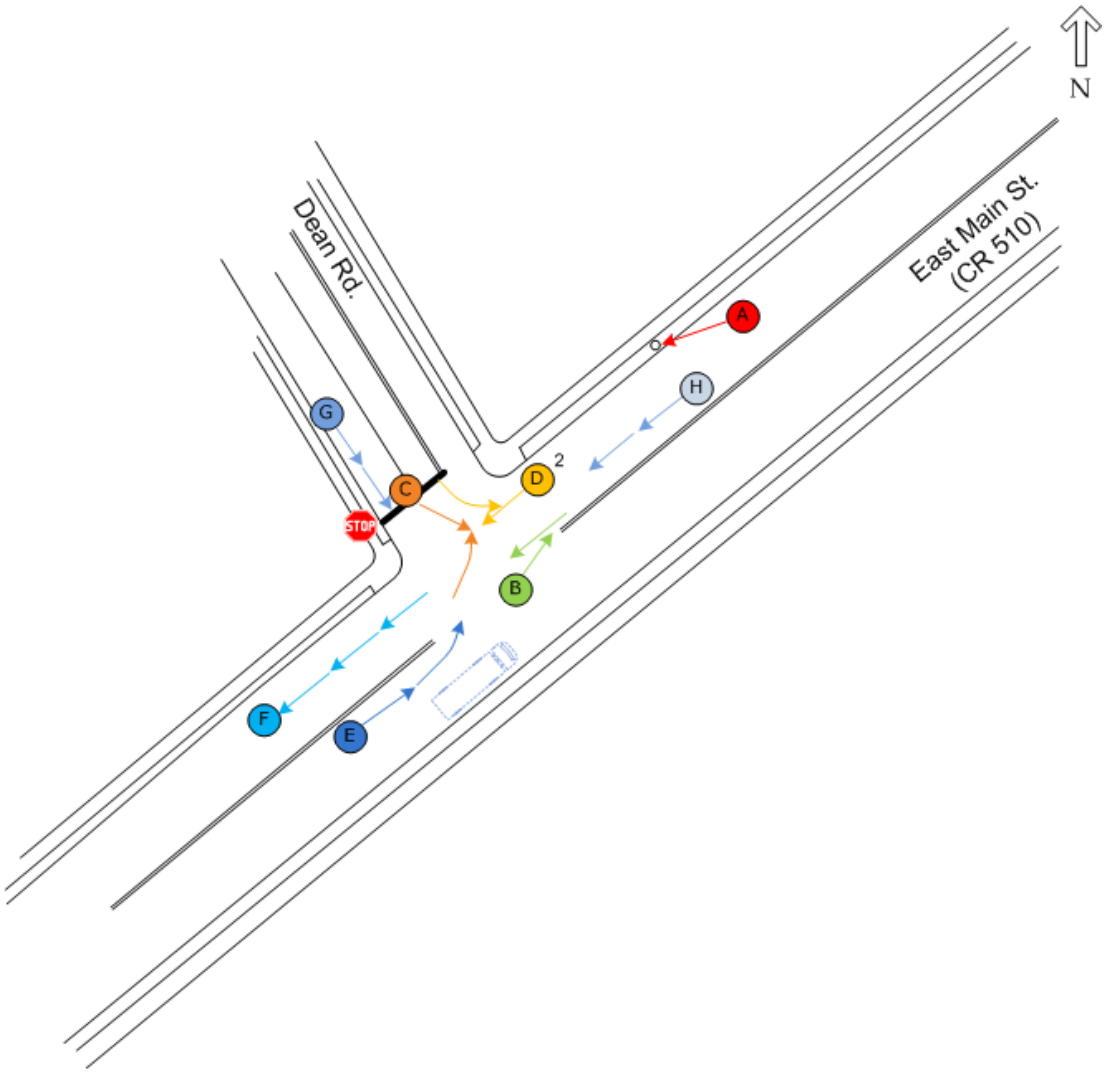
(D) **Right Angle**
(4) 1/15/2009 - 8:30 am - Snowy, Daylight
(5) **11/4/2011 - 3:45 pm - Dry, Daylight**

(E) **Same Direction - Rear End**
(6) **10/19/2009 - 4:10 pm - Dry, Daylight**
(sun glare blocked view of parked truck)

(F) **Same Direction - Rear End**
(7) **5/26/2010 - 3:05 pm - Dry, Daylight**
(traffic volume)

(G) **Same Direction - Rear End**
(8) 7/6/2010 - 11:09 am - Dry, Daylight
(driver error)

(H) **Same Direction - Rear End**
(9) 1/13/2011 - 2:49 pm - Dry, Daylight



LEGEND
Injury (bold)
5
(X) No. of crashes by type (if >1)

