

APPENDIX D

Recommended Improvements

Also includes:

- D-1 1999 Existing and 2020 Estimated Traffic Volumes by Intersection**
- D-2 1999, 2020 No-Build, and 2020 Build Intersection Level of Service**
- D-3 Traffic Signal Warrants Analyses**
- D-4 Existing Public Transportation Service in the Route 138 Corridor**

MEMORANDUM

TO: Route 138 Corridor Planning Study Files

27 April, 2001

FROM: Robert Sievert

RE: Task 6: Recommend Corridor Improvement Alternatives

*(This memorandum is based on the 20 October, 2000, memorandum,
"Task 5: Develop and Test Corridor Improvement Alternatives. ")*

INTRODUCTION

As a result of completing Tasks 1 through 4 of the Route 138 Corridor Planning Study, numerous traffic congestion and safety concerns were identified in each of the three study area communities, Canton, Milton, and Stoughton. These concerns were summarized in two technical memoranda¹ which were distributed to the Route 138 Committee.

In Task 5 of the study, all of the concerns as originally identified by the committee members and/or CTPS were analyzed and potential improvements, also as suggested by the committee or by CTPS, were developed, and related directly to those Route 138 traffic concerns identified previously in the University Avenue/I-95/I-93 Regional Traffic Study.²

What follows is a revision of the memorandum re "Task 5: Develop and Test Corridor Improvement Alternatives," dated 20 October, 2000. That memorandum³ was distributed to the committee and was discussed at a meeting at Stoughton Town Hall on 1 November, 2000. Subsequent to that meeting, comments were received regarding the twenty-five suggested solutions put forth in Task 5 (see Appendix E). The comments were taken into account by CTPS; some of the suggested solutions which had been presented in Task 5 were revised accordingly and presented at another meeting on 21 March, 2001. After that final meeting, there were no further changes to the twenty-five suggested solutions. These were therefore adopted as the study's recommendations; they are presented below. Figures 1a (Milton and Canton) and 1b (Canton and Stoughton) show, from north to south, the identified concerns and the recommended improvements. At the end of this memorandum are four appendices containing the following:

- Appendix D-1 1999 Existing and 2020 Estimated Traffic Volumes by Intersection
- Appendix D-2 1999, 2020 No-Build, and 2020 Build Intersection Level of Service
- Appendix D-3 Traffic Signal Warrants Analyses
- Appendix D-4 Existing Public Transportation Service in the Route 138 Corridor

¹ R. Sievert, "Task 3: Data Collection," CTPS memorandum, 22 February, 2000, and R. Sievert, "Task 4: Review of Existing Traffic, Bicycle, Pedestrian, and Transit Conditions," CTPS memorandum, 1 March, 2000.

² R. Sievert, *University Avenue/I-95/I-93 Regional Traffic Study*, report to MassHighway, July 1999 (see Table 1 and Figure 2, pp. 12-13).

³ The memorandum of 20 October, 2000 will not be included in the final report for this study, since the present memorandum is substantially an updated version.

FIGURE 1a
Route 138 Corridor Concerns and Recommendations:
Northern Half
(Milton/Canton [partial])

CONCERNs

MILTON

1. Congestion, accidents at Route 138 at Milton St.
2. Congestion, accidents at Route 138 at Neponset Valley Parkway.
3. Congestion, accidents at Route 138 at Brush Hill Rd.
4. Large proportion of trucks in traffic, including Stop & Shop trucks on Route 138 south of Neponset Valley Parkway.

CANTON (partial)

5. Poor geometrics, accidents at Route 138 at Greenlodge St.
6. Section of Route 138 with poor roadway drainage.

RECOMMENDATIONS

MILTON

1. Improve signage, enforce speed limits at Route 138 at Milton St intersection.
2. Install an exclusive left turn lane or shoulder bypass lane on Route 138 NB at Neponset Valley Parkway.
3. Resurface Route 138 in this section to current standards, creating full shoulders on both sides, a sidewalk on the west side, and crosswalks at the signal. If possible, add a second driveway to the Montessori school from Brush Hill Rd.
4. There are no recommendations to restrict truck traffic from travelling on Route 138. Add crosswalks near the Trailside Museum and at the Blue Hills ski area. Enhance painted shoulders/bicycle lanes and bicycle signage. Add signage prohibiting AM and PM peak period left turns from Green St. to Route 138.

CANTON (partial)

5. Add signage prohibiting AM and PM peak period left turns from Greenlodge St. to Route 138.
6. Improve roadway drainage on and/or adjacent to Route 138.

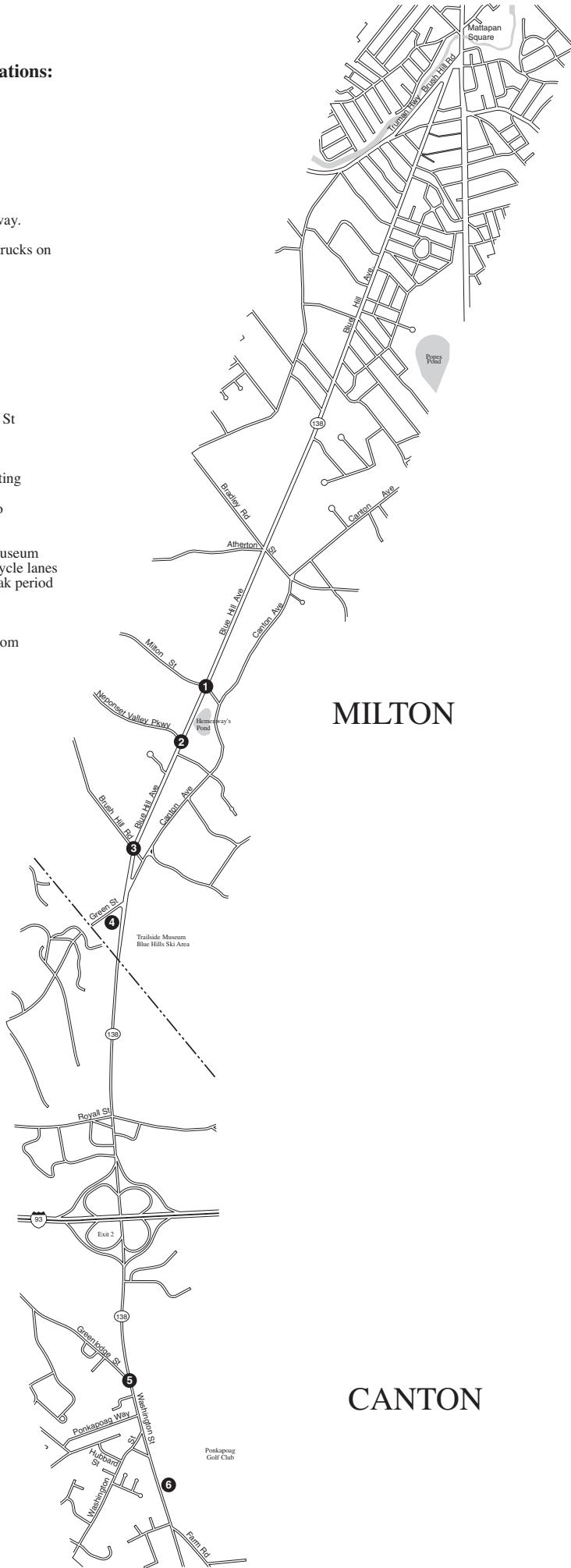


FIGURE 1b
Route 138 Corridor Concerns and Recommendations:
Southern Half
(Canton [continued]/Stoughton)

CONCERNS

CANTON (cont.)

7. Poor sight distance southbound on Route 138 just prior to Randolph St intersection.
8. Area with light industrial/commercial driveways with numerous left in/left out peak period movements, contributing to peak period congestion.
9. Congestion on Route 138 is compounded by police details which prioritize exiting driveway traffic.
10. Area with poorly defined curb cuts.
11. High congestion levels on Route 138 between the Stoughton line and I-93.
12. A traffic signal or other improvements are needed at Route 138 at Stagecoach Road.
13. Preserve Ponkapoag's residential character and historical integrity. Enforce speed limits.
14. Public transportation should be enhanced in the Route 138 corridor.
15. There needs to be better lighting on Route 138.
16. More sidewalks should be installed along Route 138.

STOUGHTON

17. Congestion, accidents at Route 138 at York St.
18. Driveway with poor sight distance to the north.
19. Congestion, accidents at Route 138 at Central St.
20. Area with poorly defined curb cuts.
21. High congestion levels on Route 138 between Lincoln St and York St.
22. Lincoln Street westbound left-turn traffic prevents right-turn traffic from proceeding.
23. Congestion, accidents at Route 138 at School St.
24. Congestion, accidents at Route 138 at Stoughton Square.
25. Congestion, accidents at Route 138 at Plain St.

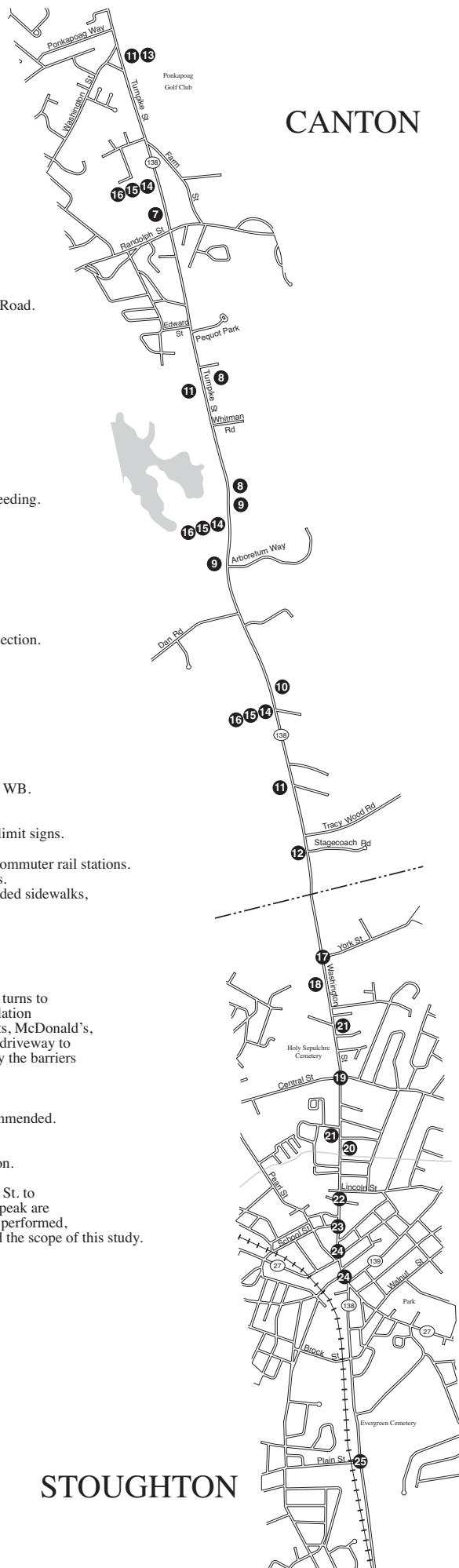
RECOMMENDATIONS

CANTON (cont.)

