COUNCIL OF GOVERNMENTS **CENTRAL NAUGATUCK VALLEY**
49 Leavenworth Street • Suite 303 • WATERBURY, CT 06702-1403
(203)757-0535 • *Web Site: www.cogcnv.org* • *E-Mail: cogcnv@cogcnv.org*

March 1, 2013

MEMORANDUM 030113

To: Barbara Ricozzi, CT DOT
Ed St. John, First Selectman, Town of Middlebury
Edgar Wynkoop, CT DOT
From: Pat Gallagher, Regional Planner
Subject: Route 63 and Route 64 Intersection Operation Study, Town of Middlebury

Introduction

COGCNV staff conducted turning movement counts at the intersection of Route 63 and Route 64 in September 2011 and February 2012. A split I-84 interchange at exit 17 forces vehicles to go through the intersection as they make their way on and off the highway. The intersection was last analyzed in the *I-84 West of Waterbury (WoW) Needs and Deficiencies Study,* which recommends a new connector road that would allow vehicles entering and exiting I-84 to bypass the intersection (Project 174-309). CT DOT has put the project on hold indefinitely due to lack of funding. Staff collected data on traffic volumes and accident records to study the existing conditions and the effects of a connector road and other short-term improvements on traffic operations at the intersection.

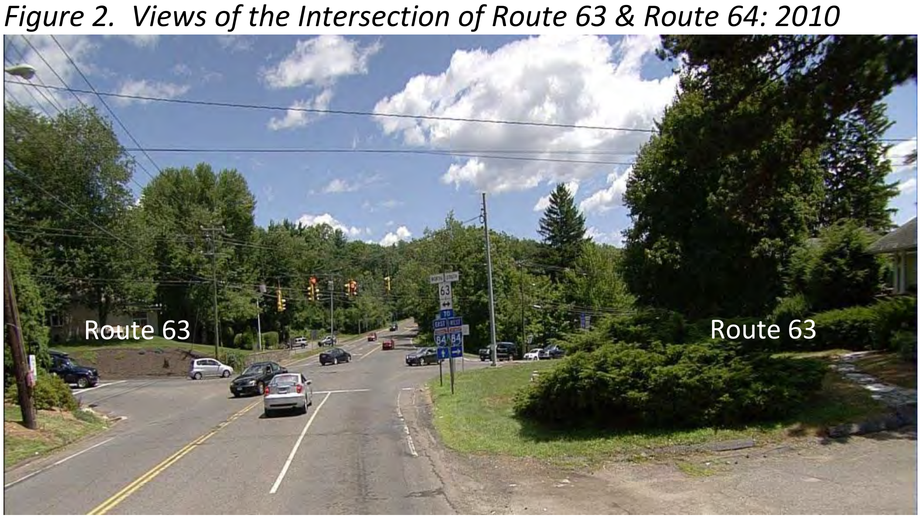
Study Area

Route 63 and Route 64 are functionally-classified as urban principal arterials. Route 64 connects to Chase Parkway and I-84 to the east and to Middlebury to the west. Route 63 connects to I-84 and Naugatuck to the south and to Watertown in the north. Complicating matters, two local roads intersect with Route 63 just north (Richardson Dr.) and just south (Old Waterbury Rd.) of the intersection with Route 64. A map of the intersection is presented in Figure 1. Views from each approach are shown in Figure 2.

Land uses in the adjacent area are primarily medium-density residential. The entrance to Memorial Middle School is located approximately one-quarter mile west of the intersection, which may generate school bus and passenger vehicle traffic during school pick-up and drop-off hours. The Middlebury public works garage and transfer station are located nearby off of Route 63 between Route 64 and I-84.

Figure 1. Route 63 and Route 64 Intersection in Middlebury

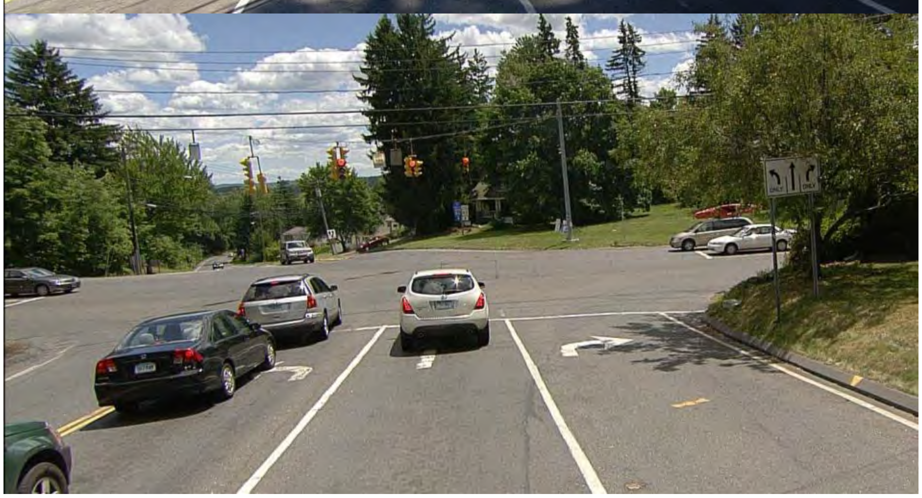
Figure 2. Views of the Intersection of Route 63 & Route 64: 2010



Route 64 looking east towards I-84 EB ramp

Route 64 looking west towards Middlebury

Route 63 looking north towards Watertown



Route 63 looking south towards I-84 WB ramp

Source: 2010 Photolog, CT DOT

Traffic Volumes

Manual turning movement counts were conducted during the weekday morning (7:00 a.m. - 9:00 a.m.) peak periods in February 2012 and evening (4:00 p.m. - 6:00 p.m.) peak periods in

September 2011. The peak hours are 7:45 a.m. to 8:45 a.m and 4:30 p.m. to 5:30 p.m. The morning and evening peak hour traffic volumes are presented in Appendix A. In addition to turning movement counts, average daily traffic counts (ADT) were obtained from CT DOT. In 2011, the ADTs on Route 64 were 20,500 vehicles per day (vpd) to the east of the intersection and 13,700 vpd to the west. ADTs on Route 63 were 13,800 vpd to the south of the intersection and 13,900 vpd to the north.