Tempe Wick Road & East Main Street

(A) **Same Direction - Rear End**
- (1) 2/23/2009 - 2:54 pm - Dry, Daylight
- (2) 5/5/2009 - 3:50 pm - Wet, Daylight
- (3) 1/14/2011 - 7:28 am - Dry, Daylight

(B) **Same Direction - Rear End**
- (4) 10/27/2009 - 12:05 pm - Wet, Daylight

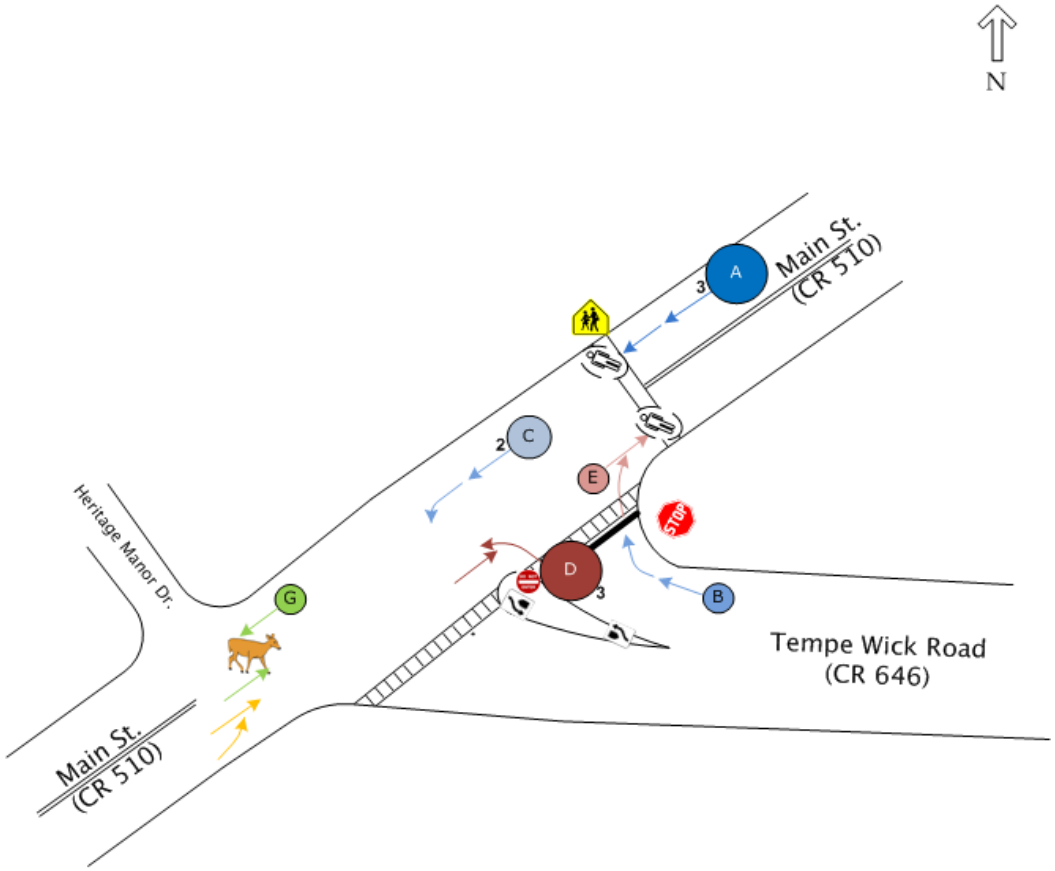
(C) **Same Direction - Rear End**
- (5) 4/30/2010 - 3:00 pm - Dry, Daylight
- (6) 3/27/2011 - 3:27 pm - Dry, Daylight

(D) **Right Angle**
- (7) 6/5/2009 - 11:20 am - Wet, Daylight
- (8) 8/19/2009 - 12:52 pm - Dry, Daylight
- (9) **5/20/2010 - 3:15 pm - Dry, Daylight**
  (EB vehicle overturned)

(E) **Right Angle**
- (10) 11/19/2010 - 11:02 am - Dry, Daylight

(F) **Same Direction - Side Swipe**
- (11) 1/19/2011 - 12:01 pm - Wet, Daylight

(G) **Animal**
- (12) 11/12/2011 - 7:30 pm - Dry, Dark (Street Lights On/Continuous)



LEGEND
Injury (bold)
5 (X) No. of crashes by type (if >1)
Pedestrian not struck; was cause of crash

Mendham Shopping Center & East Main Street

Cold Hill Road & East Main Street

A **Same Direction - Rear End**
1 4/7/2009 - 8:33 am - NULL, Daylight

B **Same Direction - Rear End**
2 6/24/2009 - 10:38 pm - Dry, Dark (Street Lights On/Continuous)

