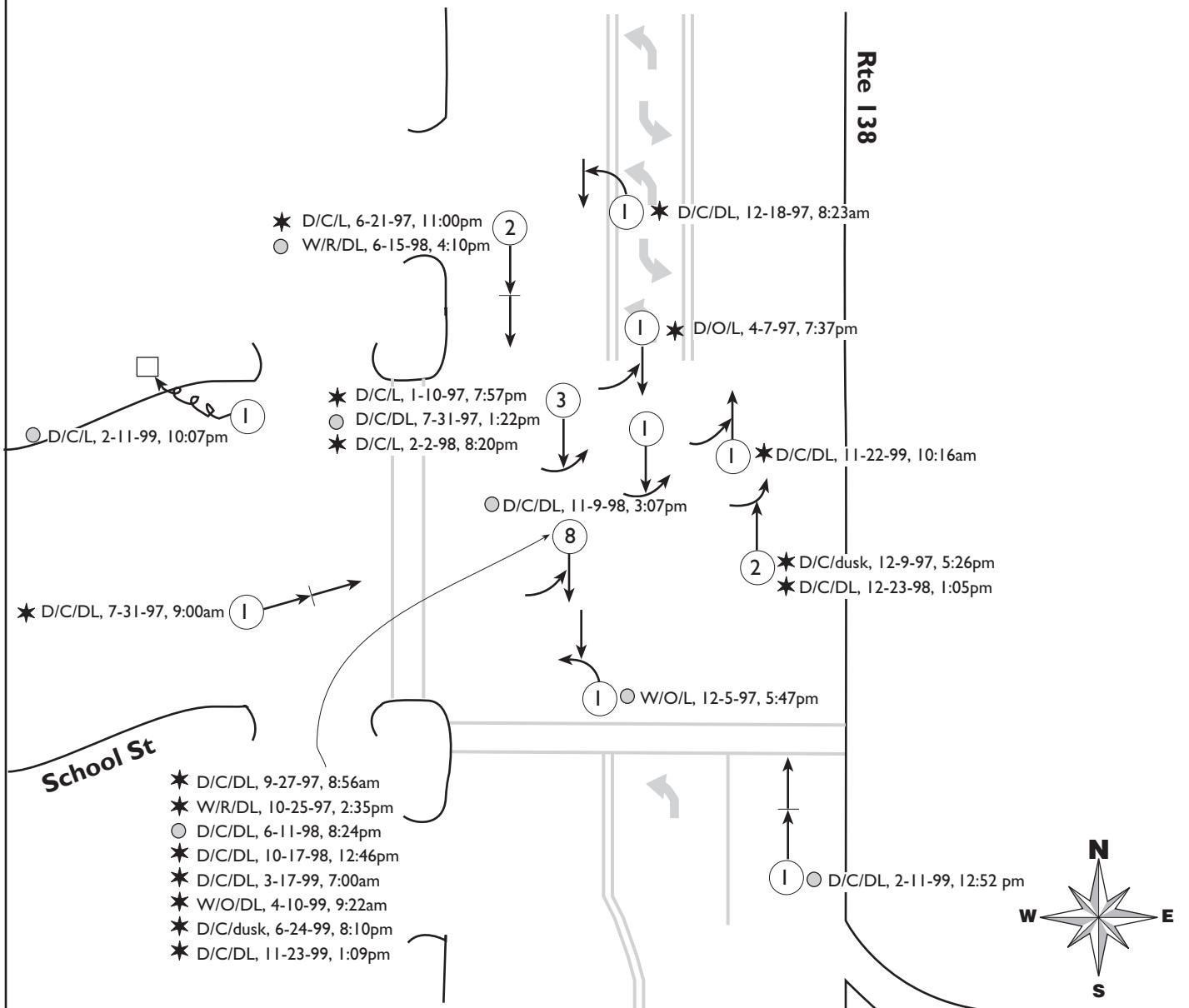


Figure 16
Collision Diagram
1/1/97 to 12/31/99
Route 138 @ School St
Stoughton



SYMBOLS	PAVEMENT/WEATHER/LIGHTING	TYPES OF COLLISIONS
<ul style="list-style-type: none"> ← Moving Vehicle ↔ Backing Vehicle --- Pedestrian □ Parked Vehicle ★ Property Damage Only ● Injury ● Fatality □ Fixed Object → Out of Control # Number of Accidents 	<ul style="list-style-type: none"> D Dry C Clear W Wet R Rain F Foggy S Snowy, Icy O Other DL Daylight N Dark – No Lights L Dark – Lighted 	<ul style="list-style-type: none"> →← Head On ←→ Angle ↔ Rear End →↖ Sideswipe ↖→ Broadside

CTPS

One reason for the relatively high turning volumes shown is the existence of two traffic generators to the west of the intersection: the Stoughton Senior High School and Middle School on Pearl Street (north of School Street), and the Stoughton MBTA commuter rail station two blocks further to the southwest. This section of School Street is therefore an important connector between the two generators and Route 138. Additionally, it was observed from field work that small but steady numbers of pedestrians walk along, as well as across, Route 138 at this intersection. In particular, numerous students were seen among the pedestrians during the AM peak period.

It is recommended that a traffic signal be installed at this intersection.¹⁴ It is also recommended that Route 138 operate with two southbound lanes and one northbound lane between Avalon Street and Monk Street. This would involve converting the southern end of the existing two-way center left-turn lane to southbound operation only between Avalon Street and School Street. It would eliminate the existing northbound left-turn lane south of the intersection by converting it to southbound operation. Finally, northbound left turns would be prohibited during the AM and PM peak periods (see Figure 17). Jurisdiction would belong to MassHighway and the town of Stoughton.

Finally, due to the relative closeness of this intersection to Stoughton Square, located approximately 750 ft to the south, the impacts of the recommended prohibition of northbound peak period left turns at School Street have been taken into account, and are discussed below in Concern/Recommendation 24 for Stoughton Square.

ROUTE 138/SCHOOL ST:					
• Intersection LOS/Delay (1)	AM:	Turns	1999	2020 No-Build	2020 Build (new signal)
		EB L,R	F / *	F / *	C / 24 (entire intersection)
	PM:	NB L	A / 4	A / 4	
		EB L,R	F / *	F / *	B / 14 (entire intersection)
		NB L	B / 9	C / 13	

• Number of Collisions, 1997–1999 (Stoughton Police): 23 (7.7 per year)
 • Jurisdiction of Improvement(s): MassHighway, Town of Stoughton

