

MASSDOT DESIGN PUBLIC HEARING WESTBOROUGH – ROUTE 9 AT LYMAN STREET



February 5, 2015

GPI

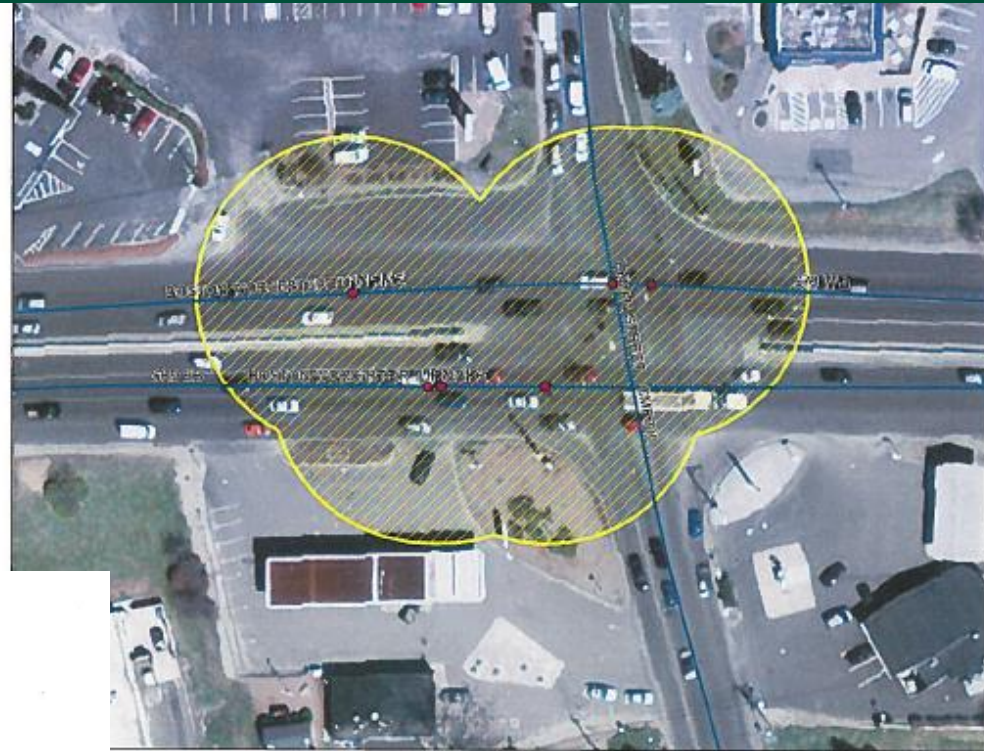
MassDOT Project Purpose

1. Reduce Congestion
2. Improve Safety
3. Improve Ped/Bike Accommodations
4. Roadway Rehabilitation



Road Safety Audit

- Ranked 185 in the Region



BOSTON WORCESTER TURNPIKE ROUTE 9
LYMAN STREET

MassDOT District 3
RPA CMRPC
EPDO 104

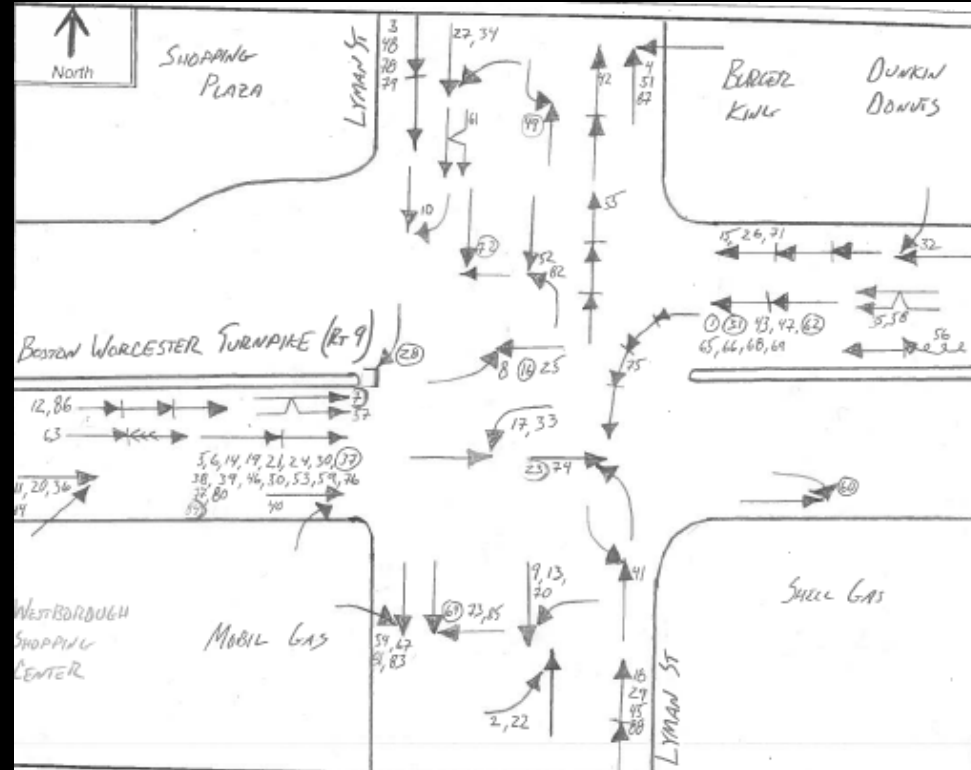