C **Same Direction - Rear End**
3 8/14/2009 - 5:58 pm - Dry, Daylight

D **Same Direction - Rear End**
4 9/20/2009 - 5:08 pm - Dry, Daylight

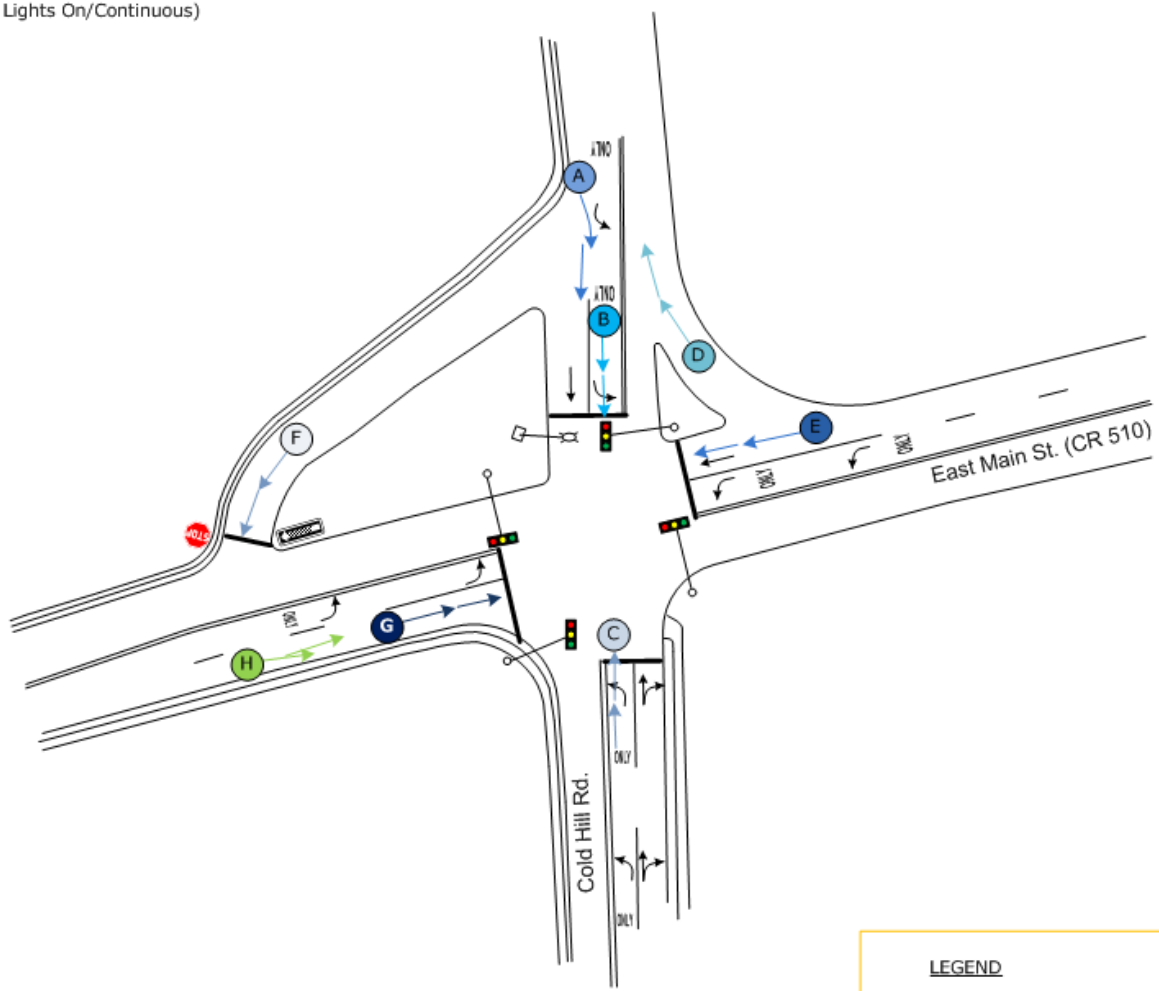
E **Same Direction - Rear End**
5 7/23/2010 - 3:07 pm - Dry, Daylight