Accident/Safety Analysis

The Route 63 portion of the intersection is listed on CT DOT's Suggested List of Surveillance Study Sites (SLOSSS), which covers a period from 2006 to 2008. To get a more complete understanding of the types, causes, and severity of accidents, detailed records were obtained from the CT Crash data repository for 2007 to 2009. A summary of accident data for the intersection can be seen in Tables 1 to 4 below, while a collision diagram showing traffic accidents is presented in Figure 3.The Route 63 and Route 64 intersection saw 86 accidents during this period with 52 on the Route 63 approaches and 34 on the Route 64 approaches. The most common types of accidents were rear-end collisions (68.6%), sideswipe-opposite direction (9.3%), and turning-opposite direction (9.3%). A majority of accidents (62.8%) were caused by vehicles following too closely. The approaches that exhibited the highest frequency of rear-end accidents were SB and WB with 21 and 15 accidents respectively.

The prevalence of rear-end accidents suggests that drivers may be speeding up in an attempt to get through the intersection before the phase is over. Poor sightlines on Route 64 east of the intersection caused by a vertical curve may not give drivers enough time to slow down while approaching the intersection, especially if there is a long queue. The intersection saw the highest number of accidents between 12 p.m. and 2 p.m., accounting for 24.4% of all accidents.

Table 1. Traffic Accidents by Collision Type: 2007-2009

	Route 64		**Route 63**	
Type	**Number**	**Percent**	**Number**	**Percent**
Rear-End	24	70.6%	35	67.3%
Sideswipe - Same Direction	4	11.8%	4	7.7%
Turning - Opposite Direction	3	8.8%	5	9.6%
Turning - Intersecting Paths	2	5.9%	2	3.8%
Backing	1	2.9%	2	3.8%
Fixed Object	-	-	2	3.8%
Unknown	-	-	1	1.9%
Turning - Same Direction	-	-	1	1.9%
Total	**34**	**100%**	**52**	**100%**

Source: CT Crash Data Repository: 2007-2009, Route 63 and Route 64 Intersection, Middlebury

Table 2. Traffic Accidents by Contributing Factor: 2007-2009

Contributing Factor	Route 64		Route 63	
	Number	**Percent**	**Number**	**Percent**
Following Too Closely	23	67.6%	31	59.6%
Improper Lane Change	3	8.8%	5	9.6%
Failed to Grant Right of Way	3	8.8%	5	9.6%
Violated Traffic Control	2	5.9%	-	-
Speed Too Fast for Conditions	1	2.9%	4	7.7%
Unsafe Backing	1	2.9%	2	3.8%
Driver Lost Control	1	2.9%	1	1.9%
Driverless Vehicle	-	-	1	1.9%
Improper Turning Maneuver	-	-	1	1.9%
Unknown	-	-	1	1.9%
Unsafe Right Turn on Red	-	-	1	1.9%
Total	**34**	**100%**	**52**	**100%**

Source: CT Crash Data Repository: 2007-2009, Route 63 and Route 64 Intersection, Middlebury

Table 3. Traffic Accidents by Injury Severity: 2007-2009

Injury Severity	Route 64		Route 63	
	Number	**Percent**	**Number**	**Percent**
A-Injuries	2	1.6%	-	-
B-Injuries	6	4.8%	1	1.9%
C-Injuries	10	7.9%	14	26.9%
Property Damage Only	108	85.7%	37	71.2%
Total	**126**	**100%**	**52**	**100%**

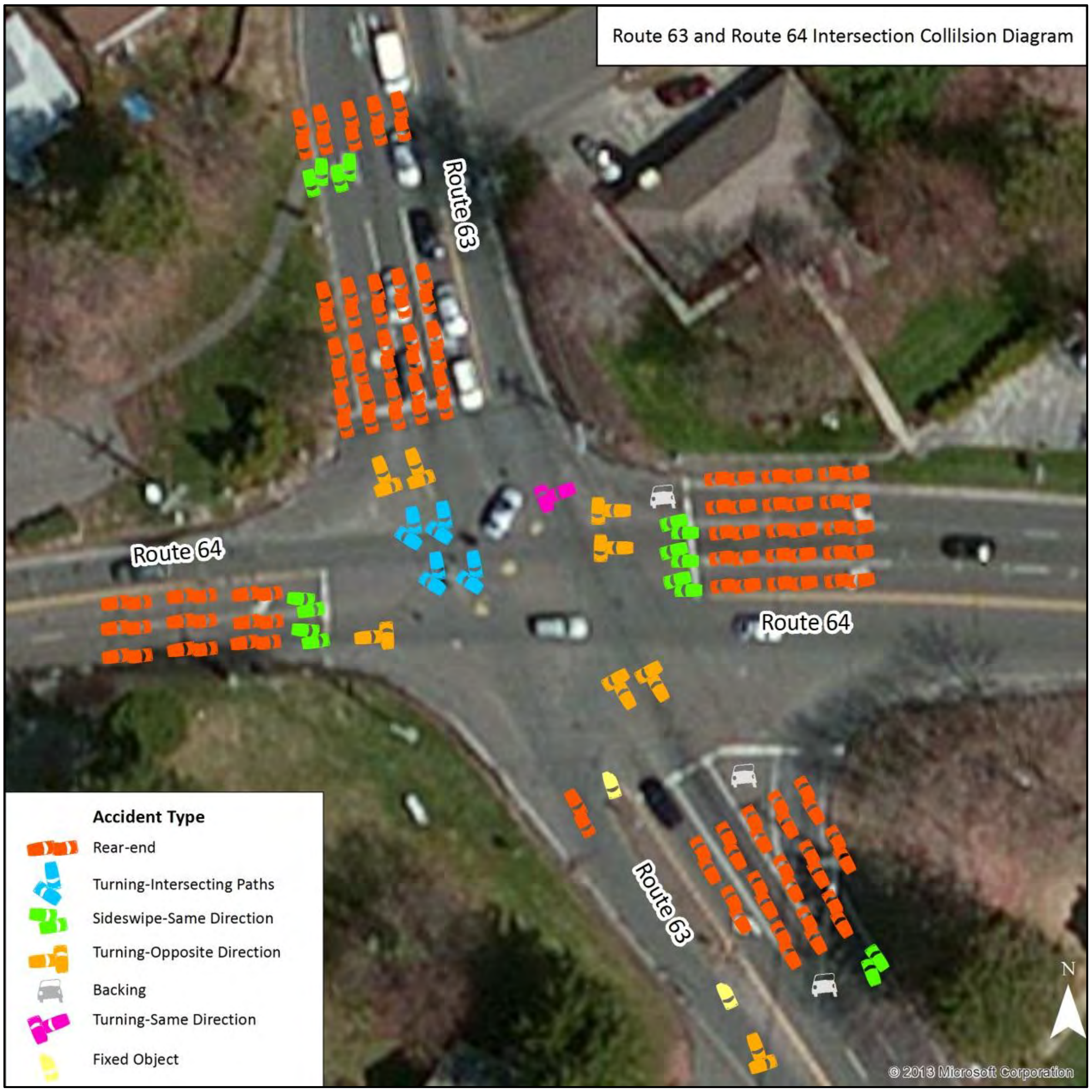
Source: CT Crash Data Repository: 2007-2009, Route 63 and Route 64 Intersection, Middlebury