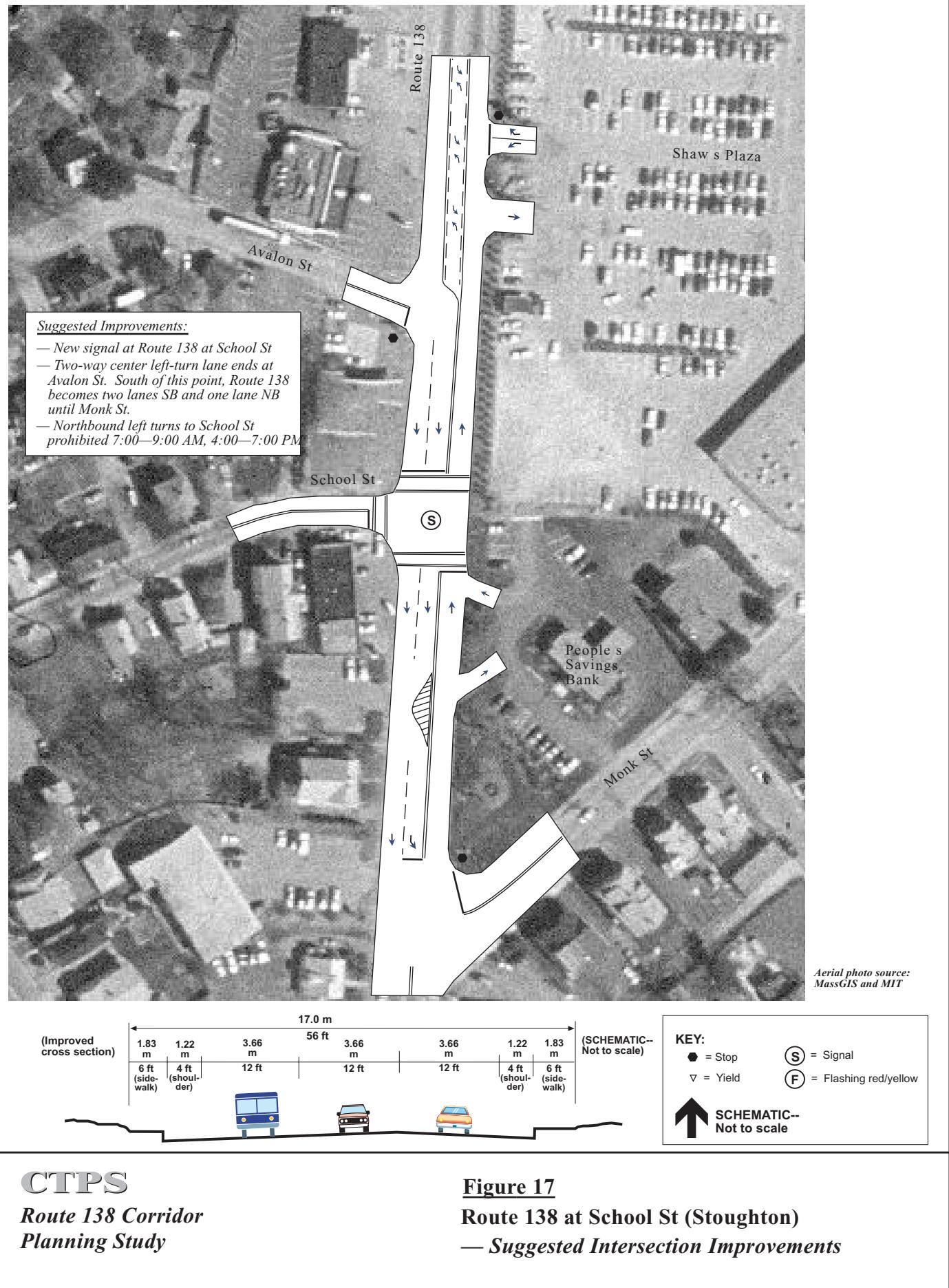
(1) = LOS is for the critical turning movements for unsignalized conditions; for the entire intersection for signalized conditions. Delay is in seconds. * = 75 or more seconds delay for signalized intersections, 60 or more seconds delay for unsignalized intersections.

24 Concern: “Very congested conditions with numerous traffic accidents exist throughout the area known as Stoughton Square, a 370-ft long, four-lane section in the center of Stoughton where eight approaches converge.”

Recommendation: It should be mentioned at the outset that, due to the complex existing traffic operations, this study recommends a full study of potential traffic improvements for Stoughton Square and the surrounding area and roadways. Such a study could build on this and previous work¹⁵ and look to more in-depth solutions which are beyond the scope of this study.

¹⁴ The Route 138 at School Street intersection is likely to meet all warrants for new traffic signals. Only four hours of turning movement data were available, but they were of large enough magnitudes to presumably meet any eight-hour requirements (see Appendix D-3).

¹⁵ Old Colony Planning Council, *The Route 138 Corridor Safety Study*, November 1982, and Old Colony Planning Council, *The Route 27 Corridor Improvement Study*, October 1983.



What follows is a basic analysis of traffic conditions in the square, as well as some general suggestions for improvement.

For the purposes of this study, analysis of Stoughton Square has been divided into three sections: North, Middle, and South. Due to the layout of the square, and the interrelationship of traffic in the northern, middle, and southern sections, improvements proposed in one part are likely to have impacts elsewhere in the square. With this in mind, a primary goal has been to refrain from suggesting improvements which would have the effect of increasing queues *within* the square especially, thereby adding to the risk of gridlock. Figure 15 shows existing turning movements for the Stoughton Square area.

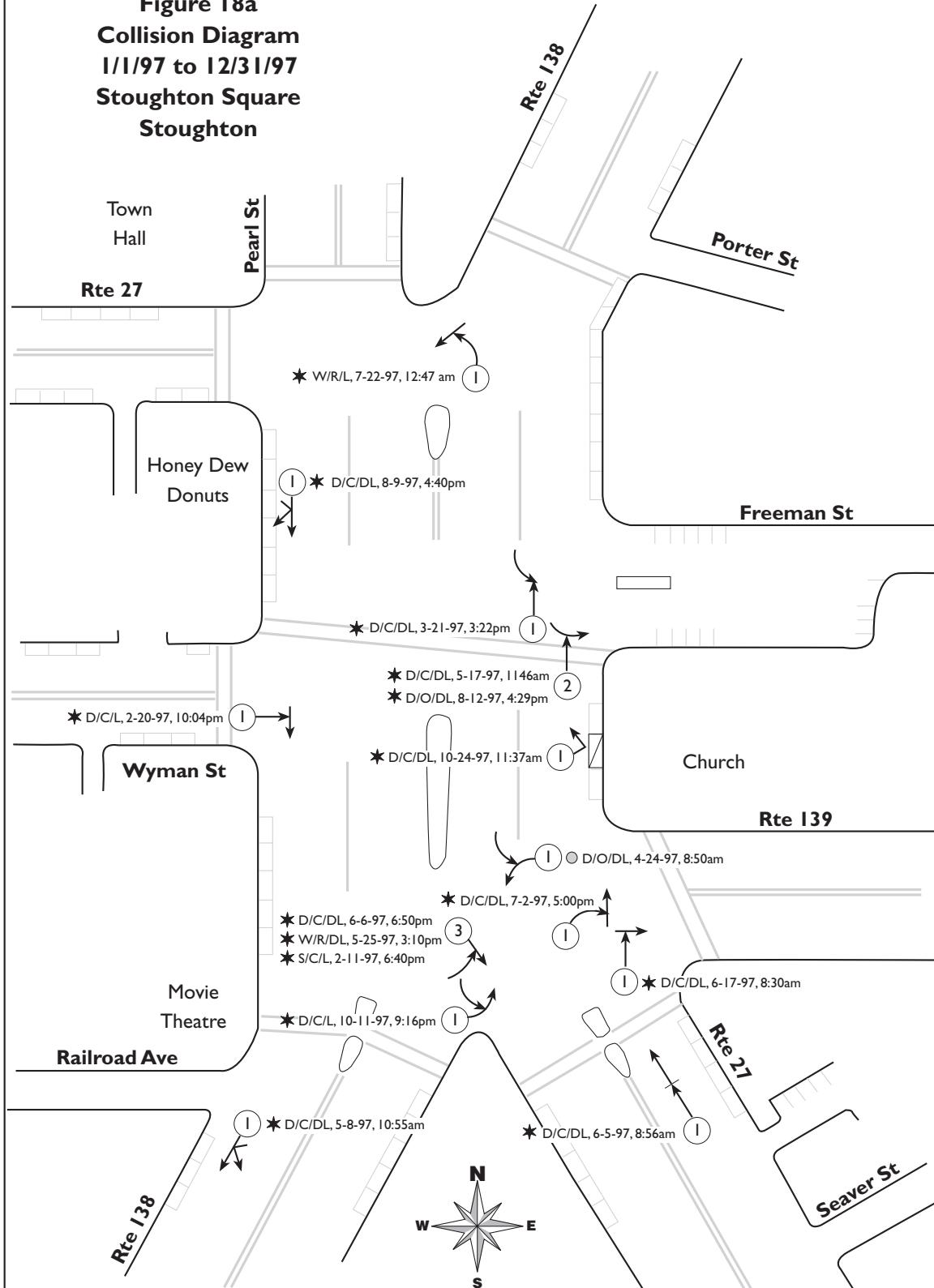
a. Stoughton Square North. This intersection includes Route 138 (Washington Street) from the north, Pearl Street from the northwest, Route 27 (Porter Street) from the southwest, and Routes 138/27 from the southeast. Only the Pearl Street approach is stop-controlled; the remaining three approaches are uncontrolled. In addition, a right-in/right-out only, lower-volume section of Porter Street connects to Route 138 just to the northeast.