F **Same Direction - Rear End**
6 10/10/2010 - 12:55 pm - Dry, Daylight

G **Same Direction - Rear End**
7 9/10/2011 - 12:57 pm - Dry, Daylight

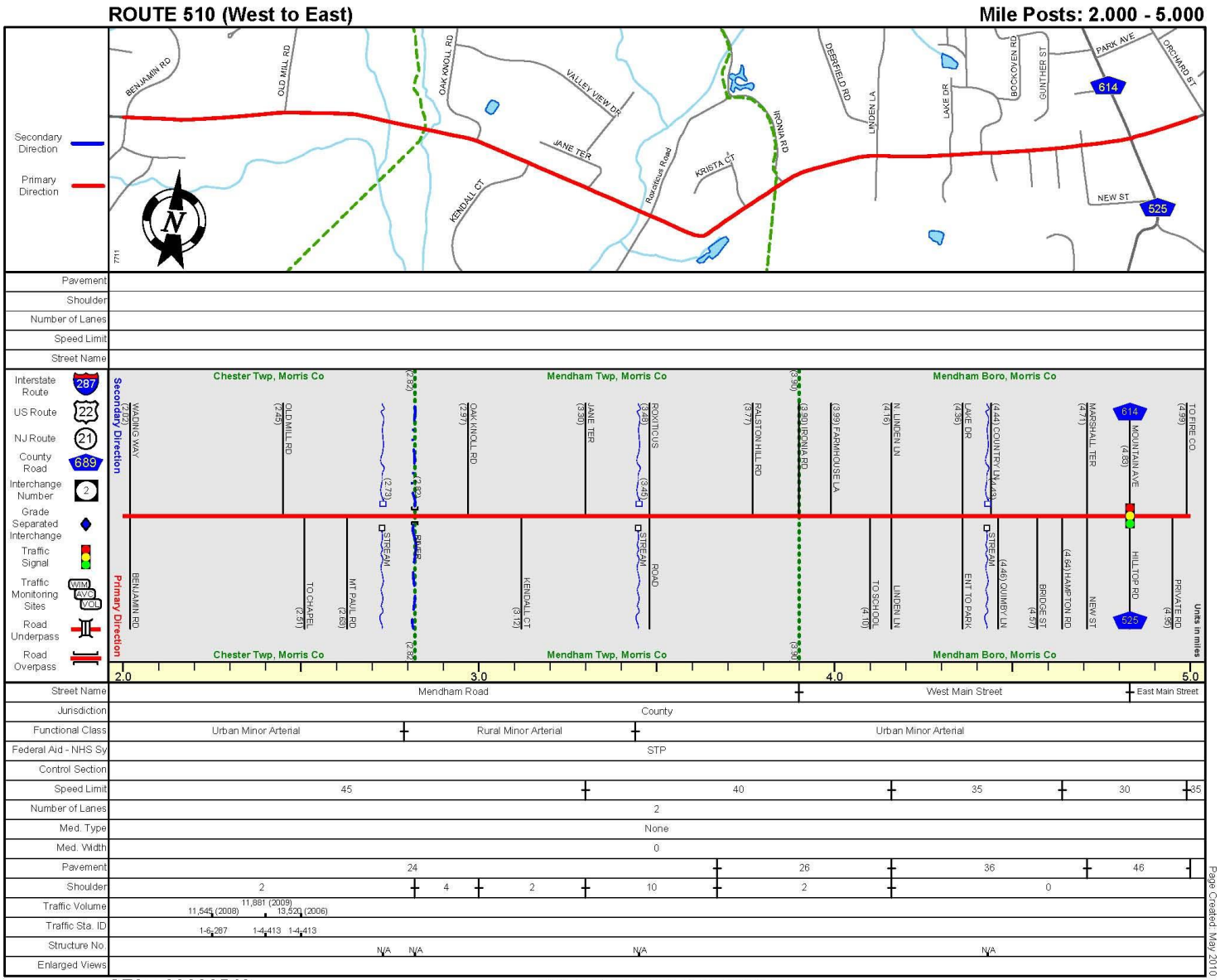
H **Same Direction – Side Swipe**
8 1/1/2011 -5:02 pm - Dry, Dusk

Not Diagramed - No Direction of Travel Specified
9 Backing - 6/6/2011 - 3:03 pm - Dry, Daylight