Table 4. Traffic Accidents by Vehicle Type: 2007-2009

Vehicle Type	Route 64		Route 63	
	Number	**Percent**	**Number**	**Percent**
Automobile	77	79.4%	88	85.4%
Single-Unit Truck	14	14.4%	11	10.7%
Passenger Van	4	4.1%	2	1.9%
Truck-Trailer	1	1.0%	-	-
Commercial Bus	1	1.0%	-	-
Unknown	-	-	1	1
Farm Equipment	-	-	1	1
Total	**97**	**100%**	**103**	**100%**

Source: CT Crash Data Repository: 2007-2009, Route 63 and Route 64 Intersection, Middlebury

Figure 3. Collision Diagram for Route 63 and Route 64 in Middlebury



Source: CT Crash Data Repository: 2007-2009, Route 63 and Route 64 Intersection, Middlebury

Analysis of Existing Conditions

Analysis was performed in Synchro to measure volume-to-capacity (V/C) ratios and Level of Service (LOS) for both the morning and evening peak hours. V/C ratios compare vehicle volumes to the carrying capacity of a road. Level of Service for signalized intersections is defined by vehicle delay, which is a measure of driver discomfort, frustration, and lost travel time. The delay experienced by a motorist is related to signal control, geometry, traffic volumes, and incidents. Delay is a complex measure and is dependent on variables such as the quality of progression, cycle length, the green ratio, and the V/C ratio for the lane group in question. There are six defined Levels of Service, with “A” being the most favorable and “F” being the least favorable. A breakdown of the LOS classifications can be seen in Figure 5.

Table 5. LOS Classification for Signalized Intersections

LOS	Delay per Vehicle
A	Less than 10 seconds
B	10-20 seconds
C	20-35 seconds
D	35-55 seconds
E	55-80 seconds
F	80 seconds or more

Based on the analysis of existing operations, the intersection of Route 63 and Route 64 in Middlebury operates at LOS D during the morning peak and LOS E during the evening peak. A breakdown of the analysis by lane group can be seen in Table 6 for the morning peak and Table 7 for the evening peak. Major findings include:

- Route 63 and Route 64 have near equal traffic volumes during peak hours. 53 percent of movements are thru movements, 24 percent are right-turning, and 23 percent are left-turning. This makes prioritizing turning movements difficult.
- 38 percent of vehicles during the morning peak and 33 percent of vehicles during the evening peak access Route 64 eastbound towards the I-84 east ramp
- Traffic volumes are greater during the evening peak than during the morning peak.
- One lane group during the morning peak and three lane groups during the evening peak operate at or above capacity. All of these lane groups operate at LOS F.
- One lane group during the morning peak and five lane groups during the evening peak experience delays of over 1 minute. Southbound left-turning vehicles on Route 63 experience delays of over 4 minutes during the morning peak.

Table 6. Morning Peak Hour LOS Analysis

Approach	Lane Group	V/C Ratio	Delay by Lane Group (sec/veh)	LOS by Lane Group
EB	L	0.17	12.9	B
EB	TR	0.87	45.4	D
WB	L	0.78	35.3	D
WB	T	0.37	22.7	C
WB	R	0.28	2.1	A
NB	L	0.55	58.2	E
NB	T	0.74	50.7	D
NB	R	0.59	9.7	A
SB	L	1.41	246.3	F
SB	T	0.75	48.1	D
SB	R	0.18	5.5	A

Table 7. Evening Peak Hour LOS Analysis

Approach	Lane Group	V/C Ratio	Delay by Lane Group (veh/sec)	LOS by Lane Group
EB	L	0.61	28.7	C
EB	TR	0.94	64.0	E
WB	L	1.11	116.8	F
WB	T	0.87	51.3	D
WB	R	0.23	3.9	A
NB	L	0.61	65.6	E
NB	T	0.98	83.0	F
NB	R	0.55	9.6	A
SB	L	1.06	111.0	F
SB	T	0.62	37.8	D
SB	R	0.21	10.8	B

Improvement Options

Signal timing/optimization, especially during peak hours, was initially considered as a near-term improvement option for the intersection, which operates at LOS D during the morning peak and LOS E during the evening peak. However, because of the high volume-to-capacity ratio of this intersection during peak hours, signal timing/optimization did not offer any improvement in LOS. Delay per vehicle was reduced by 11.4 seconds in the morning and only 1.9 seconds in the evening. In both cases, signal optimization reduced delay on the worst-performing lane groups, while increasing delay on the better-performing lane groups. Signal optimization was last performed in 2008, and traffic patterns have likely not changed enough to warrant an additional optimization. Because of these results, signal optimization is not seen as a standalone way of improving operations. Instead, signal optimization should be done along with one or more of the improvement options listed below. The best improvement options are those that increase capacity at the intersection — such as extending storage lanes and adding new turning lanes — or those that reduce the peak hour traffic volume traveling through the intersection. Due to the high number of accidents at this location, efforts should also be made to minimize safety deficiencies. Several improvement options were analyzed in Synchro to examine their impacts on LOS and delay. The results can be seen in Table 8.