Accident data showed fewer collisions here than elsewhere in the square, with most collisions being rear end or sideswipes (see Figures 18a–c). From LOS analysis it was found that one approach operates at E or F in the AM and PM peak hours: Route 138 southbound (entering the square). The other three approaches yielded acceptable results (LOS A through C).

It was investigated whether a second travel lane could be added to the southbound Route 138 approach. Due to the limited available ROW in this area (a roadway width of 42 ft to the north of Porter Street), widening was not deemed feasible: on-street parking would have to be eliminated. Several signalized and unsignalized alternatives were investigated; they had limited apparent benefits. A suggested stop sign on Route 138 southbound approaching Stoughton Square is also not recommended, due to the likely queueing of traffic back to Monk Street, perhaps even to the School Street intersection.

Therefore, no geometric or signal improvements are recommended at Stoughton Square North, other than to install enhanced crosswalks. The crosswalks would be upgraded throughout the entire square, made prominent with differently colored pavements and/or with flashing lights set into the pavement. These would be reminders to drivers that the area is very important for pedestrians accessing the MBTA commuter rail station, town hall, schools, a movie theatre, restaurants, and retail shops. Since the Stoughton Square area is not a state highway section, all improvements would be under local jurisdiction.

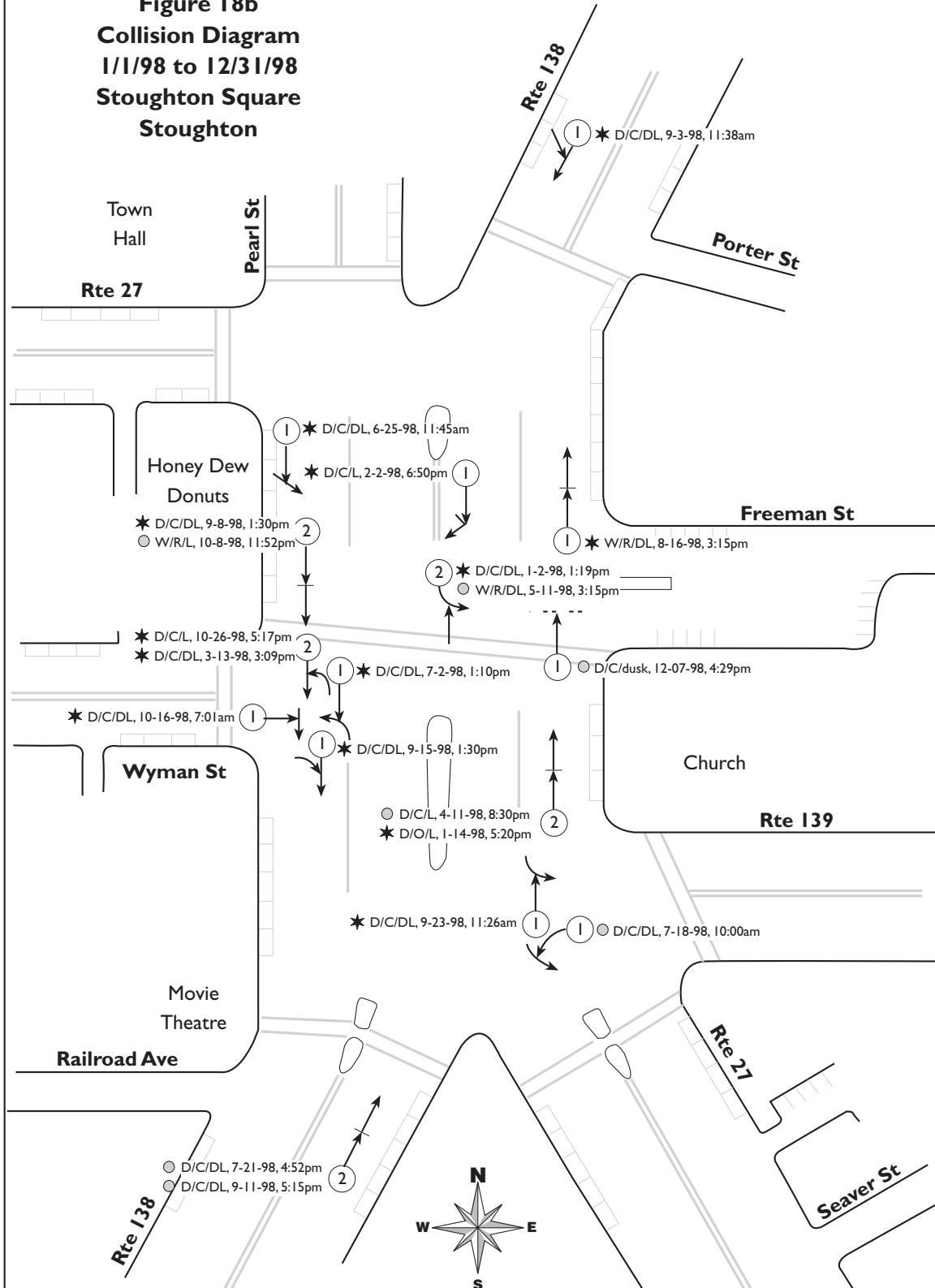
Figure 18a
Collision Diagram
1/1/97 to 12/31/97
Stoughton Square
Stoughton



SYMBOLS	PAVEMENT/WEATHER/LIGHTING	TYPES OF COLLISIONS
← Moving Vehicle	D Dry	→ Head On
←→ Backing Vehicle	C Clear	← Angle
--- Pedestrian	W Wet	↔ Rear End
□ Parked Vehicle	R Rain	↔ Sideswipe
★ Property Damage Only	F Foggy	↓ Broadside
○ Injury	S Snowy, Icy	
● Fatality	O Other	
□ Fixed Object	DL Daylight	
↖ Out of Control	N Dark - No Lights	
(#)	L Dark - Lighted	