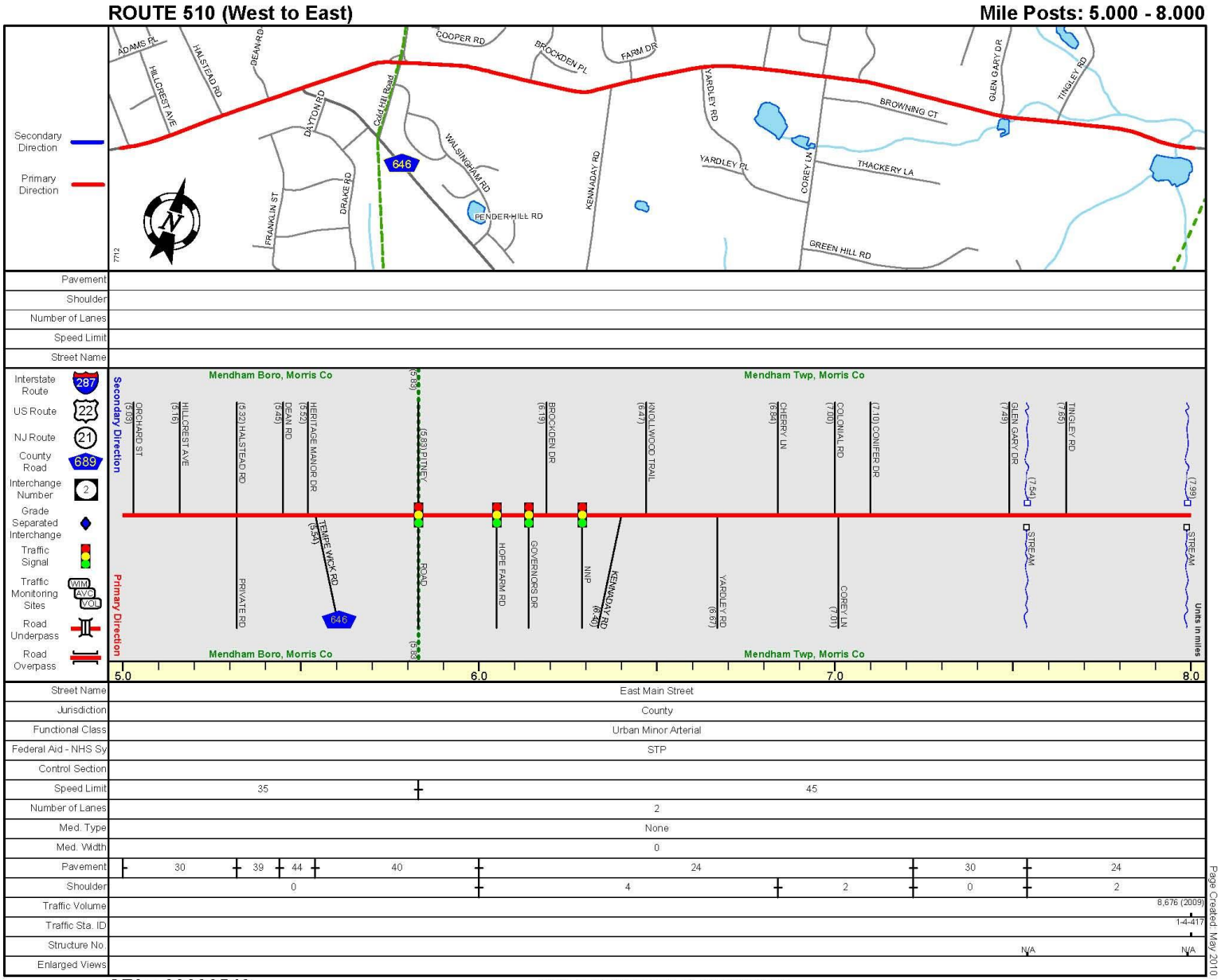
Appendix C – Straight Line Diagrams

East Main Street (CR 510)