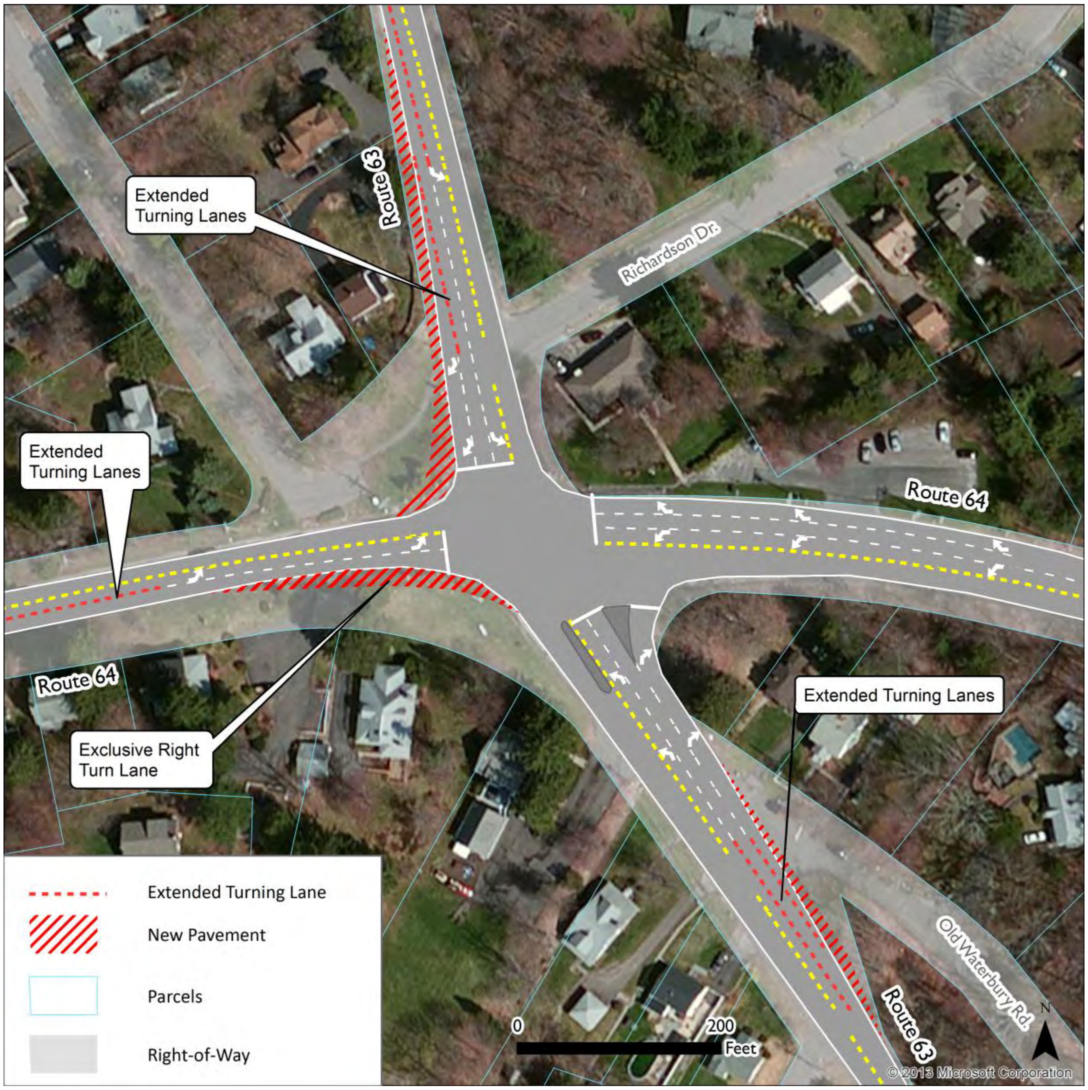
Table 8. Synchro Analysis of Improvement Options

Scenario	Time	LOS	Average Delay Per Vehicle	Delay Reduction per Vehicle
Existing Conditions				
Baseline	AM	D	53.0 seconds	---
	PM	E	57.2 seconds	---
Signal Optimization				
Signal optimization	AM	D	41.6 seconds	11.4 seconds
	PM	E	55.3 seconds	1.9 seconds
Improvement Option A				
Extended storage lanes, exclusive right turn lane on 64 WB, signal optimization.	AM	C	34.9 seconds	18.1 seconds
	PM	D	49.3 seconds	7.9 seconds
Improvement Option B				
New connector road, signal optimization	AM	C	34.9 seconds	18.1 seconds
	PM	D	44.5 seconds	12.7 seconds
Hybrid Option				
Improvement options A and B combined	AM	C	31.6 seconds	21.4 seconds
	PM	D	42.9 seconds	14.3 seconds
Improvement Option C				
Improvement option B plus left turn prohibition on Rte 63 SB	AM	C	23.7 seconds	29.3 seconds
	PM	C	25.2 seconds	32.0 seconds

Improvement Option A: Minimizing Geometric Deficiencies

Both field observations and the Synchro analysis revealed vehicles queued beyond the capacity of the storage lanes. In some cases, thru traffic blocked the left and right turning lanes, while in other cases, queued left-turning vehicles blocked access to the intersection for thru and right-turning vehicles. Right-turning vehicles on Route 64 EB frequently experienced cycle failures because of the shared lane with thru vehicles. Creating a new exclusive right-hand turn lane on Route 64 EB would reduce delay for both right-turning and thru vehicles. There is enough room within the right-of-way to accommodate a new right-turn lane on Route 64, although it would require the relocation of signs and utilities. On the east side of Route 64, a rock formation makes it challenging to extend storage lanes. A Synchro analysis was performed to examine the impacts of extending left hand turn lanes on the three other approaches to 500 feet and adding new right-turn lane on Route 64 EB (Figure 4). The traffic signal was optimized to account for the extended storage lanes. The analysis showed that the intersection would operate at LOS C in the morning and LOS D in the evening with these improvements. Delay per vehicle would be reduced by 18.1 seconds in the morning and 7.9 seconds in the evening. All of the improvements came from the new exclusive right-turn lane on Route 64 EB. Extended left-turn lanes did not improve operations at the intersection.