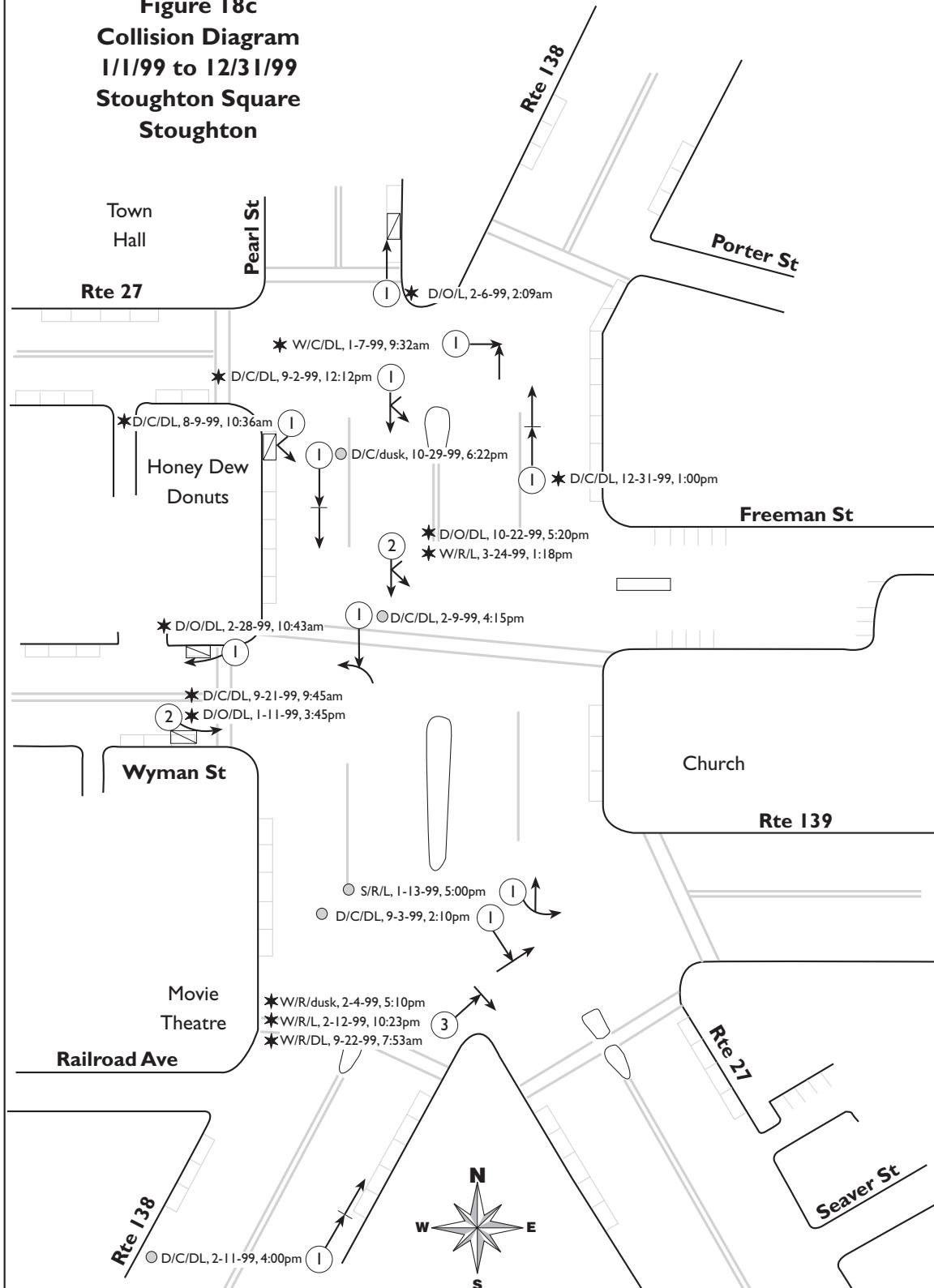
CTPS

Figure 18b
Collision Diagram
1/1/98 to 12/31/98
Stoughton Square
Stoughton



SYMBOLS	PAVEMENT/WEATHER/LIGHTING	TYPES OF COLLISIONS
← Moving Vehicle	D Dry	→ Head On
←→ Moving Vehicle	C Clear	← Angle
--- Pedestrian	W Wet	↔ Rear End
□ Parked Vehicle	R Rain	↔ Sideswipe
★ Property Damage Only	F Foggy	↓ Broadside
○ Injury	S Snowy, Icy	
● Fatality	O Other	
□ Fixed Object	DL Daylight	
→ Out of Control	N Dark - No Lights	
○ Number of Accidents	L Dark - Lighted	

Figure 18c
Collision Diagram
1/1/99 to 12/31/99
Stoughton Square
Stoughton



SYMBOLS	PAVEMENT/WEATHER/LIGHTING	TYPES OF COLLISIONS
← Moving Vehicle	D Dry	→ Head On
←→ Backing Vehicle	C Clear	← Angle
--- Pedestrian	W Wet	↔ Rear End
□ Parked Vehicle	R Rain	↓ Sideswipe
★ Property Damage Only	F Foggy	↑ Broadside
○ Injury	S Snowy, Icy	
● Fatality	O Other	
□ Fixed Object	DL Daylight	
→ Out of Control	N Dark – No Lights	
○ Number of Accidents	L Dark – Lighted	

<u>STOUGHTON SQUARE</u>						
<u>NORTH:</u>						
• Intersection LOS/Delay (1)	AM:	Turns	1999	2020 No-Build	2020 (School St) Build	
		EB R	B / 7	B / 10	B / 10	
	PM:	WB T,R	F / *	F / *	F / *	
		NB L	A / 4	B / 5	B / 5	
	PM:	EB R	C / 14	E / 30	E / 30	
		WB T,R	F / *	F / *	F / *	
		NB L	B / 5	B / 6	B / 6	
<ul style="list-style-type: none"> Number of Collisions, 1997–1999 (Stoughton Police): 12 (4.0 per year) Jurisdiction of Improvement(s): Town of Stoughton 						
(1) = LOS is for the critical turning movements. Delay is in seconds. * = 60 or more seconds delay (for unsignalized intersections).						