SRI = 00000510__ Date last inventoried: August 2007

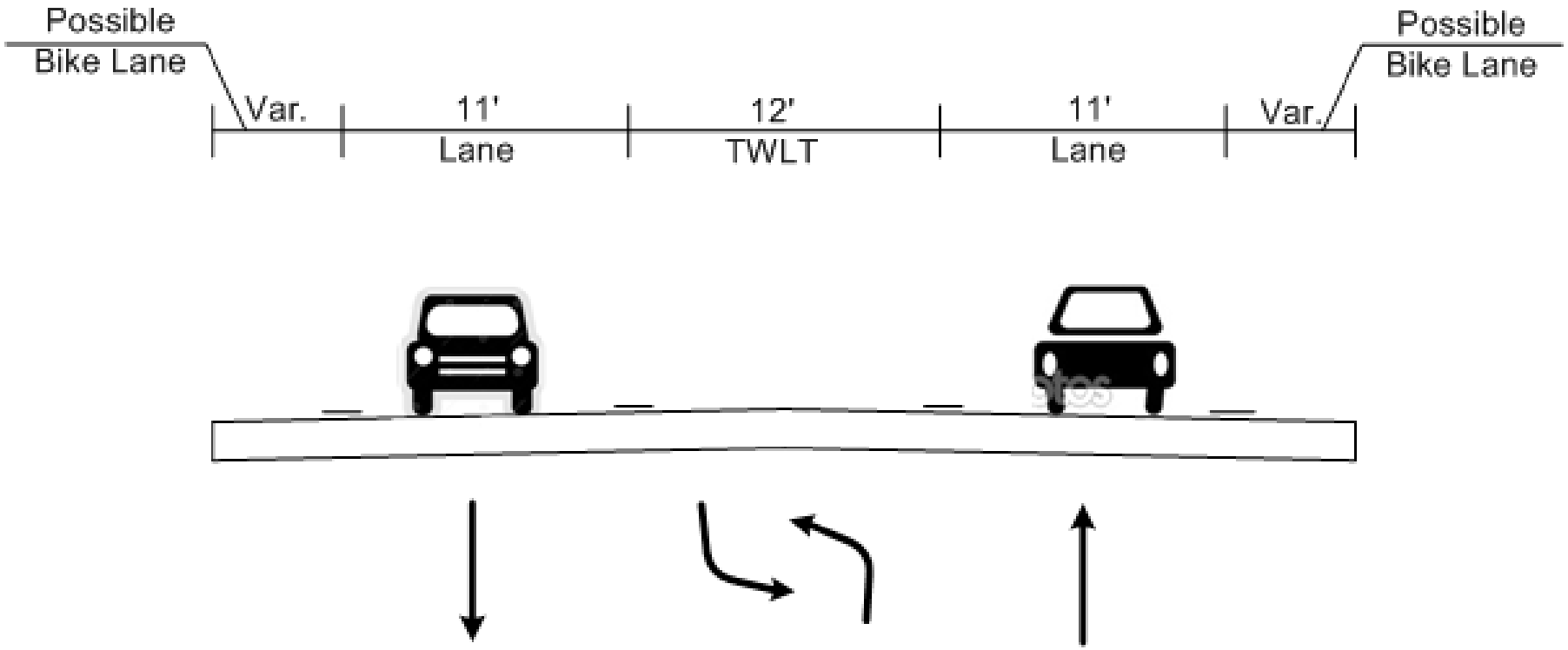
East Main Street (CR 510) - continued



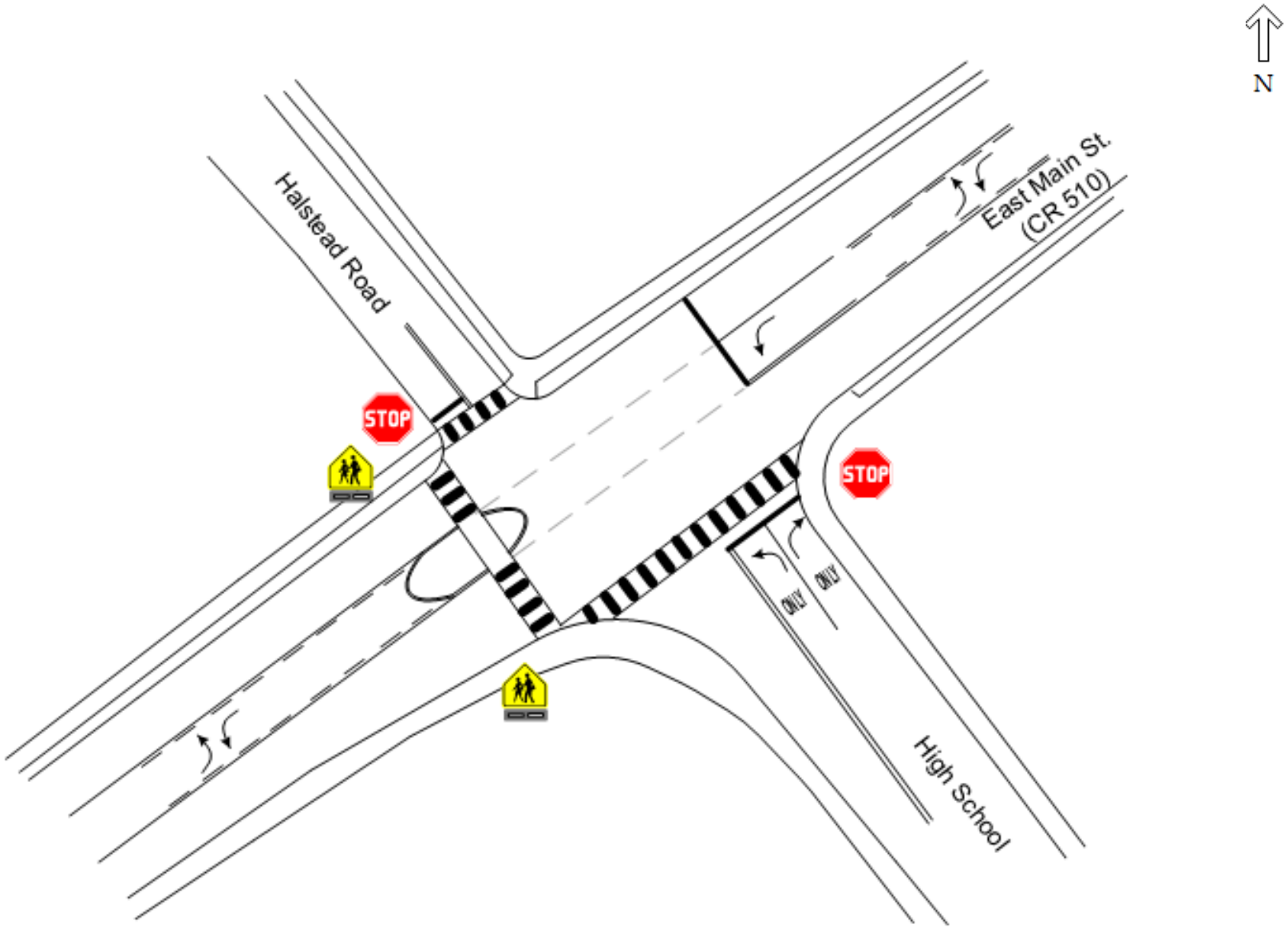
SRI = 00000510__ Date last inventoried: August 2007