7. Add a "SIGNALS AHEAD" sign north of the Route 138 at Randolph St intersection.
8. Resurface Route 138 over a 3,400-foot sections to current standards, creating full shoulders and sidewalks on both sides.
9. Instruct police details at two locations in the PM peak hour to not excessively prioritize exiting driveway traffic at the expense of Route 138 through traffic.
10. Make curb cuts more defined (#872, #930, #958, #1010, others).
11. Improvement measures at numerous intersections and driveway locations are intended to reduce overall congestion between the Stoughton line and I-93 (e.g., Reebok improvements at both Route 138 at Washington Street and at Randolph Street; improvements described in nos. 5 and 8 above).
12. An exclusive left turn lane has been proposed to be added to Stagecoach Road WB. A signal is not warranted.
13. Enforce speed limits through greater police presence and/or portable roadside speed indicators reminding drivers of posted speed limits. Add missing speed limit signs.
14. Increase public awareness of existing bus and rail service in the corridor. Seek ways to increase shuttle service between employment centers and local commuter rail stations.
15. Identify and improve lighting along Route 138, particularly in residential areas.
16. Sidewalks will be added as part of the Reebok project. There could also be added sidewalks, should improvements in concern/solution 8 be implemented.

STOUGHTON

17. New traffic signal and widening of Route 138 at York St intersection.
18. Curb cut consolidation: either close northermmost of four driveways to Albert's Plaza due to poor sight distance to the north or make it right-in only.
19. Install raised medians at three Route 138/Central St approaches to prevent left turns to or from businesses close to the intersection. Additionally, encourage the installation of a service road east of Route 138, south of Central St, behind Dunkin' Donuts, McDonald's, and Bickford's Restaurant, tying in with an existing (secondary) McDonald's driveway to Central St to the north, and to Phillips Ave to the south. Driveways affected by the barriers would become right in/right out only.
20. Make curb cuts more defined (#472, #500, #590, others).
21. Install an exclusive left turn lane on Route 138 northbound at the Block Buster plaza driveway. Sidewalks on the northbound side are also recommended.
22. Create exclusive left and right turn lanes WB on Lincoln St at Route 138. Enhance crosswalks at this intersection.
23. Add a new signal at Route 138 at School St, as well as improved lane allocation. Prohibit NB left turns during AM and PM peak periods.
24. Enhance existing crosswalks. Add signage prohibiting left turns from Wyman St. to Stoughton Square in the AM peak period. Currently, left turns during the PM peak are prohibited. It is recommended that a full traffic study of Stoughton Square be performed, with analysis and development of improvement alternatives, which are beyond the scope of this study.
25. New traffic signal and widening of Route 138 at Plain St intersection.



MILTON

In Milton, Route 138 is located near the western edge of the town, stretching about 3.6 miles between Route 28 near Mattapan to the Blue Hills area at the Canton line. It is a two-lane roadway throughout this section. Most of the abutting land in the northern half of the section is single-family residential, while in the southern half it is a combination of residential and undeveloped (forested) land.

1 Concern: *"There are accidents and congestion at Route 138 at Milton Street."*

Recommendation: With two-way daily volumes on Route 138 south of the Milton Street intersection measured at about 11,500 vehicles, intersection level of service (LOS) analysis showed no failing conditions (E or F) for the base year (1999) or future year (2020).⁴ Of the 21 accidents listed for 1995–1997 in the Mass. Registry data files for Milton Street, 15 were rear-end collisions while the remaining six were angle collisions.

From field observation it was noted that this signalized intersection is located on a slight hillcrest. It is conceivable that due to limited sight distance, some left-turning vehicles from Route 138 may hesitate and delay their turning movements due to the sudden observation of an oncoming through vehicle. This may contribute to the number of collisions occurring, particularly rear end. Additionally, some through vehicles may be travelling at excessive speeds right at the intersection since the posted speed limit changes from 45 mph north and south of Milton Street to 35 mph closer to the intersection.

As a result, no geometric improvements have been recommended for the Route 138 at Milton Street intersection. However, additional signage on Route 138 stating "Reduced Speed Ahead," combined with continued enforcement of speed limits by Milton and State police near the intersection are recommended.

ROUTE 138/MILTON ST:					
•	Intersection LOS/Delay (1)	1999		2020 No-Build	
		AM:	B / 7	B / 7	2020 Build
		PM:	B / 9	B / 9	No Capacity
					Improvements Recommended
	•	Number of Collisions, 1995–1997 (Mass Registry):	21 (7.0 per year)		
	•	Jurisdiction of signs, speed enforcement:	MassHighway, State and Milton Police		

(1) = LOS is for the entire intersection. Delay is in seconds.

2 Concern: *"There are accidents and congestion at Route 138 at Neponset Valley Parkway."*

Recommendation: Neponset Valley Parkway is located about a quarter of a mile south of Milton Street. Daily two-way volumes at this intersection are about 25,000 on Route 138 south of the Parkway, 11,500 north of the Parkway, and just under 14,000 on the Parkway west of Route 138.

Just as at Milton Street, existing LOS is acceptable, B and C for the critical turning movements. Eleven of the 18 accidents reported during 1995–1997 were rear end, while six

⁴ Appendix D-1 shows 1999 and projected 2020 AM and PM peak hour turning volumes for key Route 138 intersections in Milton, Canton, and Stoughton. Appendix D-2 shows operational LOS for the same intersections for 1999, for 2020 No-Build, and for recommended 2020 Build.

were angle collisions. Figure 2 shows the intersection and the 1999 AM and PM peak hour turning volumes.

It is recommended that an exclusive left-turn storage lane be created on Route 138 in the northbound direction. The large proportion of vehicles turning left onto Neponset Valley Parkway would thereby be accommodated. The added lane, which would fall under the jurisdiction of MassHighway, would also enable through traffic to safely bypass turning vehicles, potentially reducing the incidence of rear-end collisions. It would especially provide additional storage for Stop & Shop and other trucks making left turns. Available right-of-way (ROW) is 55 ft. However, widening this location to a three-lane cross section would result in a width of 64 ft, requiring waivers. The cross section would consist of three 12-ft lanes, painted 8-ft shoulders/bicycle lanes, and 6-ft sidewalks on both sides. The new cross section would be 58 ft if sidewalks are constructed on just one side of Route 138 (see Figure 2).

Analysis showed that warrants for installing a new traffic signal at this intersection are met (see Appendix D-3). MassHighway has previously proposed a signal for this location. It is recommended in this study that, in the event that the proposed signal project goes forward, a northbound left-turn lane be included as well. LOS analysis showed that without such a left-turn lane the intersection would experience unacceptable levels of service.

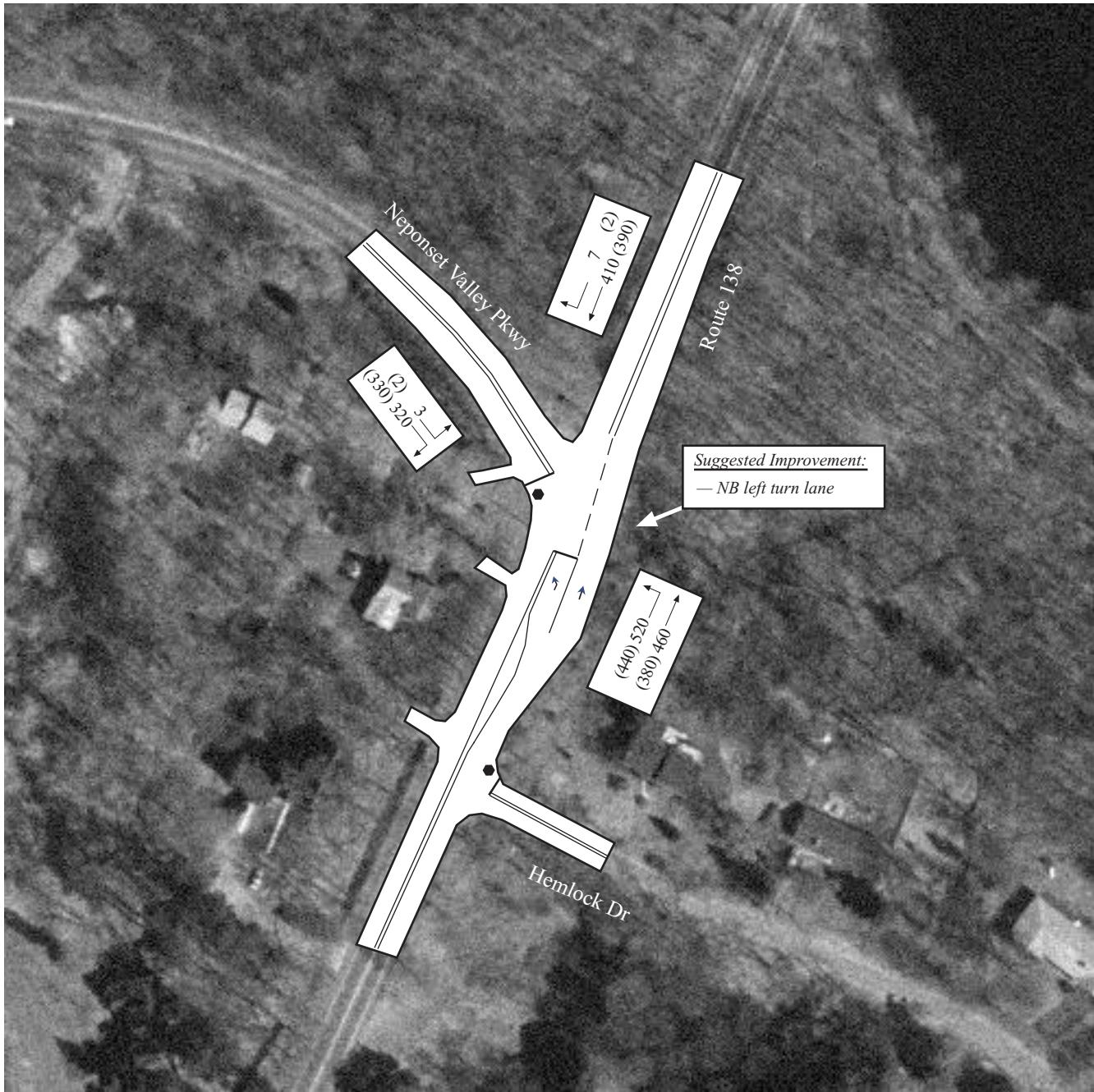
ROUTE 138/NEPONSET VALLEY PARKWAY:							
		Turns	1999	2020 No-Build	2020 Build (if left unsignalized)	2020 Build (if signalized)	
• Intersection LOS/ Delay (1)	AM:	EB L,R	C / 13	F / *	C / 14	E / 46	
		NB L	B / 8	C / 11	C / 11	(entire intersection)	
	PM:	EB L,R	B / 9	C / 12	C / 11	D / 29	
		NB L	B / 6	B / 8	B / 8	(entire intersection)	
<ul style="list-style-type: none"> Number of Collisions, 1995–1997 (Mass Registry): 18 (6.0 per year) Jurisdiction of Improvement(s): MassHighway 							
(1) = LOS is for the critical turning movements. Delay is in seconds. * = 60 or more seconds delay (for unsignalized intersections).							