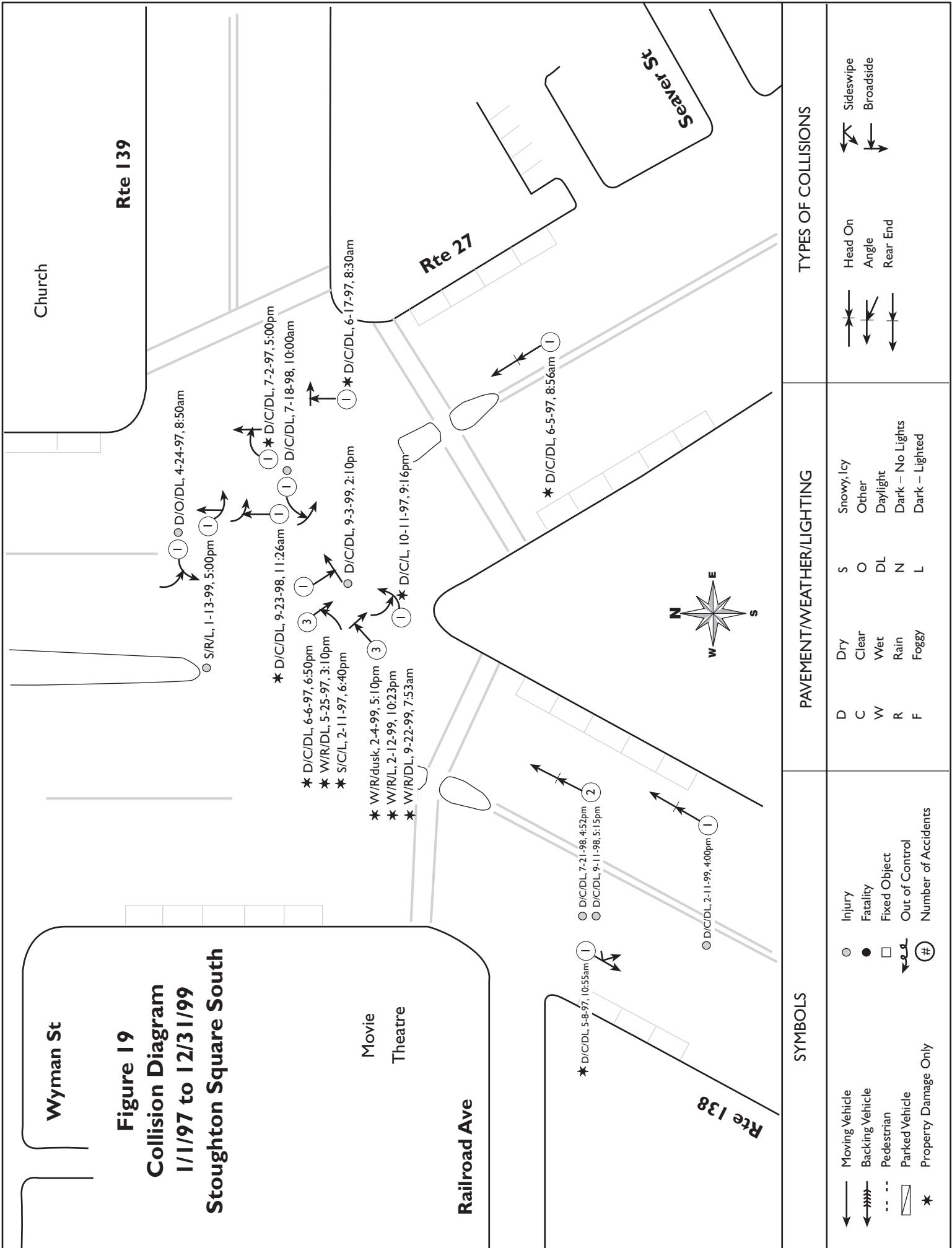
b. Stoughton Square Middle. Two local, stop-controlled, two-lane streets enter the middle of the square, Wyman Street from the southwest and Freeman Street from the northeast (Figure 15). Wyman Street carries far more traffic and connects Routes 138/27 with the Stoughton MBTA station and the neighborhood west of the commuter rail line. Very little traffic uses Freeman Street to access the square; importantly, however, the Stoughton Fire Department is located on Freeman Street and thus has immediate access to all the approaches which make up the square.

Although a number of signalized alternatives were investigated, *it is suggested that this location remain unsignalized. The only recommended improvement is that traffic from Wyman Street eastbound be prohibited from turning left to Routes 138/27 northbound during the AM peak period (7:00 to 9:00)*. This prohibition already exists for the PM peak period (4:00 to 7:00).

<u>STOUGHTON SQUARE</u>						
<u>MIDDLE:</u>						
• Intersection LOS/Delay (1)	AM:	Turns	1999	2020 No-Build	2020 Build	
		EB all	F / *	F / *	B / 9	
	PM:	WB R	B / 7	B / 8	B / 8	
		NB L	B / 9	C / 12	C / 12	
		SB L	C / 16	D / 23	D / 23	
		EB all	C / 11	C / 16		
		WB R	A / 5	B / 5	No Improvements	
		NB L	C / 17	D / 25	Recommended	
		SB L	B / 8	B / 10		
<ul style="list-style-type: none"> Number of Collisions, 1997–1999 (Stoughton Police): 23 (7.7 per year) Jurisdiction of Improvement(s): Town of Stoughton 						
(1) = LOS is for the critical turning movements. Delay is in seconds. * = 60 or more seconds delay (for unsignalized intersections).						

c. Stoughton Square South. Three state-numbered routes merge at this location: Route 138 (Washington Street) from the south, Route 27 (Park Street) from the southeast, Route 139 (Pleasant Street) from the northeast, and Routes 138/27 from the northwest. All but the last approach are stop-controlled. This is also the area of the square where an accident pattern is the most identifiable. The pattern of collisions which stands out pertains to vehicles from Route 138 northbound and Route 27 northbound conflicting with vehicles from Routes 138/27 southbound (see Figure 19).

Figure 19
Collision Diagram
1/1/97 to 12/31/99
Stoughton Square South



A problem appears to be that there is too much “open space” in the intersection, within which vehicles from Route 138 northbound must first stop at a stop line and then cross the open space before continuing onto either Routes 138/27 northbound or Route 139 eastbound. Vehicles from Route 27 northbound also stop at a stop line, while vehicles in the square, on Routes 138/27 southbound, have the right-of-way to either turn left onto Route 139 eastbound or to continue straight on Route 27 southbound. Vehicles continuing on Route 138 southbound simply stay in the right lane and do not encounter conflicting traffic, other than at a pedestrian crossing. Collisions in the intersection seem to occur because numerous vehicles (were observed to) run the stop signs, and/or too few gaps exist for northbound Route 138 or Route 27 traffic to safely proceed.