Appendix D – Additional Images

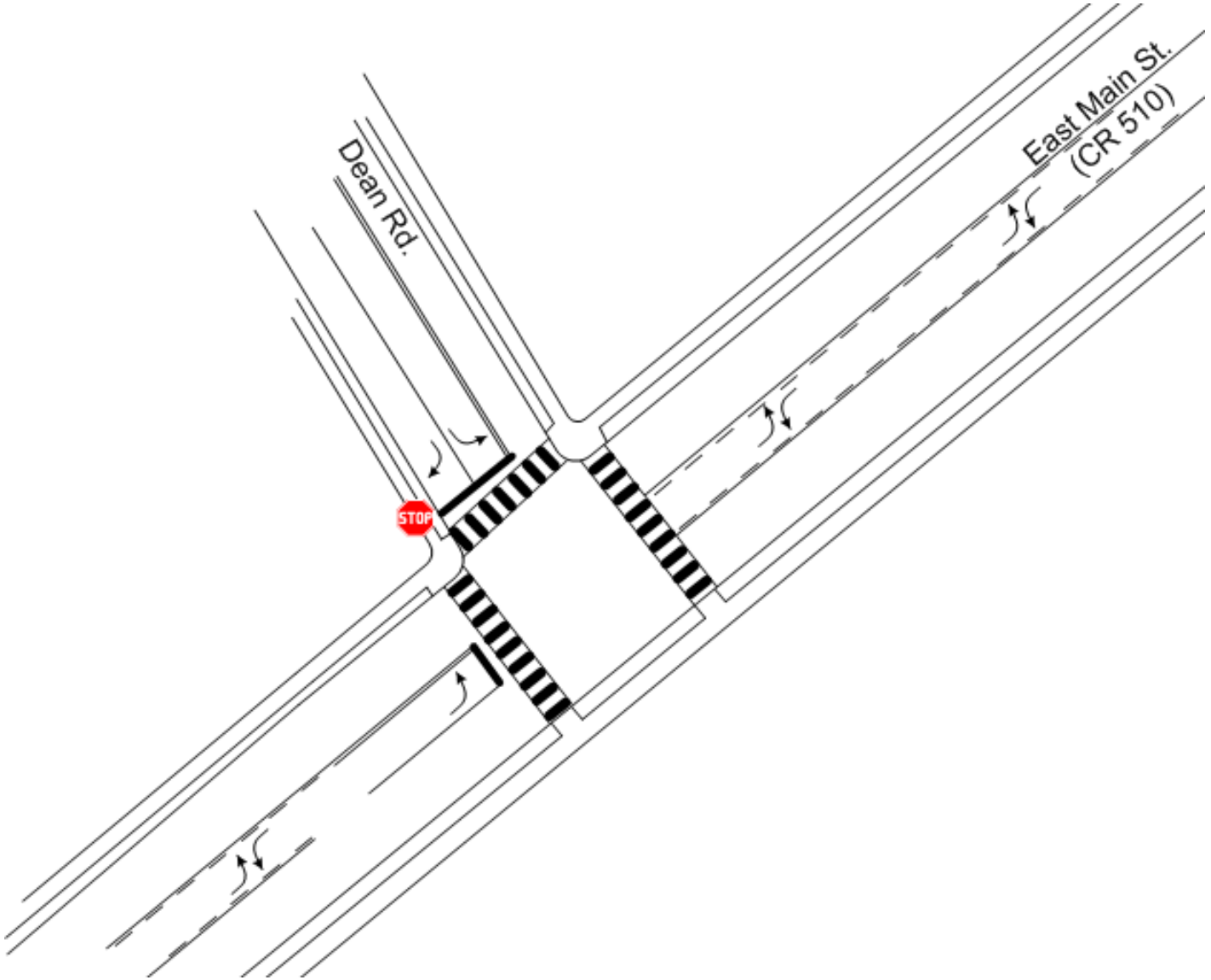
Typical Cross Section – Two-Way Left Turn