3 *Concern: “There are accidents and congestion at Route 138 at Brush Hill Road.”*

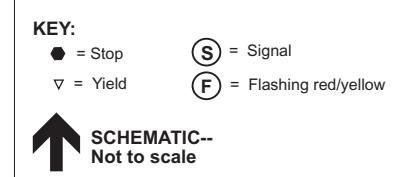
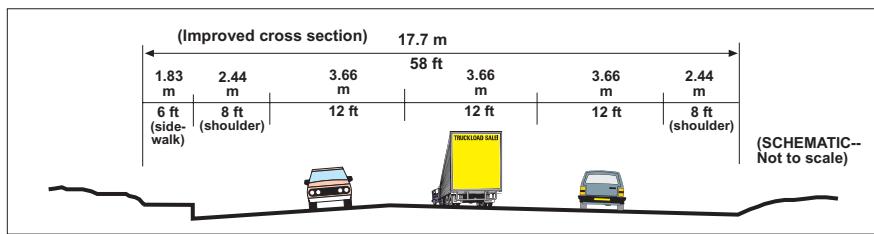
Recommendation: Daily two-way traffic south of Route 138 at Brush Hill Road/Canton Avenue is just over 31,000.⁵ The traffic signal at Brush Hill Road currently shows no failing conditions for either the AM or PM peak hours. However, projected 2020 No-Build volumes create deteriorated conditions for some turning movements. Reported collisions totalled 49 during 1995–1997, causing the intersection to be listed in MassHighway’s top 1,000 “High Accident Locations.” Of these accidents, 30 were rear-end and 13 were angle collisions.

Just south of the signal, a Montessori School driveway is located on the west side of Route 138. It was observed during field work that vehicles dropping off/picking up children during the AM and PM peak periods occasionally queued back out onto Route 138, even through the signalized intersection to the north. This created congested conditions for through traffic, as well as for left turns onto Route 138 (southbound) from Brush Hill Road and Canton Avenue.

⁵ The 31,000 daily vehicle count (VHB, Inc., 1996) was recorded just south of the Route 138/Canton Avenue intersection, which is located about 600 ft south of Route 138/Brush Hill Road.



Aerial photo source: MassGIS and MIT



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Route 138 Corridor
Planning Study

Figure 2
Route 138 at Neponset Valley Parkway (Milton)
— **Suggested Intersection Improvements**
— **1999 AM (PM) Peak Hour Turning Movements**

Recommended improvements at this location are based on improving safety. *It is recommended that Route 138 south of the signal be resurfaced and widened to current standards. This would provide wider breakdown/bicycle shoulders on both sides, sidewalks on the west (southbound) side, and crosswalks and a pedestrian phase at the signal* (see Figure 3 for an improved cross section as well as existing turning movements). These improvements would help to facilitate movements in and out of the school due to the wider shoulders, would not require waivers, and would fall under MassHighway's jurisdiction. New bicycle/breakdown shoulders on both sides (8-ft minimum), and sidewalks (6-ft minimum) on the west side of Route 138, would be constructed within the available 55 ft ROW, and would benefit local residents as well as residents at the new Fuller Senior Housing development just to the north. New sidewalks are not recommended on the east side of Route 138, because they would encourage pedestrians to try to cross the busy intersection where Route 138 and Canton Avenue diverge.

An additional recommendation is that the Town of Milton propose to the school that it alter its internal driveway circulation, by requiring parents to park their vehicles in the parking lot prior to dropping off/picking up their children. This would decrease the potential for vehicles backing out onto Route 138. It should also be investigated by Milton officials whether a second driveway from the school could be added with access to Brush Hill Road, west of the signal. A second driveway would further decrease the potential for driveway/Route 138 vehicle conflicts (see Figure 3 for 1999 turning movements and recommended improvements).

ROUTE 138/BRUSH HILL RD:		1999	2020 No-Build	2020 Build
• Intersection LOS/Delay (1)	AM: C / 16	C / 24		No Capacity Improvements Recommended
	PM: C / 18	C / 16		
• Number of Collisions, 1995–1997 (Mass Registry): 49 (16.3 per year)				
• Jurisdiction of Improvement(s): MassHighway, Town of Milton, Thacher Montessori School				

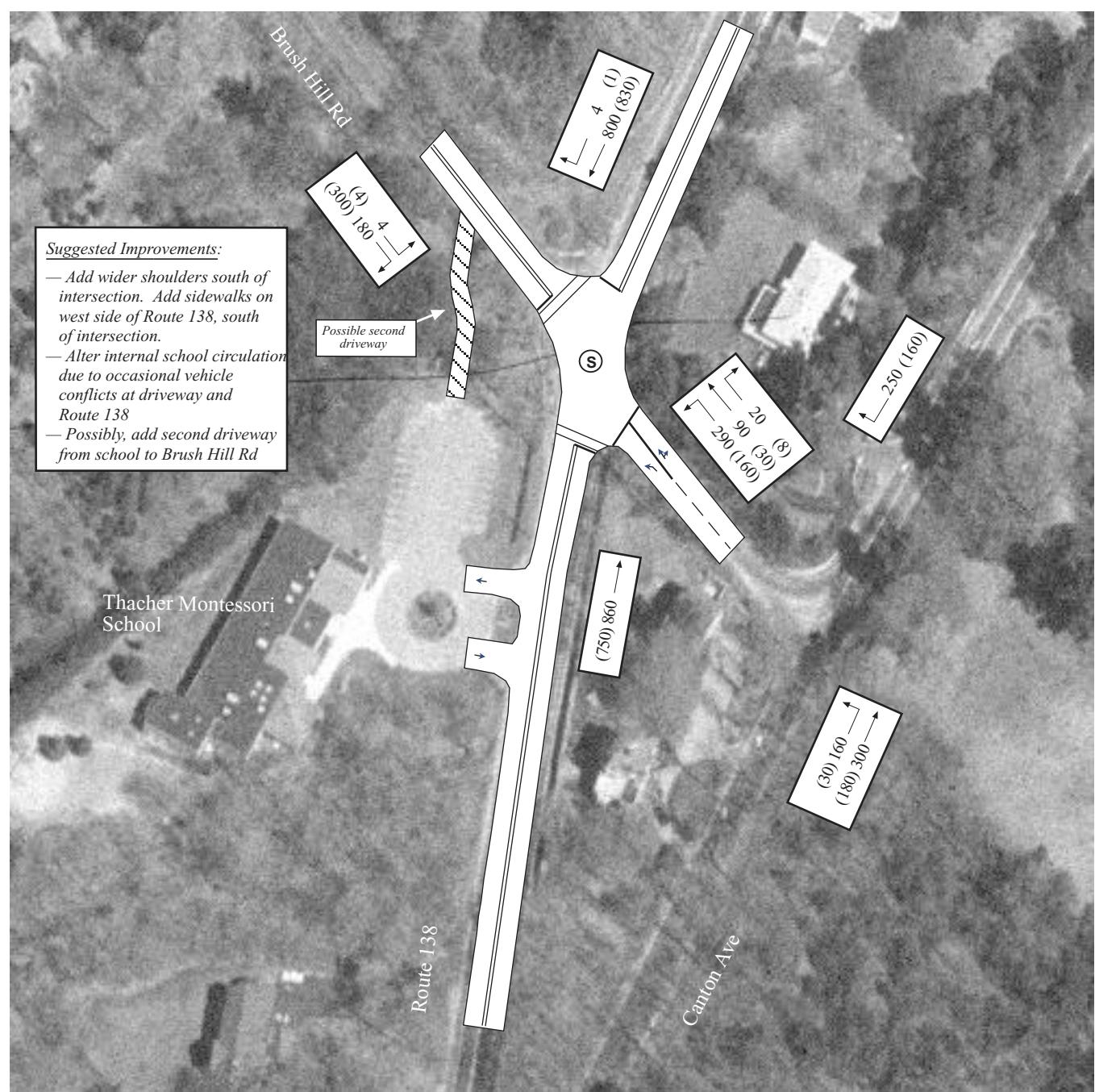
(1) = LOS is for the entire intersection. Delay is in seconds.

4 Concern: *"There is a large proportion of trucks, particularly Stop & Shop trucks, on Route 138 south of Neponset Valley Parkway."*

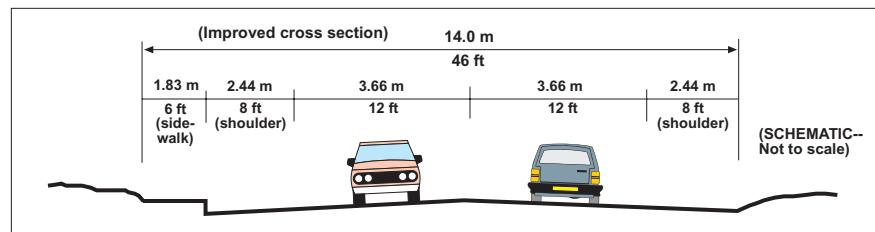
Recommendation: There is no legal way to prevent trucks from reaching their destination via a particular route without providing access on an alternative route. One other local route, East Street/Sprague Street/Hyde Park Avenue, connects I-93/I-95 (Route 128) to the Stop & Shop depot in Readville. That route, however, is more winding, is hilly, passes through residential neighborhoods, and encounters a number of narrow over- and underpasses along the way.