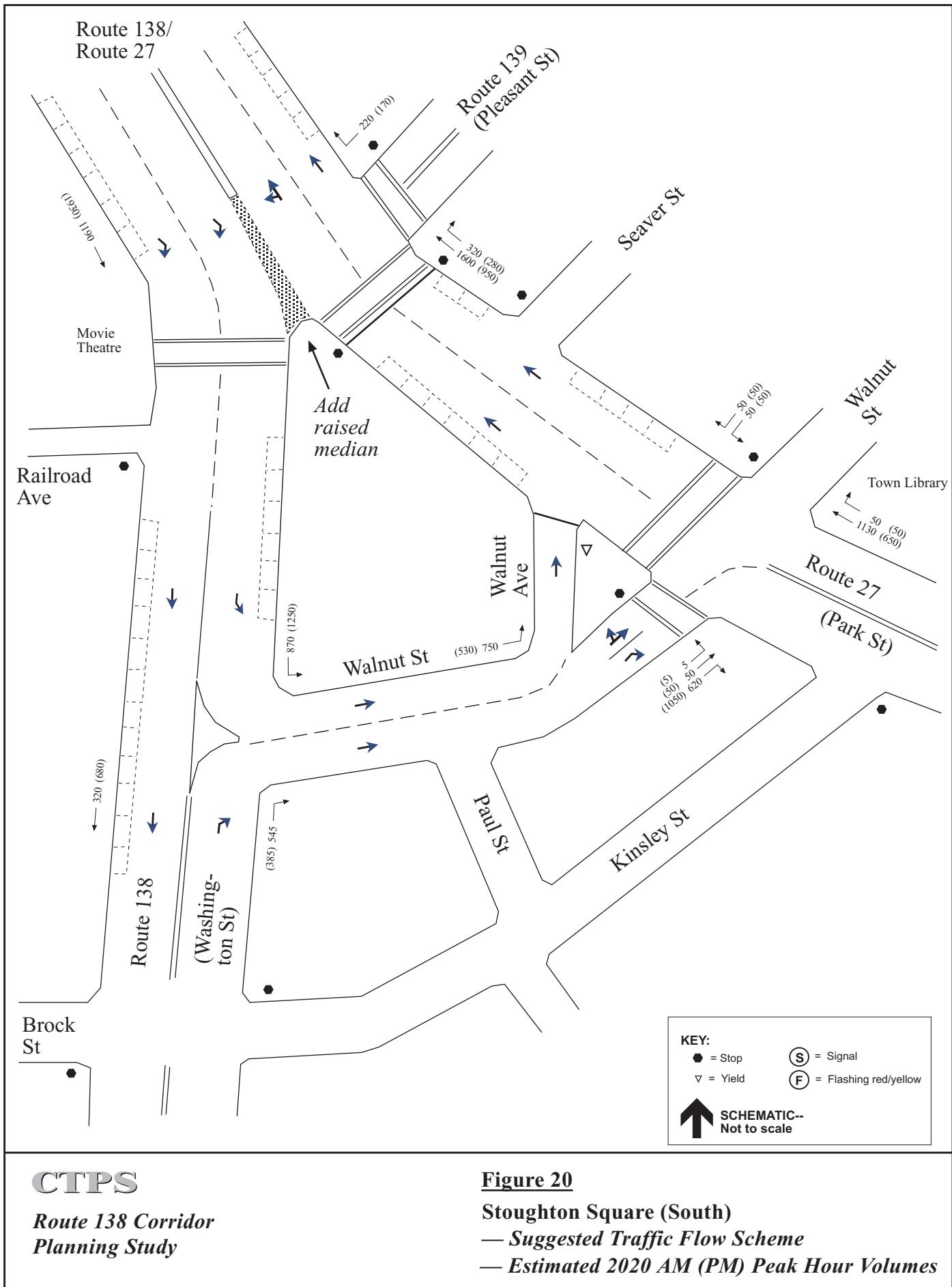
Four alternatives were considered, three pertaining to Stoughton Square South and one impacting the square generally (*none of the four are explicitly recommended*):

(1) A “do-nothing” alternative. In this alternative, the southern end of the square would remain as it is currently. The physical layout and geometric restrictions allow for little or no widening, realignment, or channelization. The possible addition of a stop sign on the southbound approach, creating a four-way stop intersection, would negatively affect the middle section of the square, causing southbound traffic to queue northward into the square.

(2) A traffic signal at this location was investigated, and showed positive safety and LOS results (B in the AM, C in the PM), but only if the southbound left turns from Routes 138/27 to Route 139 were prohibited. If the left turns remained, the intersection would fail in terms of operational LOS. Since these left turns are in the vicinity of 200 vehicles in both the AM and PM peak hours, any prohibition of the turns would likely yield diversions onto parallel residential streets (e.g., Monk Street north of the square; Seaver Street and Walnut Street south of the square). In addition, queuing within the square from stopped southbound traffic would likely occur during the red phase, potentially creating gridlock conditions.

(3) A third alternative, a scheme which redirects traffic to the south of the Stoughton Square South location, is shown in Figure 20 (this figure is not to scale; Figure 15 shows an aerial view of the area). In this alternative, Route 138 northbound traffic approaching the square would turn right about 850 ft south of the square onto Walnut Street, a two-way, two-lane street which would be converted to a one-way street with two eastbound lanes. About 250 ft east of Route 138, Walnut Street splits into Walnut Street to the right, and Walnut Avenue to the left. These two legs would also become one-way operation to Route 27. Route 27 would become one-way northbound from the intersection with Walnut Street to the square, with two travel lanes and parking on both sides. Route 138 south of the square would become one-way southbound, two lanes, until Walnut Street, where the left lane would turn left onto Walnut Street and the right lane would continue south.

A raised median would be constructed in the southern end of the square, dividing Route 27 northbound traffic from Route 138 southbound traffic. Southbound vehicles in the square wishing to turn left onto Route 139 would need to follow the loop, Route 138 southbound–Walnut Street eastbound–Route 27 northbound–Route 139 eastbound. Traffic from the square to Route 27 southbound would follow Route 138 southbound–Walnut Street eastbound–Route 27 southbound. At the point where Route 27 and Route 138 currently diverge/merge in the square,



it is suggested that the northbound approach (Park Street/Route 27) remain stop-controlled. Crosswalks would be enhanced with a different color, surface material, and/or flashing inset lights. Since the southbound approach (Washington Street southbound) would not be stop-controlled, it would be imperative that all crosswalks become highly visible to drivers.

The benefit of this scheme is that the area where vehicle conflicts currently exist at Stoughton Square South would be eliminated and replaced by a raised median. However, drawbacks of the plan are that there would be circuitous travel to make the “turns”; a short local street, Walnut Street between Routes 138 and 27, would encounter significantly more traffic than it does presently; and pedestrians could have increased difficulties crossing Washington Street southbound, since there would be two uncontrolled southbound lanes as opposed to one lane currently. LOS results for 2020 at the Route 27/Walnut Street intersection were created from estimated 1999 volumes¹⁶ which were grown to 2020 levels. From the analysis, it was found that at least one approach would fail both in the AM and PM peak hours (Walnut Street westbound).

There is no clear-cut suggestion how to physically improve the southern end of Stoughton Square. There are costly drawbacks to each of these first three alternatives, such as a continuation of vehicle collisions in the square due to high volumes/absence of acceptable gaps (alternative 1, do-nothing); potential queuing of traffic within the square, possibly leading to gridlock (alternative 2, traffic signal); and diversion of traffic onto other local streets near the square (alternative 3, one-way “loop” system).

ROUTE 27/WALNUT ST:						
• Intersection LOS/Delay (1)	AM:	Turns	1999	2020 No-Build	2020 Build	
		EB L,T EB R WB L,R	N.A.	N.A.	D / 25 B / 6 F / *	
• Number of Collisions: N.A.	PM:	EB L,T EB R WB L,R	N.A.	N.A.	C / 10 D / 23 F / *	
• Jurisdiction of Improvement(s): Town of Stoughton						
(1) = LOS is for the critical turning movements. Delay is in seconds. * = 60 or more seconds delay (for unsignalized intersections).						

(4) As a result, a fourth improvement alternative was examined, involving strategies which redirect traffic volumes away from the Stoughton Square area. In this alternative, the town of Stoughton could petition MassHighway to reroute two state-numbered roadways away from the square, Route 27 and Route 139. Depending on the particular strategy followed, sufficient reductions in traffic could result to improve congestion levels in the square.¹⁷

¹⁶ Actual 1999 turning movements were unavailable.