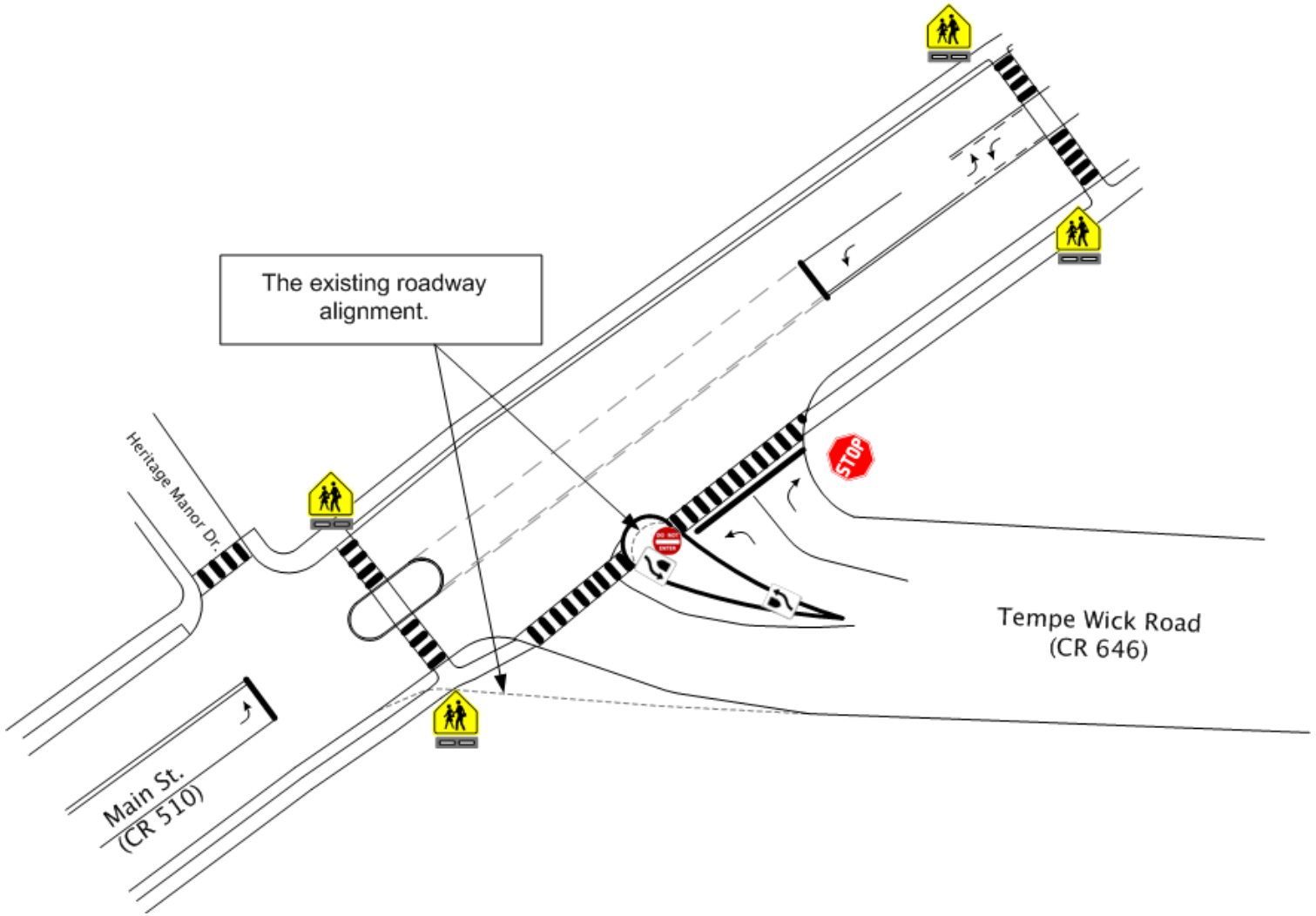
Pedestrian Refuge Island with Two-Way Left Turn and Delineated Left Turn Lane



Two-Way Left Turn Lane and Delineated Left Turn Lane



Tempe Wick Road – Decreasing the Radius, Installation of Pedestrian Refuge Islands in the Crosswalks



Institute a Road Diet, Two-Way Left Turns and Right and Left Turn Lanes out of Mendham Shopping Center