Additional recommendations for this section of Route 138:

- 1. Install a pedestrian signal (if warranted) near the Trailside Museum/Blue Hills ski area on Route 138, and/or clearly visible crosswalks, including appropriate recreational/pedestrian signage. Recommended crosswalk locations are the museum parking lot driveway intersecting with Route 138, just south of Green Street ("Pedestrian Crossing" signs needed), and the ski area parking lot driveway located 300 ft south of the museum area ("Pedestrian Crossing" signs already exist, but no crosswalk markings). This would improve safety for hikers using the network of Blue*



Aerial photo source: MassGIS and MIT



KEY:

- = Stop
- ▽ = Yield
- (S) = Signal
- (F) = Flashing red/yellow

SCHEMATIC-- Not to scale

CTPS
Route 138 Corridor
Planning Study

Figure 3
Route 138 at Brush Hill Rd (Milton)
— **Suggested Improvements**
— **1999 AM (PM) Peak Hour Turning Movements**

Hills trails on both sides of Route 138, as well as for skiers that park in the MassHighway park-and-ride lot on the west side of Route 138.

2. *Enhance painted shoulders/bicycle lanes; improve signage for bicycle use (the Boston-Cape Cod Bikeway runs on Route 138 between Milton Street in Milton and Randolph Street in Canton).*
3. *Add a sign prohibiting left turns from Green Street during the periods 6:30–9:30 AM and 4:00–7:00 PM. There are very few left turns from Green Street onto Route 138 northbound (10–20 vehicles turn, right or left, from Green Street in the AM or PM peak hours), and it is recommended that these vehicles instead access Route 138 at the signalized intersection at Royall Street/Blue Hill River Road.*

CANTON

Randolph Street is somewhat of a dividing line of the Route 138 corridor in Canton. North of this point, about 2.5 miles to the Milton line, land abutting Route 138 is of mixed use. It is predominantly residential in the Ponkapoag area between Randolph Street and the I-93 (Route 128) interchange. Some commercial use also exists in this section. Immediately north of the interchange, abutters are mainly gas stations, a restaurant, and a MassHighway park-and-ride lot. Northernmost Canton just south of the Milton line has a ski area on the east side and a few residences and undeveloped (forested) land on the west side.

The area of Route 138 south of Randolph Street, a 2.5-mile section to the Stoughton line, is mainly characterized by light industrial, warehouse, and small office uses, with some residential pockets scattered throughout. Route 138 has two travel lanes through Canton, except for a short four-lane section at the I-93 interchange.

The entire Route 138 corridor in Canton was analyzed for traffic concerns and potential solutions. However, three major intersections did not receive the same scrutiny, because they are either already being reconstructed or are under design for improvements as a result of the Reebok World Headquarters project: full reconstruction of Route 138 at Royall Street began in late 1999; the intersections of Route 138 at Washington Street and at Randolph Street have been redesigned and will soon undergo the public hearing process.⁶ It should be noted that mitigation measures for these three intersections, as proposed by VHB, Inc., and Reebok, appear to be sound. The conceptual plans for each intersection seem to solve congestion and safety-related concerns prevalent today. This study is therefore not recommending any improvements at these locations other than those put forth in the Reebok DEIR.

5 Concern: *“There are accidents and difficulty when making left turns from Greenlodge Street eastbound onto Route 138 northbound.”*

Recommendation: Of the 19 accidents at this intersection reported to the Canton Police in 1997–1999, 13 were angle collisions. Of these, 10 involved left-turning vehicles from Greenlodge Street to Route 138 northbound, most of them occurring during the AM or PM peak

⁶ See Draft Environmental Impact Report – EOEA #11280, “Reebok World Headquarters,” prepared by Vanesse Hangen Brustlin, Inc., January 1998.

periods (see Figure 4). The intersection geometry is such that Route 138 has a significantly steep slope, and Greenlodge Street intersects Route 138 from the west at a 45° angle. Figure 5 shows the area around the intersection as well as the 1999 AM and PM peak hour turning movements.

The traffic volumes in Appendix D-3 show that this intersection meets Warrants 10 and 11 for new traffic signals. However, due to the relatively low number of existing peak hour left turns from Greenlodge Street to Route 138 northbound (40 in the AM, 50 in the PM), a new traffic signal is not recommended. Rather, *it is recommended that a sign prohibiting left turns from Greenlodge Street during the peak periods (6:30–9:30 AM and 4:00–7:00 PM) be installed as a safety measure.* Vehicles wishing to leave the residential area west of the intersection during peak periods and go north on Route 138 could alternatively use, albeit circuitously, Ponkapoag Way, Hubbard Street, or Pecunit Street to reach Washington Street and Route 138. Vehicles could also safely exit Greenlodge Street as follows: turn right onto Route 138 southbound, go straight through the signal, turn right on Sassamon Street, turn right on Washington Street, and turn left at the signal onto Route 138 northbound.

It was suggested by a Route 138 Committee member that a second travel lane in the northbound direction, a climbing lane, be constructed on Route 138 between Washington Street and I-93, in order to accommodate slower-moving traffic and trucks. Field analysis showed that such a lane would not be necessary since traffic flowed steadily during both the AM and PM peak periods. The only northbound queues observed in this section occurred when a vehicle attempted to turn left from Greenlodge Street onto Route 138 toward I-93,⁷ slowing northbound traffic momentarily, or when a school bus stopped to pick up or drop off schoolchildren. However, *it is recommended that this section be resurfaced and restriped.* This would create standard 12-ft lanes and a designated shoulder (the shoulder width could vary, increasing further up the hill, closer to I-93, where two lanes become four lanes). This work could possibly be done in conjunction with the Route 138/Washington Street intersection improvements as an extension of the Reebok project mitigation (see Figure 5 for a cross section of the resurfaced roadway).

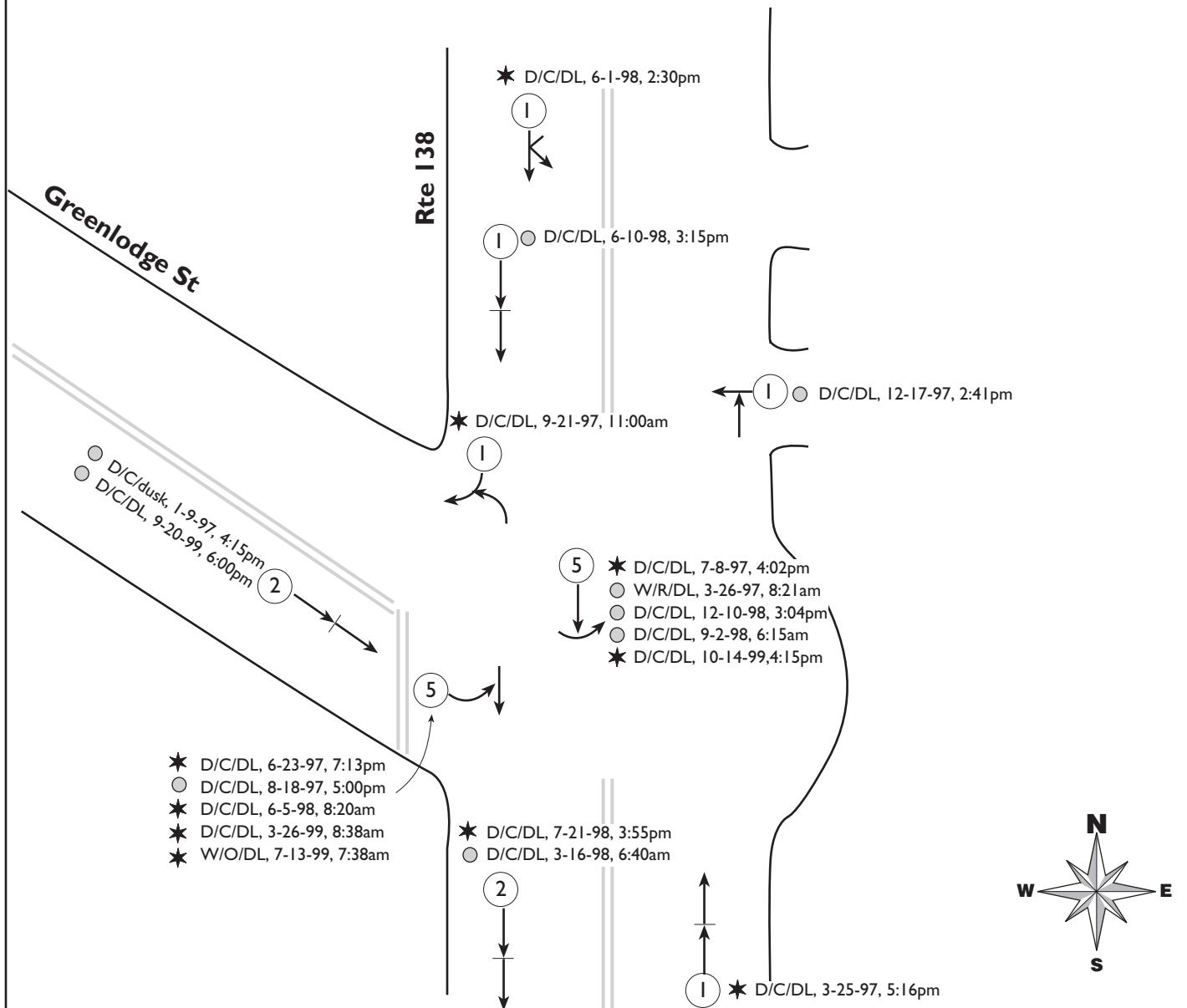
ROUTE 138/GREENLODGE						
ST:						
		Turns	1999	2020 No-Build	2020 Build	
• Intersection LOS/ Delay (1)	AM:	EB L,R	F / *	F / *	D / 25	
		NB L	C / 13	C / 20	C / 20	
	PM:	EB L,R	F / *	F / *	F / *	
		NB L	C / 14	D / 26	D / 26	
<ul style="list-style-type: none"> Number of Collisions, 1997–1999 (Canton Police): 19 (6.3 per year) Jurisdiction of Improvement(s): MassHighway 						
(1) = LOS is for the critical turning movements. Delay is in seconds. * = 60 or more seconds delay (for unsignalized intersections).						