Figure 4: Suggested Geometric Improvements



Improvement Option B: Exit 17 Interchange Redesign — New Connector Road

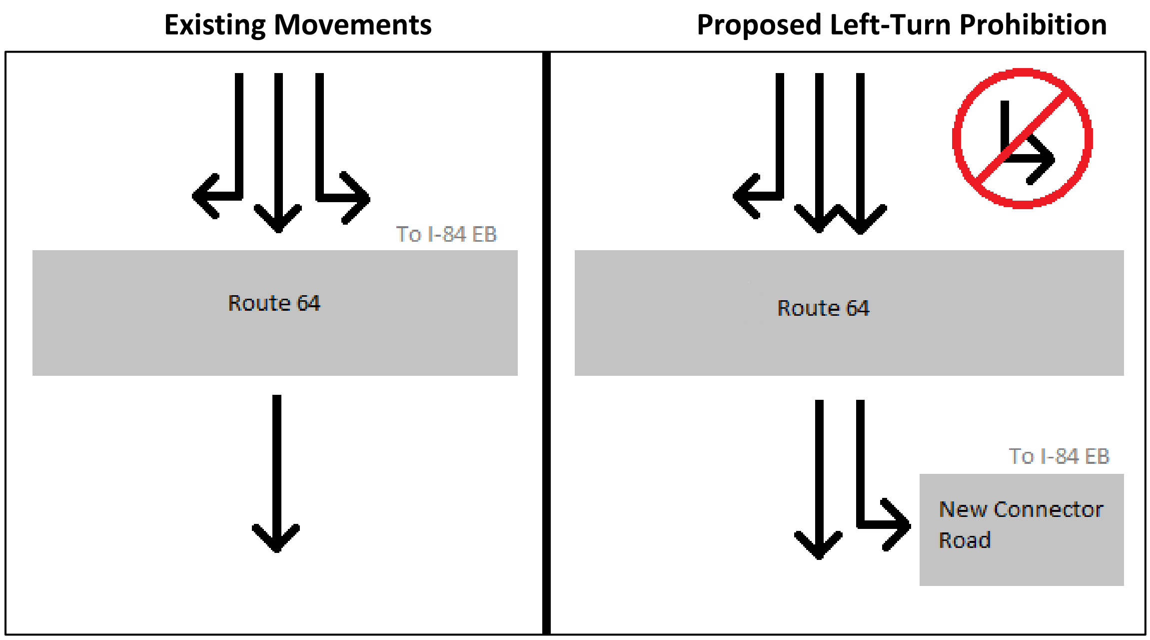
The long-term solution involves a complete redesign of the I-84 exit 17 interchange. Exit 17 is a split interchange, forcing vehicles that are entering and exiting I-84 to go through the intersection. Redesign plans call for a new two-way connector road (Chase Parkway Extension) between the split interchange, allowing vehicles entering and exiting I-84 to bypass the Route 63 and Route 64 intersection (Project 174-309). Two new traffic lights would be installed at either end of the connector road. A Synchro analysis was performed on with new connector to examine its impact on LOS. It was assumed that the connector road would capture 95% of northbound right-turning vehicles and westbound left-turning vehicles. This improvement option (Table 8) would allow the intersection to operate at LOS C in the morning and LOS D in the evening. Delay per vehicle would be reduced by 18.1 seconds in the morning and 12.7 seconds in the evening. A hybrid option that combines the new connector road with extended storage lanes would offer only minor reductions in delay compared to improvement options A or B.

Figure 5: Exit 17 Interchange Redesign with New Connector Road and Multi-Use Trail

Improvement Option C: New Connector Road plus Left-Turn Prohibition

In addition to the new connector road, another option is to implement a left-turn prohibition for southbound vehicles on Route 63 (Table 6). Instead, southbound vehicles would make a left turn at the new connector road to access I-84 EB and Chase Parkway. The left-turn lane at Route 63 SB could be converted to an additional storage lane for thru traffic. This would require a second southbound lane to be added to Route 63 between Route 64 and the new connector road. This improvement option would allow the intersection to operate at LOS C during both the morning and evening. Delay per vehicle would be reduced by 29.3 seconds in the morning and 32.0 seconds in the evening. Because this option minimizes the number of vehicles turning left at the Route 63 and Route 64 intersection, it allows for longer cycle lengths for thru vehicles. Left-turn prohibition, while offering the greatest reduction in delay, would be difficult to implement politically.

Figure 6: Left-Turn Prohibition on Route 63 Southbound



Improvement Option D: Expand Park-and-Ride Lot and Promote Alternative Modes

Another way of reducing peak hour traffic volumes at the intersection of Route 63 and Route 64 is to promote carpooling and alternative modes to driving. While this option would not provide a standalone answer to congestion issues at this intersection, it would help supplement the other improvement options. The park-and-ride lot on Route 63 is the most heavily used in the region, with an average occupancy rate of 95% since 2005. In 2012, the lot was used at or above its maximum capacity for three of the four commuter lot counts. Expanding the park-and-ride lot would encourage more people to carpool and reduce the number of single-occupancy vehicles passing through the intersection. Improving pedestrian and bicycle infrastructure could also reduce the number of vehicles passing through the intersection. The Middlebury Greenway runs through the center of town and ends just south of the intersection. *The I-84 West of Waterbury Needs and Deficiencies* Study recommended extending the Middlebury Greenway along the new connector road (Figure 5). A continuation of the multi-use trail and the installation of sidewalks or bicycle lanes along Chase Parkway would allow pedestrians and bicyclists to access Naugatuck Valley Community College and a number of commercial and healthcare facilities. The Route 64 – Chase Parkway Corridor is served by the 42 bus, although service in Middlebury is limited. Seven roundtrip busses stop on Route 64 opposite Kelly Road. This bus route is plagued by low ridership, which will likely remain low due to the high rate of vehicle ownership in Middlebury and the lack of adequate sidewalks and bike paths nearby.

Improvement Option E: Minimizing Safety Deficiencies

Poor visibility on the eastern portion of Route 64 caused by a vertical curve could be augmented by a flashing beacon and warning sign placed several hundred feet from the intersection. A flashing beacon and warning sign would warn drivers of a red light or long queue well in advance, giving them time to slow down before reaching the back of the queue. Flashing beacons can also be installed on the other legs of the intersection to improve driver awareness. While this would not offer any direct operational improvements at the intersection, it could help reduce the number of rear-end accidents and improve overall intersection safety. A long-term solution to the poor sightlines would involve re-grading Route 64 to eliminate the vertical curve.

Rear-end collisions could also be reduced by eliminating driver confusion through improved signage to alert motorists of the intersection configuration. Adding advanced lane control signs will further ensure that motorists are aware of where they need to be before arriving at the intersection. This option could be particularly effective in the SB direction on Route 63, which has a high volume of left turns during the peak period. The existing sign is about 235 feet from the stop bar, where the taper begins. It does not appear to be retroreflective, reducing its overall effectiveness. Pavement marking arrows on the approach are badly faded and may also need improvement.

Conclusions

The intersection of Route 63 and Route 64 in Middlebury is one of the most congested in the Central Naugatuck Valley Region. High traffic volumes, poor intersection geometry, and the split exit 17 interchange on I-84 all contribute to the poor operations of the Route 63 and Route 64 intersection. Safety improvements, such as improving signage and road markings, should be addressed in the short-term. Because of the complexity of the intersection and cost of long-term improvement options, the project has been put on hold indefinitely. The improvement options put forward in this report should be examined in greater detail once a funding source has been identified.

Appendix A:

Peak Period

Traffic Counts: AM/PM

Route 63 and Route 64, Middlebury
Wednesday, February 29, 2012
7:00 - 9:00 A.M.