¹⁷ A separate means by which traffic in Stoughton Square may be reduced as well is the potential extension of the Stoughton commuter rail line to Easton and communities to the south. A 1993 MBTA passenger survey revealed that of all passengers boarding at Stoughton Station, nearly 20% originated in Easton and other towns along the proposed extension. Future Stoughton Square AM and PM peak period volumes could thus experience reductions due to rail passengers south of Stoughton parking closer to their towns of origin.

Figure 21 shows the current routing of Route 27 from Brockton through Stoughton, via Park Street, the square, Canton Street, and merging with Central Street in northwest Stoughton. The figure also shows Route 139 between the northeast part of Stoughton and terminating at Stoughton Square.

As the figure shows, a redesignated Route 27 would depart Park Street and follow a 1.2-mile section of Turnpike Street, turn left onto Central Street, and continue across Route 138 (Washington Street) towards Sharon. Route 139 would be rerouted less dramatically. At the intersection of Pleasant Street and Central Street, instead of continuing its current routing to the square via Pleasant Street, Route 139 would turn right (westward) onto Central Street and end at Route 138. A benefit of this change would be that long-distance traffic on Route 139 would reach Route 138 not in Stoughton Square, where only right turns are permitted, but at the signalized Central Street intersection, where all turns are permitted.

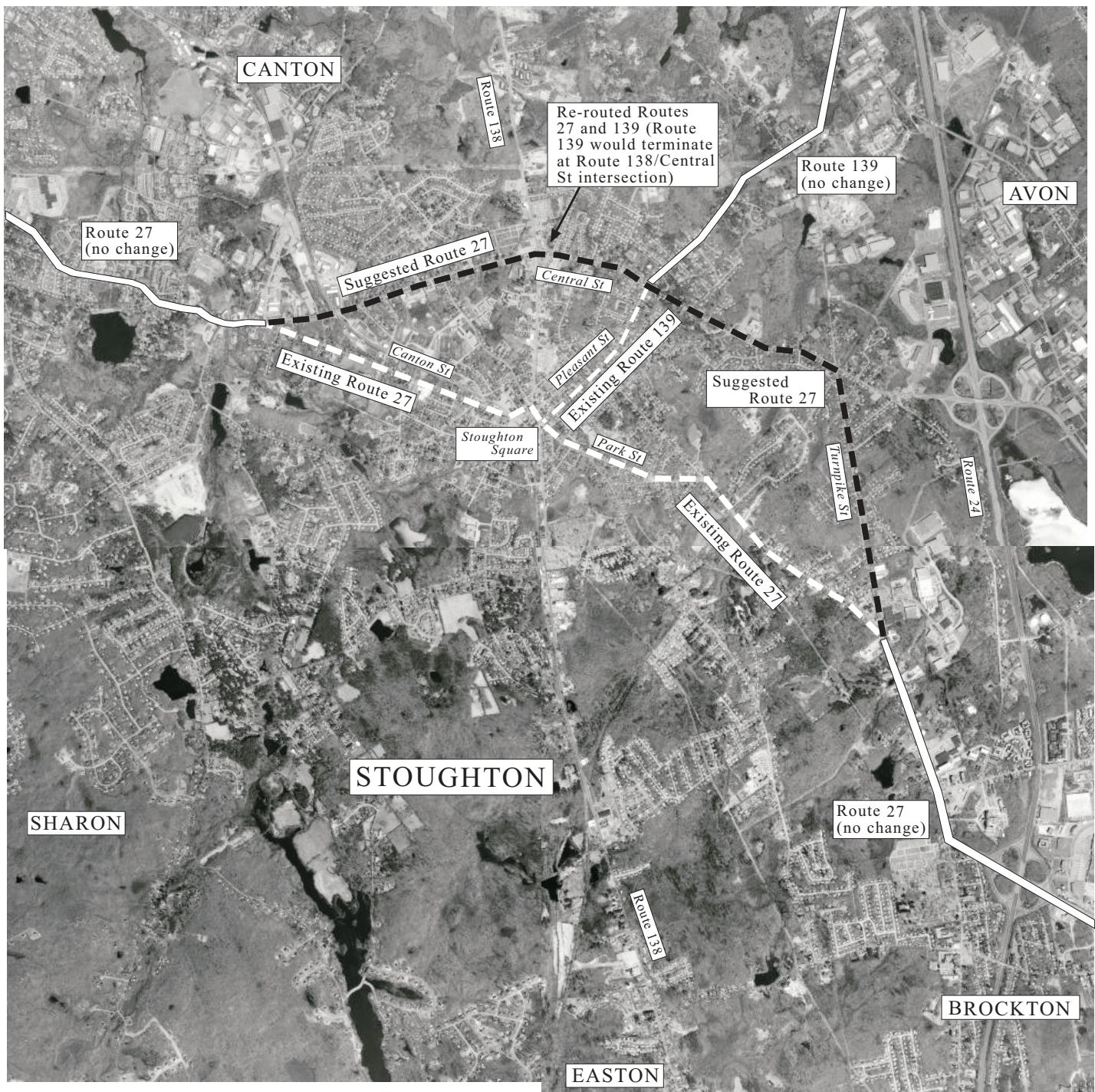
These two suggested reroutings have the potential of reducing traffic travelling through the square. Clearly, however, traffic levels on Turnpike Street and Central Street would need to be monitored to see whether additional, redirected traffic from Routes 27 and 139 could be absorbed. If redesignation is feasible without significant impacts on the Turnpike Street and Central Street neighborhoods, either of the following two strategies would divert vehicles away from the square and onto the renumbered routes:

1. Redesignate Route 27 and Route 139 as described and shown in Figure 21, with no other restrictions of traffic. Under this strategy, local Route 27 and Route 139 traffic would likely continue to use the shorter and faster routes via the square. However, benefits may be that long-distance drivers unfamiliar with the area would stay on the redesignated Routes 27 or 139.
2. Redesignate Route 27 and Route 139 as described, and/or restrict through trucks from Stoughton Square by directing them onto the redesignated roadways. Current daily percentages of heavy vehicles travelling through the square are 7%, or about 1,450 trucks, on Park Street (Route 27), and 4%, or about 280 trucks, on Pleasant Street (Route 139).¹⁸

As stated at the beginning of the analysis of the Stoughton Square area, *it is recommended that an in-depth traffic study of Stoughton Square and its environs be done. The present study will therefore not recommend any particular improvement strategy to improve traffic conditions.*

Stoughton Square, in all its complexity, does function currently. There is congestion and there are some collisions, but it does process peak hour traffic, albeit slowly. It is possible that some of the collisions could be averted with a stronger local police presence, particularly by reducing the frequent running of stop signs. It is also likely that some traffic would be diverted away from the square as a result of either of these options.

¹⁸ Old Colony Planning Council, *Vehicle Speed and Classification Study, Stoughton Square, Stoughton, Massachusetts*, p. V-2, October 1999.



Aerial photo source: MassGIS and MIT



CTPS

**Route 138 Corridor
Planning Study**

Figure 21

Stoughton

*– Existing Routing / Suggested Rerouting
of Routes 27 and 139*

<u>STOUGHTON SQUARE</u>										
<u>SOUTH:</u>										
• Intersection LOS/Delay (1)	AM:	Turns	1999	2020 No-Build	2020 Build					
		EB T,R WB R SB L	F / * B / 6 C / 11	F / * B / 8 C / 20	No Improvements					
	PM:	EB T,R WB R SB L	F / * A / 5 B / 5	F / * B / 5 B / 7	Recommended					
		• Number of Collisions, 1997–1999 (Stoughton Police): 19 (6.3 per year)								
• Jurisdiction of Improvement(s): MassHighway, Town of Stoughton										
(1) = LOS is for the critical turning movements. Delay is in seconds. * = 60 or more seconds delay (for unsignalized intersections).										