6 Concern: “An area with poor roadway drainage exists on Route 138 (Turnpike Street) south of Washington Street, between Sassamon Street and Blue Hill Montessori School.”

Recommendation: The intersections of Route 138 at Washington Street and at Randolph Street will both undergo widening and upgrading as part of mitigation for the Reebok project,

⁷ These left turns from Greenlodge Street, and occasional queuing on Route 138 northbound, would be eliminated should the recommended signs prohibiting peak period left turns be implemented.

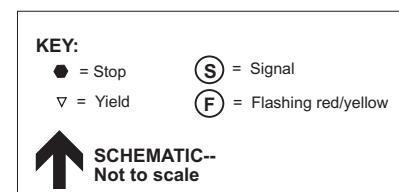
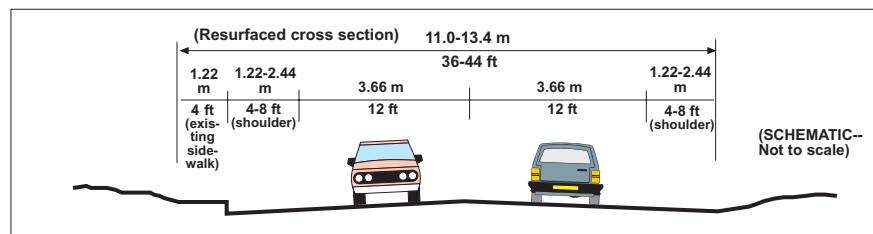
Figure 4
Collision Diagram
1/1/97 to 12/31/99
Route 138 @ Greenlodge St
Canton



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		



Aerial photo source: MassGIS and MIT



CTPS

**Route 138 Corridor
Planning Study**

Figure 5

**Route 138 at Greenlodge St (Canton)
— 1999 AM (PM) Peak Hour Turning Movements**

located further north off of Royall Street. It appears from the conceptual improvement plans for those two intersections that the area identified as having poor drainage is just outside of the intersection areas being improved.

*It is recommended that as part of regular maintenance of this section of Route 138 by the Canton DPW and/or MassHighway, possible obstructions of culverts nearby, which may contribute to the poor drainage, be cleared away. Beyond that, it is unlikely that there would be improvements or full reconstruction of the roadway apart from any other development project in this section. However, the Town of Canton can petition to MassHighway that improvements such as new sidewalks in this segment be constructed even if the roadway is not rebuilt. The town can make the case that this predominantly residential segment of Route 138 has no sidewalks on either side, and that linking the sidewalk improvements proposed at Washington Street with those proposed one half mile to the south at Randolph Street would make sense. "A Massachusetts Highway Department directive, enacted into the state's General Laws in 1996, requires all state funded road and highway projects to include pedestrian and bicycle accommodations wherever possible."*⁸

7 Concern: *"There is poor vertical sight distance when travelling southbound on Route 138, just prior to the signalized Randolph Street intersection."*

Recommendation: *It is recommended that a prominent LED warning sign be installed by MassHighway north of the hillcrest that would alert drivers of a traffic signal just over the hill. It is recommended that this improvement be linked to the forthcoming Reebok-related intersection upgrade at Route 138 at Randolph Street. This new sign would replace a previous warning sign which has been removed.*

8 Concern: *"An area exists just south of Edward Street, approximately between Pequot Park and Merkert Inc., with numerous peak period left-turn movements to/from Route 138. These contribute to high peak period congestion levels."*

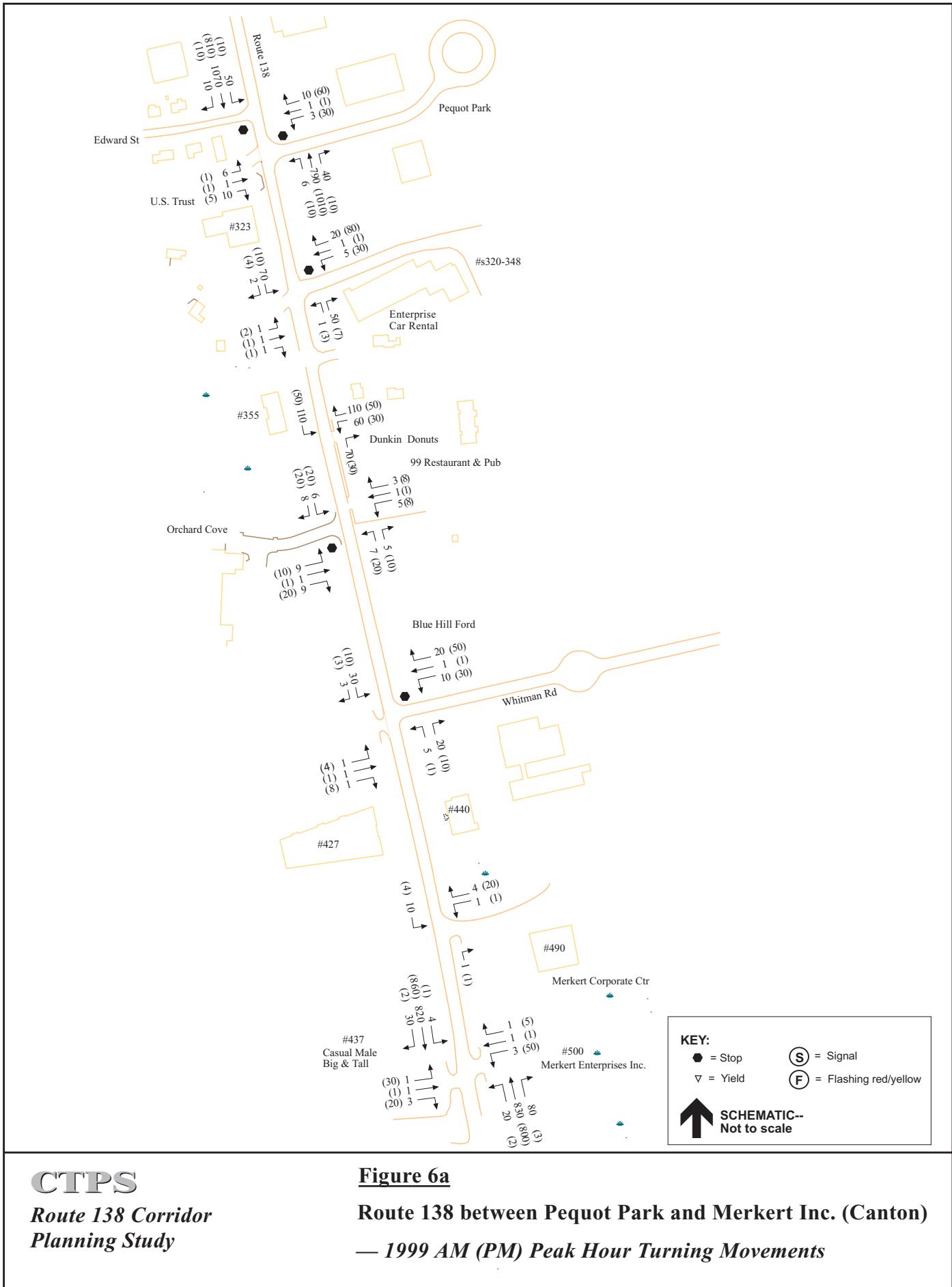
Recommendation: This segment of Route 138, approximately 3,400 ft in length, contains a number of driveways with AM or PM peak hour left-turn volumes ranging from fewer than 10 to more than 100 (see Figure 6a). As seen in Figure 6a, the vast majority of left (and right) turns are to/from properties on the east side of Route 138. Eighty-seven accidents (1995–1997, Mass. Registry) were about evenly split between rear-end and angle collisions throughout the segment. This indicates both the existence of congested, stop-and-go through traffic and an abundance of side street or driveway turning movements.

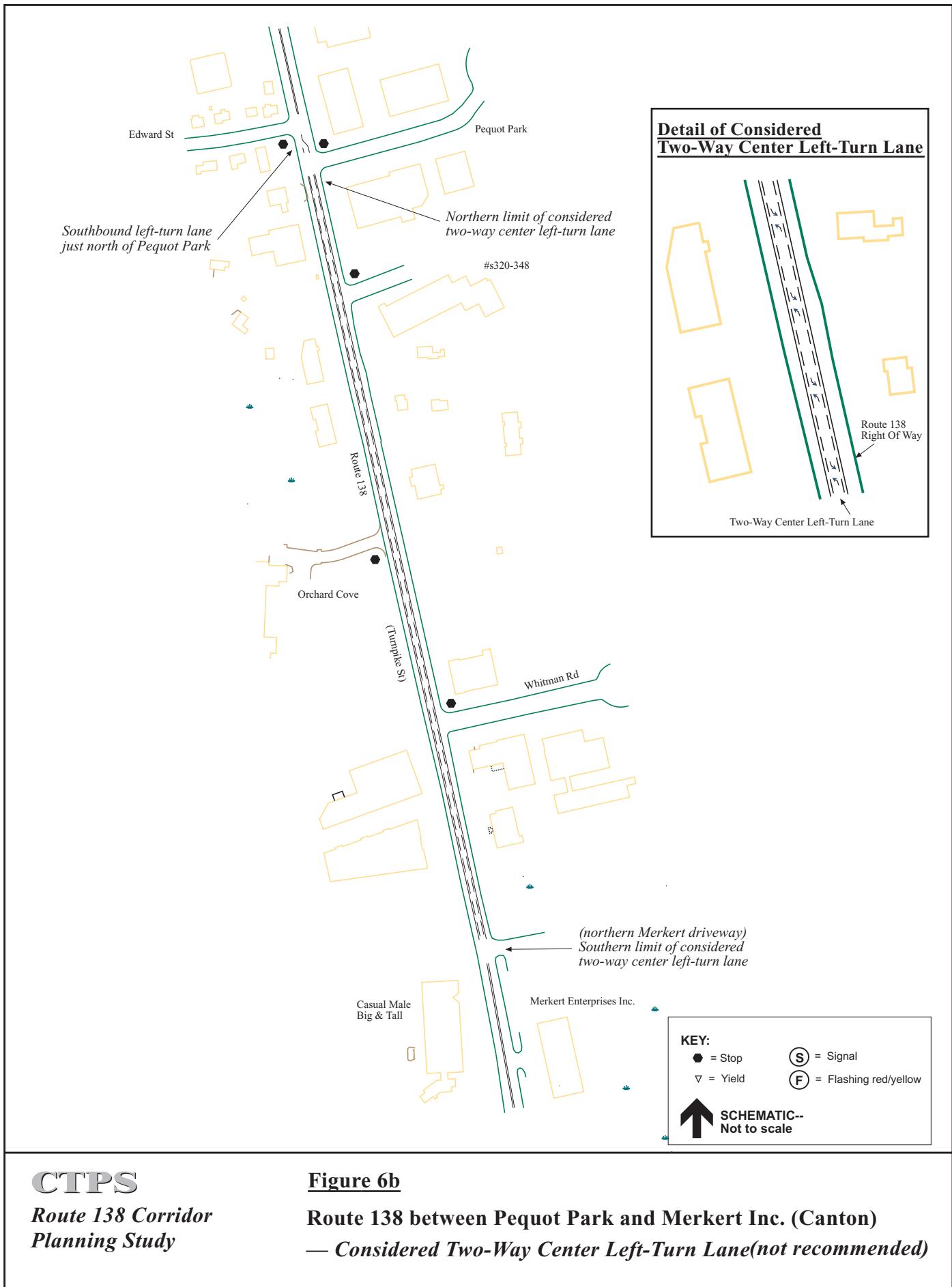
Four measures have been suggested to improve traffic conditions in this segment (the fourth is recommended):

1. Install a 3,400-ft continuous two-way center left-turn lane between Pequot Park and Merkert Inc. (see Figure 6b).

With the imbalance in the number of left turns in this segment, implementing a two-way center left-turn lane would probably create a de facto continuous southbound left-turn lane, with

⁸ *The Pedestrian, Transit and Bicycling Workbook*, prepared by the Massachusetts Chapter of the American Planning Association and the Pioneer Valley Planning Commission, September 1999, p. 10.





increased risks for head-on collisions for the relatively few northbound left-turning vehicles. Also, a two-way center left-turn lane as part of a three-lane cross section is generally designed for roadways with daily volumes below 12,000.⁹ Route 138 has daily volumes of about 25,000 in this area. Therefore, a two-way center left-turn lane would not be an appropriate solution.

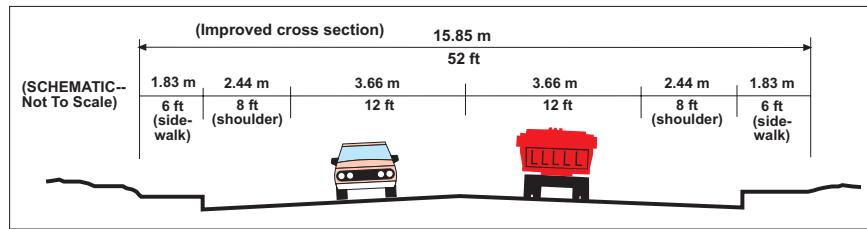
2. Install a new signal at Route 138 at the Orchard Cove/99 Restaurant & Pub driveways, and an east side service road connecting at least five existing driveways (see Figure 6c). The five (or more) driveways would become right in/right out only, with all left-turn movements taking place at the new signal.

Installing a new signal together with constructing an east side service road may be the ideal solution, but may at the same time be the least feasible. This alternative would collect the majority of Route 138 left-turn movements at one signalized, protected location. The connected, unsignalized, east side driveways would not permit left turns to or from Route 138, becoming right in/right out only. However, for the town of Canton to coordinate the various property owners and convince them to convert part of their land to become a system of connected roadways, as well as to petition MassHighway to reconstruct their Route 138 driveways to right in/right out only, could be a difficult task.

3. Install a second travel lane in the southbound direction only, from just north of Pequot Park to the northern Merkert Inc. driveway (see Figure 6d).

During data collection, manual turning movement counts were performed at six driveway locations within the segment. From these counts, it was found that more than 80 percent of all AM and PM peak hour left turns were to or from the east side streets and driveways.¹⁰ Any future development is more likely to occur on the east side due to the existence of a reservoir and wetlands on the west side. However, this improvement is not recommended since it would create an unbalanced cross section, potentially causing driver confusion and higher risks for collisions.

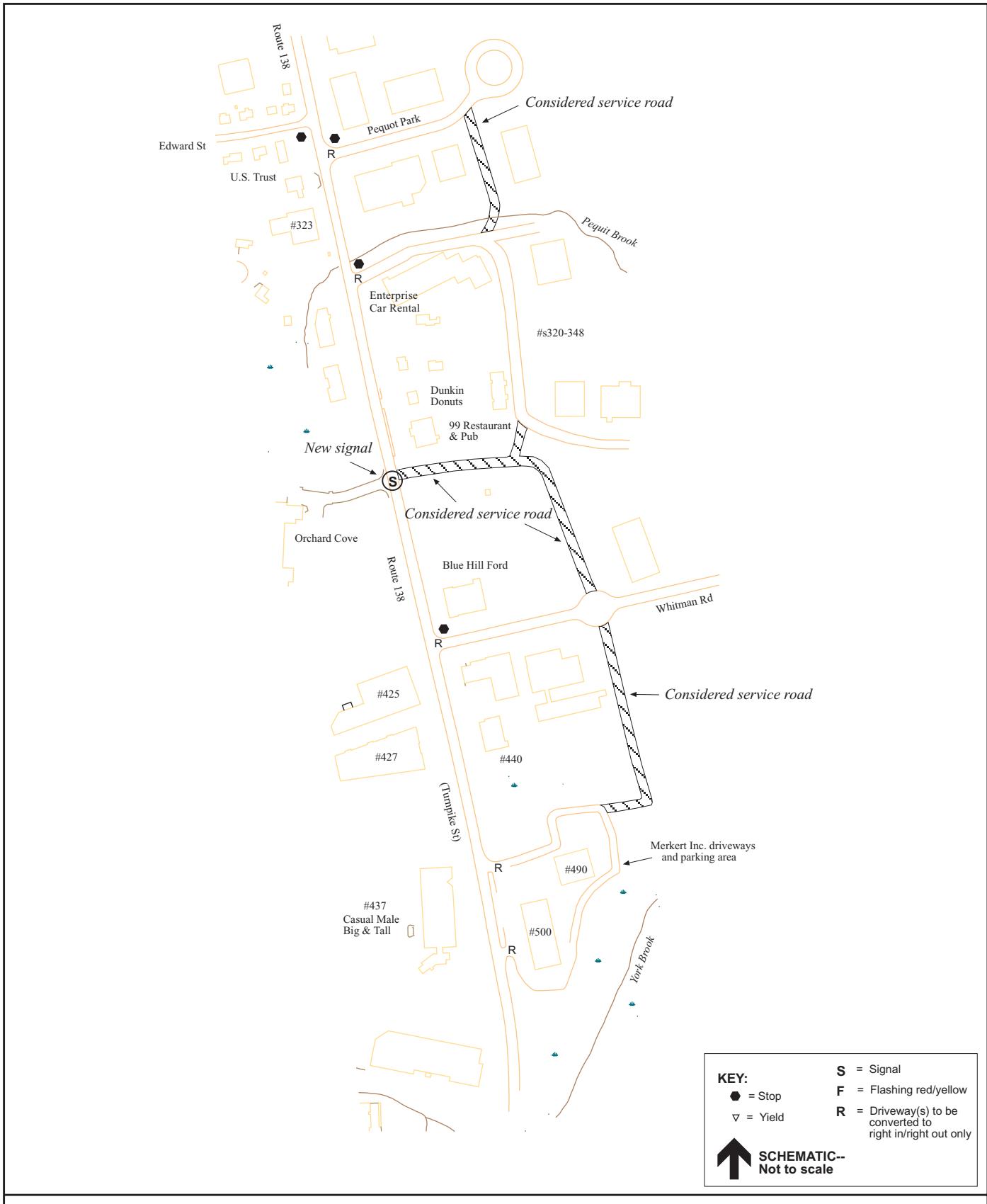
4. *It is recommended that the existing two-lane section from just north of Pequot Park to the northern Merkert Inc. driveway be resurfaced and widened. This would become an improved two-lane section, with wider shoulders and sidewalks, as well as curb cut consolidation (see diagram below).*



The rationale for this recommended improvement is the same as that for the preceding suggested improvement (#3): to accommodate the numerous left-turning vehicles in the segment.

⁹ J.E. Hummer and C.F. Lewis, "Operational Capacity of Three-Lane Cross Sections," Center for Transportation Engineering Studies, North Carolina State University, April 2000.

¹⁰ There were 645 left turns to or from the east side driveways during the AM and PM peak hours combined. During the same time, only 144 left turns were made to or from the west side driveways.