Time	Rte 63 NB					Rte 64 EB					Rte 63 SB					Rte 64 WB					Int. Total
	Right	Thru	Left	Trucks	Approach Total	Right	Thru	Left	Trucks	Approach Total	Right	Thru	Left	Trucks	Approach Total	Right	Thru	Left	Trucks	Approach Total	
7:00	38	34	7	0	79	15	128	7	3	153	2	60	57	3	122	31	48	19	4	102	456
7:15	56	53	9	0	118	13	132	12	1	158	10	62	48	0	120	47	63	16	1	127	523
7:30	66	38	11	1	116	18	127	11	0	156	7	66	66	3	142	28	66	25	2	121	535
7:45	86	68	21	0	175	12	130	10	1	153	23	77	59	1	160	63	82	38	2	185	673
8:00	53	49	14	0	116	23	119	21	1	164	14	78	59	3	154	63	70	64	0	197	631
8:15	66	66	16	0	148	19	129	17	2	167	18	83	72	0	173	59	76	50	0	185	673
8:30	60	54	13	0	127	12	92	23	0	127	17	81	50	4	152	57	66	48	2	173	579
8:45	65	59	9	1	134	15	134	15	0	164	21	59	58	0	138	56	61	62	3	182	618

Route 63 and Route 64, Middlebury
Wednesday, Sept. 14, 2011
4:00 - 6:00 P.M.

Time	Rte 63 NB					Rte 64 EB					Rte 63 SB					Rte 64 WB					Int. Total
	Right	Thru	Left	Trucks	Approach Total	Right	Thru	Left	Trucks	Approach Total	Right	Thru	Left	Trucks	Approach Total	Right	Thru	Left	Trucks	Approach Total	
4:00	55	90	12	1	158	16	90	34	0	140	30	71	59	2	162	52	120	56	0	228	688
4:15	48	69	18	1	136	12	96	37	0	145	24	62	59	1	146	53	125	55	1	234	661
4:30	70	77	10	0	157	18	91	35	1	145	29	90	85	0	204	52	136	42	2	232	738
4:45	65	79	23	1	168	20	89	30	4	143	19	71	59	1	150	57	137	71	1	266	727
5:00	77	97	12	1	187	18	113	27	0	158	35	97	80	0	212	51	124	59	1	235	792
5:15	87	104	20	0	211	11	114	32	0	157	36	82	60	0	178	46	122	59	2	229	775
5:30	58	95	10	1	164	14	78	27	1	120	31	71	56	0	158	50	128	77	0	255	697
5:45	64	71	15	0	150	16	87	32	1	136	25	54	20	0	99	31	122	66	0	219	604

Peak Hour

Appendix B:

Synchro Analysis

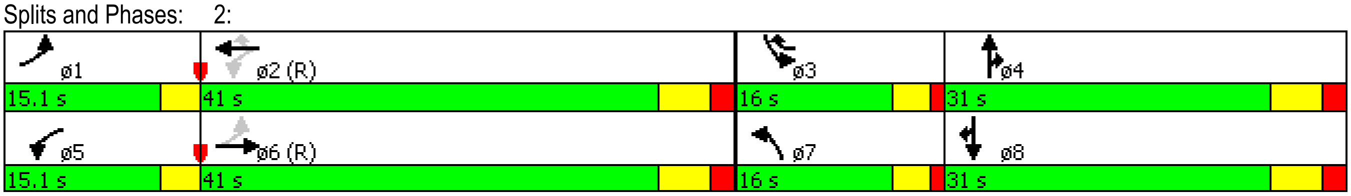
Of Existing Operations: AM/PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	71	470	66	200	294	242	64	237	265	240	319	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	11	12	12	11	12	14	11	11	16
Storage Length (ft)	250		250	325		325	200		200	250		125
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1745	1786	0	1728	1881	1615	1728	1881	1706	1728	1818	1812
Flt Permitted	0.572			0.139			0.950			0.950		
Satd. Flow (perm)	1051	1786	0	253	1881	1615	1728	1881	1706	1728	1818	1812
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				310			315			107
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		356			392			365			295	
Travel Time (s)		8.1			8.9			8.3			6.7	
Peak Hour Factor	0.77	0.90	0.90	0.83	0.96	0.78	0.76	0.87	0.77	0.83	0.96	0.78
Heavy Vehicles (%)	0%	1%	1%	1%	1%	0%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	92	522	73	241	306	310	84	272	344	289	332	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	92	595	0	241	306	310	84	272	344	289	332	92
Number of Detectors	3	1		3	1	1	3	1	1	3	1	1
Detector Template												
Leading Detector (ft)	56	6		56	315	315	56	181	181	56	106	106
Trailing Detector (ft)	0	0		0	300	300	0	175	175	0	100	100
Detector 1 Position(ft)	0	0		0	300	300	0	175	175	0	100	100
Detector 1 Size(ft)	6	6		6	15	15	6	6	6	6	6	6
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	25			25			25			25		
Detector 2 Size(ft)	6			6			6			6		
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Detector 3 Position(ft)	50			50			50			50		
Detector 3 Size(ft)	6			6			6			6		
Detector 3 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 3 Channel												
Detector 3 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	custom	Prot	NA	custom
Protected Phases	1	6		5	2	3	7	4	4	3	8	8
Permitted Phases	6	6		2	2	2		4	4		8	8
Detector Phase	1	6		5	2	3	7	4	4	3	8	8
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	20.0		5.0	20.0	5.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	8.1	26.0		8.1	26.0	9.0	9.0	22.0	22.0	9.0	22.0	22.0
Total Split (s)	15.1	41.0		15.1	41.0	16.0	16.0	31.0	31.0	16.0	31.0	31.0
Total Split (%)	14.6%	39.8%		14.6%	39.8%	15.5%	15.5%	30.1%	30.1%	15.5%	30.1%	30.1%
Yellow Time (s)	3.0	4.0		3.0	4.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.1	2.0		0.1	2.0	1.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.1	6.0		3.1	6.0	4.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	49.8	39.7		57.6	46.2	64.2	9.1	20.3	20.3	12.0	25.0	25.0
Actuated g/C Ratio	0.48	0.39		0.56	0.45	0.62	0.09	0.20	0.20	0.12	0.24	0.24
v/c Ratio	0.17	0.86		0.77	0.36	0.28	0.55	0.74	0.59	1.44	0.75	0.18
Control Delay	12.8	44.7		33.8	22.6	2.1	58.2	50.7	9.7	257.9	48.7	5.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.8	44.7		33.8	22.6	2.1	58.2	50.7	9.7	257.9	48.7	5.5
LOS	B	D		C	C	A	E	D	A	F	D	A
Approach Delay		40.4			18.3			31.5			127.9	
Approach LOS		D			B			C			F	