25 Concern: *“There are accidents, congestion, and difficult peak hour turning movements at Route 138 at Plain Street.”*

Recommendation: This is a three-legged intersection approximately two-thirds of a mile south of Stoughton Square. Due to the abundance of left turns, and accidents associated with the left turns, *it is recommended that a traffic signal be installed at this intersection.*

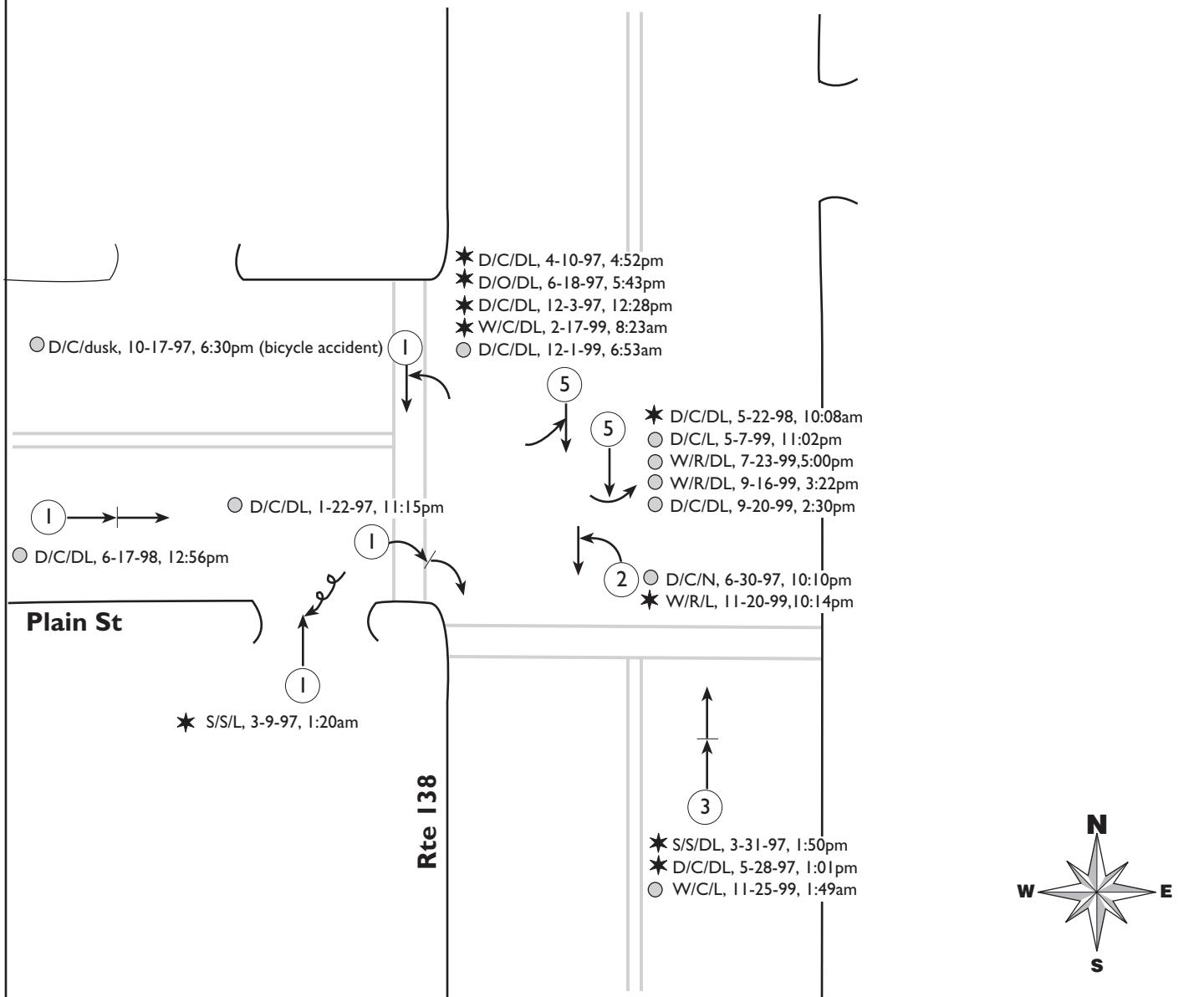
Nineteen accidents were reported during 1997–1999. Of these, 13 involved vehicles turning left either from Plain Street to Route 138 northbound or from Route 138 northbound to Plain Street (see Figure 22). Because of the high turning and through volumes, all the signal warrant criteria are met.

In addition to the signal, *it is recommended that a northbound exclusive left-turn lane be installed, as well as a southbound right-turn lane.* The Route 138 ROW at this location is 60 ft and should be sufficient for a four-lane cross section and painted shoulders/bicycle lanes. *Eastbound, it is recommended that Plain Street be widened to accommodate both exclusive left- and right-turn lanes.* The addition of these turning lanes would be necessary to yield acceptable LOS results. It is possible that some land would need to be taken to accomplish this widening.

A consideration in redesigning this intersection is the potential extension of commuter rail service to Easton and beyond. The rail ROW is less than 200 feet to the west of Route 138. Figure 23 depicts existing turning movements, as well as the recommended conceptual intersection design. The improvements on Route 138 would fall under MassHighway’s jurisdiction, while the possible widening of Plain Street would be the town’s responsibility.

<u>ROUTE 138/PLAIN ST:</u>										
• Intersection LOS/Delay (1)	AM:	Turns	1999	2020 No-Build	2020 Build (new signal)					
		EB L,R NB L	F / * A / 4	F / * A / 4	B / 15 (entire intersection)					
	PM:	EB L,R NB L	F / * B / 8	F / * C / 10	C / 16 (entire intersection)					
		• Number of Collisions, 1997–1999 (Stoughton Police): 19 (6.3 per year)								
• Jurisdiction of Improvement(s): MassHighway, Town of Stoughton										
(1) = LOS is for the critical turning movements for unsignalized conditions; for the entire intersection for signalized conditions. Delay is in seconds. * = 75 or more seconds delay for signalized intersections, 60 or more seconds delay for unsignalized intersections.										

Figure 22
Collision Diagram
1/1/97 to 12/31/99
Route 138 @ Plain St
Stoughton



SYMBOLS	PAVEMENT/WEATHER/LIGHTING	TYPES OF COLLISIONS
<ul style="list-style-type: none"> ← Moving Vehicle → Moving Vehicle ↔ Backing Vehicle --- Pedestrian □ Parked Vehicle ★ Property Damage Only ○ Injury ● Fatality □ Fixed Object → Out of Control # Number of Accidents 	<ul style="list-style-type: none"> D Dry C Clear W Wet R Rain F Foggy S Snowy, Icy O Other DL Daylight N Dark – No Lights L Dark – Lighted 	<ul style="list-style-type: none"> →← Head On →↔ Angle ↔↔ Rear End →→ Sideswipe ↓↔ Broadside
CTPS		