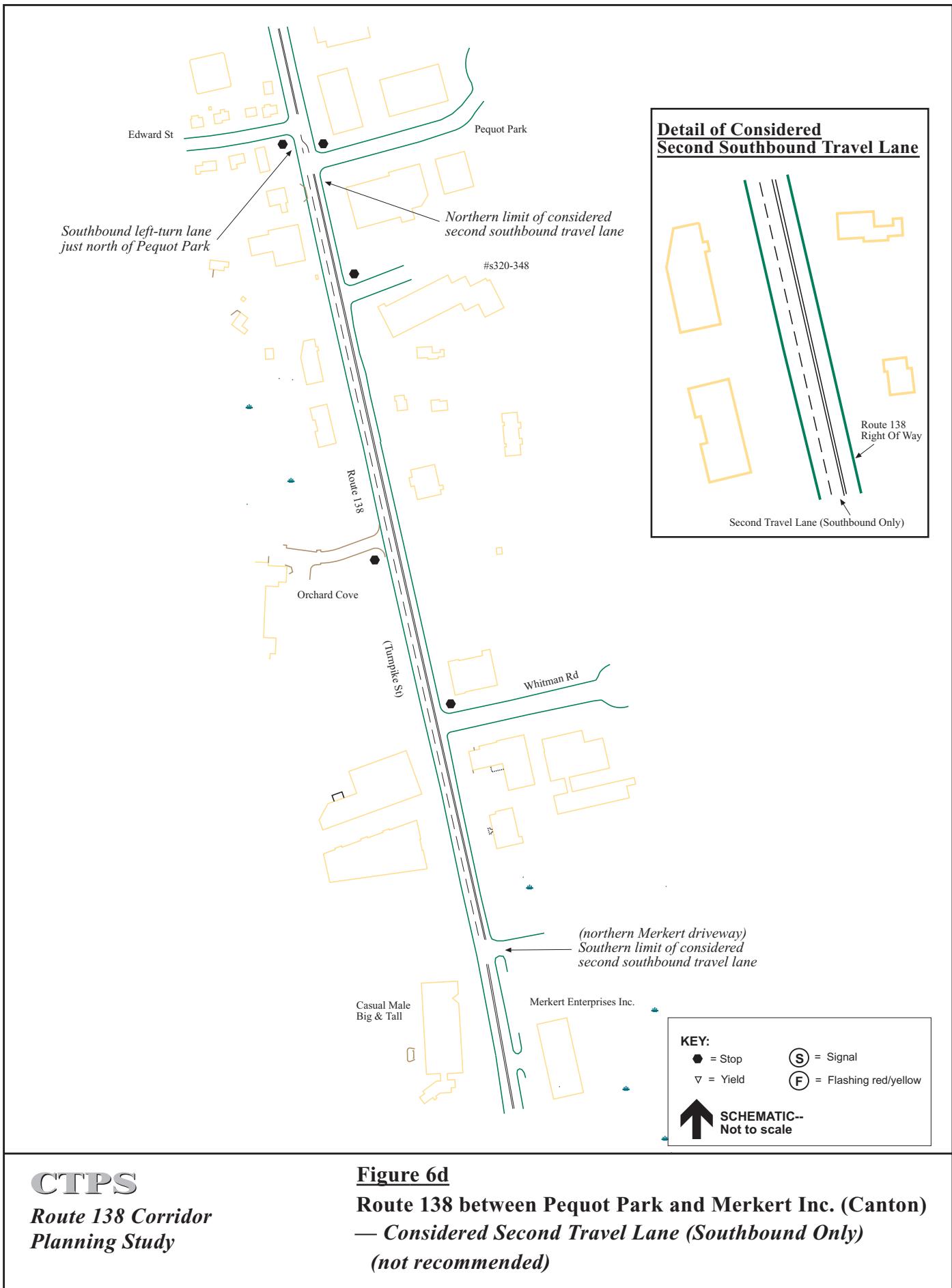


CTPS

**Route 138 Corridor
Planning Study**

Figure 6c

**Route 138 between Pequot Park and Merkert Inc. (Canton)
— Considered Service Road System(*not recommended*)**



However, it is felt that it would be sufficient, and less confusing to drivers, to widen and resurface the roadway rather than add a full travel lane in one direction only.

The additional width would be provided in the shoulders, which could then be utilized by through traffic desiring to bypass left-turning vehicles. The new sidewalks on both sides of Route 138 would be particularly beneficial to lunchtime pedestrian traffic and residents of the Orchard Cove senior housing facility. The addition of new curbing and sidewalks could result in some curb cut consolidation. MassHighway would have jurisdiction over the improvements and would work with abutters to locate/relocate their driveways. All new curb cuts would need to conform to current design standards.

9 Concern: *"PM peak period congestion on Route 138 may be compounded by police details at two adjacent locations (approximately 1,000 ft apart): at the #437 (Big & Tall/Casual Male)/#500 (Merkert Inc.) opposing driveways, and at the #530 (Arboretum Rental Community)/#555 (J. Baker Inc.) opposing driveways."*

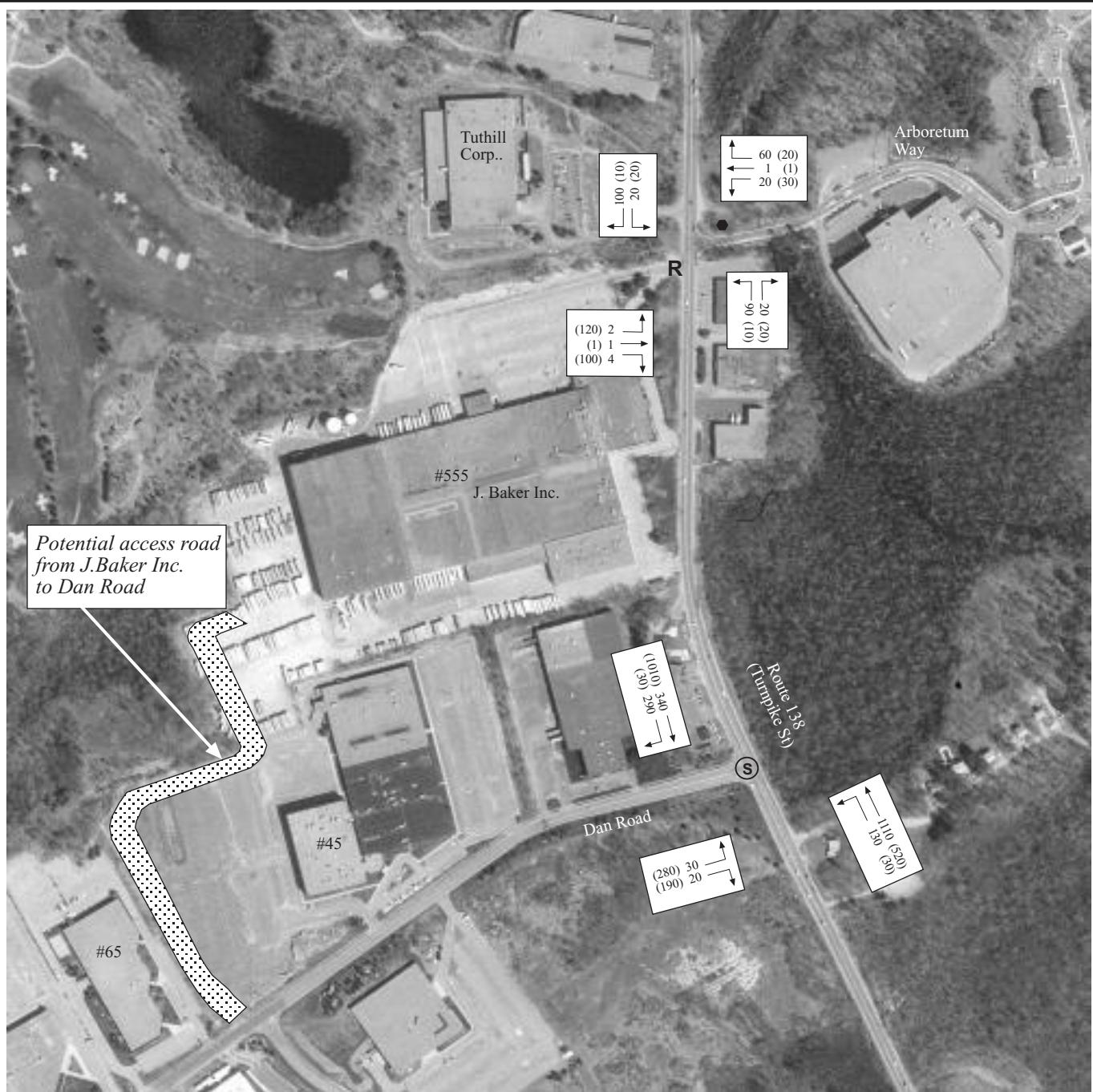
Recommendation: During a PM peak period turning movement count at Route 138 at Dan Road, it was observed that the local police officer was prioritizing exiting traffic from the J. Baker driveway, 500 ft to the north. As this was occurring, northbound Route 138 traffic repeatedly backed up to the Dan Road signalized intersection, blocking exiting left-turning vehicles during the green phase. *A short-range solution would be to not excessively prioritize exiting driveway traffic at the expense of already congested through traffic* (jurisdiction: town of Canton).

A long-range solution could include making the Merkert Inc. (#500) and J. Baker (#555) driveways right in/right out only. To accommodate existing left turns at the two driveways, two new connections would be required: for Merkert Inc., to a potential service road and signal (as described in the second suggested measure listed for Concern/Recommendation 8); and, for J. Baker, to a potential connection to Dan Road between #45 Dan Road (Home Depot, sales and administrative staff) and #65 Dan Road (Avitar) (see Figure 7 for driveway and service road improvements at J. Baker).

It is not clear, however, what arrangements would need to be made for a non-Canton Commerce Center establishment (J. Baker) to obtain access to Dan Road over the property of an existing Center company. It is recommended that the Canton Association of Industries (CAI) and town officials take the lead in coordinating the relevant members of the business community to effect improvements not directly related to Route 138. Potential service/access roads connecting private properties fall into this category of improvements.

ROUTE 138/DAN RD:		1999	2020 No-Build	2020 Recommended Build (includes J.Baker left turns, in and out)
• Intersection LOS/Delay (1)	AM: B / 9	B / 11	B / 11	
	PM: B / 11	C / 22		E / 42
• Number of Collisions, 1997–1999 (Canton Police):	17 (5.7 per year)			
• Jurisdiction of Improvement(s):	MassHighway, Town of Canton, Canton Association of Industries			

(1) = LOS is for the entire intersection. Delay is in seconds.



Aerial photo source: MassGIS and MIT

KEY:

- = Stop
- ▽ = Yield
- ↑ = Signal
- █ = Flashing red/yellow
- R = Driveway to be converted to right in/right out only

SCHEMATIC--
Not to scale

CTPS
Route 138 Corridor
Planning Study

Figure 7
Route 138 at Dan Rd Intersection Area (Canton)
— Potential Access Road and Driveway Improvements
— 1999 AM (PM) Peak Hour Turning Movements

10 Concern: “There are properties with poorly defined curb cuts abutting Route 138: for example, #872 (Brad’s Glass Service), #930 (Mass. Tire & Auto Service), #958 (Turnpike Café), and #1010 (Quail Piping Products, Inc.).”

Recommendation: There is no known data which links the poorly defined or excessively wide driveways on Route 138 with unsafe operations or high collision rates. However, to upgrade the efficiency and general aesthetics of the access points to specific properties abutting the roadway, the CAI and town planners may wish to investigate what the original curb cut permits allowed in terms of paved frontage. If blatant differences exist, suggestions to comply with the approved permits could be made to the property owners.

11 Concern: “Congestion exists on Route 138 in Canton from the Stoughton line to I-93 (Route 128).”

Recommendation: Widen Route 138 from two to four lanes from the Stoughton line to I-93. *This suggested capacity improvement does not appear to be warranted for the near future.*

Congestion in a corridor is dependent on the extent to which signalized intersections can process traffic, as well as the level of left-turn movements between the intersections. This congestion tends to be most problematic during the AM and PM peak hours, because the highest traffic levels occur at those times. Two major signalized intersections south of I-93, Route 138 at Washington Street and at Randolph Street, are scheduled to be improved as part of the Reebok project. The improvements, which include the widening of Route 138 from two to four lanes just north and south of each of the intersections, are expected to improve peak hour intersection LOS from F to D at Washington Street, and from F to B (AM) and C (PM) at Randolph Street.¹¹

The only other signalized Route 138 intersection in this segment, at Dan Road, currently operates at LOS B (AM and PM). At future year volumes (2020 No-Build), the LOS is expected to be B (AM) and C (PM). There are improvements recommended elsewhere in the segment (see Concerns/Recommendations 5 and 8 above). These recommended improvements would lessen the turbulence caused by left-turning vehicles at unsignalized streets and driveways, i.e., between the signalized intersections. They would also complement the Reebok-related improvements scheduled for two of the three signalized intersections in the segment. Consequently, there appears to be no need for a full-scale widening of Route 138 from two to four lanes.

When considering the more distant future, however, increased development seems to be occurring along the southern portion of Route 138 in Canton. South of Dan Road, for instance, there is development activity in the Canton Commerce Center, as well as across from the Foxford Business Center. Should growth continue and traffic increase measurably in this segment, it is possible that future mitigation, similar to the improvements recommended in Concern/Recommendation 8-4, could be needed at currently unidentified Route 138 locations. If such improvements are eventually pursued, it is recommended that town planning officials also look at the benefits of including service roads at the outset, if needed. Including such connector roads in the planning stages, parallel to the state highway, eliminates the more difficult challenge of trying to “retrofit” the area with a system of connected access and egress points.

¹¹ Vanesse Hangen Brustlin, Inc., op. cit., p. 5-48.

12 Concern: “A traffic signal and/or other improvements are needed at Route 138 at Stagecoach Road due to future development.”

Recommendation: Residential condominiums and an assisted living facility have been proposed to be located on an extended Stagecoach Road, currently a cul-de-sac east of Route 138. The proponent has applied for a MassHighway permit to widen Stagecoach Road where it accesses Route 138. The proposed configuration would *add an exclusive left-turn lane on Stagecoach Road*. Since projected future-year turning volumes are not of sufficient magnitude to meet any warrants for new traffic signals, *it is recommended that this intersection remain unsignalized*.

ROUTE 138/STAGECOACH						
RD:						
• Intersection LOS/Delay (1)	AM:	Turns	1999	2020 No-Build	2020 Build	
		WB L,R	F / 48	F / *	N.A.	
		WB L	N.A.	N.A.	F / *	
		WB R	N.A.	N.A.	F / *	
	PM:	SB L	C / 13	C / 18	C / 18	
		WB L,R	E / 40	F / *	N.A.	
		WB L	N.A.	N.A.	F / *	
		WB R	N.A.	N.A.	B / 6	
		SB L	A / 4	A / 4	A / 4	
<ul style="list-style-type: none"> Number of Collisions, 1995–1997 (Mass Registry): 2 (0.7 per year) Jurisdiction of Improvement(s): MassHighway, Town of Canton 						
(1) = LOS is for the critical turning movements. Delay is in seconds. * = 60 or more seconds delay (for unsignalized intersections).						

13 Concern: “The Ponkapoag area’s residential character and historical integrity must be preserved. Speed limits in this area must be enforced.”

Recommendation: This mostly residential area of Canton stretches approximately from the I-93 interchange in the north to Randolph Street in the south. It suffers somewhat from being a regional “gateway” into Canton, connecting I-93 to the neighborhoods of Canton via Washington Street and Turnpike Street (Route 138). Vehicles entering the Ponkapoag area from I-93 often travel at speeds in excess of the speed limits (45 mph SB, 40 mph NB). It must be noted that the speed limit sign in the southbound direction is placed north of the interchange. Drivers exiting I-93 and entering Route 138 southbound therefore are unaware of the posted speed limit. *It is recommended that Canton and State police continue to enforce the speed limits in this neighborhood and also that a new speed limit sign be installed south of the interchange in the southbound direction. In addition, portable electronic speed detectors could be placed along Route 138, adjacent to the shoulders, to remind drivers of the posted speed limits.* Jurisdiction for the recommended improvements would belong to MassHighway and State and Canton police.

14 Concern: “Public transportation should be enhanced throughout the Route 138 corridor.”

Recommendation: Existing public transportation service in the Route 138 corridor includes one MBTA commuter rail line and three bus routes. Stoughton Square, where state highway routes 27, 138, and 139 converge with a number of local streets, is located one block from the Stoughton commuter rail station. A Brockton Area Transit (BAT) bus route operates from Brockton, through Stoughton via routes 27, 138, and Central Street in Stoughton, to Cobb’s Corner at the Canton, Sharon, and Stoughton town lines. A second bus route in the corridor, operated by A&B Coach Lines, runs from Cobb’s Corner via Washington Street in Canton and

Blue Hill Avenue in Milton, to Mattapan and the MBTA Red Line. Finally, a third bus route exists between the Canton Commerce Center and South Station in Boston. This route (Railink #1) is operated by Interstate Coach and travels on Route 138 and on I-93, connecting with two Red Line stations in Quincy before reaching South Station (see Appendix D-4 for existing information and schedules).

Part of the Route 138 corridor is located in the Neponset Valley Transportation Management Association (TMA) district. Canton is a member of this TMA together with Norwood and Westwood. One service supported by the TMA is Railink #2. This bus shuttle connects two commuter rail stations, Route 128/University Park (also an Amtrak station) and Dedham Corporate Center, with numerous offices and enterprises located mainly in Norwood and Westwood (see Appendix D-4).

It is recommended that Milton, Canton, and Stoughton town officials, the local chambers of commerce, and business groups such as CAI work on two fronts with respect to public transportation: first, to promote increased public awareness of existing transit service on and near Route 138. This can be done, for instance, by printing the current bus schedules in the various weekly town newspapers. Second, it is recommended that an effort be made through the Neponset Valley TMA, possibly in conjunction with the MBTA and CARAVAN for Commuters, to seek ways to meet the demand for increased transit service along Route 138, and throughout Canton in general. The feasibility of connecting additional employment sites to other local commuter rail stations via a third Railink bus should be investigated.

Candidate employment sites in Canton for an additional Railink bus route could include Will Drive, the Shawmut Office Park on Dedham Street, the Washington Street downtown area, and Route 138 locations such as the Royall Street area, Pequot Park, Whitman Road, Merkert Inc., J. Baker, and the Orchard Cove, Arboretum Way, and Stagecoach Road residential/senior housing facilities. Commuter rail stations which could be linked to the employment and residential centers include Stoughton, Canton Center, and Canton Junction.

15 Concern: *“There needs to be better highway lighting to improve visibility.”*

Recommendation: There is insufficient lighting along some sections of Route 138, particularly for pedestrians walking after dark. The residential area between Washington Street and Randolph Street is particularly affected by the lack of adequate lighting. *It is recommended that the Canton DPW identify additional areas where lighting needs to be improved, and that efforts be made to upgrade conditions as soon as is reasonably possible.* Since the cost of the electricity is borne by Canton, it can work directly with the utility company to add lights where needed. MassHighway’s role would be limited to granting a permit to the utility company to perform work within the Route 138 right-of-way.

16 Concern: *“There are not enough sidewalks in the corridor, particularly in residential areas.”*

Recommendation: Generally, sidewalks are not added to a state highway facility apart from roadway widening and/or new development projects (see Concern/Recommendation 6 for a discussion of possible sidewalks on Route 138 between Washington Street and Randolph Street). A painted shoulder, approximately 4 to 8 feet wide, exists on both sides of much of Route 138 in the three study area communities, to accommodate vehicle breakdowns as well as bicyclists.

There are some sections where this shoulder narrows or disappears, particularly near the major intersections at Royall Street, Washington Street, Randolph Street, and Dan Road in Canton, and in Stoughton, between the Canton line and Stoughton Square. A one-meter bicycle shoulder will be added along both sides of Route 138 within the Reebok project limits at Royall Street.

Narrow and somewhat deteriorated sidewalks exist on the west side of Route 138 between the Trailside Museum/Blue Hills ski area and the MassHighway park-and-Ride lot, as well as in the segment south of I-93 to the Washington Street/Turnpike Street intersection. *It is recommended that these existing sidewalks be widened and repaved, in order to increase safety and encourage greater use by pedestrians.*

New sidewalks will be added along Route 138 north and south of Royall Street, as part of Reebok-related mitigation. Crosswalks and pedestrian signals and phasing will be added as well at that intersection. *It is recommended that the new sidewalks at Royall Street be extended and linked to the existing sidewalk to the north, opposite the ski area and Trailside Museum at the Milton/Canton line.* Finally, there will also be sidewalk/pedestrian signal improvements as part of the redesigned Route 138 intersection at Washington Street/Turnpike Street.

In one area which has been recommended for roadway improvements, the modifications include added sidewalks and bicycle accommodations. In Concern/Recommendation 8-4, it was recommended that the roadway be resurfaced and widened between Pequot Park and Merkert Inc. If this measure is approved and implemented, it would add bicycle shoulders, as well as sidewalks on both sides of Route 138. A sidewalk would especially benefit the senior housing development at Orchard Cove, as well as the lunchtime activities of employees along this Route 138 segment. MassHighway would have jurisdiction in any effort to widen the roadway.

STOUGHTON

The Stoughton segment of the study area stretches from the Canton town line to Plain Street, a distance of 2.3 miles. Here, the abutters to Route 138 are predominantly commercial establishments: supermarkets, drug stores, gas stations, restaurants, cleaners, banks, photo shops, and small offices. Some residences exist throughout this segment, particularly south of Stoughton Square. Route 138 has mainly two travel lanes throughout Stoughton, but five-lane sections exist north and south of Central Street, a four-lane section in Stoughton Square, and a three-lane section (two-way center left-turn lane) between School Street and Lincoln Street.

17 Concern: *"There are accidents, congestion, and difficult peak hour turning movements at Route 138 at York Street."*

Recommendation: This is a three-way intersection, with Route 138 on a steep incline. Two-way daily traffic volumes on Route 138 are about 24,000 at the Canton-Stoughton line, located 1,500 ft to the north of York Street. Figure 8 shows the 1999 AM and PM peak hour turning movements. Accident data from the Mass. Registry's 1995-1997 files listed 18 collisions, an average of 6.0 per year.

Since only four-hour traffic volumes were available on York Street, it could not be determined conclusively whether the intersection meets Signal Warrants 1 and 2. These require