Number of Fatal Crashes 0
Number of Injury Crashes 10
Number of Non-Injury Crashes 54
Total Crashes 64

Legend

- Crash Locations 2007-2009
- Local Roads
- All Functional Classification Except Local Roads
- Top Crash Intersections

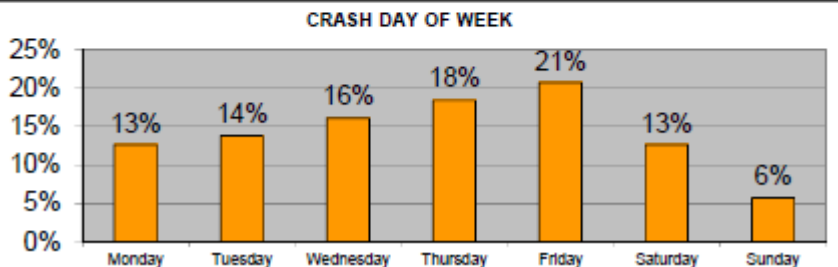
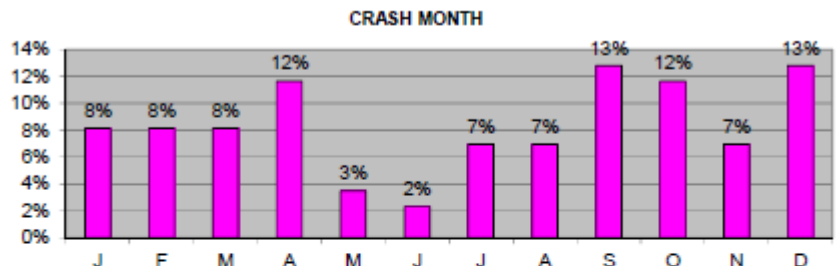
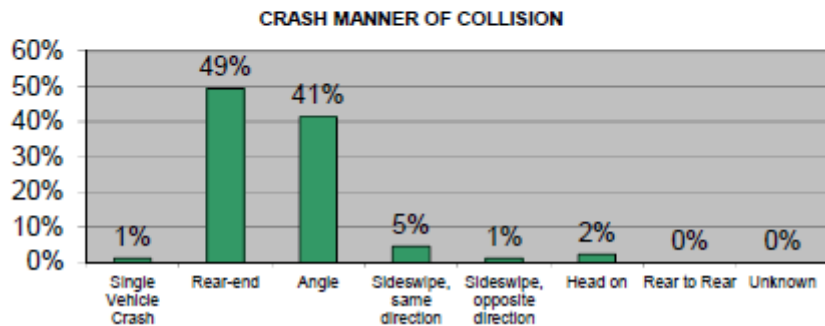
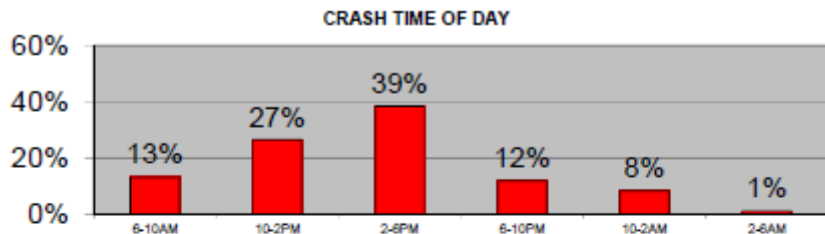
Road Safety Audit

- **Ranked 185 in the Region**
- **Significant Crossing Movement Collisions and Rearend Collisions**

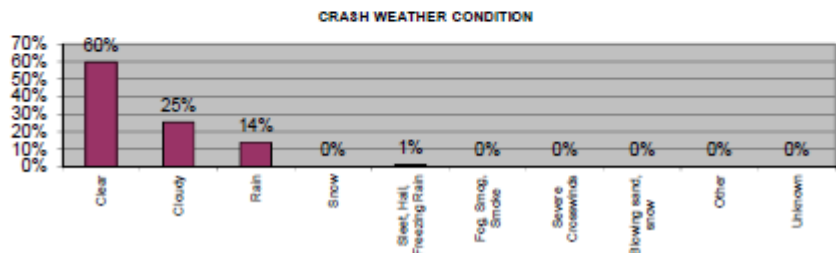
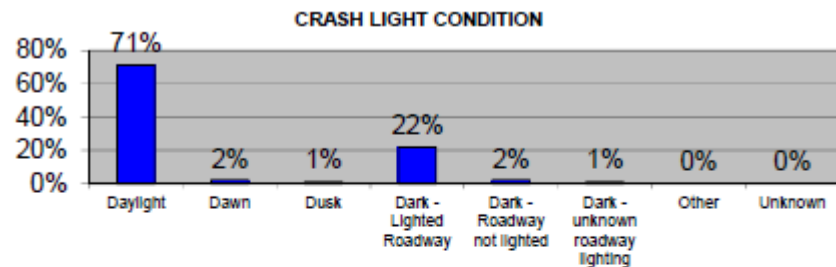
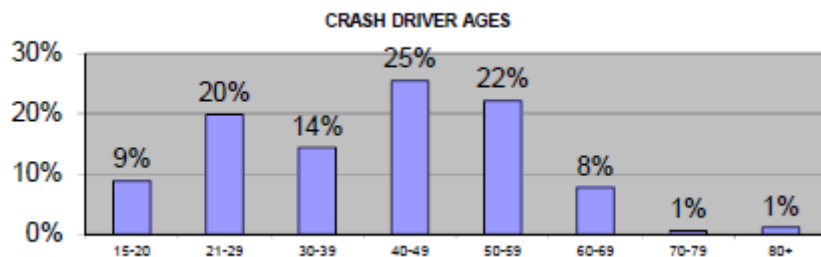
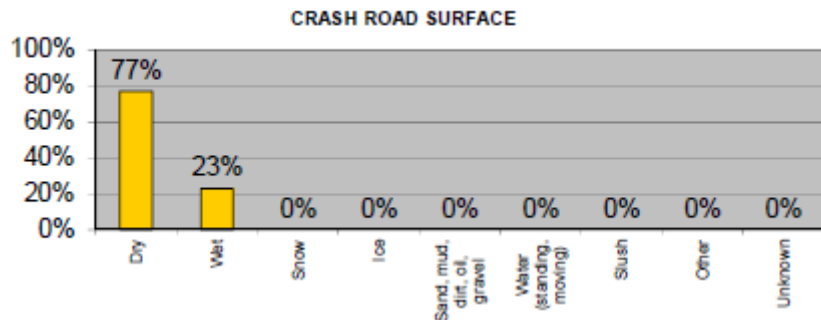


Road Safety Audit

Crash Data Summary Tables and Charts



Road Safety Audit



Road Safety Audit

Table 3. Potential Safety Enhancement Summary

Safety Issue	Safety Enhancement	Responsibility	Safety Payoff	Time Frame	Cost
Traffic Congestion & Signal Operation, Lane Designation	Reconstruct the intersection to add capacity. The designer should continue discussions with MassDOT and the Town to determine the feasibility and appropriateness of dedicated right turn lanes. (In the short-term, MassDOT will utilize methods outlined in the Highway Safety Manual to determine if dedicated right turn lanes can be expected to reduce crashes on the Route 9 approaches.)	Project	High	Mid-term	*
Traffic Congestion & Signal Operation	Provide protected-only operation for left turns from Lyman Street. This will be accomplished via split phasing.	Project	High	Mid-term	*
Access to Abutting Properties	Restrict exits from the Mobil driveway on Lyman Street to right turns only. This can be done with pavement markings and signage.	Town	Medium	Short-term	\$5,000
Pavement Markings	Reapply pavement markings.	Project	Medium	Mid-term	*
Bicycle Accommodation	Provide bicycle accommodation. The proposed project includes 4' minimum shoulders, and will include bicycle detection as part of the upgraded traffic signal.	Project	Medium	Mid-term	*
Pedestrian Accommodation	Consider pedestrian accommodation. There was debate amongst audit participants as to whether crosswalks and a pedestrian phase should be provided. This potential improvement should be further studied and discussed with MassDOT and the Town of Westborough.	MassDOT/ Town	TBD	Mid-term	*
Pavement Condition	Rehabilitate pavement at the intersection.	Project	Medium	Mid-term	*
Turning Radii	Improve the turning radius exiting the Burger King driveway onto Lyman Street.	Town	Low	Short-term	\$7,500
U-Turn Area	Increase the U-turn area adjacent to the eastbound departure lanes for westbound to eastbound U-turn	Project	Medium	Mid-term	*
Cobblestone Area	Repair the cobblestone area at the nose of the Route 9 medians.	MassDOT	Medium	Short-term	\$5,000
Lane Control Signs	Install R3-8 series graphical lane control signs on all approaches.	MassDOT (Short-term) Project (Long-term)	Medium	Short-term	\$1,500

* Improvements to be incorporated into the proposed project are assumed to be included as part of the overall project cost.

Project History – To Date

1. **2008 – GPI Retained by MassDOT to develop conceptual improvements**
2. **July 2009 – Alternatives Analysis Report**
3. **October 2009 – Analysis of Additional Background Traffic and Area Developments**
4. **May 2011 – 25% Design Submission**
5. **August 2011 – Lane Use Analysis Memo**
6. **July 2012-MassDOT RSA**
7. **October 2012 – New Traffic Counts**
8. **May 2013 – Analysis of Additional Lane Use**
9. **August 2013 – Final Lane Analysis and Recommendation**
10. **Plan Modifications Based on MassDOT Requirements**
11. **April 2014 – Revised 25% Design Submission**
12. **November 2014 DUCE Meeting**
13. **Plan Revisions based on Land Use Changes**
14. **February 5, 2015 – Design Public Hearing**

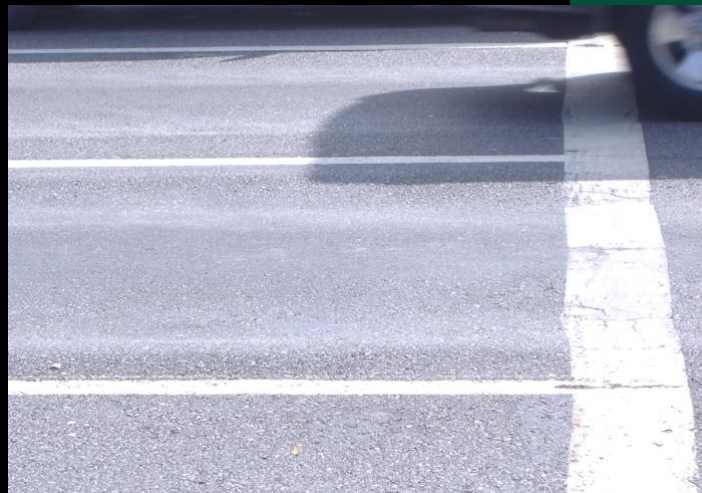
Project Milestones - Going Forward

- 1. 2016 TIP**
- 2. 75% Design Submittal – Anticipated March 2015**
- 3. 100% Submittal – June 2015**
- 4. P, S&E Submittal – August 2015**
- 5. Advertise early TIP 2016**

Proposed Improvements - General

- 1. Upgrade Signal Equipment**
- 2. Refine Operations - Protected Left-Turns**
- 3. Improve Ped./Bike Accommodations**
- 4. Enhance Turn Lanes**
- 5. ADA Compliance**
- 6. Emergency Pre-emption**
- 7. Address Drainage**

Existing Conditions



Existing Conditions



February 5, 2015

GPI

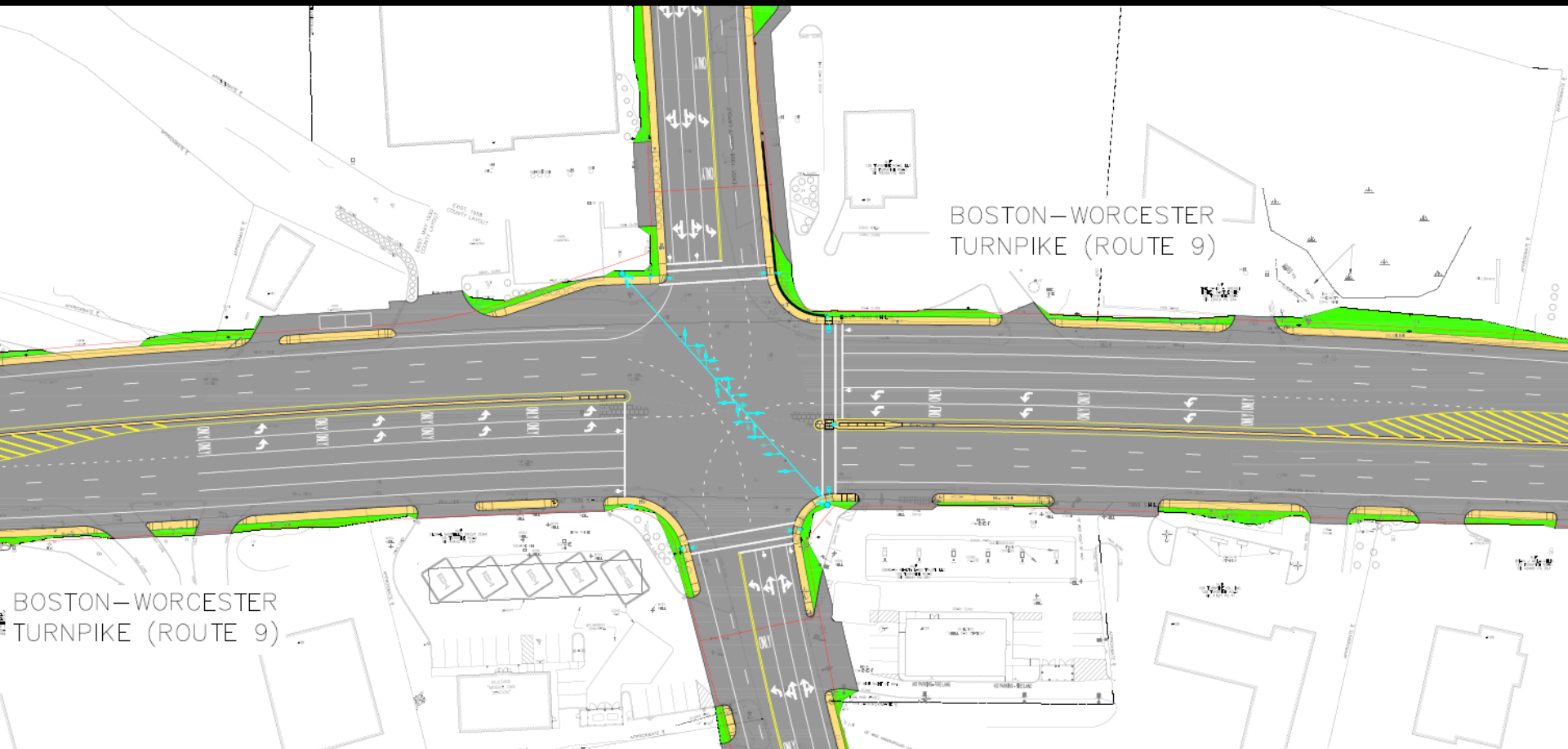
Moving Massachusetts Forward
massDOT
Highway

Main Street at Route 6A



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GPI



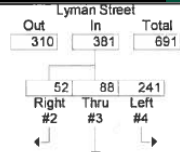
February 5, 2015

GPI

Discussion

February 5, 2015

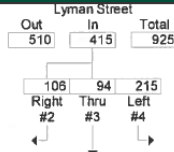
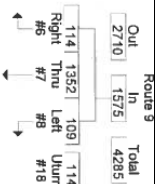
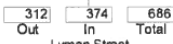
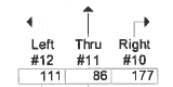
GPI



Peak Hour Data

North

Peak Hour Begins at 07:45 AM
Cars
Trucks & Buses



Peak Hour Data

North

Peak Hour Begins at 04:30 PM
Cars
Trucks & Buses

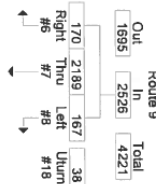
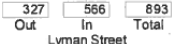
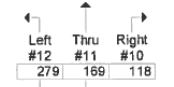


Table 2
COLLISION HISTORY

Location (crash rate)	Number of Accidents		Severity ^a			Accident Type ^b						Percent During	
	Total	Average per Year	PD	PI	F	CM	RE	HO	FO	SS	NR	Peak Hours	Wet/Icy Conditions
Main St at Route 28 (0.37 c/mev*)	5	1.67	3	2	0	3	1	0	1	0	0	80%	40%
Main St at Route 6A (0.34 c/mev*)	6	2.00	5	1	0	4	1	0	1	0	0	17%	17%

Source: Orleans Police Department.

* c/mev = crashes per million entering vehicles

^aPD = property damage only; PI = personal injury; F = fatality;

^bCM = cross movement/angle; RE = rear end; HO = head on;

FO = fixed object; SS = sideswipe; NR=not reported

EXISTING AVERAGE MONTH TRAFFIC VOLUME SUMMARY

Location/Time Period	Daily Volume ^a (vpd) ^b	Peak Hour Volume (vph) ^c	K Factor (%) ^d	Directional Distribution ^e
Boston Worcester Turnpike (Route 9):				
<i>Weekday</i>	52,800			
AM Peak Hour		3,840	7.3	65% EB
PM Peak Hour		3,650	6.9	56% WB
<i>Weekend</i>	42,100			
Midday Peak Hour		3,180	7.6	55% EB
Lyman Street:				
<i>Weekday</i>	11,600			
AM Peak Hour		777	6.7	64% NB
PM Peak Hour		952	8.2	62% NB
<i>Weekend</i>	9,351			
Midday Peak Hour		854	9.1	63% NB

^aNovember 2009 traffic volumes. (Assumed to be representative of 2011 conditions based on historical growth in the area.)

^bIn vehicles per day.

^cIn vehicles per hour.

^dPercentage of daily traffic occurring during the peak hour.

^eNB = northbound; EB = eastbound, WB = westbound

2022 Intersection/Peak Hour/Movement	Option 1 (Original) All RTL				Option 3 (Current) No RTL			
	V/C ^a	Del. ^b	LOS ^c	Queue ^d	V/C	Del.	LOS	Queue
Route 9 at Lyman Street								
<i>Weekday AM:</i>								
Route 9 EB Left/U Turn	0.30	54.5	D	65/108	0.35	54.5	D	62/103
Route 9 EB Thru/(Right)	1.04	63.7	E	921/1006	1.06	68.3	E	914/1002
Route 9 EB Right	0.15	2.7	A	0/28	-	-	-	--
Route 9 WB Left/U Turn	1.11	148.6	F	137/229	1.28	207.8	F	141/230
Route 9 WB Thru/(Right)	0.85	42.3	D	488/503	0.86	37.5	D	477/500
Route 9 WB Right	0.21	3.9	A	0/34	-	-	-	--
Lyman St NB Left	0.17	51.3	D	34/50	0.35	54.9	D	61/93
Lyman St NB Left/Thru	0.44	58.1	E	104/140	0.56	61.3	E	111/151
Lyman St NB Right*	1.07	132.3	F	260/328	1.21	176.6	F	266/336
Lyman St SB Left	1.04	124.0	F	153/238	1.21	195.0	F	184/329
Lyman St SB Left/Thru/(Right)	0.74	89.7	F	100/184	1.25	186.1	F	186/276
Lyman St SB Right	0.66	89.2	F	66/134	-	-	-	--
Overall Intersection	--	65.2	E	--	--	79.3	E	--
Route 9 at Lyman Street								
<i>Weekday PM:</i>								
Route 9 EB Left/U Turn	0.98	101.7	F	97/181	1.00	123.8	F	135/234
Route 9 EB Thru/Right	0.70	25.6	C	332/390	0.66	28.3	C	445/501
Route 9 EB Right	0.09	0.2	A	0/0	-	-	-	--
Route 9 WB Left/U Turn	0.64	55.2	E	80/122	0.71	77.8	E	113/160
Route 9 WB Thru/Right	1.02	50.7	D	667/789	1.02	57.7	E	1034/1114
Route 9 WB Right	0.25	3.8	A	5/43	-	-	-	--
Lyman St NB Left	0.49	51.1	D	61/98	0.90	110.0	F	172/327
Lyman St NB Left/Thru/(Right)	1.01	116.3	F	145/296	1.02	117.9	F	203/315
Lyman St NB Right	0.92	105.0	F	99/220	-	-	-	--
Lyman St SB Left	0.79	66.3	E	91/153	0.99	132.2	F	185/361
Lyman St SB Left/Thru/(Right)	0.61	62.8	E	76/145	0.97	107.8	F	180/289
Lyman St SB Right	1.01	130.1	F	99/227	-	-	-	--
Overall Intersection	--	50.3	D	--	--	62.9	E	--
Route 9 at Lyman Street								
<i>Saturday Midday:</i>								
Route 9 EB Left/U Turn	0.49	42.3	D	45/87	0.50	44.8	D	46/87
Route 9 EB Thru/Right	0.90	34.0	C	310/174	0.92	35.2	D	335/409
Route 9 EB Right	0.17	0.5	A	0/0	-	-	-	--
Route 9 WB Left/U Turn	0.88	67.0	E	89/165	0.89	69.7	E	89/165
Route 9 WB Thru/Right	0.83	30.5	C	279/313	0.87	30.7	C	304/353
Route 9 WB Right	0.26	2.2	A	0/21	-	-	-	--
Lyman St NB Left	0.29	36.7	D	35/62	0.62	52.3	D	72/150
Lyman St NB Left/Thru/(Right)	0.69	53.1	D	93/184	0.94	73.8	E	110/201
Lyman St NB Right	0.89	82.2	F	97/217	-	-	-	--
Lyman St SB Left	0.46	40.2	D	52/79	0.86	76.4	E	104/206
Lyman St SB Left/Thru/(Right)	0.75	60.4	E	91/169	0.88	64.6	E	102/163
Lyman St SB Right	0.85	80.3	F	81/167	-	-	-	--
Overall Intersection	--	38.2	D	--	--	42.7	D	--