Intersection Summary	
Area Type: Other	
Cycle Length: 103.1	
Actuated Cycle Length: 103.1	
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.44	
Intersection Signal Delay: 53.0	Intersection LOS: D
Intersection Capacity Utilization 82.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2:

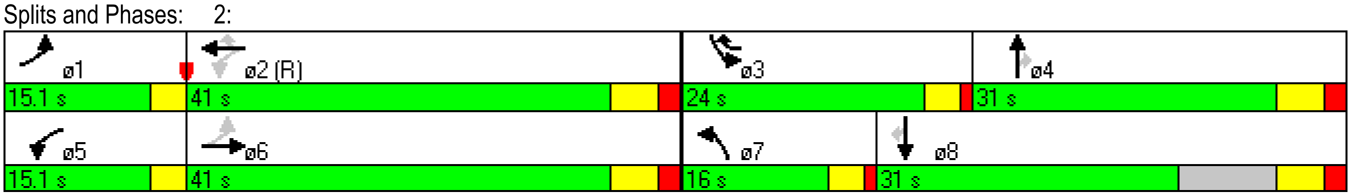


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	124	407	67	231	519	206	65	357	299	284	340	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	11	12	12	11	12	14	11	11	16
Storage Length (ft)	250		250	325		325	200		200	250		125
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.979				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1745	1780	0	1728	1881	1615	1728	1881	1706	1728	1818	1812
Flt Permitted	0.133			0.110			0.950			0.950		
Satd. Flow (perm)	244	1780	0	200	1881	1615	1728	1881	1706	1728	1818	1812
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8				175			316			102
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		352			391			365			295	
Travel Time (s)		8.0			8.9			8.3			6.7	
Peak Hour Factor	0.89	0.90	0.90	0.81	0.95	0.90	0.71	0.86	0.86	0.84	0.88	0.83
Heavy Vehicles (%)	0%	1%	1%	1%	1%	0%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	139	526	0	285	546	229	92	415	348	338	386	143
Number of Detectors	3	1		3	1	1	3	1	1	3	1	1
Detector Template												
Leading Detector (ft)	56	6		56	315	315	56	181	181	56	106	106
Trailing Detector (ft)	0	0		0	300	300	0	175	175	0	100	100
Detector 1 Position(ft)	0	0		0	300	300	0	175	175	0	100	100
Detector 1 Size(ft)	6	6		6	15	15	6	6	6	6	6	6
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	25			25			25			25		
Detector 2 Size(ft)	6			6			6			6		
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Detector 3 Position(ft)	50			50			50			50		
Detector 3 Size(ft)	6			6			6			6		
Detector 3 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 3 Channel												
Detector 3 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2	3	7	4		3	8	
Permitted Phases	6	6		2	2	2		4	4		8	8
Detector Phase	1	6		5	2	3	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0	5.0	5.0	15.0	15.0	5.0	15.0	15.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	8.1	26.0		8.1	26.0	9.0	9.0	22.0	22.0	9.0	22.0	22.0
Total Split (s)	15.1	41.0		15.1	41.0	24.0	16.0	31.0	31.0	24.0	31.0	31.0
Total Split (%)	13.6%	36.9%		13.6%	36.9%	21.6%	14.4%	27.9%	27.9%	21.6%	27.9%	27.9%
Maximum Green (s)	12.0	35.0		12.0	35.0	20.0	12.0	25.0	25.0	20.0	25.0	25.0
Yellow Time (s)	3.0	4.0		3.0	4.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.1	2.0		0.1	2.0	1.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.1	6.0		3.1	6.0	4.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	5.0		2.0	5.0	2.0	2.0	4.0	4.0	2.0	4.0	4.0
Recall Mode	None	Min		None	C-Min	None	None	None	None	None	None	None
Walk Time (s)								15.0	15.0		15.0	15.0
Flash Dont Walk (s)								1.0	1.0		1.0	1.0
Pedestrian Calls (#/hr)								0	0		0	0
Act Effct Green (s)	46.7	34.5		51.3	37.1	63.6	9.7	25.0	25.0	20.5	37.8	37.8
Actuated g/C Ratio	0.42	0.31		0.46	0.33	0.57	0.09	0.23	0.23	0.18	0.34	0.34
v/c Ratio	0.61	0.94		1.11	0.87	0.23	0.61	0.98	0.55	1.06	0.62	0.21
Control Delay	28.7	64.0		116.8	51.3	3.9	65.6	83.0	9.6	111.0	37.8	10.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.7	64.0		116.8	51.3	3.9	65.6	83.0	9.6	111.0	37.8	10.8
LOS	C	E		F	D	A	E	F	A	F	D	B
Approach Delay		56.6			58.6			51.2			61.9	
Approach LOS		E			E			D			E	

Intersection Summary	
Area Type: Other	
Cycle Length: 111.1	
Actuated Cycle Length: 111.1	
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.11	
Intersection Signal Delay: 57.2	Intersection LOS: E
Intersection Capacity Utilization 89.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2:



Appendix C:

Results of Signal

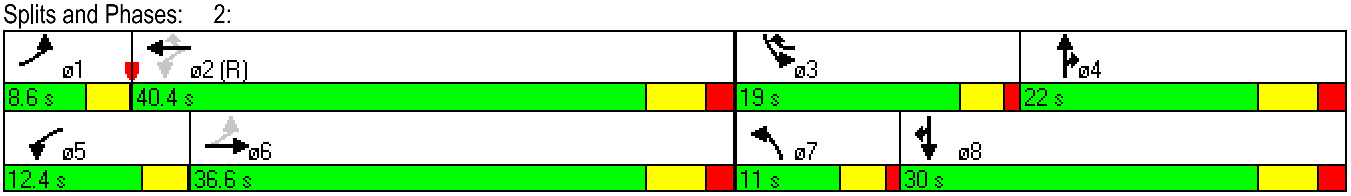
Optimization Analyses: AM/PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	71	470	66	200	294	242	64	237	265	240	319	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	11	12	12	11	12	14	11	11	16
Storage Length (ft)	250		250	325		325	200		200	250		125
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1745	1786	0	1728	1881	1615	1728	1881	1706	1728	1818	1812
Flt Permitted	0.573			0.122			0.950			0.950		
Satd. Flow (perm)	1052	1786	0	222	1881	1615	1728	1881	1706	1728	1818	1812
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8				293			259			160
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		356			392			365			295	
Travel Time (s)		8.1			8.9			8.3			6.7	
Peak Hour Factor	0.77	0.90	0.90	0.83	0.96	0.78	0.76	0.87	0.77	0.83	0.96	0.78
Heavy Vehicles (%)	0%	1%	1%	1%	1%	0%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	92	522	73	241	306	310	84	272	344	289	332	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	92	595	0	241	306	310	84	272	344	289	332	92
Number of Detectors	3	1		3	1	1	2	1	1	3	1	1
Detector Template												
Leading Detector (ft)	56	6		56	315	315	31	181	181	56	106	106
Trailing Detector (ft)	0	0		0	300	300	0	175	175	0	100	100
Detector 1 Position(ft)	0	0		0	300	300	0	175	175	0	100	100
Detector 1 Size(ft)	6	6		6	15	15	0	6	6	6	6	6
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	25			25			25			25		
Detector 2 Size(ft)	6			6			6			6		
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Detector 3 Position(ft)	50			50						50		
Detector 3 Size(ft)	6			6						6		
Detector 3 Type	Cl+Ex			Cl+Ex						Cl+Ex		
Detector 3 Channel												
Detector 3 Extend (s)	0.0			0.0						0.0		
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	custom	Prot	NA	custom
Protected Phases	1	6		5	2	3	7	4	4	3	8	8
Permitted Phases	6	6		2	2	2		4	4		8	8
Detector Phase	1	6		5	2	3	7	4	4	3	8	8
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	20.0		5.0	20.0	5.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	8.1	26.0		8.1	26.0	9.0	9.0	22.0	22.0	9.0	22.0	22.0
Total Split (s)	8.6	36.6		12.4	40.4	19.0	11.0	22.0	22.0	19.0	30.0	30.0
Total Split (%)	9.6%	40.7%		13.8%	44.9%	21.1%	12.2%	24.4%	24.4%	21.1%	33.3%	33.3%
Yellow Time (s)	3.0	4.0		3.0	4.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.1	2.0		0.1	2.0	1.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.1	6.0		3.1	6.0	4.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Min		None	C-Min	None	None	None	None	None	None	None
Act Effct Green (s)	39.0	30.6		46.3	36.4	57.4	6.7	15.6	15.6	15.0	25.8	25.8
Actuated g/C Ratio	0.43	0.34		0.51	0.40	0.64	0.07	0.17	0.17	0.17	0.29	0.29
v/c Ratio	0.18	0.97		0.87	0.40	0.27	0.66	0.83	0.67	1.00	0.64	0.15
Control Delay	12.7	60.9		49.5	21.9	1.8	65.5	59.0	16.9	93.8	35.5	1.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	60.9		49.5	21.9	1.8	65.5	59.0	16.9	93.8	35.5	1.0
LOS	B	E		D	C	A	E	E	B	F	D	A
Approach Delay		54.4			22.4			39.1			54.7	
Approach LOS		D			C			D			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 41.6	Intersection LOS: D
Intersection Capacity Utilization 82.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2:



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	124	407	67	231	519	206	65	357	299	284	340	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	11	12	12	11	12	14	11	11	16
Storage Length (ft)	250		250	325		325	200		200	250		125
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.979				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1745	1780	0	1728	1881	1615	1728	1881	1706	1728	1818	1812
Flt Permitted	0.207			0.125			0.950			0.950		
Satd. Flow (perm)	380	1780	0	227	1881	1615	1728	1881	1706	1728	1818	1812
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8				121			294			144
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		352			391			365			295	
Travel Time (s)		8.0			8.9			8.3			6.7	
Peak Hour Factor	0.89	0.90	0.90	0.81	0.95	0.90	0.71	0.86	0.86	0.84	0.88	0.83
Heavy Vehicles (%)	0%	1%	1%	1%	1%	0%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	139	526	0	285	546	229	92	415	348	338	386	143
Number of Detectors	3	1		3	1	1	3	1	1	3	1	1
Detector Template												
Leading Detector (ft)	56	6		56	315	315	56	181	181	56	106	106
Trailing Detector (ft)	0	0		0	300	300	0	175	175	0	100	100
Detector 1 Position(ft)	0	0		0	300	300	0	175	175	0	100	100
Detector 1 Size(ft)	6	6		6	15	15	6	6	6	6	6	6
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	25			25			25			25		
Detector 2 Size(ft)	6			6			6			6		
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Detector 3 Position(ft)	50			50			50			50		
Detector 3 Size(ft)	6			6			6			6		
Detector 3 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 3 Channel												
Detector 3 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2	3	7	4		3	8	
Permitted Phases	6	6		2	2	2		4	4		8	8
Detector Phase	1	6		5	2	3	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0	5.0	5.0	15.0	15.0	5.0	15.0	15.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	8.1	26.0		8.1	26.0	9.0	9.0	22.0	22.0	9.0	22.0	22.0
Total Split (s)	9.0	35.7		15.3	42.0	22.0	12.0	27.0	27.0	22.0	37.0	37.0
Total Split (%)	9.0%	35.7%		15.3%	42.0%	22.0%	12.0%	27.0%	27.0%	22.0%	37.0%	37.0%
Maximum Green (s)	5.9	29.7		12.2	36.0	18.0	8.0	21.0	21.0	18.0	31.0	31.0
Yellow Time (s)	3.0	4.0		3.0	4.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.1	2.0		0.1	2.0	1.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.1	6.0		3.1	6.0	4.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	5.0		2.0	5.0	2.0	2.0	4.0	4.0	2.0	4.0	4.0
Recall Mode	None	Min		None	C-Min	None	None	None	None	None	None	None
Walk Time (s)								15.0	15.0		15.0	15.0
Flash Dont Walk (s)								1.0	1.0		1.0	1.0
Pedestrian Calls (#/hr)								0	0		0	0
Act Effct Green (s)	38.5	29.7		47.9	36.0	60.0	7.6	21.0	21.0	18.0	33.4	33.4
Actuated g/C Ratio	0.38	0.30		0.48	0.36	0.60	0.08	0.21	0.21	0.18	0.33	0.33
v/c Ratio	0.62	0.99		0.98	0.81	0.23	0.70	1.05	0.59	1.09	0.64	0.20
Control Delay	29.3	71.2		72.9	39.8	4.8	73.4	98.8	11.6	116.3	34.9	5.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	71.2		72.9	39.8	4.8	73.4	98.8	11.6	116.3	34.9	5.1
LOS	C	E		E	D	A	E	F	B	F	C	A
Approach Delay		62.5			41.1			60.6			61.7	
Approach LOS		E			D			E			E	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 55.3 Intersection LOS: E
Intersection Capacity Utilization 89.5% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 2: