CENTRAL MASSACHUSETTS

METROPOLITAN PLANNING ORGANIZATION

West Boylston - Boylston - Shrewsbury Route 140 Corridor Profile Technical Appendix

December 2018

Document Prepared by:
Staff of the Central Massachusetts Metropolitan Planning Organization
1 Mercantile Street, Suite 520, Worcester MA 01608

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Central Massachusetts Regional Planning Commission
1 Mercantile Street
Suite 520
Worcester, MA 01608
(508) 756-7717

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One Ashburton Place, 6th floor
Boston, MA 02109
(617) 994-6000
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PROPOSED MEETING AGENDA

140 Worcester Street, West Boylston, Massachusetts 01583
In accordance with the provisions of MGL 30A §§ 18-25

TRANSPORTATION COMMITTEE Board / Committee Name	August 28, 2017 Date of Notice
Town Hall, 140 Worcester Street Meeting Place	Rm 210 Conference Room Number or Location
Sept. 7, 2017 at 6:00pm Date / Time of Meeting	 Clerk or Board Member Signature
Meeting CANCELLED or POSTPONED due to:	***Date of Cancellation or Postponement***

Notices and Agendas are to be posted 48 hours in advance of the meetings, excluding Saturdays, Sundays and legal holidays. Please note the hours of operation at the Town Clerk's Office to ensure that this posting will satisfy this requirement.

This is the current list of topics that the Chair reasonably anticipates will be discussed at this meeting.

AGENDA

TOPICS:

Approval of Minutes from prior meetings:
June 1, 2017 and August 3, 2017

Rich Rydant of CMRPC to discuss Rt. 140 Corridor Study

Review and approve draft Transportation Chapter for Master Plan

Save this file as Year-Month-Day-Name of Committee-Agenda [Example: 2017-10-15-ZBA Agenda.docx]

PROPOSED MEETING AGENDA

140 Worcester Street, West Boylston, Massachusetts 01583
In accordance with the provisions of MGL 30A §§ 18-25

Transportation Cmte Board / Committee Name	September 28, 2017 Date of Notice
140 Worcester Street Meeting Place	#210 Conference Room Number or Location
October 5, 2017; 6:00 pm Date / Time of Meeting	 Clerk or Board Member Signature
 Meeting CANCELLED or POSTPONED to:	 ***Date of Cancellation or Postponement***

Notices and Agendas are to be posted 48 hours in advance of the meetings, excluding Saturdays, Sundays and legal holidays. Please note the hours of operation at the Town Clerk's Office to ensure that this posting will satisfy this requirement.

This is the current list of topics that the Chair reasonably anticipates will be discussed at this meeting.

Est. Start Time: 6pm

AGENDA

1. Rich Rydant from CMRPC re TIP list projects – Identify potential projects to seek Selectmen approval for submittal to the state for the next TIP list.
2. Pavement Management Plan Update
3. Master Plan Update – review of draft Transportation Chapter.
4. Minutes
5. Misc. Updates

West Boylston Transportation Committee
September 7, 2017 Meeting

Host Community Concerns:
Route 12/Route 140
West Boylston Street-Worcester Street &
Central Street-Temple Street, Church Street

Observed Deficiencies

Route 12/Route 140 Background

- *State-Maintained Location, MassDOT Highway Division, District #3 office, Worcester*
- *HSIP-identified location*
- *The Route 12/Route 140 intersection was partially reconstructed with the addition of a new traffic signal controller under the Congestion Mitigation & Air Quality (CMAQ) program in 2003. Traffic signal (timing & phasing) changes were made at that time. Existing traffic signal very reactive to fluctuations in traffic flow volumes, applying broad timing & phasing parameters.*

- A significant number of reported vehicle crashes in the host community occur at the Route 12/Route 140 study intersection. *(Staff is currently compiling the necessary vehicle crash documentation to verify this observation.)*

- Overall, both travel & turning lane widths at this intersection are somewhat narrow, most less than 11 feet in width. (Standard lane widths are 12', however, 11' can often suffice at intersection locations.) Also, the overall alignment of the focus location, due to the acute angle of the intersecting roadways, has been observed to have the potential for driver "confusion", perhaps due to the unanticipated intersection geometry. As observed in the field, the opposing Route 12 northbound and southbound left turn lanes are not optimally aligned.

- Route 140 northbound queues have been observed to measure approximately one-half mile during the evening peak travel period at 4:00 PM.

- The Route 140 northbound to Route 12 southbound left turning maneuver is difficult, due to the sharp turn angle, and requires large trucks to cross the opposing travel lanes.

- The transition of the Route 140 northbound approach to the alignment of the Route 12/140 northbound departure lane has a somewhat poor transition area and has been observed to be potentially confusing for those unfamiliar with the area.

- The Route 140 northbound "Stop Line" sign and corresponding pavement marking (wide white line) are not optimally positioned due to the adjacent sidewalk and private driveway area.

- The Route 12 northbound approach lanes are observed to exhibit significant pavement distress, particularly wheel path deterioration ("wash boarding").

- The Route 12 southbound left turn to the Route 140 southbound departure, or receiving, lane has been observed to be somewhat narrow, just under 11 feet in width. Further, vehicles from Route 12 northbound making a right turn to Route 140 southbound using the curved, channelized right turn lane, need to be cautious of Route 140 flows.

- The transition of the Central Street right turn lane approach to the alignment of the Route 12 southbound departure lane has a somewhat poor transition area. Further, the Central Street exclusive right turn lane is fairly narrow in width at 10'-5".

- A right turn movement from the southbound Route 12/140 approach to Central Street southbound, continuing to Crescent Street, is prohibited. In order to avoid this turning restriction, it has been observed that traffic uses the private driveway of the church situated to the north as a cut-through route. *As the church accommodates a nursery school parking lot, this unauthorized usage need to be curtailed.*

- Existing pedestrian phase signal equipment appears to be corroded and could be a candidate for replacement and upgrades.

- This focus intersection has marked shoulders of minimal width (~1 foot) for bicycle accommodation, considered insufficient.

- Further, although wheelchair ramps currently exist, connectivity with sidewalks is essentially limited. *(Fully ADA compliant?)* Existing sidewalks are fairly narrow and need to be reconstructed and widened. *(Reference the town's recent "Complete Streets" efforts and associated improvement project listing.)*

- Right turns *into* Church Street, which bisects this location, are permissible on each side of the intersection. Vehicles are prohibited from entering the Route 12/Route 140 intersection *from* each Church Street approach.)

Route 12/Franklin Street

❖ *HSIP-identified location*

- Unsignalized location with the Franklin Street approaches under "STOP" sign control.

- The westbound approach of Franklin Street has a short, gradual incline.

- Possibly the most reported vehicle crashes in the host community of West Boylston occur at the Route 12/Franklin Street study intersection. *(Staff is currently compiling the necessary vehicle crash documentation to verify this observation.)*

- In prior years, town officials had considered making Franklin Street a one-way roadway traveling eastbound from Route 12 to Route 140. This envisioned/proposed traffic pattern change would potentially serve to address the existing/ongoing crash issues involving vehicles on the westbound approach of Franklin Street attempting to cross or turn onto Route 12.

Route 140/Franklin Street

- An increased volume of traffic has been observed turning at this intersection and using Franklin Street as a cut-through to Route 12, avoiding the difficult northbound left turn at the signalized Route 12/Route 140 intersection.

- *(Staff is currently compiling the necessary vehicle crash documentation for this location.)*

Suggested Improvement Options

Short Term:

- Consider a range of Transportation Systems Management (TSM) techniques.

- Maintain all existing traffic control signals, signs and pavement markings. Consider improving regulatory lane usage signage as necessary.

- Conduct regular pavement maintenance, including crack sealing. Further, maintain all nearby drainage structures through periodic inspection and cleaning.

Longer Term:

- Reconstruction and improvement of all three (3) intersection locations, including all connecting roadways of the "Triangle" formed by Route 12, Route 140 and Franklin Street. Install signalized traffic control at the Route 12/Franklin Street intersection.

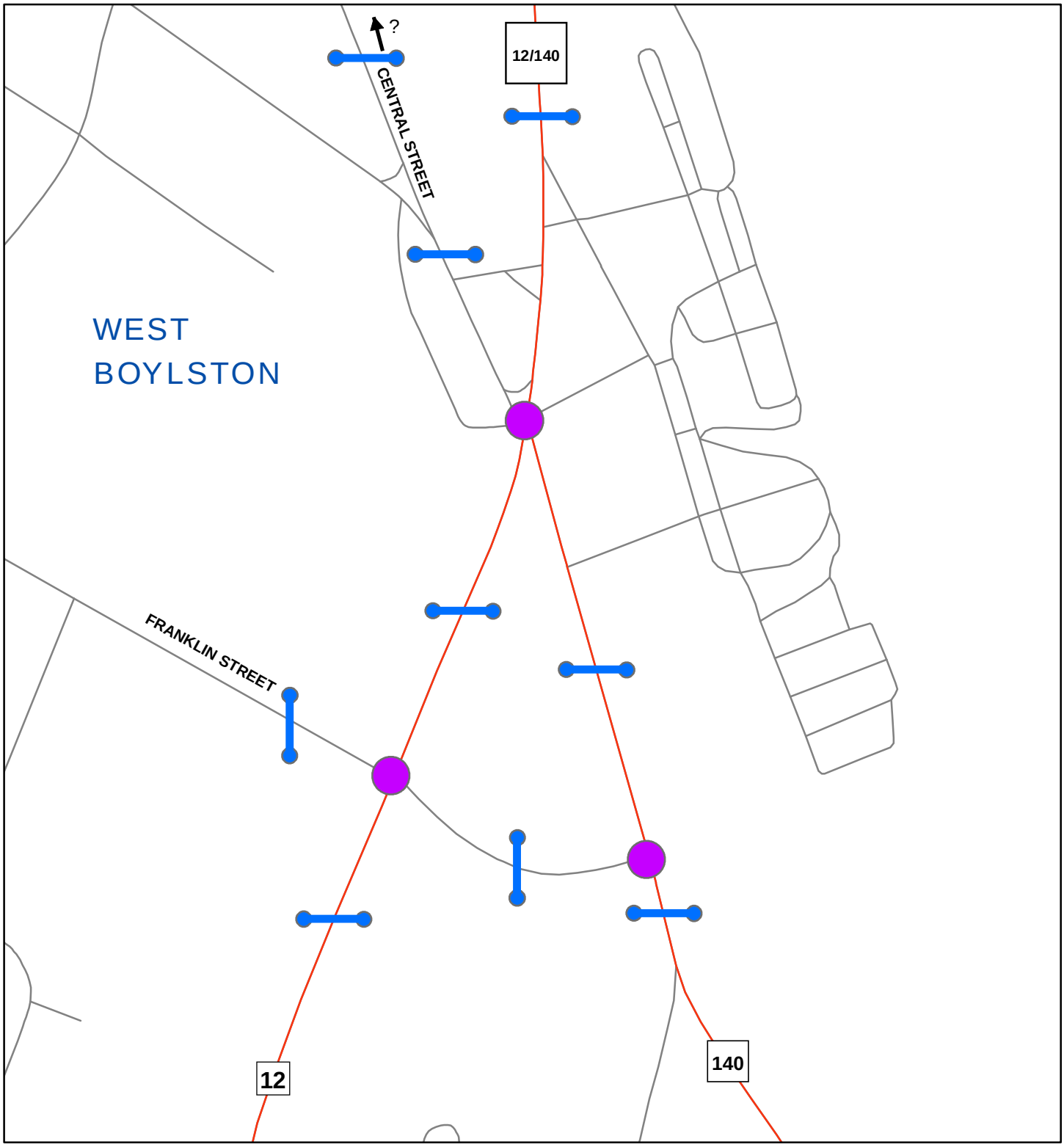
- Fully consider necessary roadway widening, improved intersection geometry through potential realignment. Seek to fully accommodate pedestrians and bicycles with improved sidewalks and roadway shoulder areas. Note that roadway widening often impacts the location of closed drainage structures that would need to be relocated for necessary curbside placement. Further, adjacent homes and businesses will likely be impacted through either temporary easements during construction or permanent land takings to accommodate improvements that meet modern design criteria.

- Existing sidewalks need to be reconstructed and widened. Also, new sidewalks need to be installed, allowing for pedestrian passage and connectivity through this heavily traveled location.

- Consider associated, necessary utility improvements. Utility pole relocation would appear to be necessary to accommodate envisioned roadway widenings.

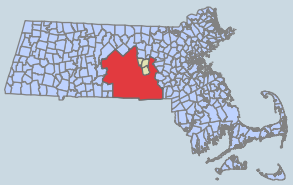
- Host community often responsible for design, environmental and right-of-way acquisitions. In this case, MassDOT maintains the Route 12/Route 140 intersection. *A meeting with District #3 staff and host community officials is suggested.*

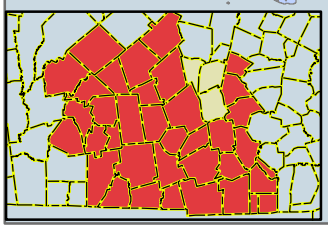
- Submit required Project Need Form (PNF) to MassDOT Highway Division for Project Review Committee (PRC) consideration/acceptance of a new improvement project. If accepted, apply for Transportation Improvement Program ("TIP") funding available to the planning region through the Central Massachusetts Metropolitan Planning Organization (CMMPO). *[FFY 2023+]*



ROUTE 140 CORRIDOR PROFILE

Potential Traffic Count Locations - Spring 2018





Legend

Count Locations - 48 hours
Automatic Traffic Recorder (ATR)

Turning Movement Count Locations
AM & PM Peak Periods

C M R P C
Central Massachusetts Regional Planning Commission

Source: Data provided by the US Census Bureau, Central Massachsuetts Regional Planning Commission (CMRPC), massDOT Office Of Transportation Planning Geospatial Resources Section and the Office of Geographic Information MassGIS), Commonwealth of Massachusetts, Information Technology Division.

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution intrepreting positional accuracy.

1 in = 0.07 miles

Central Massachusetts
Metropolitan Planning Organization

Date:	October 4, 2018
Topic:	West Boylston Transportation Committee
Location:	West Boylston Town Hall
Invited Participants:	Transportation Committee Members Rich Rydant, CMRPC Staff Sujatha Krishnan, CMRPC Staff

AGENDA

1.) Introduction

2.) Route 140 Development Timeline & Next Steps

3.) Corridor Profile Overview
- Traffic Volumes
- Safety
- Pavement
- Environmental
- Overall Corridor Profile Findings
- Observations & Deficiencies
- Suggested Improvements

4.) Adjournment

West Boylston Transportation Committee
October 4, 2018 Meeting

Route 140 Corridor Profile: *Development Timeline*

Third in a competitively chosen series of studies by the CMMPO identified in the federally-required 2015 work plan.

October 2018: Targeted completion of the Route 140 Corridor Profile study document.

November 16, 2015: Program Manager *(former)* arranged conference call, staff MEB, SM, RAR, West Boylston Planning Board Vincent, Raj.

Summer 2016: Staff commences Route 140 CP data collection effort in the three (3) host communities of West Boylston, Boylston & Shrewsbury.

November 2016: Staff directed by Program Manager to contact West Boylston Town Administrator.

December 2016: Staff meeting with West Boylston Town Administrator.

Spring 2017: Data collection efforts continue; in West Boylston, DCR roadway drainage & filtration construction activities near Old Stone Church & Oakdale delay data collection activities.

June 2017: CMRPC Annual Meeting; BOS member informed that staff plans to "respond with additional feedback" concerning the Route 12/Route 140/Central Street intersection.

July/August 2017: Staff summarizes & supplements locally-generated West Boylston Planning Board observations at Route 12/Route 140/Central Street intersection.

September 7, 2017: West Boylston Transportation Committee meeting, Route 12/Route 140/Central Street intersection and overall "Triangle Area" issues discussed. Meeting also includes overview of the annual CMMPO TIP program.

October 5, 2017: West Boylston Transportation Committee meeting, staff returns to clarify earlier discussions as well as resurrect Road Safety Audit (RSA) conducted in 2011.

October 31, 2017: Staff meets with Shrewsbury town officials to discuss the study. Concerns voiced concerning potential truck traffic generation from FedEx development in Boylston.

November 2017: CMRPC brokers meeting with MassDOT District #3 to discuss Route 12/Route 140/Central Street area as well as the "Triangle Area" formed by Route 12, Route 140 and Franklin Street.

> *Town requests MassDOT resurfacing of rutted pavement on Route 12/Route 140/Central Street intersection approaches. MassDOT also requests more recent traffic counts for the entire Triangle Area-CMRPC staff seeks to accommodate this request in the **Spring of 2018**.*

April-May 2018: MassDOT, as requested by the town, scarifies and resurfaces Route 12/Route 140/Central Street intersection. Pavement markings reinstalled, ADA retrofits made on wheelchair ramps.

June 2018: Following resurfacing and pavement marking activities, CMRPC conducts targeted data collection effort in the Triangle Area - *supplementary to the Route 140 CP study effort and at no-cost to the community*. All data was completed while area schools were still in session. When completed, all data was forwarded to MassDOT and town officials.

- Nine (9) Automatic Traffic Recorder (ATR) counts, 48 continuous hours
- Three (3) manual Turning Movement Counts (TMCs), peak flow periods 7-9 AM, 4-6 PM

June 2018: Recently collected traffic volumes used to conduct required preliminary "Signal Warrants Analysis" as detailed in the Manual on Uniform Traffic Control Devices (MUTCD).

- Route 12 at Franklin Street: **MEETS** warrants for required 8-hour period
- Route 140 at Franklin Street: **DOES NOT** meet warrants for required 8-hour period *(Only 5 of 8 required hours)*

July 2018: Route 140 CP traffic flow networks updated to reflect FedEx development in Boylston; independent studies previously conducted by both Boylston & Shrewsbury.

August 2018: "Observations & Identified Deficiencies" compiled for the entire study corridor.

August 16, 2018: CMRPC staff meets with MassDOT District #-3 staff. Session focuses on LRTP update and range of other topics including status of potential improvements at the Route 12/Route 140/Central Street and associated Triangle Area.

> *MassDOT D-3 considers observed traffic volumes to be "fairly low-to-moderate in magnitude". Concerning intersection safety, the calculated Equivalent Property Damage Only (EPDO) ranking for the Route 12/Route 140/Central Street intersection is <40. By comparison, Worcester's Kelly Square EPDO is 542.*

August 28, 2018: Staff meeting with Town Administrator to review most recent status as screened & prioritized by MassDOT. Staff plans to attend October meeting of the West Boylston Transportation Committee.

September 2018: "Suggested Improvement Options" crafted for host community consideration.

September 12, 2018: Staff meets with Boylston Town Administrator to discuss the study. Meeting also includes overview of the annual CMMPO TIP program.

October 4, 2018: West Boylston Transportation Committee meeting. Staff reviews study timeline, report document excerpts and **IMPORTANT NEXT STEPS**.

October 2018: CMRPC staff targets completion of the Route 140 Corridor Profile study document for the host communities of West Boylston, Boylston & Shrewsbury. *Technical Appendix materials will also accompany the completed study.)*

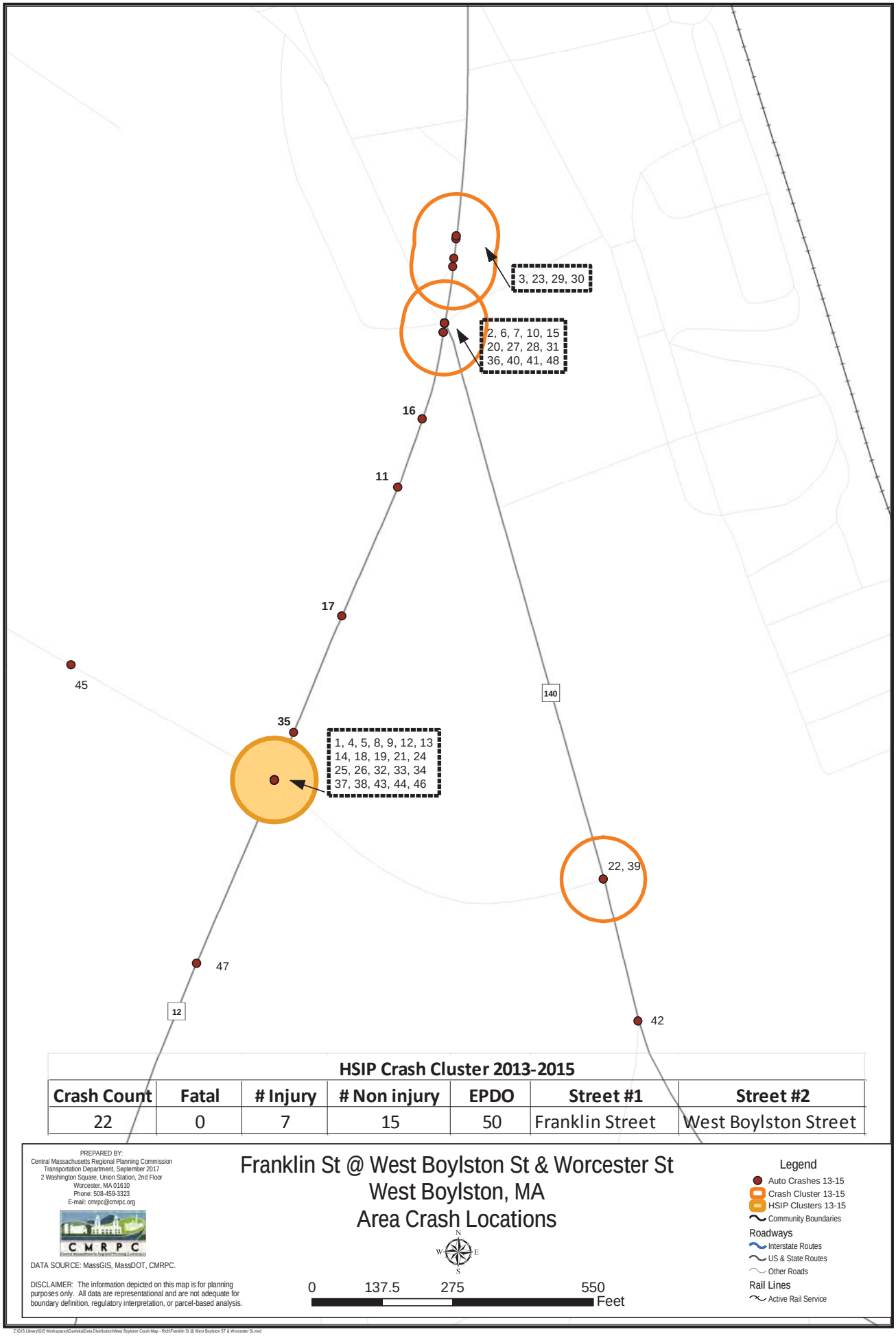
IMPORTANT NEXT STEPS:

- Based on MassDOT feedback, West Boylston officials *"Need to **decide** how to proceed. What is the community seeking and what will the community accept?"*

- MassDOT District #3 has suggested, at meeting held August 16, 2018, that the community hold a **Public Information Meeting** in order to determine local sentiment for improvements at the Route 12/Route 140/Central Street intersection, the adjacent town common area and the Triangle Area formed with nearby Franklin Street.

- Does community consensus exist?? If so, MassDOT has suggested to bring the project to a **"10% design level"** *(accordingly less than the standard 25% design stage)*.

- *TEC, VHB, HNTB, AECOM, others, suggested as **potential consultants** to assist the host community with a Public Information Meeting that includes a future visioning session or design "charette".*



HSIP Crash Cluster 2013-2015

Crash Count	Fatal	# Injury	# Non injury	EPDO	Street #1	Street #2
22	0	7	15	50	Franklin Street	West Boylston Street

PREPARED BY:
Central Massachusetts Regional Planning Commission
Transportation Department, September 2017
2 Washington Square, Union Station, 2nd Floor
Worcester, MA 01610
Phone: 508-459-3323
E-mail: cmrpc@cmrpc.org

DATA SOURCE: MassGIS, MassDOT, CMRPC.

DISCLAIMER: The information depicted on this map is for planning purposes only. All data are representational and are not adequate for boundary definition, regulatory interpretation, or parcel-based analysis.

Franklin St @ West Boylston St & Worcester St
West Boylston, MA
Area Crash Locations

0 137.5 275 550 Feet

Legend
- Auto Crashes 13-15
- Crash Cluster 13-15
- HSIP Clusters 13-15
- Community Boundaries

Roadways
- Interstate Routes
- US & State Routes
- Other Roads

Rail Lines
- Active Rail Service

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WORCESTER, MASSACHUSETTS

Projects safeguard Wachusett Reservoir

By Ken Cleveland Item Correspondent
Posted Aug 25, 2017 at 2:00 AM
Updated Aug 25, 2017 at 11:12 AM

The Wachusett Reservoir holds 65 billion gallons of water, more or less, and is the primary source of water for about 2.5 million Massachusetts residents.

While the towns surrounding the reservoir host the water and the watershed that feeds into it, the state Department of Conservation and Recreation is charged with protecting the quality of the water, including managing the watershed that helps feeds the water supply.

Those efforts have been visible in recent years — and days — with projects to safeguard the reservoir.

"The top priority is to eliminate direct discharge of stormwater into the reservoir," according to Jonathan Yeo, DCR's director of water supply protection.

The agency has "a comprehensive program" in all three major watersheds (the Wachusett Reservoir, Quabbin Reservoir and the Ware River), he said. Road runoff directly entering the reservoir is a major concern, carrying contaminants such as salt into the drinking water supply.

But there is more.

"The big concern is the potential overturn of a tanker and release of hazardous material into the reservoir," Yeo said. The solution was a series of basins and control systems "to capture and treat stormwater" and contain any spill, allowing it to be captured before entering the reservoir.

With more than $700,000 invested in planning and design, the network of basins is being installed.

Boylston and Clinton

It started along Route 70 from Boylston into Clinton, then focused on other areas.

DCR has worked with the Massachusetts Department of Transportation (MassDOT), Yeo said.

"MassDOT has been willing to fund and manage construction of these projects," he said, which has cost more than $7 million over the past seven or eight years.

"We started in Clinton at the Cosgrove intake (along Route 70) seven or eight years ago," Yeo said, directing stormwater down the hill past the dam and into the park area.

West Boylston

The area of the causeway carrying Route 12 over the reservoir in West Boylston was the next project.

Recently completed, the project had to deal with water coming from both the north and south.

The solution was "a series of basins that trap and treat stormwater and discharge. There is no discharge even from the causeway into the reservoir," Yeo said.

In addition, the project was able to "wrap together other improvements," such as sidewalks along the west side of causeway — "having sidewalks is a nice improvement" — and clear road markings. The West Boylston water depth water lines were also piggy-backed onto the project.

"It looks great," Yeo said of the finished project. "And for protecting the water supply, it has been great."

Plantings are geared to those that thrive in an "occasional water environment" when runoff fills the basins. "We're happy with it," he said.

For those who want to learn more, signs detail the project and how the basins and filtration system work.

Other work is under way on Beaman Street in West Boylston near Oakdale. Making use of the former Chapman well-drilling property the DCR had purchased and an old parking lot on the other side, storm drains and basins have been installed.

"Hopefully, that work will wrap up soon," Yeo said.

Back to Boylston

Work is also being done along Route 140, in Boylston, just past the West Boylston line.

There, "treatment units will be in the ground; we don't have room for basins there," Yeo said. The devices will trap and treat stormwater before it enters the reservoir in the south bay area. "A few years ago, there was an accident with a truck and car on that stretch, and there was a small discharge into the reservoir. It gets at the threat we would like to eliminate."

With MassDOT pushing up the construction phase of the project, Yeo said there was no opportunity in the current project to address the "S" curve on that part of the road, but "we still hope it will happen. The 'S' curve was going to be a bigger challenge in engineering into the hillside. It is our hope one day we can work with MassDOT and the towns to get that changed." Both towns have expressed concerns about the dangerousness of that portion of Route 140.

The ongoing project, however, "will have taken care of the watershed quality mission."

In that area, trees have been taken down, making room for treatment areas in a space that has little room between the reservoir and the road before steep hills. Some filtration devices will be on either side. As work goes on, "we hope to keep detours to a minimum," Yeo said.

Sterling

Another area that could also see work, on a smaller scale, is the north dike area along Route 110 in Sterling. Overall, the projects have resulted in "a gigantic improvement to the quality of the water system, and improvements to the roads and for pedestrians."

Yeo said there is constant training with local fire and police departments to prepare for situations they hope never happen.

"We work closely with local emergency responders," he said, with public education as well to make the reservoir more than just a body of water local residents drive by.

"And lots of fishermen are enjoying the public access," Yeo said, noting a record white perch was taken from Wachusett recently.

"There is a competition between Quabbin and Wachusett," he said, with each holding records in different fishing categories. "Wachusett is an amazing fishery," Yeo added, with the shores of the reservoir attracting fishing enthusiasts who take advantage of its bounty from April through November each year.

This year, with the drought over, the reservoir is up to normal operations, he said.

Education

With numerous places for walking, and interpretive programs and school presentations, the DCR gets its message out. That includes tours of the dam for school groups, and the popular twice-yearly opening of the top of the dam, in

Clinton, to the public.

Meanwhile, regular maintenance of the watershed areas continues, including forestry efforts. Tree removals are part of regular forestry management of the watershed, including allowing new native hardwood growth.

In the past, some trees were removed because of their condition, such as red pines along Route 70 in Clinton that had root rot, and in the Thomas Basin in West Boylston. That allowed native growth to replace the pines that were planted in the 1930s, largely after the Hurricane of 1938 and through Works Progress Administration programs of that era.

While work continues to protect the water supply, Yeo said, efforts will be made to keep traffic delays to a minimum so as not to inconvenience local drivers.

In the end, the reservoir and adjoining watershed areas will remain a large piece of the local communities and a crucial resource for thirsty Massachusetts residents, who sip its waters every day.

CENTRAL MASS REGIONAL PLANNING COMMISSION—MPO & AC

T.I.P. PROJECT REVIEW

Date : January 23, 2015

Project Number: 607734 Town/City : West Boylston MDOT DISTRICT: 3

Project Name : Rehabilitation and Stormwater Improvements on Sterling Street (Rte. 14) at the Wachusett Reservoir

STATUS

Design Level : 25% Engineers Estimate : $2.04 m

PRC Approved ? Yes TIP Schedule : 2016

Is the Project eligible for "HSIP" ? Is the Project eligible for "CMAQ" ?

Has an RSA been held/scheduled : Does the Project comply with Healthy Transportation Policy ?

Project Overview :

The proposed project involves rehabilitation of a section of Route 140/12 in West Boylston. A major component of the project is to provide stormwater mitigation and spill containment for Wachusett Reservoir, which supplies drinking water for approximately 2 million residents of the Commonwealth. The project involves reconstruction of existing sidewalk and construction of new sidewalk to provide pedestrian connection to existing sidewalk. Related work involves improvements to guardrail and relocation of entrance to a gravel parking lot to improve sight distance for exiting vehicles. The West Boylston Water Department is coordinating work to replace old water main that runs through the project area.

Regional Significance :

Route 12/140 is a significant travel corridor north\south through the region. In addition, protection of the Reservoir is significant for metropolitan Boston as well as the Town of Clinton water supplies. The reservoir also serves as a significant recreational resource in the region and protection from a transportation spill is significant

What Permits and/or ROW are anticipated : DCR will obtain conservation commission approval. MassDOT is pursuing ROW. All ROW owned by DCR or MassDOT.

Are there EJ Concerns

Are there ED Benefits : .

Can the Project be PHASED : No. .

What is Next in the Schedule : Complete design; put out to bid October 2015.

Route 140 Corridor Profile:
Complete Traffic Volume Data Collection Effort

Town of West Boylston

ATRs: Route 140 at Sterling Town Line, **9/13/16**
Route 140 north of Route 12, **9/13/16**
Route 140/12 north of Central Street, **10/19/16**
Route 140 south of Route 12, **9/13/16**

TMCs: Route 140/Laurel Street, **5/24/16**
Route 140/Route 12, **9/2/11**
Route 140/Route 12/Central Street, **8/21/14**
Route 140/Franklin Street, **9/25/12**
Route 12/Franklin Street, **9/25/12**

Town : West Boylston
Street : North Main Street (Rt 140)
Location : At Sterling TL

Site: 2016181

Weekly Volume

Interval Start	Mon 9/12/2016		Tue 9/13/2016		Wed 9/14/2016		Thu 9/15/2016		Fri 9/16/2016		Sat 9/17/2016		Sun 9/18/2016		Mon - Fri Average		Weekly Average	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
12:00 AM	-	-	7	13	8	8	-	-	-	-	-	-	-	-	7.5	10.5	7.5	10.5
1:00 AM	-	-	5	5	5	4	-	-	-	-	-	-	-	-	5.0	4.5	5.0	4.5
2:00 AM	-	-	9	4	6	5	-	-	-	-	-	-	-	-	7.5	4.5	7.5	4.5
3:00 AM	-	-	5	8	6	12	-	-	-	-	-	-	-	-	5.5	10.0	5.5	10.0
4:00 AM	-	-	42	13	34	13	-	-	-	-	-	-	-	-	38.0	13.0	38.0	13.0
5:00 AM	-	-	102	33	97	32	-	-	-	-	-	-	-	-	99.5	32.5	99.5	32.5
6:00 AM	-	-	268	89	268	81	-	-	-	-	-	-	-	-	268.0	85.0	268.0	85.0
7:00 AM	-	-	325	140	327	122	-	-	-	-	-	-	-	-	326.0	131.0	326.0	131.0
8:00 AM	-	-	215	149	240	138	-	-	-	-	-	-	-	-	227.5	143.5	227.5	143.5
9:00 AM	-	-	161	118	154	124	-	-	-	-	-	-	-	-	157.5	121.0	157.5	121.0
10:00 AM	120	113	137	117	-	-	-	-	-	-	-	-	-	-	128.5	115.0	128.5	115.0
11:00 AM	114	134	137	130	-	-	-	-	-	-	-	-	-	-	125.5	132.0	125.5	132.0
12:00 PM	107	127	136	134	-	-	-	-	-	-	-	-	-	-	121.5	130.5	121.5	130.5
1:00 PM	139	151	143	149	-	-	-	-	-	-	-	-	-	-	141.0	150.0	141.0	150.0
2:00 PM	151	170	149	178	-	-	-	-	-	-	-	-	-	-	150.0	174.0	150.0	174.0
3:00 PM	186	270	183	304	-	-	-	-	-	-	-	-	-	-	184.5	287.0	184.5	287.0
4:00 PM	167	365	201	349	-	-	-	-	-	-	-	-	-	-	184.0	357.0	184.0	357.0
5:00 PM	183	386	178	412	-	-	-	-	-	-	-	-	-	-	180.5	399.0	180.5	399.0
6:00 PM	139	241	127	251	-	-	-	-	-	-	-	-	-	-	133.0	246.0	133.0	246.0
7:00 PM	91	146	75	148	-	-	-	-	-	-	-	-	-	-	83.0	147.0	83.0	147.0
8:00 PM	41	71	65	93	-	-	-	-	-	-	-	-	-	-	53.0	82.0	53.0	82.0
9:00 PM	33	65	32	69	-	-	-	-	-	-	-	-	-	-	32.5	67.0	32.5	67.0
10:00 PM	23	40	34	36	-	-	-	-	-	-	-	-	-	-	28.5	38.0	28.5	38.0
11:00 PM	15	35	14	30	-	-	-	-	-	-	-	-	-	-	14.5	32.5	14.5	32.5
Totals	1509	2314	2750	2972	1145	539	0	0	0	0	0	0	0	0	2702.0	2912.5	2702.0	2912.5
Combined	3823		5722		1684		0		0		0		0		5614.5		5614.5	
Split (%)	39.5	60.5	48.1	51.9	68.0	32.0	-	-	-	-	-	-	-	-	48.1	51.9	48.1	51.9

Peak Hours

12:00 AM - 12:00 PM	10:00 AM	11:00 AM	7:00 AM	8:00 AM	7:00 AM	8:00 AM	-	-	-	-	-	-	-	-	7:00 AM	8:00 AM	7:00 AM	8:00 AM
Volume	120	134	325	149	327	138	-	-	-	-	-	-	-	-	326.0	143.5	326.0	143.5
12:00 PM - 12:00 AM	3:00 PM	5:00 PM	4:00 PM	5:00 PM	-	-	-	-	-	-	-	-	-	-	3:00 PM	5:00 PM	3:00 PM	5:00 PM
Volume	186	386	201	412	-	-	-	-	-	-	-	-	-	-	184.5	399.0	184.5	399.0

Town : West Boylston
Street : Beaman Street (140)
Location : North of Sterling Street (140/12)

Site: 2016219

Weekly Volume

Interval Start	Mon 9/12/2016		Tue 9/13/2016		Wed 9/14/2016		Thu 9/15/2016		Fri 9/16/2016		Sat 9/17/2016		Sun 9/18/2016		Mon - Fri Average		Weekly Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	-	-	5	8	7	7	-	-	-	-	-	-	-	-	6.0	7.5	6.0	7.5
1:00 AM	-	-	1	5	2	1	-	-	-	-	-	-	-	-	1.5	3.0	1.5	3.0
2:00 AM	-	-	3	1	1	3	-	-	-	-	-	-	-	-	2.0	2.0	2.0	2.0
3:00 AM	-	-	1	6	2	5	-	-	-	-	-	-	-	-	1.5	5.5	1.5	5.5
4:00 AM	-	-	9	4	7	5	-	-	-	-	-	-	-	-	8.0	4.5	8.0	4.5
5:00 AM	-	-	23	27	31	20	-	-	-	-	-	-	-	-	27.0	23.5	27.0	23.5
6:00 AM	-	-	93	48	82	41	-	-	-	-	-	-	-	-	87.5	44.5	87.5	44.5
7:00 AM	-	-	166	82	170	82	-	-	-	-	-	-	-	-	168.0	82.0	168.0	82.0
8:00 AM	-	-	121	93	161	84	-	-	-	-	-	-	-	-	141.0	88.5	141.0	88.5
9:00 AM	-	-	111	74	97	97	-	-	-	-	-	-	-	-	104.0	85.5	104.0	85.5
10:00 AM	71	84	78	98	79	89	-	-	-	-	-	-	-	-	76.0	90.3	76.0	90.3
11:00 AM	62	86	86	95	-	-	-	-	-	-	-	-	-	-	74.0	90.5	74.0	90.5
12:00 PM	67	107	89	124	-	-	-	-	-	-	-	-	-	-	78.0	115.5	78.0	115.5
1:00 PM	76	101	81	107	-	-	-	-	-	-	-	-	-	-	78.5	104.0	78.5	104.0
2:00 PM	112	120	119	105	-	-	-	-	-	-	-	-	-	-	115.5	112.5	115.5	112.5
3:00 PM	133	164	121	151	-	-	-	-	-	-	-	-	-	-	127.0	157.5	127.0	157.5
4:00 PM	115	190	123	198	-	-	-	-	-	-	-	-	-	-	119.0	194.0	119.0	194.0
5:00 PM	93	201	113	217	-	-	-	-	-	-	-	-	-	-	103.0	209.0	103.0	209.0
6:00 PM	76	114	98	129	-	-	-	-	-	-	-	-	-	-	87.0	121.5	87.0	121.5
7:00 PM	57	84	51	78	-	-	-	-	-	-	-	-	-	-	54.0	81.0	54.0	81.0
8:00 PM	22	44	23	53	-	-	-	-	-	-	-	-	-	-	22.5	48.5	22.5	48.5
9:00 PM	17	39	11	48	-	-	-	-	-	-	-	-	-	-	14.0	43.5	14.0	43.5
10:00 PM	7	18	16	23	-	-	-	-	-	-	-	-	-	-	11.5	20.5	11.5	20.5
11:00 PM	5	13	6	8	-	-	-	-	-	-	-	-	-	-	5.5	10.5	5.5	10.5
Totals	913	1365	1548	1782	639	434	0	0	0	0	0	0	0	0	1512.0	1745.3	1512.0	1745.3
Combined	2278		3330		1073		0		0		0		0		3257.3		3257.3	
Split (%)	40.1	59.9	46.5	53.5	59.6	40.4	-	-	-	-	-	-	-	-	46.4	53.6	46.4	53.6

Peak Hours

12:00 AM - 12:00 PM	10:00 AM	11:00 AM	7:00 AM	10:00 AM	7:00 AM	9:00 AM	-	-	-	-	-	-	-	-	7:00 AM	11:00 AM	7:00 AM	11:00 AM
Volume	71	86	166	98	170	97	-	-	-	-	-	-	-	-	168.0	90.5	168.0	90.5
12:00 PM - 12:00 AM	3:00 PM	5:00 PM	4:00 PM	5:00 PM	-	-	-	-	-	-	-	-	-	-	3:00 PM	5:00 PM	3:00 PM	5:00 PM
Volume	133	201	123	217	-	-	-	-	-	-	-	-	-	-	127.0	209.0	127.0	209.0

Town : West Boylston
Street : Worcester Street (12/140)
Location : North of Central Street

Site: 2016220

Weekly Volume

Interval Start	Mon 10/17/2016		Tue 10/18/2016		Wed 10/19/2016		Thu 10/20/2016		Fri 10/21/2016		Sat 10/22/2016		Sun 10/23/2016		Mon - Fri Average		Weekly Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	-	-	-	-	12	25	11	29	-	-	-	-	-	-	11.5	27.0	11.5	27.0
1:00 AM	-	-	-	-	5	21	7	15	-	-	-	-	-	-	6.0	18.0	6.0	18.0
2:00 AM	-	-	-	-	9	4	7	9	-	-	-	-	-	-	8.0	6.5	8.0	6.5
3:00 AM	-	-	-	-	16	21	15	16	-	-	-	-	-	-	15.5	18.5	15.5	18.5
4:00 AM	-	-	-	-	55	36	44	35	-	-	-	-	-	-	49.5	35.5	49.5	35.5
5:00 AM	-	-	-	-	145	64	137	70	-	-	-	-	-	-	141.0	67.0	141.0	67.0
6:00 AM	-	-	-	-	337	203	330	188	-	-	-	-	-	-	333.5	195.5	333.5	195.5
7:00 AM	-	-	-	-	632	183	527	266	-	-	-	-	-	-	579.5	224.5	579.5	224.5
8:00 AM	-	-	-	-	513	267	475	255	-	-	-	-	-	-	494.0	261.0	494.0	261.0
9:00 AM	-	-	-	-	344	269	335	268	-	-	-	-	-	-	339.5	268.5	339.5	268.5
10:00 AM	-	-	-	-	305	281	302	297	-	-	-	-	-	-	303.5	289.0	303.5	289.0
11:00 AM	-	-	-	-	271	343	-	-	-	-	-	-	-	-	271.0	343.0	271.0	343.0
12:00 PM	-	-	334	329	316	384	-	-	-	-	-	-	-	-	325.0	356.5	325.0	356.5
1:00 PM	-	-	294	358	317	381	-	-	-	-	-	-	-	-	305.5	369.5	305.5	369.5
2:00 PM	-	-	362	382	332	453	-	-	-	-	-	-	-	-	347.0	417.5	347.0	417.5
3:00 PM	-	-	414	546	366	548	-	-	-	-	-	-	-	-	390.0	547.0	390.0	547.0
4:00 PM	-	-	353	613	394	630	-	-	-	-	-	-	-	-	373.5	621.5	373.5	621.5
5:00 PM	-	-	378	693	375	683	-	-	-	-	-	-	-	-	376.5	688.0	376.5	688.0
6:00 PM	-	-	275	467	346	445	-	-	-	-	-	-	-	-	310.5	456.0	310.5	456.0
7:00 PM	-	-	174	310	211	298	-	-	-	-	-	-	-	-	192.5	304.0	192.5	304.0
8:00 PM	-	-	122	247	118	247	-	-	-	-	-	-	-	-	120.0	247.0	120.0	247.0
9:00 PM	-	-	101	173	68	147	-	-	-	-	-	-	-	-	84.5	160.0	84.5	160.0
10:00 PM	-	-	45	84	47	80	-	-	-	-	-	-	-	-	46.0	82.0	46.0	82.0
11:00 PM	-	-	30	66	30	64	-	-	-	-	-	-	-	-	30.0	65.0	30.0	65.0
Totals	0	0	2882	4268	5564	6077	2190	1448	0	0	0	0	0	0	5453.5	6068.0	5453.5	6068.0
Combined	0		7150		11641		3638		0		0		0		11521.5		11521.5	
Split (%)	-	-	40.3	59.7	47.8	52.2	60.2	39.8	-	-	-	-	-	-	47.3	52.7	47.3	52.7

Peak Hours

12:00 AM - 12:00 PM	-	-	-	-	7:00 AM	11:00 AM	7:00 AM	10:00 AM	-	-	-	-	-	-	7:00 AM	11:00 AM	7:00 AM	11:00 AM
Volume	-	-	-	-	632	343	527	297	-	-	-	-	-	-	579.5	343.0	579.5	343.0
12:00 PM - 12:00 AM	-	-	3:00 PM	5:00 PM	4:00 PM	5:00 PM	-	-	-	-	-	-	-	-	3:00 PM	5:00 PM	3:00 PM	5:00 PM
Volume	-	-	414	693	394	683	-	-	-	-	-	-	-	-	390.0	688.0	390.0	688.0

Town : West Boylston
Street : Worcester Street (Rt 140)
Location : South of West Boylston Street (Rt 12)

Site: 2016221

Weekly Volume

Interval Start	Mon 9/12/2016		Tue 9/13/2016		Wed 9/14/2016		Thu 9/15/2016		Fri 9/16/2016		Sat 9/17/2016		Sun 9/18/2016		Mon - Fri Average		Weekly Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	-	-	30	7	39	6	-	-	-	-	-	-	-	-	34.5	6.5	34.5	6.5
1:00 AM	-	-	14	5	25	4	-	-	-	-	-	-	-	-	19.5	4.5	19.5	4.5
2:00 AM	-	-	9	9	5	6	-	-	-	-	-	-	-	-	7.0	7.5	7.0	7.5
3:00 AM	-	-	7	8	12	12	-	-	-	-	-	-	-	-	9.5	10.0	9.5	10.0
4:00 AM	-	-	11	42	9	30	-	-	-	-	-	-	-	-	10.0	36.0	10.0	36.0
5:00 AM	-	-	27	107	32	111	-	-	-	-	-	-	-	-	29.5	109.0	29.5	109.0
6:00 AM	-	-	85	324	65	311	-	-	-	-	-	-	-	-	75.0	317.5	75.0	317.5
7:00 AM	-	-	167	667	208	625	-	-	-	-	-	-	-	-	187.5	646.0	187.5	646.0
8:00 AM	-	-	242	630	230	644	-	-	-	-	-	-	-	-	236.0	637.0	236.0	637.0
9:00 AM	-	-	212	340	241	384	-	-	-	-	-	-	-	-	226.5	362.0	226.5	362.0
10:00 AM	-	-	197	252	195	248	-	-	-	-	-	-	-	-	196.0	250.0	196.0	250.0
11:00 AM	183	201	215	215	-	-	-	-	-	-	-	-	-	-	199.0	208.0	199.0	208.0
12:00 PM	213	217	240	221	-	-	-	-	-	-	-	-	-	-	226.5	219.0	226.5	219.0
1:00 PM	227	212	228	253	-	-	-	-	-	-	-	-	-	-	227.5	232.5	227.5	232.5
2:00 PM	285	238	310	275	-	-	-	-	-	-	-	-	-	-	297.5	256.5	297.5	256.5
3:00 PM	445	255	446	269	-	-	-	-	-	-	-	-	-	-	445.5	262.0	445.5	262.0
4:00 PM	622	275	643	272	-	-	-	-	-	-	-	-	-	-	632.5	273.5	632.5	273.5
5:00 PM	755	272	720	272	-	-	-	-	-	-	-	-	-	-	737.5	272.0	737.5	272.0
6:00 PM	604	233	610	225	-	-	-	-	-	-	-	-	-	-	607.0	229.0	607.0	229.0
7:00 PM	320	197	351	198	-	-	-	-	-	-	-	-	-	-	335.5	197.5	335.5	197.5
8:00 PM	210	104	226	115	-	-	-	-	-	-	-	-	-	-	218.0	109.5	218.0	109.5
9:00 PM	141	68	163	78	-	-	-	-	-	-	-	-	-	-	152.0	73.0	152.0	73.0
10:00 PM	77	24	93	47	-	-	-	-	-	-	-	-	-	-	85.0	35.5	85.0	35.5
11:00 PM	60	29	64	24	-	-	-	-	-	-	-	-	-	-	62.0	26.5	62.0	26.5
Totals	4142	2325	5310	4855	1061	2381	0	0	0	0	0	0	0	0	5256.5	4780.5	5256.5	4780.5
Combined	6467		10165		3442		0		0		0		0		10037.0		10037.0	
Split (%)	64.0	36.0	52.2	47.8	30.8	69.2	-	-	-	-	-	-	-	-	52.4	47.6	52.4	47.6

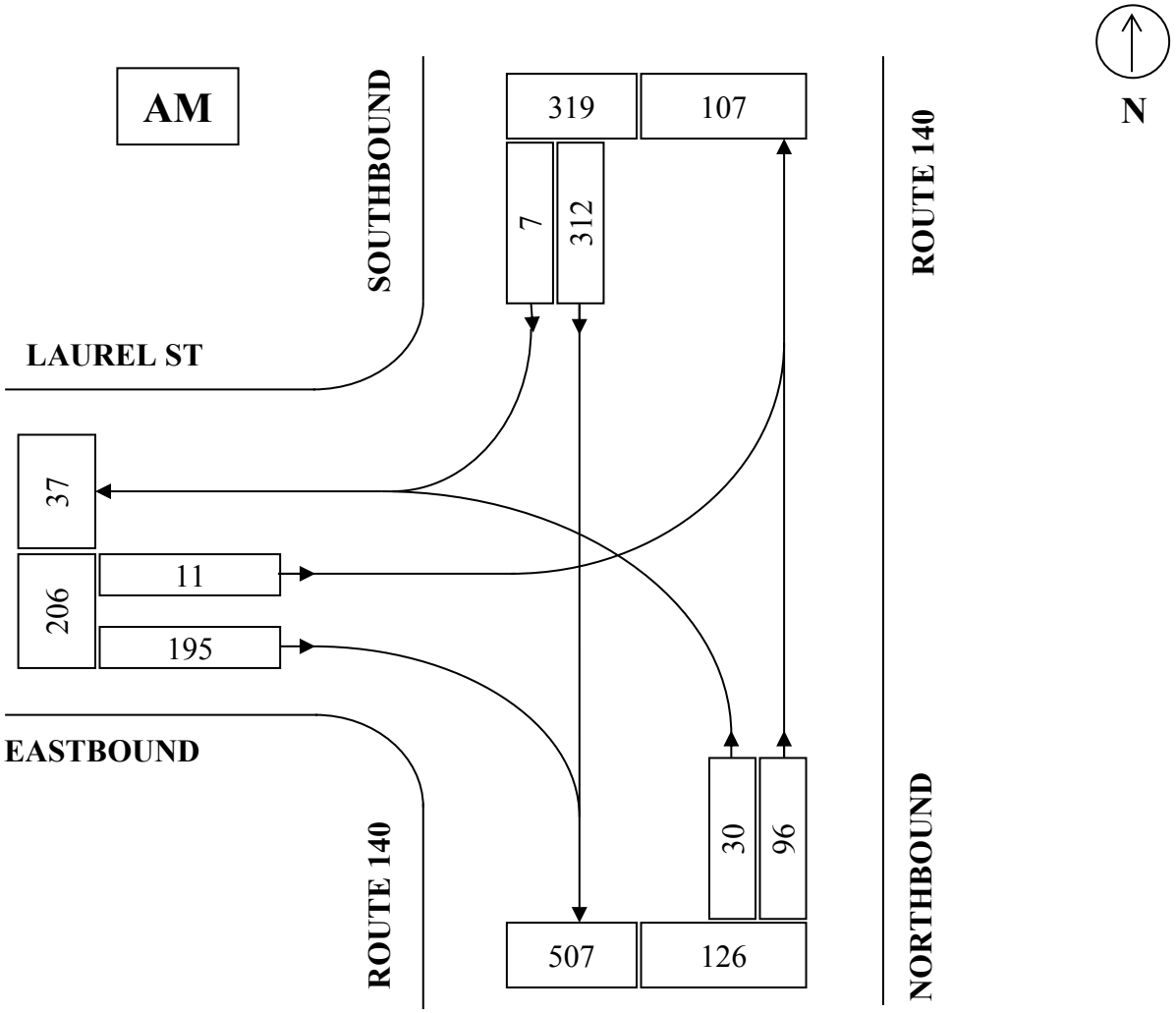
Peak Hours

12:00 AM - 12:00 PM	11:00 AM	11:00 AM	8:00 AM	7:00 AM	9:00 AM	8:00 AM	-	-	-	-	-	-	-	-	8:00 AM	7:00 AM	8:00 AM	7:00 AM
Volume	183	201	242	667	241	644	-	-	-	-	-	-	-	-	236.0	646.0	236.0	646.0
12:00 PM - 12:00 AM	5:00 PM	4:00 PM	5:00 PM	2:00 PM	-	-	-	-	-	-	-	-	-	-	5:00 PM	4:00 PM	5:00 PM	4:00 PM
Volume	755	275	720	275	-	-	-	-	-	-	-	-	-	-	737.5	273.5	737.5	273.5

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: West Boylston **DATE:** 5/24/16 **DAY OF WEEK:** Tuesday
INTERSECTION: Route 140 / Laurel Street

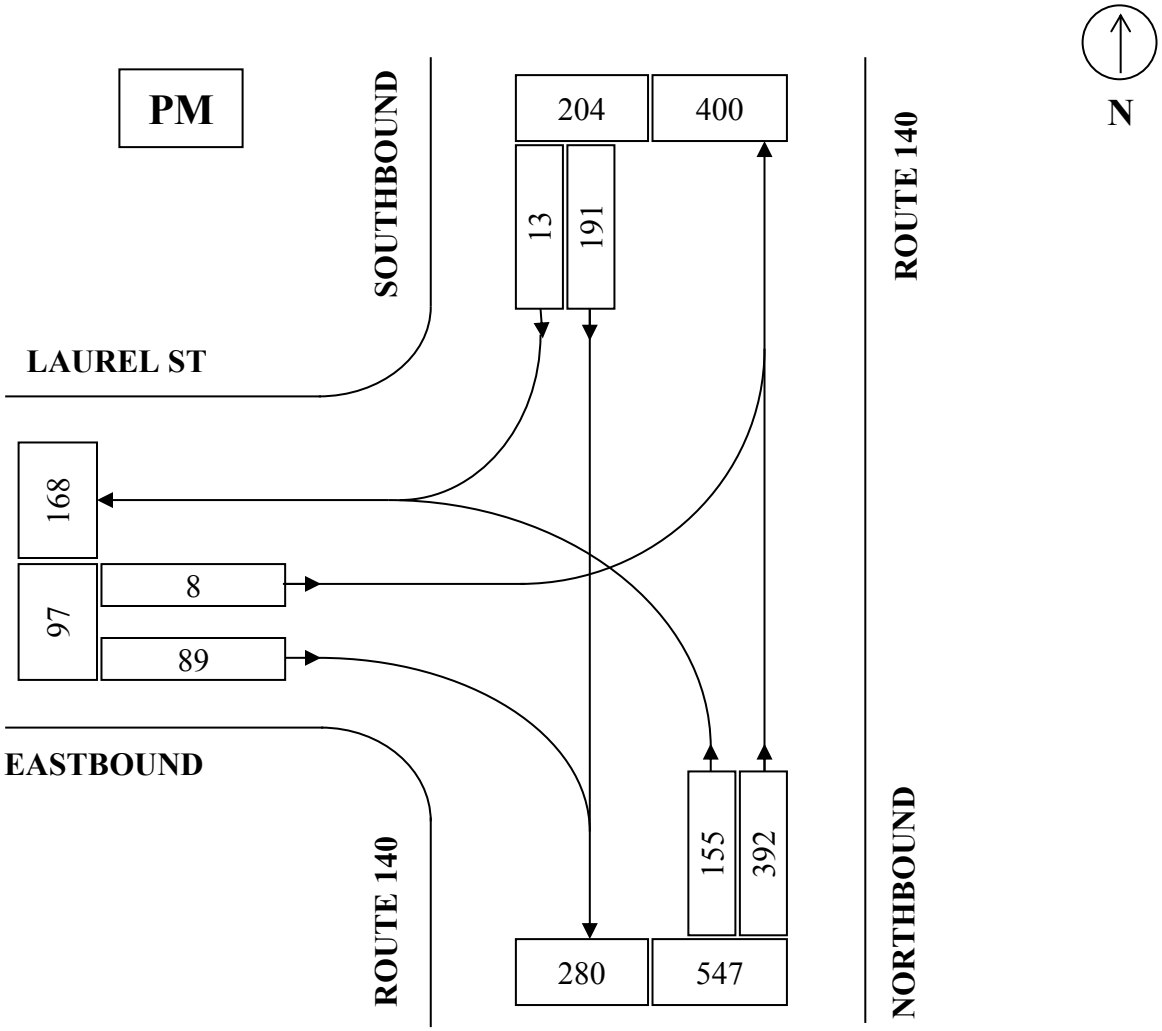


STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			7:00 - 8:00 AM
Laurel St EB	206	31.6%	
			PHF = .97
Route 140 NB	126	19.4%	
			VEHICLES COUNTED
Route 140 SB	319	49.0%	
			ALL VEHICLES: 651
TOTAL	651	100.0%	**TRUCKS:** 14
			PERCENT TRUCKS: 2.15%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: West Boylston **DATE:** 5/24/16 **DAY OF WEEK:** Tuesday
INTERSECTION: Route 140 / Laurel Street



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			4:45 - 5:45 PM
Laurel St EB	97	11.4%	
			PHF = .96
Route 140 NB	547	64.5%	
			VEHICLES COUNTED
Route 140 SB	204	24.1%	
			ALL VEHICLES: 848
TOTAL	848	100.0%	**TRUCKS:** 9
			PERCENT TRUCKS: 1.06%

TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: Town of West Boylston

DATE: 5/24/2016

LOCATION: Route 140 / Laurel Street

DAY OF WEEK: Tuesday

WEATHER: AM: Cloudy/Rain PM: Clear

TECHNICIAN: ZB

Time Period	Laurel St EB								Route 140 NB				Route 140 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15	3	0	50	1					7	27	0	4	0	78	2	0	167	
7:15 - 7:30	1	0	54	0					8	17	0	2	0	83	4	0	167	
7:30 - 7:45	2	0	43	0					6	25	0	3	0	74	0	3	150	
7:45 - 8:00	5	0	48	0					9	27	0	1	0	77	1	0	167	651
8:00 - 8:15	3	0	49	1					15	30	0	2	0	45	3	1	145	629
8:15 - 8:30	8	0	33	1					18	32	0	3	0	60	3	1	154	616
8:30 - 8:45	4	0	38	2					10	28	0	2	0	58	0	0	138	604
8:45 - 9:00	1	0	27	0					13	26	0	0	0	47	4	2	118	555
TOTAL	27	0	342	5	0	0	0	0	86	212	0	17	0	522	17	7	1206	
		EBPct	31.6			**WBPct**	0.0			**NBPct**	19.4			**SBPct**	49.0			
Peak Sums:	**11**	**0**	**195**	**1**	**0**	**0**	**0**	**0**	**30**	**96**	**0**	**10**	**0**	**312**	**7**	**3**	**651**	
Total Trucks	14					**TrkPct**	2.15			**PHF**	0.97							

Time Period	Laurel St EB								Route 140 NB				Route 140 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15	5	0	15	0					46	103	0	3	0	49	4	2	222	
4:15 - 4:30	2	0	14	0					41	79	0	1	0	43	6	2	185	
4:30 - 4:45	7	0	14	1					44	98	0	5	0	45	1	2	209	
4:45 - 5:00	4	0	19	1					44	94	0	2	0	55	3	2	219	835
5:00 - 5:15	2	0	22	0					27	99	0	1	0	43	3	0	196	809
5:15 - 5:30	2	0	16	0					46	103	0	1	0	50	3	2	220	844
5:30 - 5:45	0	0	32	0					38	96	0	0	0	43	4	0	213	848
5:45 - 6:00	0	0	18	0					52	100	0	2	0	42	4	0	216	845
TOTAL	22	0	150	2	0	0	0	0	338	772	0	15	0	370	28	10	1680	
		EBPct	11.4			**WBPct**	0.0			**NBPct**	64.5			**SBPct**	24.1			
Peak Sums:	**8**	**0**	**89**	**1**	**0**	**0**	**0**	**0**	**155**	**392**	**0**	**4**	**0**	**191**	**13**	**4**	**848**	
Total Trucks	9					**TrkPct**	1.06			**PHF**	0.96							

HCS7 Two-Way Stop-Control Report

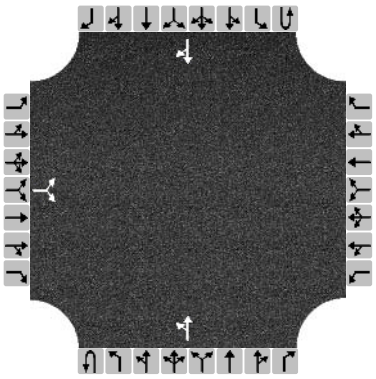
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/25/2016
Analysis Year	2016
Time Analyzed	7:00 - 8:00 AM
Intersection Orientation	North-South
Project Description	Balanced 2016

Site Information

Intersection	Route 140/Laurel St
Jurisdiction	West Boylston
East/West Street	Laurel St
North/South Street	Route 140
Peak Hour Factor	0.97
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		11		195						30	96				312	7
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			212							31						
Capacity, c (veh/h)			702							1230						
v/c Ratio			0.30							0.03						
95% Queue Length, Q_{95} (veh)			1.3							0.1						
Control Delay (s/veh)			12.3							8.0						
Level of Service, LOS			B							A						
Approach Delay (s/veh)		12.3								2.1						
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

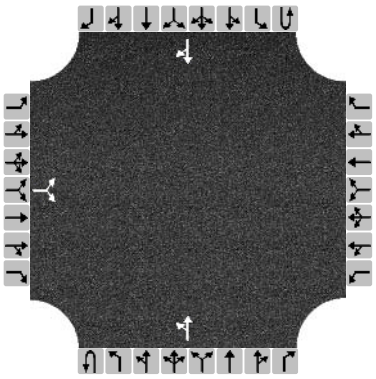
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/25/2016
Analysis Year	2016
Time Analyzed	4:45 - 5:45 PM
Intersection Orientation	North-South
Project Description	Balanced 2016

Site Information

Intersection	Route 140/Laurel St
Jurisdiction	West Boylston
East/West Street	Laurel St
North/South Street	Route 140
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		8		89						155	392				191	13
Percent Heavy Vehicles (%)		1		1						1						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.41		6.21						4.11						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.51		3.31						2.21						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			101							161						
Capacity, c (veh/h)			712							1363						
v/c Ratio			0.14							0.12						
95% Queue Length, Q_{95} (veh)			0.5							0.4						
Control Delay (s/veh)			10.9							8.0						
Level of Service, LOS			B							A						
Approach Delay (s/veh)		10.9								3.1						
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

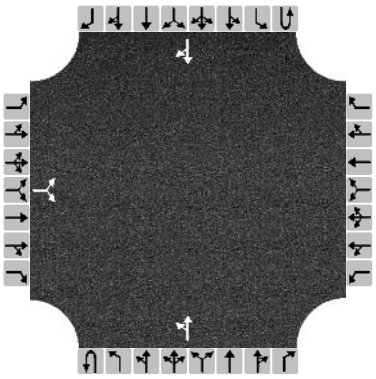
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/25/2016
Analysis Year	2016
Time Analyzed	7:00 - 8:00 AM
Intersection Orientation	North-South
Project Description	Projected 2026

Site Information

Intersection	Route 140/Laurel St
Jurisdiction	West Boylston
East/West Street	Laurel St
North/South Street	Route 140
Peak Hour Factor	0.97
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		12		215						33	115				355	8
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			234							34						
Capacity, c (veh/h)			661							1184						
v/c Ratio			0.35							0.03						
95% Queue Length, Q_{95} (veh)			1.6							0.1						
Control Delay (s/veh)			13.4							8.1						
Level of Service, LOS			B							A						
Approach Delay (s/veh)		13.4								2.0						
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

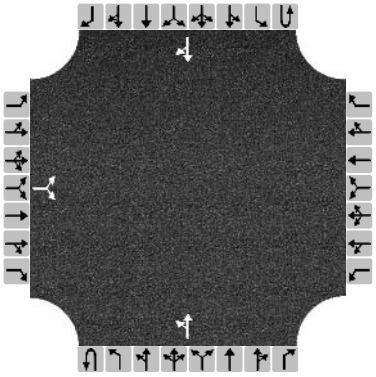
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/25/2016
Analysis Year	2016
Time Analyzed	4:45 - 5:45 PM
Intersection Orientation	North-South
Project Description	Projected 2026

Site Information

Intersection	Route 140/Laurel St
Jurisdiction	West Boylston
East/West Street	Laurel St
North/South Street	Route 140
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		9		98						171	443				218	14
Percent Heavy Vehicles (%)		1		1						1						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.41		6.21						4.11						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.51		3.31						2.21						

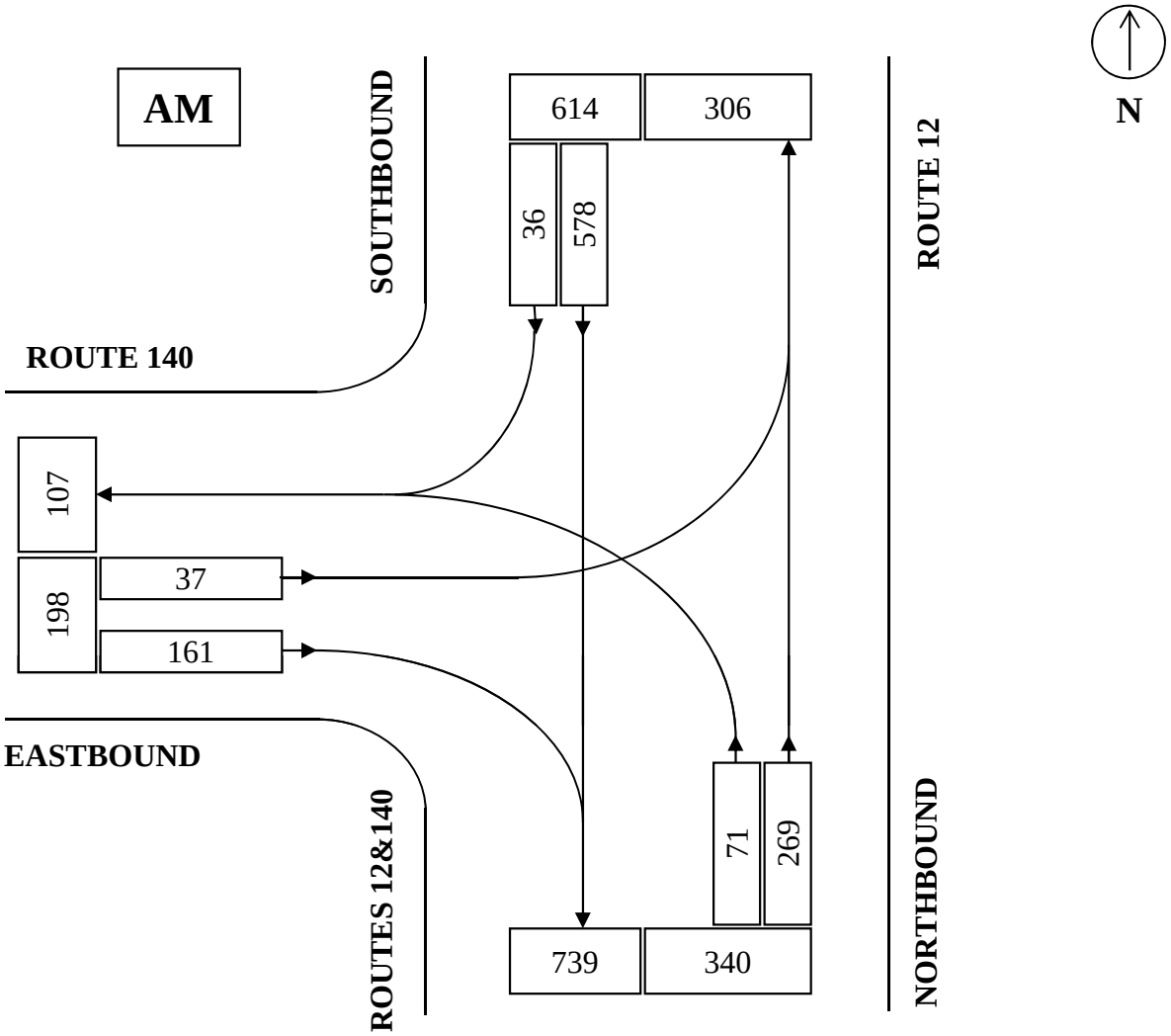
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			111							178						
Capacity, c (veh/h)			658							1330						
v/c Ratio			0.17							0.13						
95% Queue Length, Q_{95} (veh)			0.6							0.5						
Control Delay (s/veh)			11.6							8.1						
Level of Service, LOS			B							A						
Approach Delay (s/veh)		11.6								3.3						
Approach LOS		B														

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: West Boylston **DATE:** 5/26/11 **DAY OF WEEK:** Thursday
INTERSECTION: Route 12 / Route 140

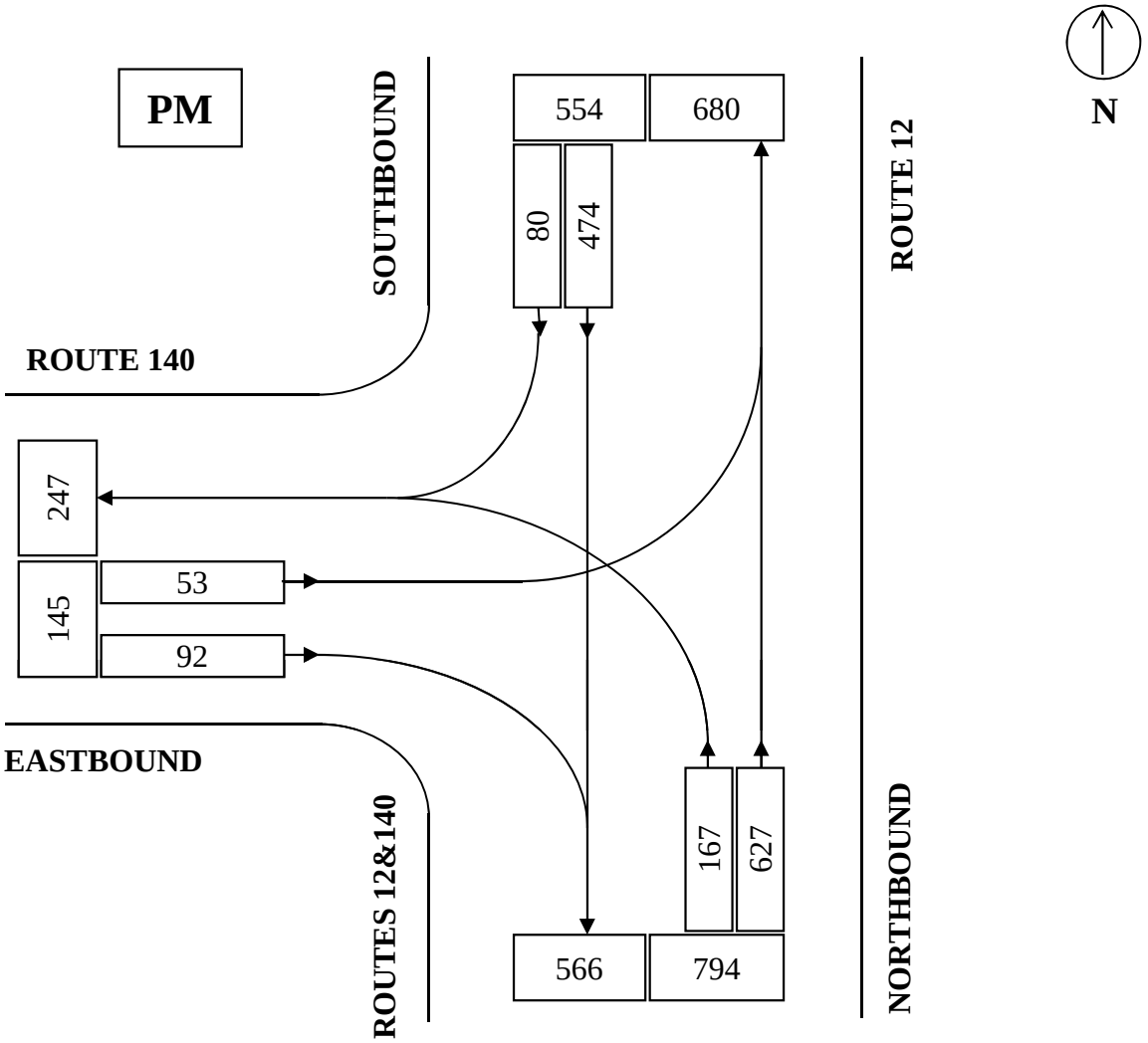


STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			7:15 - 8:15 AM
Route 140 EB	198	17.2%	
			PHF = .92
Routes 12 & 140 NB	340	29.5%	
			VEHICLES COUNTED
Route 12 SB	614	53.3%	
			ALL VEHICLES: 1152
TOTAL	1152	100.0%	**TRUCKS:** 58
			PERCENT TRUCKS 5.03%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: West Boylston **DATE:** 5/26/11 **DAY OF WEEK:** Thursday
INTERSECTION: Route 12 / Route 140



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			4:45 - 5:45 PM
Route 140 EB	145	9.7%	
			PHF = .88
Routes 12 & 140 NB	794	53.2%	
			VEHICLES COUNTED
Route 12 SB	554	37.1%	
			ALL VEHICLES: 1493
TOTAL	1493	100.0%	**TRUCKS:** 33
			PERCENT TRUCKS 2.21%

TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: Town of West Boylston

DATE: 5/26/2011

LOCATION: Route 12 / Route 140

DAY OF WEEK: Thursday

WEATHER: AM: Clear PM: Clear

TECHNICIAN: RR

Time Period	Route 140 EB								Route 12/140 NB				Route 12 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15	9	0	34	0					11	54	0	5	0	142	8	5	258	
7:15 - 7:30	6	0	41	4					13	60	0	4	0	167	3	11	290	
7:30 - 7:45	12	0	38	1					13	73	0	3	0	120	8	4	264	
7:45 - 8:00	6	0	39	3					20	57	0	5	0	153	10	6	285	1097
8:00 - 8:15	13	0	43	4					25	79	0	5	0	138	15	8	313	1152
8:15 - 8:30	11	0	33	2					13	68	0	7	0	130	10	5	265	1127
8:30 - 8:45	11	0	23	3					12	68	0	4	0	107	17	8	238	1101
8:45 - 9:00	12	0	27	3					15	77	0	8	0	106	10	4	247	1063
TOTAL	80	0	278	20	0	0	0	0	122	536	0	41	0	1063	81	51	2160	
		EBPct	17.2			**WBPct**	0.0			**NBPct**	29.5			**SBPct**	53.3			
Peak Sums:	**37**	**0**	**161**	**12**	**0**	**0**	**0**	**0**	**71**	**269**	**0**	**17**	**0**	**578**	**36**	**29**	**1152**	
Total Trucks	58					**TrkPct**	5.03			**PHF**	0.92							

Time Period	Route 140 EB								Route 12/140 NB				Route 12 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15	14	0	18	1					40	149	0	9	0	87	24	3	332	
4:15 - 4:30	16	0	39	6					43	140	0	7	0	107	13	4	358	
4:30 - 4:45	13	0	20	4					35	155	0	5	0	92	18	2	333	
4:45 - 5:00	11	0	22	1					23	133	0	5	0	103	19	2	311	1334
5:00 - 5:15	14	0	19	0					41	187	0	11	0	108	14	1	383	1385
5:15 - 5:30	16	0	29	1					53	160	0	4	0	141	23	5	422	1449
5:30 - 5:45	12	0	22	0					50	147	0	2	0	122	24	1	377	1493
5:45 - 6:00	13	0	18	0					36	157	0	4	0	103	12	1	339	1521
TOTAL	109	0	187	13	0	0	0	0	321	1228	0	47	0	863	147	19	2855	
		EBPct	9.7			**WBPct**	0.0			**NBPct**	53.2			**SBPct**	37.1			
Peak Sums:	**53**	**0**	**92**	**2**	**0**	**0**	**0**	**0**	**167**	**627**	**0**	**22**	**0**	**474**	**80**	**9**	**1493**	
Total Trucks	33					**TrkPct**	2.21			**PHF**	0.88							

HCS7 Two-Way Stop-Control Report

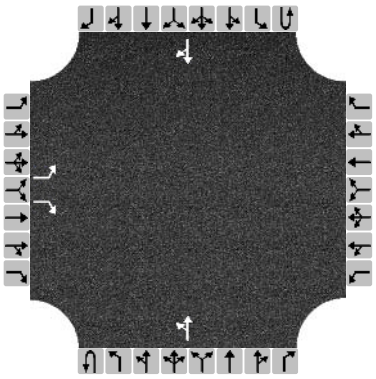
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/27/2011
Analysis Year	2011
Time Analyzed	7:15 - 8:15 AM
Intersection Orientation	North-South
Project Description	Balanced 2016

Site Information

Intersection	Route 12/Route 140
Jurisdiction	West Boylston
East/West Street	Route 140
North/South Street	Route 12/140
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	0	1		0	0	0	0	0	1	0	0	0	1	0
Configuration		L		R						LT						TR
Volume, V (veh/h)		39		169						75	283				607	38
Percent Heavy Vehicles (%)		5		5						5						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.45		6.25						4.20						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.54		3.34						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		42		184						82						
Capacity, c (veh/h)		196		446						888						
v/c Ratio		0.21		0.41						0.09						
95% Queue Length, Q_{95} (veh)		0.8		2.0						0.3						
Control Delay (s/veh)		28.3		18.6						9.5						
Level of Service, LOS		D		C						A						
Approach Delay (s/veh)		20.4								2.8						
Approach LOS		C														

HCS7 Two-Way Stop-Control Report

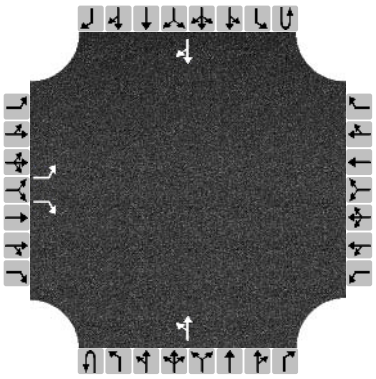
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/27/2011
Analysis Year	2011
Time Analyzed	4:45 - 5:45 PM
Intersection Orientation	North-South
Project Description	Balanced 2016

Site Information

Intersection	Route 12/Route 140
Jurisdiction	West Boylston
East/West Street	Route 140
North/South Street	Route 12/140
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	0	1		0	0	0	0	0	1	0	0	0	1	0
Configuration		L		R						LT						TR
Volume, V (veh/h)		56		97						176	659				498	84
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		64		110						200						
Capacity, c (veh/h)		73		492						937						
v/c Ratio		0.88		0.22						0.21						
95% Queue Length, Q_{95} (veh)		4.4		0.8						0.8						
Control Delay (s/veh)		169.3		14.4						9.9						
Level of Service, LOS		F		B						A						
Approach Delay (s/veh)		71.4								5.1						
Approach LOS		F														

HCS7 Two-Way Stop-Control Report

General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/27/2011
Analysis Year	2011
Time Analyzed	7:15 - 8:15 AM
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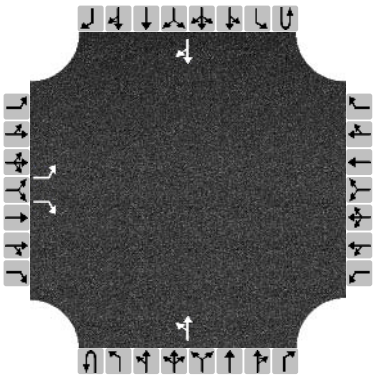
Project Description	Projected 2026

Site Information

Intersection	Route 12/Route 140
Jurisdiction	West Boylston
East/West Street	Route 140
North/South Street	Route 12/140
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	0	1		0	0	0	0	0	1	0	0	0	1	0
Configuration		L		R						LT						TR
Volume, V (veh/h)		43		197						92	331				691	42
Percent Heavy Vehicles (%)		5		5						5						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.45		6.25						4.20						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.54		3.34						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		47		214						100						
Capacity, c (veh/h)		147		394						816						
v/c Ratio		0.32		0.54						0.12						
95% Queue Length, Q_{95} (veh)		1.3		3.1						0.4						
Control Delay (s/veh)		40.6		24.5						10.0						
Level of Service, LOS		E		C						B						
Approach Delay (s/veh)	27.4								3.4							
Approach LOS	D															

HCS7 Two-Way Stop-Control Report

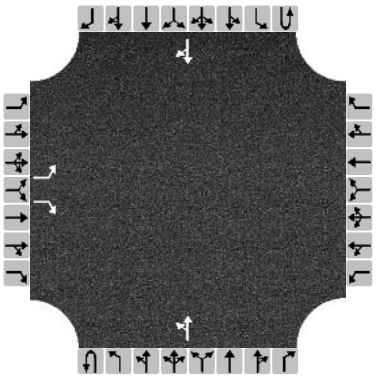
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	5/27/2011
Analysis Year	2011
Time Analyzed	4:45 - 5:45 PM
Intersection Orientation	North-South
Project Description	Projected 2026

Site Information

Intersection	Route 12/Route 140
Jurisdiction	West Boylston
East/West Street	Route 140
North/South Street	Route 12/140
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	0	1		0	0	0	0	0	1	0	0	0	1	0
Configuration		L		R						LT						TR
Volume, V (veh/h)		62		114						204	748				570	93
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.20						

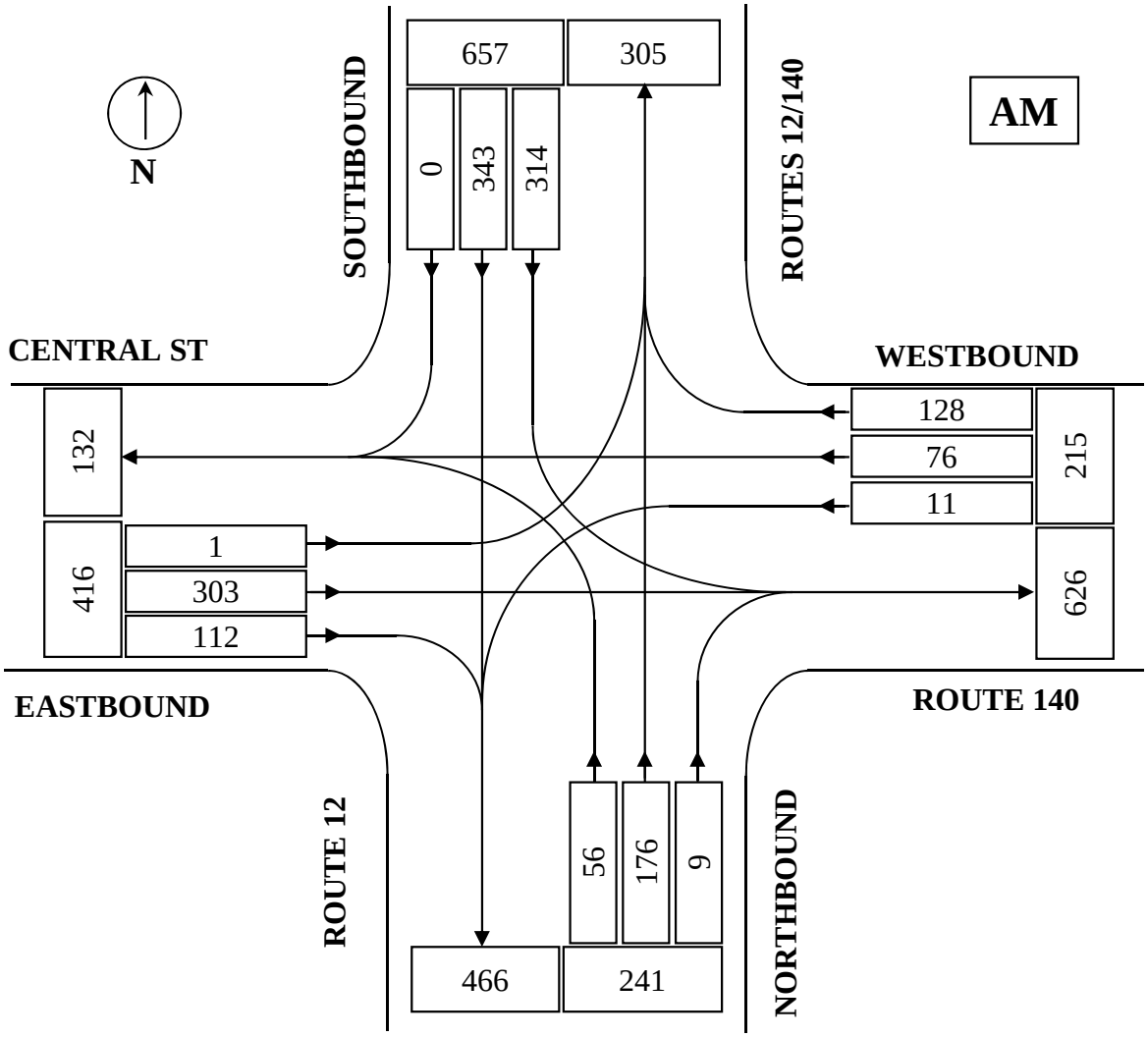
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		70		130						232						
Capacity, c (veh/h)		47		439						866						
v/c Ratio		1.49		0.30						0.27						
95% Queue Length, Q_{95} (veh)		6.8		1.2						1.1						
Control Delay (s/veh)		443.3		16.6						10.7						
Level of Service, LOS		F		C						B						
Approach Delay (s/veh)		166.9								6.8						
Approach LOS		F														

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: West Boylston **DATE:** 8/21/14 **DAY OF WEEK:** Thursday
INTERSECTION: Route 12 / Route 140 / Central Street

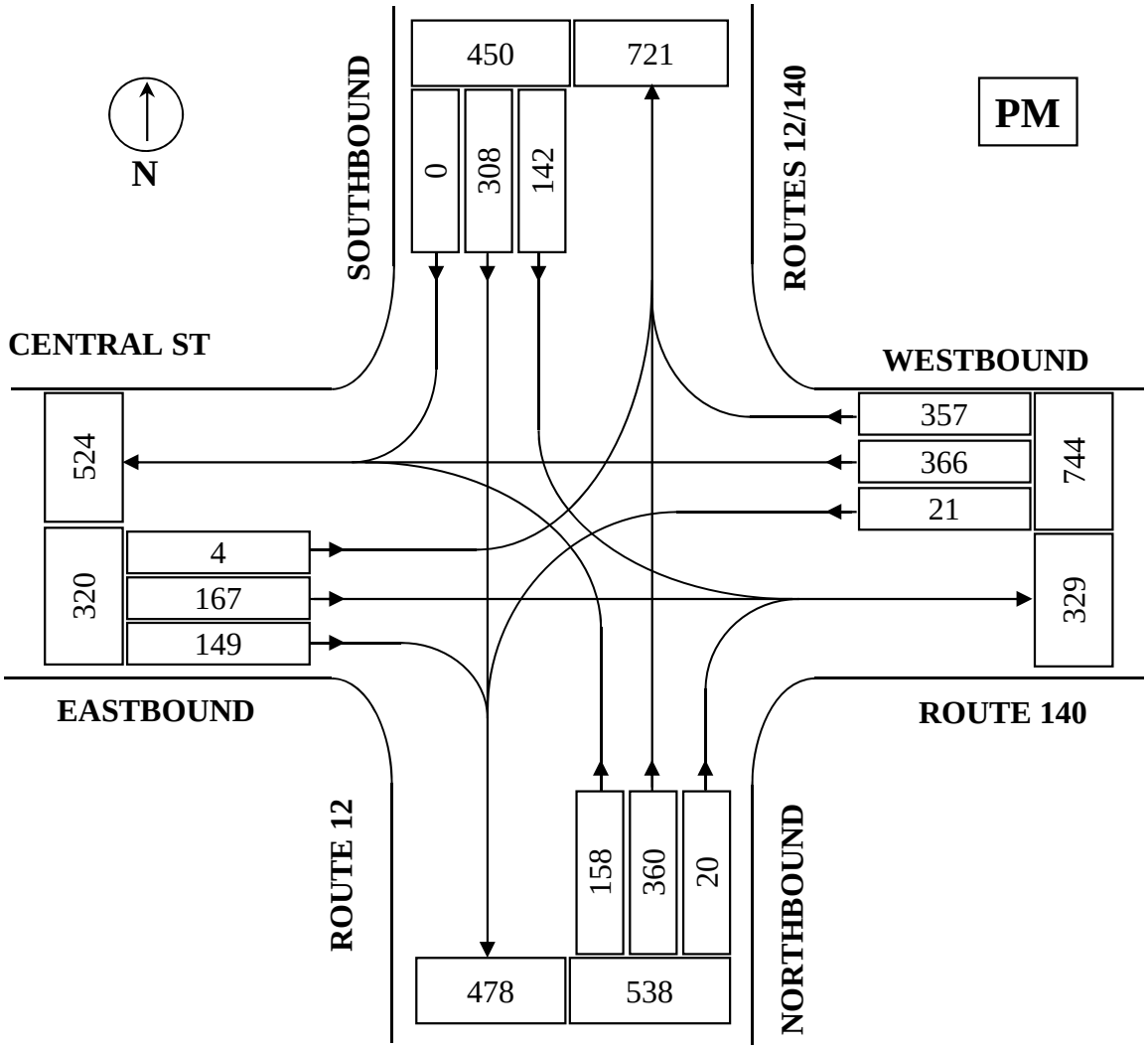


STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
Central St EB	416	27.2%	7:30 - 8:30 AM
Route 140 WB	215	14.1%	PHF = .96
Route 12 NB	241	15.7%	**VEHICLES COUNTED**
Routes 12/140 SB	657	43.0%	**ALL VEHICLES:** 1529
TOTAL	1529	100.0%	**TRUCKS:** 47
			PERCENT TRUCKS: 3.07%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: West Boylston **DATE:** 8/21/14 **DAY OF WEEK:** Thursday
INTERSECTION: Route 12 / Route 140 / Central Street



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
Central St EB	320	15.6%	5:00 - 6:00 PM
Route 140 WB	744	36.3%	PHF = .98
Route 12 NB	538	26.2%	**VEHICLES COUNTED**
Routes 12/140 SB	450	21.9%	**ALL VEHICLES:** 2052
TOTAL	2052	100.0%	**TRUCKS:** 18
			PERCENT TRUCKS: 0.88%

TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: Town of West Boylston

DATE: 8/21/2014

LOCATION: Route 12 / Route 140 / Central Street

DAY OF WEEK: Thursday

WEATHER: AM: Clear PM: Clear

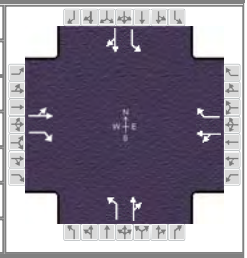
TECHNICIAN: JO & RJ

Time Period	Central St EB				Route 140 WB				Route 12 NB				Routes 12/140 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15	0	58	26	0	3	12	23	1	12	31	0	2	60	57	1	4	283	
7:15 - 7:30	0	100	33	2	5	22	20	2	12	36	2	1	77	63	4	3	374	
7:30 - 7:45	0	87	28	1	1	27	29	2	13	47	2	1	84	75	0	3	393	
7:45 - 8:00	0	64	23	1	1	16	25	3	17	43	2	5	74	82	0	3	347	1397
8:00 - 8:15	0	70	39	1	6	20	36	4	13	37	1	2	76	101	0	6	399	1513
8:15 - 8:30	1	82	22	3	3	13	38	5	13	49	4	2	80	85	0	5	390	1529
8:30 - 8:45	0	58	27	0	2	23	29	3	19	37	2	3	75	76	2	7	350	1486
8:45 - 9:00	0	28	18	1	0	16	22	4	13	37	5	3	50	52	0	5	241	1380
TOTAL	1	547	216	9	21	149	222	24	112	317	18	19	576	591	7	36	2777	
		EBPct	27.2			**WBPct**	14.1			**NBPct**	15.8			**SBPct**	43.0			
Peak Sums:	**1**	**303**	**112**	**6**	**11**	**76**	**128**	**14**	**56**	**176**	**9**	**10**	**314**	**343**	**0**	**17**	**1529**	
Total Trucks	47					**TrkPct**	3.07			**PHF**	0.96							

Time Period	Central St EB				Route 140 WB				Route 12 NB				Routes 12/140 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15	0	24	28	0	7	75	68	3	42	79	4	1	36	57	0	5	420	
4:15 - 4:30	1	19	24	0	5	81	70	2	39	89	0	1	41	78	0	3	447	
4:30 - 4:45	0	39	27	0	6	83	79	4	45	91	1	2	36	68	0	2	475	
4:45 - 5:00	0	23	34	1	6	83	88	3	48	88	3	0	38	53	0	1	464	1806
5:00 - 5:15	0	39	30	1	5	81	96	2	41	95	5	1	31	77	0	0	500	1886
5:15 - 5:30	0	47	37	3	1	93	92	2	40	88	4	0	41	81	0	2	524	1963
5:30 - 5:45	0	43	38	1	10	109	87	2	32	79	6	0	38	68	0	3	510	1998
5:45 - 6:00	4	38	44	0	5	83	82	1	45	98	5	0	32	82	0	0	518	2052
TOTAL	5	272	262	6	45	688	662	19	332	707	28	5	293	564	0	16	3858	
		EBPct	15.6			**WBPct**	36.3			**NBPct**	26.2			**SBPct**	21.9			
Peak Sums:	**4**	**167**	**149**	**5**	**21**	**366**	**357**	**7**	**158**	**360**	**20**	**1**	**142**	**308**	**0**	**5**	**2052**	
Total Trucks	18					**TrkPct**	0.88			**PHF**	0.98							

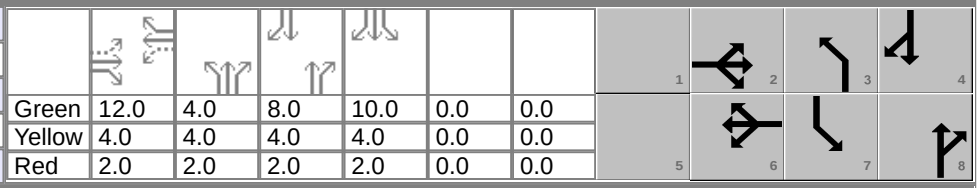
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Sep 4, 2014	Area Type	Other
Jurisdiction	West Boylston	Time Period	7:30 - 8:30 AM	PHF	0.96
Urban Street	Route 140	Analysis Year	2014	Analysis Period	1> 7:30
Intersection	Rt12/Rt 140/Central St	File Name	14_Rt 12 & Rt 140 & Central St_AM-bal.xus		
Project Description	Balanced 2016				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	1	379	114	16	98	166	57	180	14	395	350	0

Signal Information			
Cycle, s	58.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	12.0	4.0	8.0	10.0	0.0	0.0
Yellow	4.0	4.0	4.0	4.0	0.0	0.0
Red	2.0	2.0	2.0	2.0	0.0	0.0

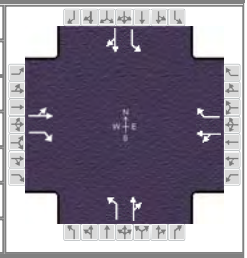
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		7.0		7.0	2.0	4.0	2.0	4.0
Phase Duration, s		18.0		18.0	10.0	24.0	16.0	30.0
Change Period, ($Y+R_c$), s		6.0		6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s		3.2		3.2	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s		14.0		7.7	3.9	7.0	12.0	10.3
Green Extension Time (g_e), s		0.0		0.9	0.0	0.3	0.0	0.7
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		1.00		0.63	1.00	0.00	1.00	0.77

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h		396	119		119	173	59	202		411	0	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1855	1572		1761	1572	1767	1832		1767	0	
Queue Service Time (g_s), s		2.6	3.8		0.0	5.7	1.9	5.0		10.0	0.0	
Cycle Queue Clearance Time (g_c), s		12.0	3.8		3.1	5.7	1.9	5.0		10.0	0.0	
Green Ratio (*g/C*)		0.21	0.21		0.21	0.21	0.07	0.31		0.17		
Capacity (*c*), veh/h		446	325		435	325	122	568		305		
Volume-to-Capacity Ratio (*X*)		0.887	0.365		0.273	0.531	0.487	0.355		1.350	0.000	
Back of Queue (*Q*), ft/ln (50 th percentile)		183	32.3		31.7	50	19.6	47		481.6	0	
Back of Queue (*Q*), veh/ln (50 th percentile)		7.2	1.3		1.2	2.0	0.8	1.8		18.8	0.0	
Queue Storage Ratio (*RQ*) (50 th percentile)		0.00	0.00		0.00	0.00	0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh		23.2	19.7		19.5	20.5	26.0	15.5		24.0		
Incremental Delay (d_2), s/veh		18.5	0.3		0.1	0.9	1.1	0.1		177.9	0.0	
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh		41.7	20.0		19.6	21.4	27.1	15.6		201.9		
Level of Service (LOS)		D	B		B	C	C	B		F		
Approach Delay, s/veh / LOS	36.7	D		20.6	C		18.3	B		112.9	F	
Intersection Delay, s/veh / LOS	63.6						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.3	B	2.2	B
Bicycle LOS Score / LOS	1.3	A	1.0	A	0.9	A	1.8	B

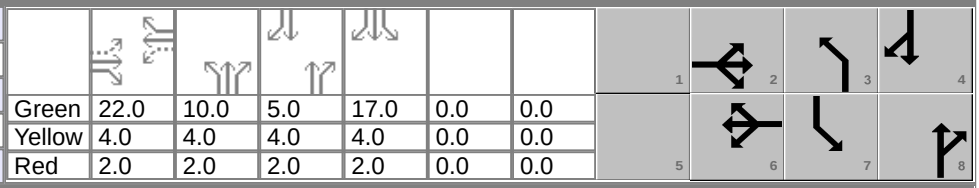
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Sep 4, 2014	Area Type	Other
Jurisdiction	West Boylston	Time Period	5:00 - 6:00 PM	PHF	0.98
Urban Street	Route 140	Analysis Year	2014	Analysis Period	1> 5:00
Intersection	Rt12/Rt 140/Central St	File Name	14_Rt 12 & Rt 140 & Central St_PM-bal.xus		
Project Description	Balanced 2016				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	4	170	152	26	398	399	161	382	20	165	374	0

Signal Information			
Cycle, s	78.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	22.0	10.0	5.0	17.0	0.0	0.0
Yellow	4.0	4.0	4.0	4.0	0.0	0.0
Red	2.0	2.0	2.0	2.0	0.0	0.0

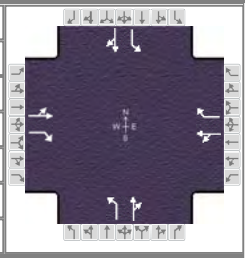
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		7.0		7.0	2.0	4.0	2.0	4.0
Phase Duration, s		28.0		28.0	16.0	27.0	23.0	34.0
Change Period, ($Y+R_c$), s		6.0		6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s		3.2		3.2	3.1	3.0	3.1	3.1
Queue Clearance Time (g_s), s		8.0		21.2	8.8	18.0	8.3	14.7
Green Extension Time (g_e), s		2.4		0.4	0.0	0.3	0.8	0.0
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		0.05		1.00	1.00	1.00	0.04	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h		178	155		433	407	164	410		168	0	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1876	1598		1852	1598	1795	1868		1795	0	
Queue Service Time (g_s), s		0.0	6.0		6.8	19.2	6.8	16.0		6.3	0.0	
Cycle Queue Clearance Time (g_c), s		5.8	6.0		17.0	19.2	6.8	16.0		6.3	0.0	
Green Ratio (*g/C*)		0.28	0.28		0.28	0.28	0.13	0.27		0.22		
Capacity (*c*), veh/h		576	451		571	451	230	503		391		
Volume-to-Capacity Ratio (*X*)		0.308	0.344		0.757	0.904	0.714	0.815		0.430	0.000	
Back of Queue (*Q*), ft/ln (50 th percentile)		61.8	54.4		197	236.9	85.8	201.3		65.5	0	
Back of Queue (*Q*), veh/ln (50 th percentile)		2.5	2.2		7.8	9.4	3.4	8.0		2.6	0.0	
Queue Storage Ratio (*RQ*) (50 th percentile)		0.00	0.00		0.00	0.00	0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh		22.2	22.3		26.1	27.0	32.6	26.7		26.3		
Incremental Delay (d_2), s/veh		0.1	0.2		5.2	20.8	8.6	9.4		0.3	0.0	
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh		22.3	22.4		31.3	47.8	41.3	36.1		26.6		
Level of Service (LOS)		C	C		C	D	D	D		C		
Approach Delay, s/veh / LOS	22.4	C		39.3	D		37.6	D		22.6	C	
Intersection Delay, s/veh / LOS	32.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	1.0	A	1.9	B	1.4	A	1.4	A

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Sep 4, 2014	Area Type	Other
Jurisdiction	West Boylston	Time Period	7:30 - 8:30 AM	PHF	0.96
Urban Street	Route 140	Analysis Year	2014	Analysis Period	1> 7:30
Intersection	Rt12/Rt 140/Central St	File Name	14_Rt 12 & Rt 140 & Central St_AM-proj.xus		
Project Description	Projected 2026				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	1	422	126	18	111	210	63	199	15	466	387	0

Signal Information					1	2	3	4
Cycle, s	58.0	Reference Phase	2					
Offset, s	0	Reference Point	End	Green	12.0	4.0	8.0	10.0	0.0	0.0
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	4.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	2.0	2.0	0.0	0.0

	5	6	7	8

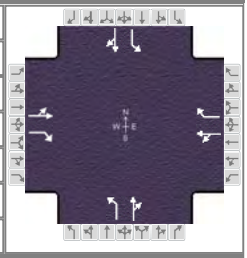
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		7.0		7.0	2.0	4.0	2.0	4.0
Phase Duration, s		18.0		18.0	10.0	24.0	16.0	30.0
Change Period, ($Y+R_c$), s		6.0		6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s		3.2		3.2	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s		14.0		9.4	4.1	7.5	12.0	11.4
Green Extension Time (g_e), s		0.0		0.7	0.0	0.3	0.0	0.7
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		1.00		1.00	1.00	0.00	1.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h		441	131		134	219	66	223		485	0	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1855	1572		1750	1572	1767	1832		1767	0	
Queue Service Time (g_s), s		2.6	4.2		0.0	7.4	2.1	5.5		10.0	0.0	
Cycle Queue Clearance Time (g_c), s		12.0	4.2		3.6	7.4	2.1	5.5		10.0	0.0	
Green Ratio (*g/C*)		0.21	0.21		0.21	0.21	0.07	0.31		0.17		
Capacity (*c*), veh/h		446	325		433	325	122	569		305		
Volume-to-Capacity Ratio (*X*)		0.988	0.403		0.311	0.672	0.538	0.392		1.593	0.000	
Back of Queue (*Q*), ft/ln (50 th percentile)		267.3	36.1		36.3	10.1	22.9	52.5		707.1	0	
Back of Queue (*Q*), veh/ln (50 th percentile)		10.4	1.4		1.4	0.4	0.9	2.1		27.6	0.0	
Queue Storage Ratio (*RQ*) (50 th percentile)		0.00	0.00		0.00	0.00	0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh		23.8	19.9		19.7	21.2	26.1	15.7		24.0		
Incremental Delay (d_2), s/veh		39.2	0.3		0.2	4.4	2.6	0.2		281.9	0.0	
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh		63.0	20.2		19.8	25.6	28.7	15.9		305.9		
Level of Service (LOS)		E	C		B	C	C	B		F		
Approach Delay, s/veh / LOS	53.2	D		23.4	C		18.8	B		173.1	F	
Intersection Delay, s/veh / LOS	94.1						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.91	B	1.91	B	1.92	B	1.89	B
Bicycle LOS Score / LOS	1.43	A	1.07	A	0.96	A	1.95	B

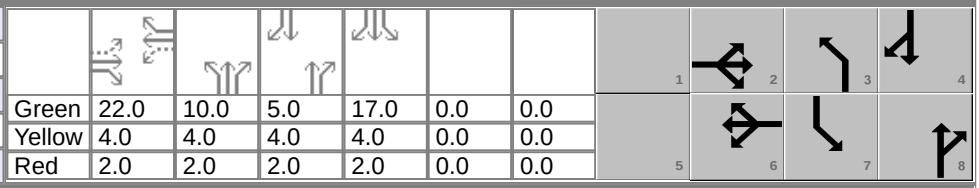
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Sep 4, 2014	Area Type	Other
Jurisdiction	West Boylston	Time Period	5:00 - 6:00 PM	PHF	0.98
Urban Street	Route 140	Analysis Year	2014	Analysis Period	1> 5:00
Intersection	Rt12/Rt 140/Central St	File Name	14_Rt 12 & Rt 140 & Central St_PM-proj.xus		
Project Description	Projected 2026				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	4	193	168	29	446	471	178	422	22	209	413	0

Signal Information			
Cycle, s	78.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	22.0	10.0	5.0	17.0	0.0	0.0
Yellow	4.0	4.0	4.0	4.0	0.0	0.0
Red	2.0	2.0	2.0	2.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		7.0		7.0	2.0	4.0	2.0	4.0
Phase Duration, s		28.0		28.0	16.0	27.0	23.0	34.0
Change Period, ($Y+R_c$), s		6.0		6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s		3.2		3.2	3.1	3.0	3.1	3.1
Queue Clearance Time (g_s), s		8.7		24.0	9.7	20.2	10.2	16.4
Green Extension Time (g_e), s		2.7		0.0	0.0	0.1	0.8	0.0
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		0.10		1.00	1.00	1.00	0.15	1.00

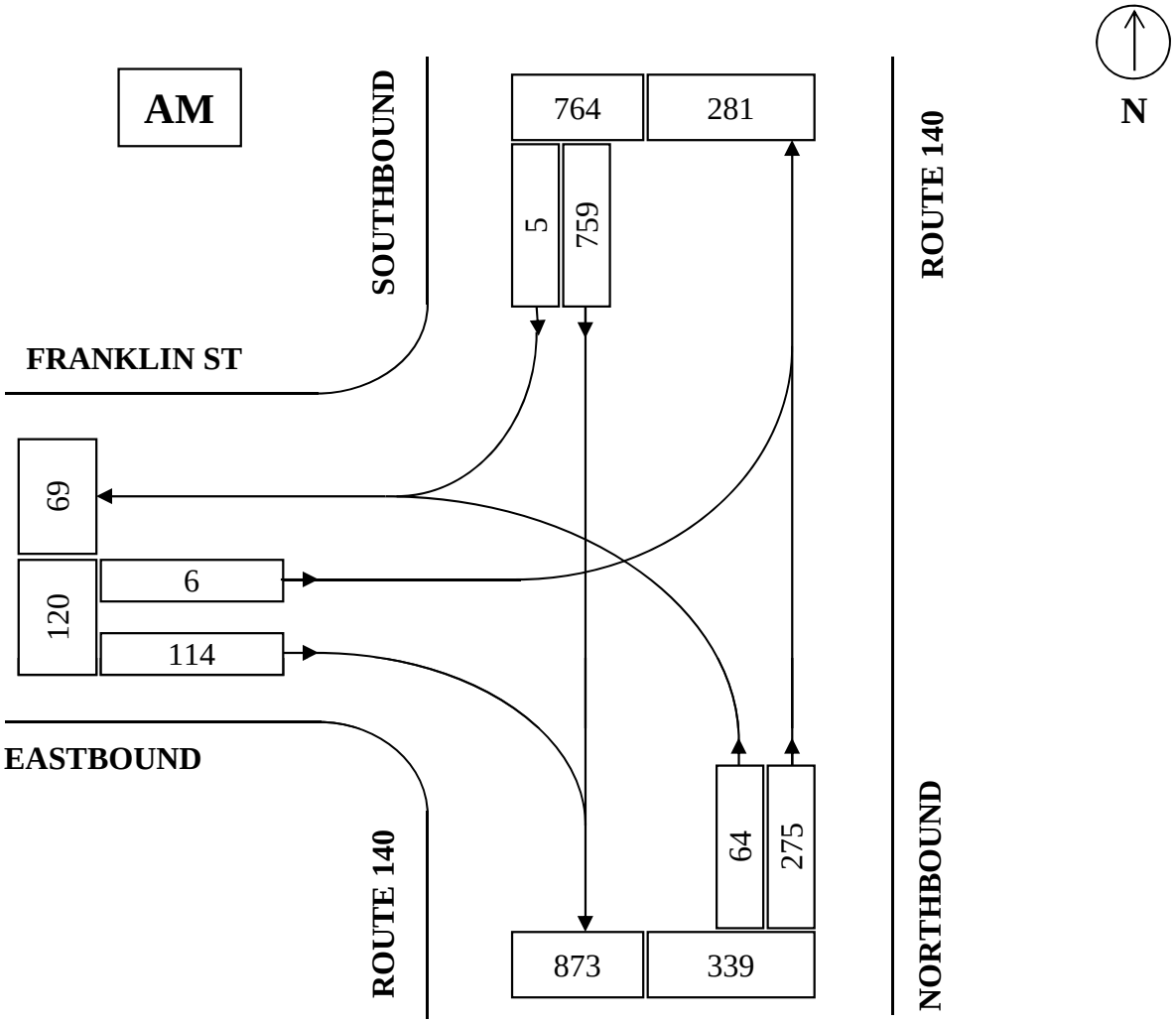
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h		201	171		485	481	182	453		213	0	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1876	1598		1849	1598	1795	1869		1795	0	
Queue Service Time (g_s), s		0.0	6.7		10.3	22.0	7.7	18.2		8.2	0.0	
Cycle Queue Clearance Time (g_c), s		6.7	6.7		19.9	22.0	7.7	18.2		8.2	0.0	
Green Ratio (*g/C*)		0.28	0.28		0.28	0.28	0.13	0.27		0.22		
Capacity (*c*), veh/h		576	451		570	451	230	503		391		
Volume-to-Capacity Ratio (*X*)		0.349	0.380		0.850	1.067	0.789	0.901		0.545	0.000	
Back of Queue (*Q*), ft/ln (50 th percentile)		71	60.7		249.5	390.1	105	257.3		86.8	0	
Back of Queue (*Q*), veh/ln (50 th percentile)		2.8	2.4		9.9	15.5	4.2	10.2		3.4	0.0	
Queue Storage Ratio (*RQ*) (50 th percentile)		0.00	0.00		0.00	0.00	0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh		22.5	22.5		27.1	28.0	33.0	27.5		27.1		
Incremental Delay (d_2), s/veh		0.1	0.2		11.1	61.3	15.4	18.7		0.9	0.0	
Initial Queue Delay (d_3), s/veh		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh		22.6	22.7		38.2	89.3	48.4	46.2		28.0		
Level of Service (LOS)		C	C		D	F	D	D		C		
Approach Delay, s/veh / LOS	22.7	C		63.6	E		46.8	D		24.0	C	
Intersection Delay, s/veh / LOS	44.0						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.92	B	1.92	B	1.92	B	1.91	B
Bicycle LOS Score / LOS	1.10	A	2.08	B	1.53	B	1.53	B

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: West Boylston **DATE:** 9/26/12 **DAY OF WEEK:** Wednesday
INTERSECTION: Route 140 / Franklin Street

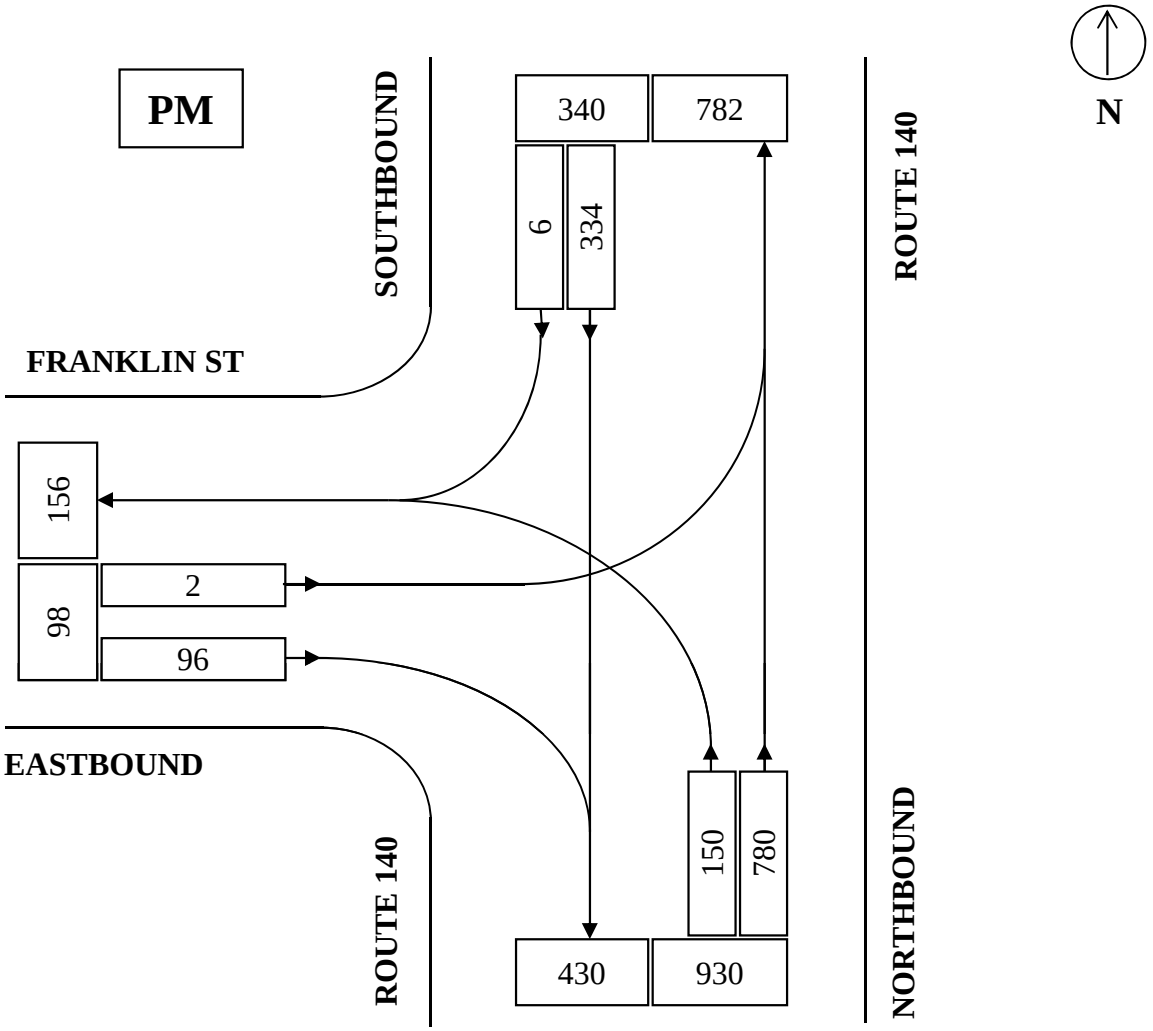


STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			7:15 - 8:15 AM
Franklin St EB	120	9.8%	
			PHF = .95
Route 140 NB	339	27.7%	
			VEHICLES COUNTED
Route 140 SB	764	62.5%	
			ALL VEHICLES: 1223
TOTAL	1223	100.0%	**TRUCKS:** 61
			PERCENT TRUCKS 4.99%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: West Boylston **DATE:** 9/25/12 **DAY OF WEEK:** Tuesday
INTERSECTION: Route 140 / Franklin Street



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			4:30 - 5:30 PM
Franklin St EB	98	7.2%	
			PHF = .92
Route 140 NB	930	68.0%	
			VEHICLES COUNTED
Route 140 SB	340	24.8%	
			ALL VEHICLES: 1368
TOTAL	1368	100.0%	**TRUCKS:** 39
			PERCENT TRUCKS 2.85%

TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: Town of West Boylston

DATE: 9/25&26/12

LOCATION: Route 140 / Franklin Street

DAY OF WEEK: Tues & Weds

WEATHER: AM: Cloudy PM: Clear

TECHNICIAN: EL/RR

Time Period	Franklin St EB								Route 140 NB				Route 140 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15	1	0	34	1					7	61	0	3	0	137	2	4	242	
7:15 - 7:30	2	0	30	0					16	70	0	7	0	204	0	8	322	
7:30 - 7:45	2	0	22	0					13	57	0	6	0	209	0	4	303	
7:45 - 8:00	1	0	32	0					21	73	0	14	0	180	1	9	308	1175
8:00 - 8:15	1	0	30	0					14	75	0	9	0	166	4	4	290	1223
8:15 - 8:30	0	0	19	2					15	50	0	6	0	134	1	12	219	1120
8:30 - 8:45	2	0	18	0					9	58	0	8	0	126	1	4	214	1031
8:45 - 9:00	1	0	25	4					12	65	0	6	0	95	1	8	199	922
TOTAL	10	0	210	7	0	0	0	0	107	509	0	59	0	1251	10	53	2097	
		EBPct	9.8			**WBPct**	0.0			**NBPct**	27.7			**SBPct**	62.5			
Peak Sums:	**6**	**0**	**114**	**0**	**0**	**0**	**0**	**0**	**64**	**275**	**0**	**36**	**0**	**759**	**5**	**25**	**1223**	
Total Trucks	61					**TrkPct**	4.99			**PHF**	0.95							

Time Period	Franklin St EB								Route 140 NB				Route 140 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15	0	0	25	0					31	174	0	3	0	83	3	4	316	
4:15 - 4:30	0	0	31	0					30	137	0	5	0	87	0	9	285	
4:30 - 4:45	1	0	28	0					40	202	0	4	0	67	0	7	338	
4:45 - 5:00	0	0	36	1					37	175	0	4	0	70	2	3	320	1259
5:00 - 5:15	0	0	18	0					39	208	0	7	0	105	2	3	372	1315
5:15 - 5:30	1	0	14	0					34	195	0	4	0	92	2	6	338	1368
5:30 - 5:45	1	0	18	0					33	200	0	5	0	76	2	3	330	1360
5:45 - 6:00	1	0	21	0					41	169	0	2	0	67	1	2	300	1340
TOTAL	4	0	191	1	0	0	0	0	285	1460	0	34	0	647	12	37	2599	
		EBPct	7.2			**WBPct**	0.0			**NBPct**	68.0			**SBPct**	24.9			
Peak Sums:	**2**	**0**	**96**	**1**	**0**	**0**	**0**	**0**	**150**	**780**	**0**	**19**	**0**	**334**	**6**	**19**	**1368**	
Total Trucks	39					**TrkPct**	2.85			**PHF**	0.92							

HCS7 Two-Way Stop-Control Report

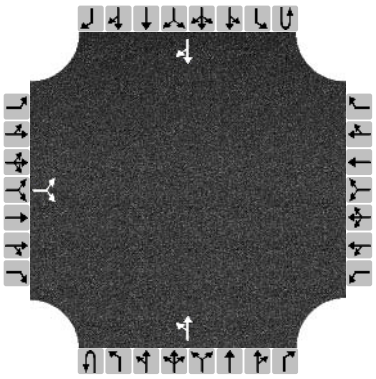
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	9/27/2012
Analysis Year	2012
Time Analyzed	7:15 - 8:15 AM
Intersection Orientation	North-South
Project Description	Balanced 2016

Site Information

Intersection	Route 140/Franklin St
Jurisdiction	West Boylston
East/West Street	Franklin St
North/South Street	Route 140
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		6		119						67	286				789	5
Percent Heavy Vehicles (%)		0		0						5						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.20						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			131							71						
Capacity, c (veh/h)			352							788						
v/c Ratio			0.37							0.09						
95% Queue Length, Q_{95} (veh)			1.7							0.3						
Control Delay (s/veh)			21.2							10.0						
Level of Service, LOS			C							B						
Approach Delay (s/veh)		21.2								2.8						
Approach LOS		C														

HCS7 Two-Way Stop-Control Report

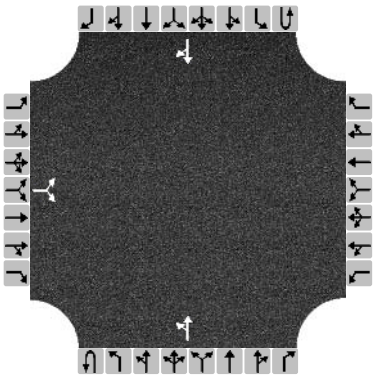
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	9/27/2012
Analysis Year	2012
Time Analyzed	4:30 - 5:30 PM
Intersection Orientation	North-South
Project Description	Balanced 2016

Site Information

Intersection	Route 140/Franklin St
Jurisdiction	West Boylston
East/West Street	Franklin St
North/South Street	Route 140
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		2		100						156	811				347	6
Percent Heavy Vehicles (%)		0		0						3						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			111							170						
Capacity, c (veh/h)			609							1186						
v/c Ratio			0.18							0.14						
95% Queue Length, Q_{95} (veh)			0.7							0.5						
Control Delay (s/veh)			12.2							8.5						
Level of Service, LOS			B							A						
Approach Delay (s/veh)		12.2								3.5						
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

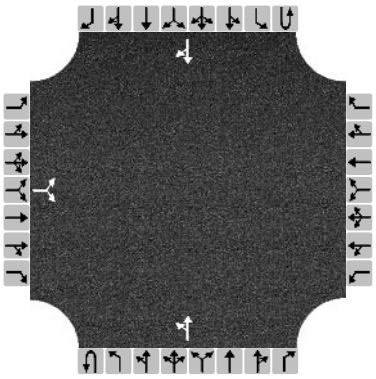
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	9/27/2012
Analysis Year	2012
Time Analyzed	7:15 - 8:15 AM
Intersection Orientation	North-South
Project Description	Projected 2026

Site Information

Intersection	Route 140/Franklin St
Jurisdiction	West Boylston
East/West Street	Franklin St
North/South Street	Route 140
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		7		133						76	346				905	6
Percent Heavy Vehicles (%)		0		0						5						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.20						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			147							80						
Capacity, c (veh/h)			293							707						
v/c Ratio			0.50							0.11						
95% Queue Length, Q_{95} (veh)			2.6							0.4						
Control Delay (s/veh)			29.1							10.7						
Level of Service, LOS			D							B						
Approach Delay (s/veh)		29.1								3.2						
Approach LOS		D														

HCS7 Two-Way Stop-Control Report

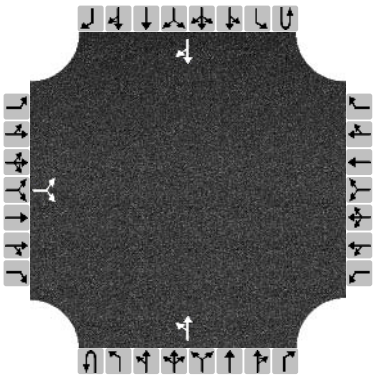
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	9/27/2012
Analysis Year	2012
Time Analyzed	4:30 - 5:30 PM
Intersection Orientation	North-South
Project Description	Projected 2026

Site Information

Intersection	Route 140/Franklin St
Jurisdiction	West Boylston
East/West Street	Franklin St
North/South Street	Route 140
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		2		112						174	932				415	7
Percent Heavy Vehicles (%)		0		0						3						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

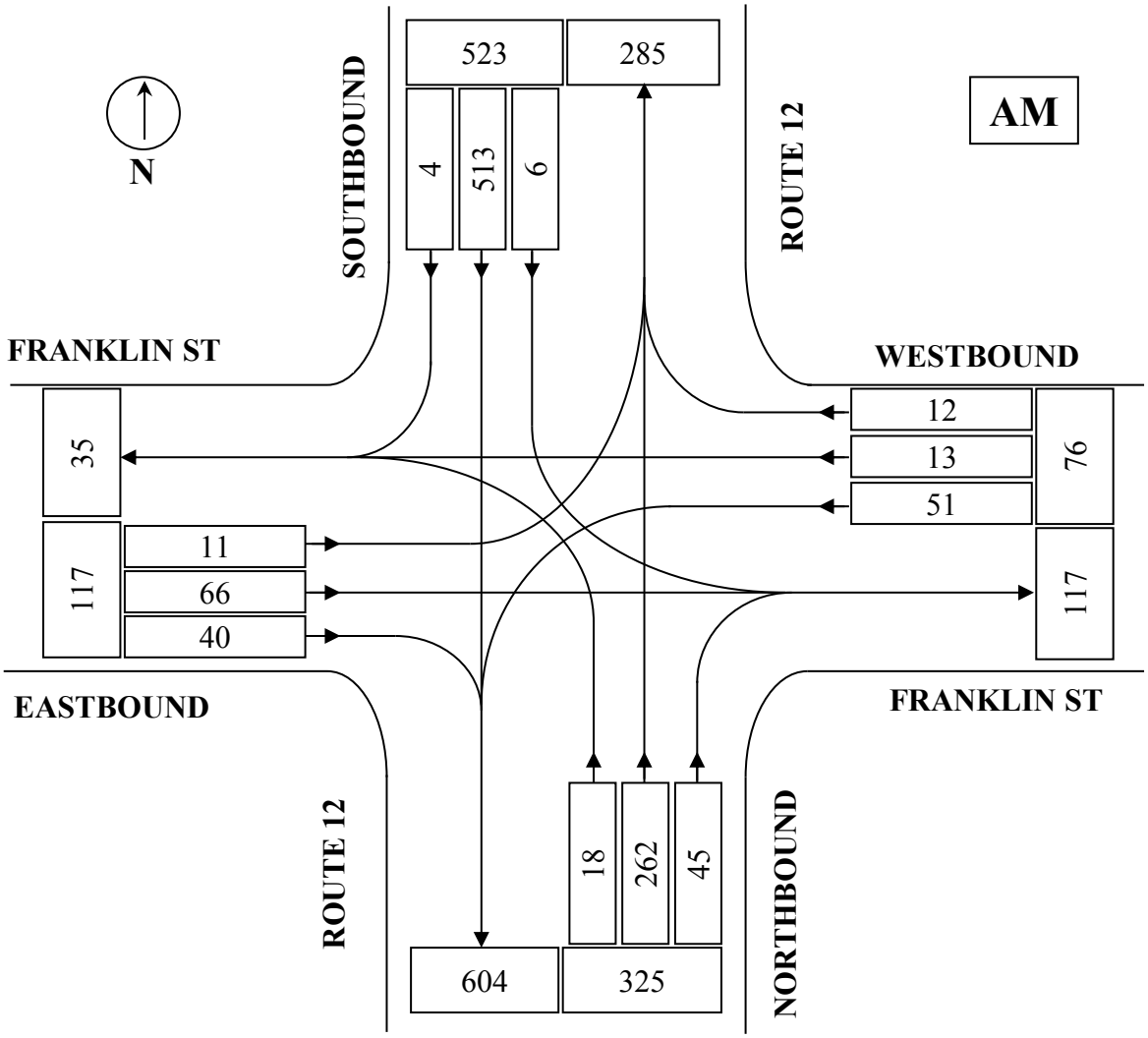
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			124							189						
Capacity, c (veh/h)			536							1113						
v/c Ratio			0.23							0.17						
95% Queue Length, Q_{95} (veh)			0.9							0.6						
Control Delay (s/veh)			13.7							8.9						
Level of Service, LOS			B							A						
Approach Delay (s/veh)		13.7								4.6						
Approach LOS		B														

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: West Boylston **DATE:** 9/26/12 **DAY OF WEEK:** Wednesday
INTERSECTION: Route 12 / Franklin Street

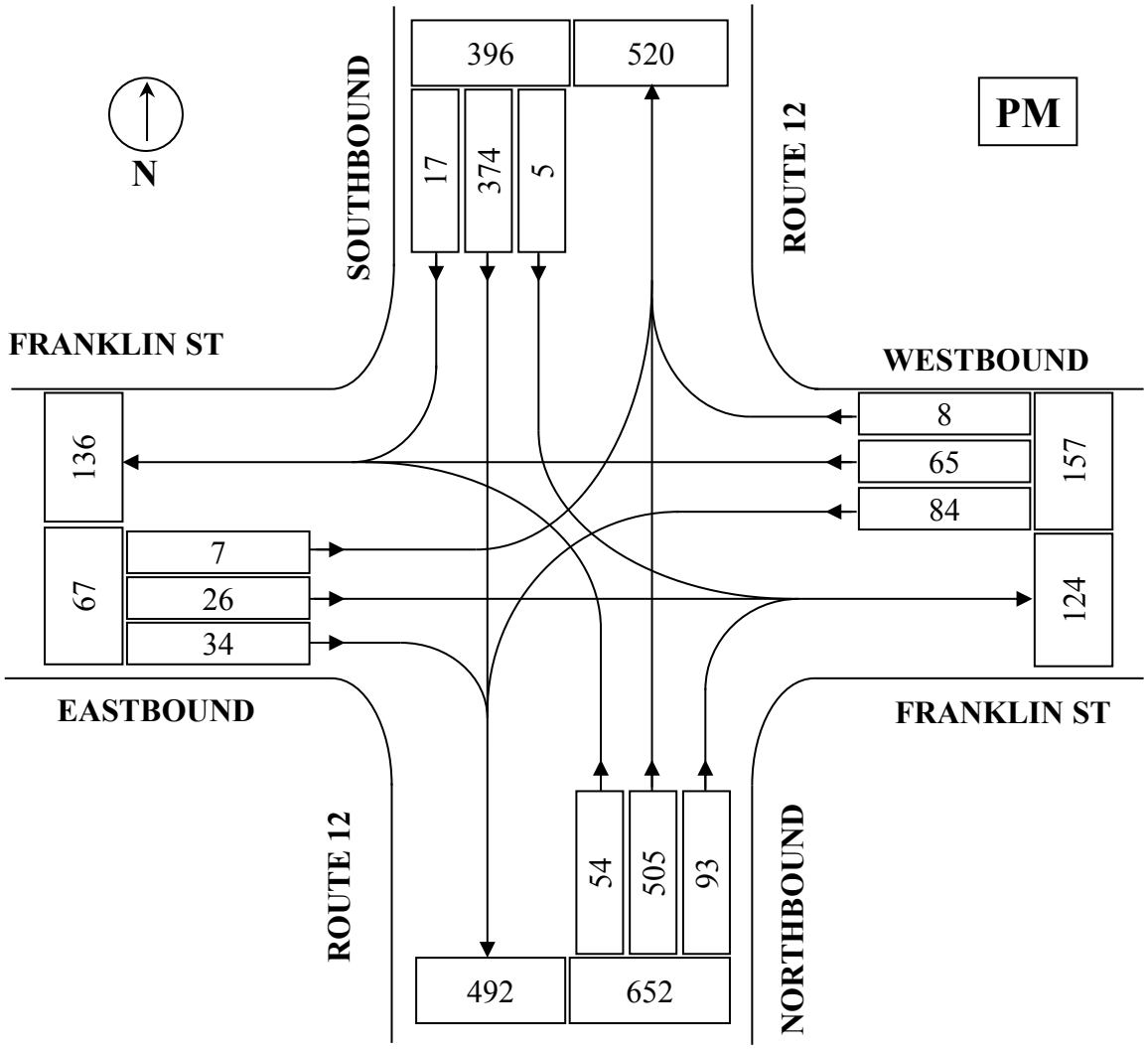


STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
Franklin St EB	117	11.2%	7:15 - 8:15 AM
Franklin St WB	76	7.3%	PHF = .92
Route 12 NB	325	31.2%	**VEHICLES COUNTED**
Route 12 SB	523	50.3%	**ALL VEHICLES:** 1041
TOTAL	1041	100.0%	**TRUCKS:** 28
			PERCENT TRUCKS: 2.69%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: West Boylston **DATE:** 9/25/12 **DAY OF WEEK:** Tuesday
INTERSECTION: Route 12 / Franklin Street



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
Franklin St EB	67	5.3%	4:15 - 5:15 PM
Franklin St WB	157	12.3%	PHF = 1.00
Route 12 NB	652	51.3%	**VEHICLES COUNTED**
Route 12 SB	396	31.1%	**ALL VEHICLES:** 1272
TOTAL	1272	100.0%	**TRUCKS:** 15
			PERCENT TRUCKS: 1.18%

TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: Town of West Boylston

DATE: 9/25&26/12

LOCATION: Route 12 / Franklin Street

DAY OF WEEK: Tues & Weds

WEATHER: AM: Cloudy PM: Clear

TECHNICIAN: KK

Time Period	Franklin St EB				Franklin St WB				Route 12 NB				Route 12 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15	4	25	11	0	4	3	1	1	0	59	13	4	0	89	0	1	209	
7:15 - 7:30	4	20	10	0	11	4	2	0	4	86	6	1	2	132	1	3	282	
7:30 - 7:45	4	13	8	0	11	2	3	2	4	51	10	1	3	130	2	4	241	
7:45 - 8:00	1	21	14	1	16	4	3	1	1	60	12	3	1	143	1	1	277	1009
8:00 - 8:15	2	12	8	1	13	3	4	1	9	65	17	4	0	108	0	5	241	1041
8:15 - 8:30	1	8	7	0	13	4	1	2	4	59	8	6	3	120	0	4	228	987
8:30 - 8:45	1	10	9	0	5	4	1	0	3	61	9	6	1	97	1	2	202	948
8:45 - 9:00	4	10	8	1	8	3	3	1	5	55	16	6	1	87	1	3	201	872
TOTAL	21	119	75	3	81	27	18	8	30	496	91	31	11	906	6	23	1881	
		EBPct	11.2			**WBPct**	7.3			**NBPct**	31.2			**SBPct**	50.2			
Peak Sums:	**11**	**66**	**40**	**2**	**51**	**13**	**12**	**4**	**18**	**262**	**45**	**9**	**6**	**513**	**4**	**13**	**1041**	
Total Trucks	28					**TrkPct**	2.69			**PHF**	0.92							

Time Period	Franklin St EB				Franklin St WB				Route 12 NB				Route 12 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15	3	4	8	0	14	10	3	1	9	135	21	3	2	94	2	3	305	
4:15 - 4:30	2	6	9	0	21	11	3	3	11	140	26	3	0	86	4	1	319	
4:30 - 4:45	0	10	8	0	21	17	1	0	17	115	23	2	1	105	1	0	319	
4:45 - 5:00	1	6	8	0	21	18	2	0	13	124	27	1	2	87	8	4	317	1260
5:00 - 5:15	4	4	9	0	21	19	2	0	13	126	17	1	2	96	4	0	317	1272
5:15 - 5:30	4	6	10	0	19	13	1	0	8	135	13	0	0	92	4	1	305	1258
5:30 - 5:45	0	9	7	0	11	19	4	1	14	118	14	0	0	94	3	0	293	1232
5:45 - 6:00	0	5	12	0	21	19	3	0	15	118	19	2	2	78	0	1	292	1207
TOTAL	14	50	71	0	149	126	19	5	100	1011	160	12	9	732	26	10	2467	
		EBPct	5.3			**WBPct**	12.3			**NBPct**	51.3			**SBPct**	31.1			
Peak Sums:	**7**	**26**	**34**	**0**	**84**	**65**	**8**	**3**	**54**	**505**	**93**	**7**	**5**	**374**	**17**	**5**	**1272**	
Total Trucks	15					**TrkPct**	1.18			**PHF**	1.00							

HCS7 Two-Way Stop-Control Report

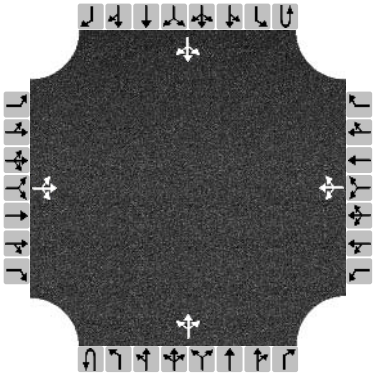
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	9/27/2012
Analysis Year	2012
Time Analyzed	7:15 - 8:15 AM
Intersection Orientation	North-South
Project Description	Balanced 2016

Site Information

Intersection	Route 12/Franklin St
Jurisdiction	West Boylston
East/West Street	Franklin St
North/South Street	Route 12
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		11	69	42		53	13	12		19	272	47		6	534	4
Percent Heavy Vehicles (%)		1	1	1		1	1	1		3				3		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.51	6.20		7.10	6.51	6.20		4.10				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.01	3.30		3.50	4.01	3.30		2.20				2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			133				85			21				7		
Capacity, c (veh/h)			291				180			1001				1223		
v/c Ratio			0.46				0.47			0.02				0.01		
95% Queue Length, Q_{95} (veh)			2.3				2.2			0.1				0.0		
Control Delay (s/veh)			27.4				41.6			8.7				8.0		
Level of Service, LOS			D				E			A				A		
Approach Delay (s/veh)		27.4				41.6				0.7				0.2		
Approach LOS		D				E										

HCS7 Two-Way Stop-Control Report

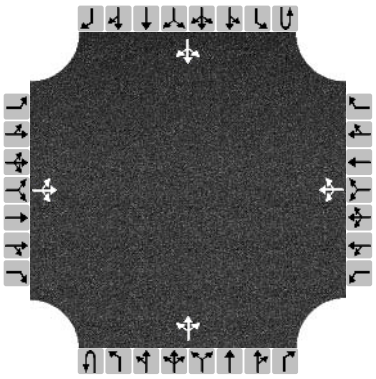
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	9/27/2012
Analysis Year	2012
Time Analyzed	4:15 - 5:15 PM
Intersection Orientation	North-South
Project Description	Balanced 2016

Site Information

Intersection	Route 12/Franklin St
Jurisdiction	West Boylston
East/West Street	Franklin St
North/South Street	Route 12
Peak Hour Factor	1.00
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		7	27	35		87	68	8		56	525	97		5	437	20
Percent Heavy Vehicles (%)		0	0	0		1	1	1		1				1		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.10	6.51	6.20		4.10				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.50	4.01	3.30		2.20				2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			69				163			56				5		
Capacity, c (veh/h)			250				156			1115				969		
v/c Ratio			0.28				1.05			0.05				0.01		
95% Queue Length, Q_{95} (veh)			1.1				8.3			0.2				0.0		
Control Delay (s/veh)			24.8				143.7			8.4				8.7		
Level of Service, LOS			C				F			A				A		
Approach Delay (s/veh)		24.8				143.7				1.3				0.2		
Approach LOS		C				F										

HCS7 Two-Way Stop-Control Report

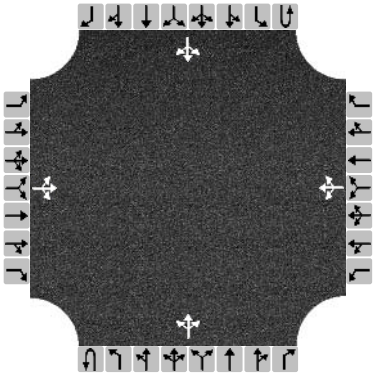
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	9/27/2012
Analysis Year	2012
Time Analyzed	7:15 - 8:15 AM
Intersection Orientation	North-South
Project Description	Projected 2026

Site Information

Intersection	Route 12/Franklin St
Jurisdiction	West Boylston
East/West Street	Franklin St
North/South Street	Route 12
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		12	76	46		59	14	13		21	300	52		7	590	4
Percent Heavy Vehicles (%)		1	1	1		1	1	1		3				3		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.51	6.20		7.10	6.51	6.20		4.10				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.01	3.30		3.50	4.01	3.30		2.20				2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			146				93			23				8		
Capacity, c (veh/h)			253				138			950				1187		
v/c Ratio			0.58				0.67			0.02				0.01		
95% Queue Length, Q_{95} (veh)			3.3				3.7			0.1				0.0		
Control Delay (s/veh)			37.0				72.7			8.9				8.1		
Level of Service, LOS			E				F			A				A		
Approach Delay (s/veh)		37.0				72.7				0.8				0.2		
Approach LOS		E				F										

HCS7 Two-Way Stop-Control Report

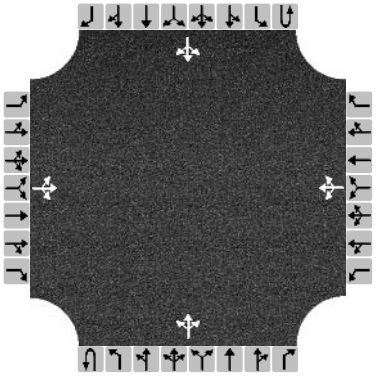
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	9/27/2012
Analysis Year	2012
Time Analyzed	4:15 - 5:15 PM
Intersection Orientation	North-South
Project Description	Projected 2026

Site Information

Intersection	Route 12/Franklin St
Jurisdiction	West Boylston
East/West Street	Franklin St
North/South Street	Route 12
Peak Hour Factor	1.00
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume, V (veh/h)		8	30	39		96	75	9		62	580	107		6	483	22
Percent Heavy Vehicles (%)		0	0	0		1	1	1		1				1		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.10	6.51	6.20		4.10				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.50	4.01	3.30		2.20				2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			77				180			62				6		
Capacity, c (veh/h)			201				122			1070				917		
v/c Ratio			0.38				1.47			0.06				0.01		
95% Queue Length, Q_{95} (veh)			1.7				12.6			0.2				0.0		
Control Delay (s/veh)			33.6				315.1			8.6				9.0		
Level of Service, LOS			D				F			A				A		
Approach Delay (s/veh)		33.6				315.1				1.5				0.2		
Approach LOS		D				F										

Signal Warrants Analysis

Route 12 @ Franklin Street
&
Route 140 @ Franklin Street

Signal Warrants Analysis

File Name:	Route 12 & Franklin St Warrant_2018.xsw
Analyst:	KK
Agency:	CMRPC
Date Performed:	8/23/2018
Time Analyzed:	
Jurisdiction:	West Boylston
Analysis Year:	2018
Project Description:	
Units:	U.S. Customary

General

Major Street Direction: North-South	Population <10,000: No
Starting Time Interval: 7	Coordinated Signal System: No
Median Type: Undivided	Crashes Per Year: 0
Major Street Speed (mi/h): 40	Adequate Trials of Crash Experience Alternatives: No
Nearest Signal (ft): 900	

School Crossing and Roadway Network

Number of Students in Highest Hour: 0	Two or More Major Routes: No
Number of Adequate Gaps in Period: 0	Weekend Count: No
Number of Minutes in Period: 0	5-year Growth Factor (%): 0

Railroad Crossing

Grade Crossing Approach: None	Rail Traffic (trains/day): 4
Highest Volume Hour with Trains: Unknown	High Occupancy Buses (%): 0
Distance to Stop Line (ft):	Tractor-Trailer Trucks (%): 10

Geometry and Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane Usage		LTR			LTR			LTR			LTR	

Traffic Volumes (veh/h)

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Hour												
07 - 08	0	177	0	0	185	0	0	491	0	0	518	0
08 - 09	0	94	0	0	130	0	0	504	0	0	556	0
09 - 10	0	79	0	0	84	0	0	465	0	0	483	0
10 - 11	0	70	0	0	100	0	0	434	0	0	420	0
11 - 12	0	72	0	0	107	0	0	461	0	0	434	0
12 - 13	0	55	0	0	105	0	0	454	0	0	441	0
13 - 14	0	56	0	0	104	0	0	421	0	0	389	0
14 - 15	0	99	0	0	136	0	0	502	0	0	522	0
15 - 16	0	76	0	0	114	0	0	558	0	0	540	0
16 - 17	0	65	0	0	89	0	0	534	0	0	522	0
17 - 18	0	68	0	0	110	0	0	435	0	0	469	0
18 - 19	0	64	0	0	92	0	0	391	0	0	416	0

Pedestrian Volumes and Gaps (Per Hour)

	Eastbound		Westbound		Northbound		Southbound	
	Gaps	Volume	Gaps	Volume	Gaps	Volume	Gaps	Volume
Hour								
07 - 08	0	0	0	0	0	0	0	0
08 - 09	0	0	0	0	0	0	0	0
09 - 10	0	0	0	0	0	0	0	0
10 - 11	0	0	0	0	0	0	0	0
11 - 12	0	0	0	0	0	0	0	0
12 - 13	0	0	0	0	0	0	0	0
13 - 14	0	0	0	0	0	0	0	0
14 - 15	0	0	0	0	0	0	0	0
15 - 16	0	0	0	0	0	0	0	0
16 - 17	0	0	0	0	0	0	0	0
17 - 18	0	0	0	0	0	0	0	0
18 - 19	0	0	0	0	0	0	0	0

Delay

Hour	Eastbound secs/veh	Eastbound veh-hrs	Westbound secs/veh	Westbound veh-hrs	Northbound secs/veh	Northbound veh-hrs	Southbound secs/veh	Southbound veh-hrs
07 - 08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08 - 09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
09 - 10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 - 11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 - 12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12 - 13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13 - 14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14 - 15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15 - 16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16 - 17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17 - 18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18 - 19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Summary

Hour	Major Volume	Minor Volume	Total Volume	1A 100%	1A 80%	1B 100%	1B 80%	2 100%	3A 100%	3B 100%	4A 100%	4B 100%
07 - 08	1009	185	1371	Yes	Yes	Yes	Yes	Yes	No	No	No	No
08 - 09	1060	130	1284	No	Yes	Yes	Yes	Yes	No	No	No	No
09 - 10	948	84	1111	No	No	Yes	Yes	No	No	No	No	No
10 - 11	854	100	1024	No	No	Yes	Yes	No	No	No	No	No
11 - 12	895	107	1074	No	No	Yes	Yes	No	No	No	No	No
12 - 13	895	105	1055	No	No	Yes	Yes	No	No	No	No	No
13 - 14	810	104	970	No	No	Yes	Yes	No	No	No	No	No
14 - 15	1024	136	1259	No	Yes	Yes	Yes	Yes	No	No	No	No
15 - 16	1098	114	1288	No	No	Yes	Yes	Yes	No	No	No	No
16 - 17	1056	89	1210	No	No	Yes	Yes	No	No	No	No	No
17 - 18	904	110	1082	No	No	Yes	Yes	No	No	No	No	No
18 - 19	807	92	963	No	No	Yes	Yes	No	No	No	No	No
Total	11360	1356	13691	1	3	12	12	4	0	0	0	0

Results

Warrant 1: Eight-Hour Vehicular Volume	[X]
A. Minimum Vehicular Volumes	[ ]
B. Interruption of Continuous Traffic	[X]
80% Vehicular --and-- Interruption Volumes	[ ]
Warrant 2: Four-Hour Vehicular Volume	[X]
Four-Hour Vehicular Volumes	[X]
Warrant 3: Peak Hour	[ ]
A. Peak-Hour Conditions	[ ]
B. Peak-Hour Vehicular Volume Hours Met	[ ]
Warrant 4: Pedestrian Volume	[ ]
A. Four Hour Volumes	[ ]
B. One-Hour Volumes	[ ]
Warrant 5: School Crossing	[ ]
Gaps Same Period	[ ]
Student Volumes	[ ]
Nearest Traffic Control Signal	[X]
Warrant 6: Coordinated Signal System	[ ]
Degree of Platooning	[ ]
Warrant 7: Crash Experience	[ ]
A. Adequate Trials of Alternatives	[ ]
B. Reported Crashes	[ ]
C. 80% Volumes for Warrants 1A, 1B --or-- 4	[X]
Warrant 8: Roadway Network	[ ]
A. Weekday Volume	[ ]
B. Weekend Volume	[ ]

Warrant 9: Grade Crossing [ ]
   A. Grade Crossing within 140 ft --and-- [ ]
   B. Peak-Hour Vehicular Volumes [ ]

This text report was created in HCS™ Signal Warrants Version 7.6 on 11/29/2018 7:32:36 AM

Signal Warrants Analysis

File Name:	Route 140 & Franklin St Warrant_2018.xsw
Analyst:	KK
Agency:	CMRPC
Date Performed:	8/23/2018
Time Analyzed:	
Jurisdiction:	West Boylston
Analysis Year:	2018
Project Description:	
Units:	U.S. Customary

General

Major Street Direction: North-South	Population <10,000: No
Starting Time Interval: 7	Coordinated Signal System: No
Median Type: Undivided	Crashes Per Year: 0
Major Street Speed (mi/h): 35	Adequate Trials of Crash Experience Alternatives: No
Nearest Signal (ft): 1000	

School Crossing and Roadway Network

Number of Students in Highest Hour: 0	Two or More Major Routes: No
Number of Adequate Gaps in Period: 0	Weekend Count: No
Number of Minutes in Period: 0	5-year Growth Factor (%): 0

Railroad Crossing

Grade Crossing Approach: None	Rail Traffic (trains/day): 4
Highest Volume Hour with Trains: Unknown	High Occupancy Buses (%): 0
Distance to Stop Line (ft):	Tractor-Trailer Trucks (%): 10

Geometry and Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	0	0	0	0	1	0	0	1	0
Lane Usage		LR						LT			TR	

Traffic Volumes (veh/h)

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Hour												
07 - 08	0	0	90	0	0	0	0	291	0	0	259	0
08 - 09	0	0	67	0	0	0	0	308	0	0	262	0
09 - 10	0	0	86	0	0	0	0	284	0	0	208	0
10 - 11	0	0	84	0	0	0	0	287	0	0	233	0
11 - 12	0	0	85	0	0	0	0	313	0	0	241	0
12 - 13	0	0	98	0	0	0	0	362	0	0	294	0
13 - 14	0	0	116	0	0	0	0	386	0	0	295	0
14 - 15	0	0	126	0	0	0	0	501	0	0	401	0
15 - 16	0	0	145	0	0	0	0	735	0	0	578	0
16 - 17	0	0	155	0	0	0	0	855	0	0	627	0
17 - 18	0	0	208	0	0	0	0	905	0	0	694	0
18 - 19	0	0	121	0	0	0	0	611	0	0	487	0

Pedestrian Volumes and Gaps (Per Hour)

	Eastbound		Westbound		Northbound		Southbound	
	Gaps	Volume	Gaps	Volume	Gaps	Volume	Gaps	Volume
Hour								
07 - 08	0	0	0	0	0	0	0	0
08 - 09	0	0	0	0	0	0	0	0
09 - 10	0	0	0	0	0	0	0	0
10 - 11	0	0	0	0	0	0	0	0
11 - 12	0	0	0	0	0	0	0	0
12 - 13	0	0	0	0	0	0	0	0
13 - 14	0	0	0	0	0	0	0	0
14 - 15	0	0	0	0	0	0	0	0
15 - 16	0	0	0	0	0	0	0	0
16 - 17	0	0	0	0	0	0	0	0
17 - 18	0	0	0	0	0	0	0	0
18 - 19	0	0	0	0	0	0	0	0

Delay

Hour	Eastbound secs/veh	Eastbound veh-hrs	Westbound secs/veh	Westbound veh-hrs	Northbound secs/veh	Northbound veh-hrs	Southbound secs/veh	Southbound veh-hrs
07 - 08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08 - 09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
09 - 10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 - 11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 - 12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12 - 13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13 - 14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14 - 15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15 - 16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16 - 17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17 - 18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18 - 19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Summary

Hour	Major Volume	Minor Volume	Total Volume	1A 100%	1A 80%	1B 100%	1B 80%	2 100%	3A 100%	3B 100%	4A 100%	4B 100%
07 - 08	550	90	640	No	No	No	No	No	No	No	No	No
08 - 09	570	67	637	No	No	No	No	No	No	No	No	No
09 - 10	492	86	578	No	No	No	No	No	No	No	No	No
10 - 11	520	84	604	No	No	No	No	No	No	No	No	No
11 - 12	554	85	639	No	No	No	No	No	No	No	No	No
12 - 13	656	98	754	No	No	No	Yes	No	No	No	No	No
13 - 14	681	116	797	No	No	No	Yes	No	No	No	No	No
14 - 15	902	126	1028	No	Yes	Yes	Yes	Yes	No	No	No	No
15 - 16	1313	145	1458	No	Yes	Yes	Yes	Yes	No	Yes	No	No
16 - 17	1482	155	1637	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
17 - 18	1599	208	1807	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
18 - 19	1098	121	1219	No	Yes	Yes	Yes	Yes	No	No	No	No
Total	10417	1381	11798	2	5	5	7	5	0	3	0	0

Results

Warrant 1: Eight-Hour Vehicular Volume	[ ]
A. Minimum Vehicular Volumes	[ ]
B. Interruption of Continuous Traffic	[ ]
80% Vehicular --and-- Interruption Volumes	[ ]
Warrant 2: Four-Hour Vehicular Volume	[X]
Four-Hour Vehicular Volumes	[X]
Warrant 3: Peak Hour	[X]
A. Peak-Hour Conditions	[ ]
B. Peak-Hour Vehicular Volume Hours Met	[X]
Warrant 4: Pedestrian Volume	[ ]
A. Four Hour Volumes	[ ]
B. One-Hour Volumes	[ ]
Warrant 5: School Crossing	[ ]
Gaps Same Period	[ ]
Student Volumes	[ ]
Nearest Traffic Control Signal	[X]
Warrant 6: Coordinated Signal System	[ ]
Degree of Platooning	[ ]
Warrant 7: Crash Experience	[ ]
A. Adequate Trials of Alternatives	[ ]
B. Reported Crashes	[ ]
C. 80% Volumes for Warrants 1A, 1B --or-- 4	[ ]
Warrant 8: Roadway Network	[ ]
A. Weekday Volume	[ ]
B. Weekend Volume	[ ]

Warrant 9: Grade Crossing [ ]
   A. Grade Crossing within 140 ft --and-- [ ]
   B. Peak-Hour Vehicular Volumes [ ]

This text report was created in HCS™ Signal Warrants Version 7.6 on 11/29/2018 7:33:43 AM

Host Community of Boylston

- **Corridor Profile Meeting, 9/12/18**
- **Corridor Profile Meeting, 11/13/18**
- **Draft Route 140 Study Comments**
- **News Articles**
- **Traffic Counts**
- **Turning Movement Counts (TMCs)**
  - **Existing Level-of-Service Results**
  - **Projected 2025 Level-of-Service Results**

Central Massachusetts
Metropolitan Planning Organization

Date:	September 12, 2018
Topic:	Route 140 Corridor Profile Meeting with Host Community Boylston
Location:	Boylston Town Hall
Invited Participants:	April Steward, Town Administrator Rich Rydant, CMRPC Staff

AGENDA

1.) Introduction

2.) Overview of the CMMPO & Federal Certification Documents

3.) Corridor Profile Overview
- Traffic Volumes
- Safety
- Pavement
- Complete Streets
- Environmental

4.) TIP Overview
- Schedule
- Performance Management
- Title VI, EJ, LEP
- Project Listing

5.) Potential Next Steps

6.) Adjournment

Hi Rick-

The draft Route 140 Corridor Profile study is complete. I would be pleased to sit down with the town's consultant here at the CMRPC offices, or alternately, at the Boylston town hall. It is convenient for me as I reside up the street in Clinton.

The study took a bit longer to finish than originally anticipated, but that is often the case. All completed under the federal planning program at no cost to the three host communities. Myself and the staff appreciate your support in this effort as well as a host of efforts over the past years through your participation on the T-Committee and the Commission.

Thanks Rick. Please advise as to when I can share the results of the study.

Best,
R

Rich Rydant
Transportation Project Manager
Railroad & Trucking Contact
CMRPC
1 Mercantile Street, Suite 520
Worcester, MA 01608
Tel: 508-459-3312

-----Original Message-----
From: Richard Baker <rbaker@boylston-ma.gov>
Sent: Wednesday, October 31, 2018 10:01 AM
To: Jennifer Conley <Jennifer.Conley@wsp.com>
Cc: April Steward <asteward@boylston-ma.gov>; Richard Rydant <rrydant@cmrpc.org>
Subject: Re: N. Sewall/Rt 140 intersection improvements

Jennifer,

I understand the CMRPC corridor study is not yet final, but I believe the planners are willing to share their preliminary findings and recommendations. They've also received cursory input from MDOT District 3. If all parties are willing, I would suggest meeting with you and one or more of the CMRPC traffic planners ASAP to map out a strategy to best utilize the grant funds.

The planner at CMRPC overseeing the corridor study is Rich Rydant. Perhaps we could meet at the CMRPC offices in Worcester. I will be in touch.

/rb

Richard Baker
Boylston Planning Board

> On Oct 31, 2018, at 9:46 AM, Conley, Jennifer <Jennifer.Conley@wsp.com> wrote:

>
> Hi Richard,
> Did you get your hands on a copy of the CMRPC study? I looked at their website but didn't see it.
>
> The memo from the developer is pretty vague and concludes that improvements may be able to be constructed - and don't consider whether a left turn lane is appropriate on Route 140/potential future improvements.
>
> If the town is really interested in considering a roundabout - or a longer term solution for the corridor that may include widening of Route 140 (which could alter the design by the developer), then the funds are more crucial than the short term fix at N. Sewall.
>
> I had a roundabout engineer at our firm layout potential locations/size of a roundabout at this location and determine what would be needed for survey extents and it does appear to be a viable option.
>
> Please advise if there is an opportunity for us to meet with the Town Administrator to discuss. Having the data in the CMRPC study would be helpful to know how they envision this corridor to look in the future and plan accordingly.
> Thank you
> Jenn
>
> -----Original Message-----
> From: Richard Baker [mailto:rbaker@boylston-ma.gov]
> Sent: Monday, October 15, 2018 1:02 PM
> To: Conley, Jennifer <Jennifer.Conley@wsp.com>
> Subject: N. Sewall/Rt 140 intersection improvements
>
> Hi Jennifer, attached is plan for improvements the applicant has agreed to make. I'll try to get you the CMRPC corridor study ASAP. Thanks. /rb

Kevin,

Sorry I did not have time to speak with you after the meeting last evening. I spoke with the Town Administrator, and she indicated that the Selectmen were thankful to receive the study but had few comments. From discussions with the Planning Board and my takeway from the meeting we had with Jennifer Conley at your offices, I think it's safe to summarize the Town's position as follows:

1) The Corridor Study will be a valuable resource in developing the Town's strategy for Rt. 140 traffic improvements.

2) Business development along the Rt. 140 corridor in Boylston is a very high priority for the Town, and traffic is a major obstacle.

3) The Town lacks the resources to undertake a major corridor upgrade, ie, cross-section widening, Sewall St. intersection reconfiguration, Rt 140/Rt 70 intersection improvement, without state or federal funding.

4) Improvements to be considered must not preclude or significantly impede business/retail development. Ideally, developers can work in partnership with the Town to effect improvements, much as occurred with the Scannell/FedEx development at the south end of the corridor.

5) With respect to the recommendation for a modern roundabout at the Sewall St. intersection, the Town raises a serious concern that it would require land taking from a prime developable lot on the southwest corner of the S. Sewall/Rt 140 intersection and significantly affect businesses on the east side at that location.

Thank you.

Richard Baker
Boylston Planning Board

Boylston gets grant for study of Route 140 intersection

Telegram & Gazette
Posted Oct 24, 2018 at 1:50 AM

MELROSE — The state announced nearly $5 million in awards to 31 communities through two new grant programs under the Housing Choice Initiative.

Boylston received a $83,500 Housing Choice Small town Grant to pay for a traffic engineering study for the Route 140/Sewall Street intersection. This project will consider reconfiguring the layout for better traffic flows associated with the proposed development of 66 units of apartments affecting the North Sewall Street intersection, a recently approved 30-unit senior residential development on South Sewall Street and a 57-lot subdivision that is nearing completion.

The Housing Choice Initiative is a effort to support the creation of 135,000 new housing units by 2025 to meet the needs of Massachusetts's families, workforce and residents. The Housing Choice Initiative provides incentives, rewards and technical assistance reform to encourage and empower municipalities to plan and build the diverse housing stock that the Commonwealth needs to continue to thrive.

"Our administration is focused on developing a healthy housing market for Massachusetts' long-term success, with diverse housing options that are affordable for families and residents across the income spectrum," Baker said.

Route 140 Corridor Profile:
Complete Traffic Volume Data Collection Effort

Town of Boylston

ATRs: Route 140 at Shrewsbury Town Line, **9/15/16**
Route 140 at West Boylston Town Line, **10/19/16**

TMCs: Route 140/Route 70, **7/8/14**
Route 140/School Street, **June 2016** *(by VHB)*

Town : Boylston
Street : Shrewsbury Street (Rt 140)
Location : At Shrewsbury TL

Site: 2016024

Weekly Volume

Interval Start	Mon 9/12/2016		Tue 9/13/2016		Wed 9/14/2016		Thu 9/15/2016		Fri 9/16/2016		Sat 9/17/2016		Sun 9/18/2016		Mon - Fri Average		Weekly Average	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
12:00 AM	-	-	-	-	-	-	67	34	60	32	-	-	-	-	63.5	33.0	63.5	33.0
1:00 AM	-	-	-	-	-	-	52	8	27	25	-	-	-	-	39.5	16.5	39.5	16.5
2:00 AM	-	-	-	-	-	-	26	20	24	22	-	-	-	-	25.0	21.0	25.0	21.0
3:00 AM	-	-	-	-	-	-	21	32	20	27	-	-	-	-	20.5	29.5	20.5	29.5
4:00 AM	-	-	-	-	-	-	47	78	33	89	-	-	-	-	40.0	83.5	40.0	83.5
5:00 AM	-	-	-	-	-	-	180	313	173	299	-	-	-	-	176.5	306.0	176.5	306.0
6:00 AM	-	-	-	-	-	-	375	760	313	758	-	-	-	-	344.0	759.0	344.0	759.0
7:00 AM	-	-	-	-	-	-	454	1069	474	964	-	-	-	-	464.0	1016.5	464.0	1016.5
8:00 AM	-	-	-	-	-	-	409	990	456	842	-	-	-	-	432.5	916.0	432.5	916.0
9:00 AM	-	-	-	-	-	-	409	631	390	532	-	-	-	-	399.5	581.5	399.5	581.5
10:00 AM	-	-	-	-	-	-	383	449	422	432	-	-	-	-	402.5	440.5	402.5	440.5
11:00 AM	-	-	-	-	-	-	417	453	-	-	-	-	-	-	417.0	453.0	417.0	453.0
12:00 PM	-	-	-	-	-	-	426	440	-	-	-	-	-	-	426.0	440.0	426.0	440.0
1:00 PM	-	-	-	-	466	402	485	427	-	-	-	-	-	-	475.5	414.5	475.5	414.5
2:00 PM	-	-	-	-	628	469	653	482	-	-	-	-	-	-	640.5	475.5	640.5	475.5
3:00 PM	-	-	-	-	735	532	801	564	-	-	-	-	-	-	768.0	548.0	768.0	548.0
4:00 PM	-	-	-	-	1059	472	1092	423	-	-	-	-	-	-	1075.5	447.5	1075.5	447.5
5:00 PM	-	-	-	-	1087	400	1100	452	-	-	-	-	-	-	1093.5	426.0	1093.5	426.0
6:00 PM	-	-	-	-	662	378	751	395	-	-	-	-	-	-	706.5	386.5	706.5	386.5
7:00 PM	-	-	-	-	399	311	498	369	-	-	-	-	-	-	448.5	340.0	448.5	340.0
8:00 PM	-	-	-	-	295	230	321	204	-	-	-	-	-	-	308.0	217.0	308.0	217.0
9:00 PM	-	-	-	-	223	172	253	160	-	-	-	-	-	-	238.0	166.0	238.0	166.0
10:00 PM	-	-	-	-	140	88	157	108	-	-	-	-	-	-	148.5	98.0	148.5	98.0
11:00 PM	-	-	-	-	98	55	100	73	-	-	-	-	-	-	99.0	64.0	99.0	64.0
Totals	0	0	0	0	5792	3509	9477	8934	2392	4022	0	0	0	0	9252.0	8679.0	9252.0	8679.0
Combined	0		0		9301		18411		6414		0		0		17931.0		17931.0	
Split (%)	-	-	-	-	62.3	37.7	51.5	48.5	37.3	62.7	-	-	-	-	51.6	48.4	51.6	48.4

Peak Hours

12:00 AM - 12:00 PM	-	-	-	-	-	-	7:00 AM	7:00 AM	7:00 AM	7:00 AM	-	-	-	-	7:00 AM	7:00 AM	7:00 AM	7:00 AM
Volume	-	-	-	-	-	-	454	1069	474	964	-	-	-	-	464.0	1016.5	464.0	1016.5
12:00 PM - 12:00 AM	-	-	-	-	5:00 PM	3:00 PM	5:00 PM	3:00 PM	-	-	-	-	-	-	5:00 PM	3:00 PM	5:00 PM	3:00 PM
Volume	-	-	-	-	1087	532	1100	564	-	-	-	-	-	-	1093.5	548.0	1093.5	548.0

Town : Boylston
Street : West Boylston Street (140)
Location : West Boylston TL

Site: 2016025

Weekly Volume

Interval Start	Mon 10/17/2016		Tue 10/18/2016		Wed 10/19/2016		Thu 10/20/2016		Fri 10/21/2016		Sat 10/22/2016		Sun 10/23/2016		Mon - Fri Average		Weekly Average	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12:00 AM	-	-	-	-	8	21	8	19	-	-	-	-	-	-	8.0	20.0	8.0	20.0
1:00 AM	-	-	-	-	1	15	6	17	-	-	-	-	-	-	3.5	16.0	3.5	16.0
2:00 AM	-	-	-	-	7	4	7	7	-	-	-	-	-	-	7.0	5.5	7.0	5.5
3:00 AM	-	-	-	-	14	5	19	11	-	-	-	-	-	-	16.5	8.0	16.5	8.0
4:00 AM	-	-	-	-	63	14	52	16	-	-	-	-	-	-	57.5	15.0	57.5	15.0
5:00 AM	-	-	-	-	241	35	242	45	-	-	-	-	-	-	241.5	40.0	241.5	40.0
6:00 AM	-	-	-	-	552	125	540	121	-	-	-	-	-	-	546.0	123.0	546.0	123.0
7:00 AM	-	-	-	-	882	190	843	187	-	-	-	-	-	-	862.5	188.5	862.5	188.5
8:00 AM	-	-	-	-	671	207	660	222	-	-	-	-	-	-	665.5	214.5	665.5	214.5
9:00 AM	-	-	-	-	290	210	305	247	-	-	-	-	-	-	297.5	228.5	297.5	228.5
10:00 AM	-	-	-	-	275	214	244	251	-	-	-	-	-	-	259.5	232.5	259.5	232.5
11:00 AM	-	-	-	-	259	252	-	-	-	-	-	-	-	-	259.0	252.0	259.0	252.0
12:00 PM	-	-	256	237	270	272	-	-	-	-	-	-	-	-	263.0	254.5	263.0	254.5
1:00 PM	-	-	247	249	315	307	-	-	-	-	-	-	-	-	281.0	278.0	281.0	278.0
2:00 PM	-	-	296	352	314	413	-	-	-	-	-	-	-	-	305.0	382.5	305.0	382.5
3:00 PM	-	-	286	618	304	604	-	-	-	-	-	-	-	-	295.0	611.0	295.0	611.0
4:00 PM	-	-	272	811	301	855	-	-	-	-	-	-	-	-	286.5	833.0	286.5	833.0
5:00 PM	-	-	291	965	273	954	-	-	-	-	-	-	-	-	282.0	959.5	282.0	959.5
6:00 PM	-	-	221	523	248	580	-	-	-	-	-	-	-	-	234.5	551.5	234.5	551.5
7:00 PM	-	-	146	321	154	301	-	-	-	-	-	-	-	-	150.0	311.0	150.0	311.0
8:00 PM	-	-	118	194	100	196	-	-	-	-	-	-	-	-	109.0	195.0	109.0	195.0
9:00 PM	-	-	89	177	61	133	-	-	-	-	-	-	-	-	75.0	155.0	75.0	155.0
10:00 PM	-	-	42	93	40	80	-	-	-	-	-	-	-	-	41.0	86.5	41.0	86.5
11:00 PM	-	-	19	47	20	55	-	-	-	-	-	-	-	-	19.5	51.0	19.5	51.0
Totals	0	0	2283	4587	5663	6042	2926	1143	0	0	0	0	0	0	5565.5	6012.0	5565.5	6012.0
Combined	0		6870		11705		4069		0		0		0		11577.5		11577.5	
Split (%)	-	-	33.2	66.8	48.4	51.6	71.9	28.1	-	-	-	-	-	-	48.1	51.9	48.1	51.9

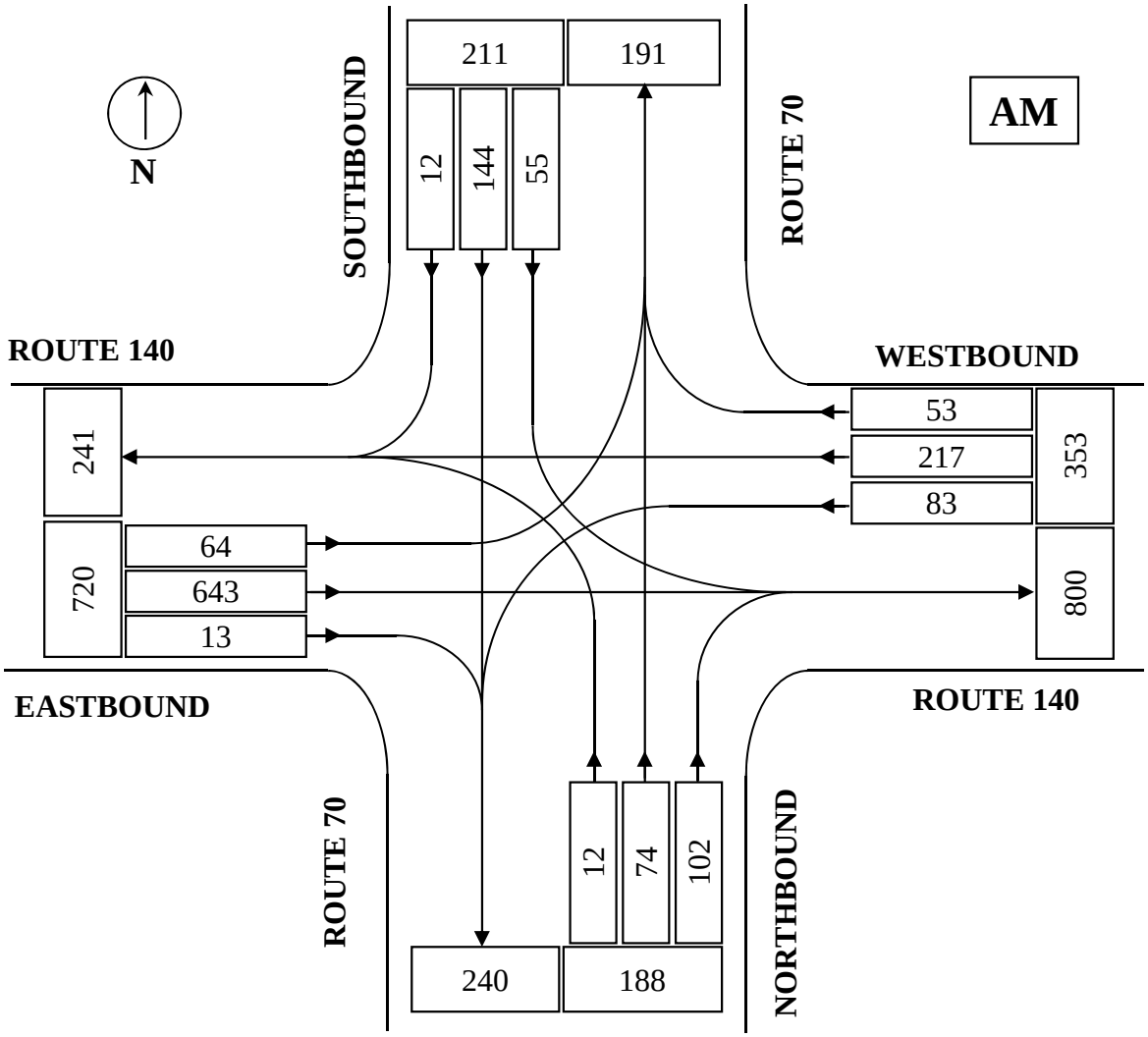
Peak Hours

12:00 AM - 12:00 PM	-	-	-	-	7:00 AM	11:00 AM	7:00 AM	10:00 AM	-	-	-	-	-	-	7:00 AM	11:00 AM	7:00 AM	11:00 AM
Volume	-	-	-	-	882	252	843	251	-	-	-	-	-	-	862.5	252.0	862.5	252.0
12:00 PM - 12:00 AM	-	-	2:00 PM	5:00 PM	1:00 PM	5:00 PM	-	-	-	-	-	-	-	-	2:00 PM	5:00 PM	2:00 PM	5:00 PM
Volume	-	-	296	965	315	954	-	-	-	-	-	-	-	-	305.0	959.5	305.0	959.5

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Boylston **DATE:** 7/8/14 **DAY OF WEEK:** Tuesday
INTERSECTION: Route 140 / Route 70

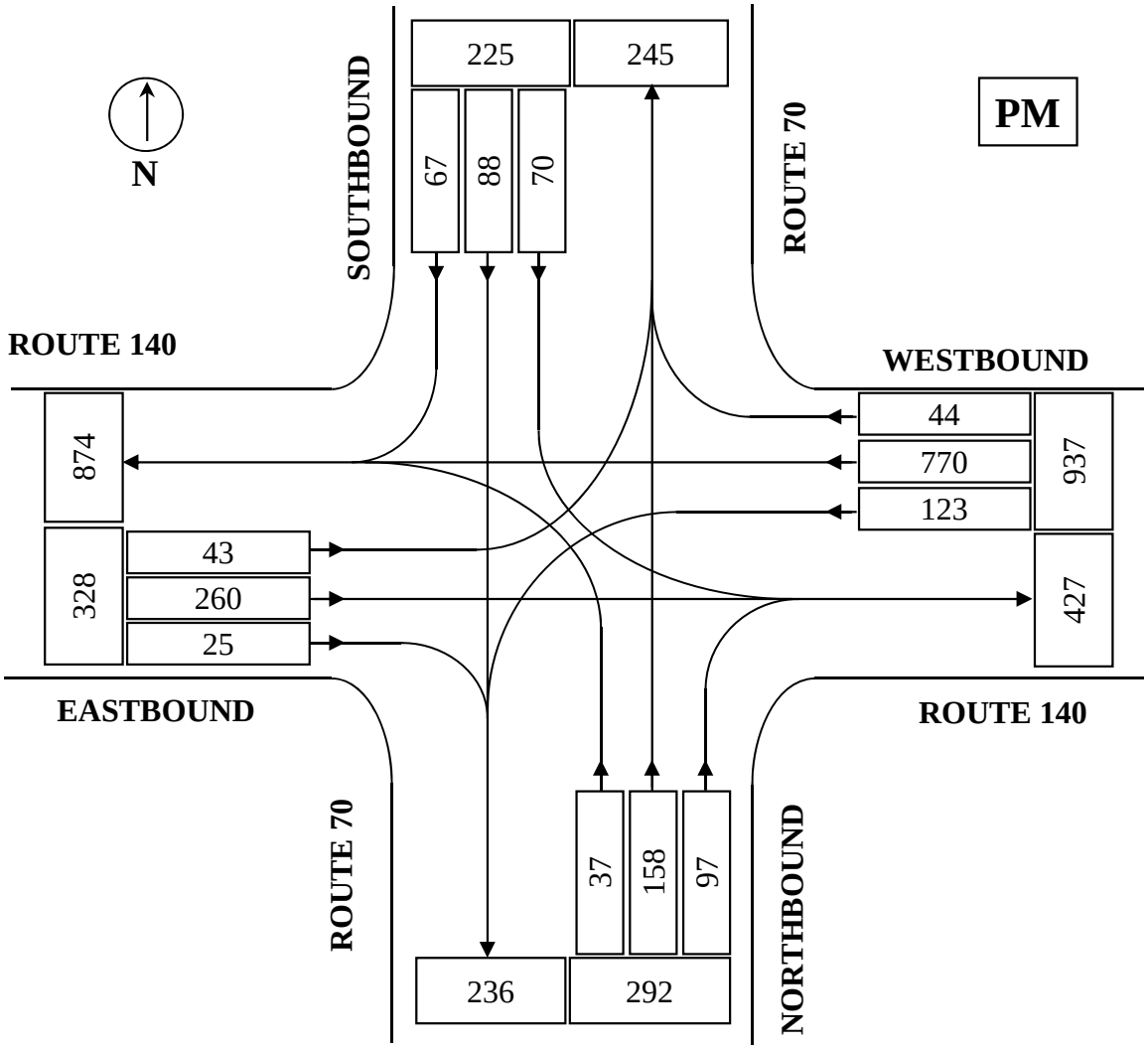


STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
Route 140 EB	720	48.9%	7:30 - 8:30 AM
Route 140 WB	353	24.0%	PHF = .90
Route 70 NB	188	12.8%	**VEHICLES COUNTED**
Route 70 SB	211	14.3%	**ALL VEHICLES:** 1472
TOTAL	1472	100.0%	**TRUCKS:** 93
			PERCENT TRUCKS: 6.32%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Boylston **DATE:** 7/8/14 **DAY OF WEEK:** Tuesday
INTERSECTION: Route 140 / Route 70



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
Route 140 EB	328	18.4%	4:30 - 5:30 PM
Route 140 WB	937	52.6%	PHF = .95
Route 70 NB	292	16.4%	**VEHICLES COUNTED**
Route 70 SB	225	12.6%	**ALL VEHICLES:** 1782
TOTAL	1782	100.0%	**TRUCKS:** 38
			PERCENT TRUCKS: 2.13%

TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: Town of Boylston

DATE: 7/8/2014

LOCATION: Route 140 / Route 70

DAY OF WEEK: Tuesday

WEATHER: AM: Clear PM: Clear

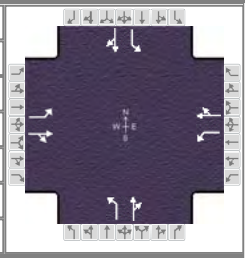
TECHNICIAN: RJ

Time Period	Route 140 EB				Route 140 WB				Route 70 NB				Route 70 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15	13	137	1	3	14	44	9	4	2	15	28	3	14	32	7	3	316	
7:15 - 7:30	20	132	5	10	20	36	10	2	3	26	26	2	19	27	2	0	326	
7:30 - 7:45	19	175	3	8	22	53	8	5	3	29	36	6	22	36	2	1	408	
7:45 - 8:00	12	183	3	9	20	57	17	11	3	12	26	2	11	40	3	5	387	1437
8:00 - 8:15	16	136	2	8	21	42	15	7	3	14	24	2	14	38	3	4	328	1449
8:15 - 8:30	17	149	5	7	20	65	13	14	3	19	16	2	8	30	4	2	349	1472
8:30 - 8:45	16	130	3	5	20	39	13	2	7	37	9	3	17	28	2	2	321	1385
8:45 - 9:00	12	103	8	8	20	35	13	6	6	19	17	2	8	30	3	3	274	1272
TOTAL	125	1145	30	58	157	371	98	51	30	171	182	22	113	261	26	20	2709	
		EBPct	48.9			**WBPct**	24.0			**NBPct**	12.8			**SBPct**	14.3			
Peak Sums:	**64**	**643**	**13**	**32**	**83**	**217**	**53**	**37**	**12**	**74**	**102**	**12**	**55**	**144**	**12**	**12**	**1472**	
Total Trucks	93					**TrkPct**	6.32			**PHF**	0.90							

Time Period	Route 140 EB				Route 140 WB				Route 70 NB				Route 70 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15	7	61	3	2	27	118	13	4	8	31	31	5	20	33	10	0	362	
4:15 - 4:30	7	59	4	1	18	153	14	2	6	34	16	2	13	19	14	2	357	
4:30 - 4:45	6	68	7	1	30	170	8	8	7	38	25	0	20	30	16	3	425	
4:45 - 5:00	17	63	4	2	36	167	13	3	11	36	27	4	19	15	19	1	427	1571
5:00 - 5:15	8	63	10	1	26	204	15	2	15	45	27	1	12	21	13	1	459	1668
5:15 - 5:30	12	66	4	3	31	229	8	6	4	39	18	1	19	22	19	1	471	1782
5:30 - 5:45	13	54	2	0	29	161	12	4	8	27	10	1	12	29	11	0	368	1725
5:45 - 6:00	8	51	6	2	29	151	8	2	4	28	20	1	5	23	12	0	345	1643
TOTAL	78	485	40	12	226	1353	91	31	63	278	174	15	120	192	114	8	3214	
		EBPct	18.4			**WBPct**	52.6			**NBPct**	16.4			**SBPct**	12.6			
Peak Sums:	**43**	**260**	**25**	**7**	**123**	**770**	**44**	**19**	**37**	**158**	**97**	**6**	**70**	**88**	**67**	**6**	**1782**	
Total Trucks	38					**TrkPct**	2.13			**PHF**	0.95							

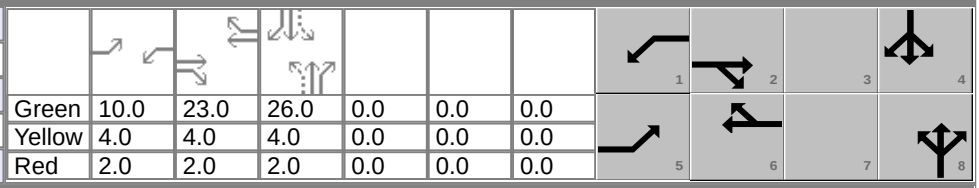
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Jul 25, 2014	Area Type	Other
Jurisdiction	Boylston	Time Period	7:30 - 8:30 AM	PHF	0.90
Urban Street	Route 140	Analysis Year	2014	Analysis Period	1> 7:30
Intersection	Route 140/Route 70	File Name	14_Rt 140 & Rt 70_AM-bal.xus		
Project Description	Balanced 2016				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	85	731	18	85	261	54	17	75	104	56	147	17

Signal Information			
Cycle, s	77.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	10.0	23.0	26.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.0	0.0	0.0	0.0

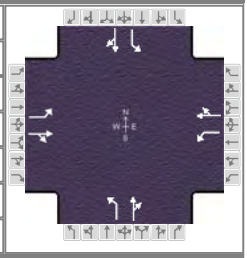
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	4.0	2.0	4.0		6.0		6.0
Phase Duration, s	16.0	29.0	16.0	29.0		32.0		32.0
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0		6.0		6.0
Max Allow Headway (*MAH*), s	3.1	3.0	3.1	3.0		3.2		3.2
Queue Clearance Time (g_s), s	5.9	25.0	5.9	14.4		8.4		10.5
Green Extension Time (g_e), s	0.0	0.0	0.0	2.0		0.8		0.8
Phase Call Probability	1.00	1.00	1.00	1.00		1.00		1.00
Max Out Probability	0.26	1.00	0.26	0.21		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	94	831		94	342		19	171		62	179	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1725	1876		1725	1833		1196	1767		1204	1827	
Queue Service Time (g_s), s	3.9	23.0		3.9	12.4		0.9	5.5		3.1	5.5	
Cycle Queue Clearance Time (g_c), s	3.9	23.0		3.9	12.4		6.4	5.5		8.5	5.5	
Green Ratio (*g/C*)	0.13	0.30		0.13	0.30		0.34	0.34		0.34	0.34	
Capacity (*c*), veh/h	224	560		224	548		411	597		415	617	
Volume-to-Capacity Ratio (*X*)	0.422	1.483		0.422	0.625		0.046	0.287		0.150	0.290	
Back of Queue (*Q*), ft/ln (50 th percentile)	41.3	1174.1		41.3	137.7		6.2	54		21.3	56.5	
Back of Queue (*Q*), veh/ln (50 th percentile)	1.6	44.8		1.6	5.3		0.2	2.1		0.8	2.2	
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	30.8	27.0		30.8	23.3		21.1	18.7		21.8	18.7	
Incremental Delay (d_2), s/veh	0.5	226.9		0.5	1.7		0.0	0.1		0.1	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	31.3	253.9		31.3	25.0		21.1	18.8		21.9	18.8	
Level of Service (LOS)	C	F		C	C		C	B		C	B	
Approach Delay, s/veh / LOS	231.2	F		26.3	C		19.0	B		19.6	B	
Intersection Delay, s/veh / LOS	130.4						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	2.0	B	1.2	A	0.8	A	0.9	A

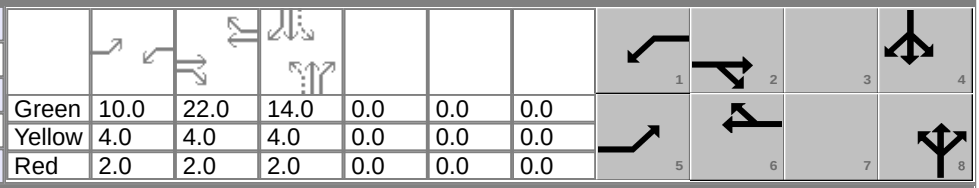
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Jul 25, 2014	Area Type	Other
Jurisdiction	Boylston	Time Period	4:30 - 5:30 PM	PHF	0.95
Urban Street	Route 140	Analysis Year	2014	Analysis Period	1> 4:30
Intersection	Route 140/Route 70	File Name	14_Rt 140 & Rt 70_PM-bal.xus		
Project Description	Balanced 2016				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	44	325	26	125	785	45	38	161	119	91	90	68

Signal Information			
Cycle, s	64.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	10.0	22.0	14.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.0	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	4.0	2.0	4.0		6.0		6.0
Phase Duration, s	16.0	28.0	16.0	28.0		20.0		20.0
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0		6.0		6.0
Max Allow Headway (*MAH*), s	3.1	3.0	3.1	3.0		3.3		3.3
Queue Clearance Time (g_s), s	3.4	11.8	6.3	24.0		10.8		16.0
Green Extension Time (g_e), s	0.0	0.9	0.1	0.0		0.5		0.0
Phase Call Probability	1.00	1.00	1.00	1.00		1.00		1.00
Max Out Probability	0.00	1.00	0.50	1.00		1.00		1.00

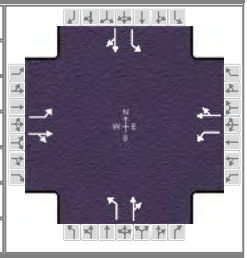
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	46	364		132	871		40	273		96	146	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1924		1781	1928		1242	1821		1107	1759	
Queue Service Time (g_s), s	1.4	9.8		4.3	22.0		1.8	8.8		5.2	4.5	
Cycle Queue Clearance Time (g_c), s	1.4	9.8		4.3	22.0		6.4	8.8		14.0	4.5	
Green Ratio (*g/C*)	0.16	0.34		0.16	0.34		0.22	0.22		0.22	0.22	
Capacity (*c*), veh/h	278	661		278	663		296	398		202	385	
Volume-to-Capacity Ratio (*X*)	0.166	0.551		0.473	1.314		0.135	0.684		0.473	0.380	
Back of Queue (*Q*), ft/ln (50 th percentile)	14.5	100.6		43.8	928.9		12.8	98.9		36.2	44.3	
Back of Queue (*Q*), veh/ln (50 th percentile)	0.6	4.0		1.7	36.6		0.5	3.9		1.4	1.7	
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	23.4	17.0		24.6	21.0		24.0	23.0		29.6	21.3	
Incremental Delay (d_2), s/veh	0.1	0.6		0.5	151.8		0.1	4.0		0.6	0.2	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	23.5	17.6		25.1	172.8		24.1	27.0		30.2	21.5	
Level of Service (LOS)	C	B		C	F		C	C		C	C	
Approach Delay, s/veh / LOS	18.2	B		153.4	F		26.6	C		25.0	C	
Intersection Delay, s/veh / LOS	89.2						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.3	B	2.3	B
Bicycle LOS Score / LOS	1.2	A	2.1	B	1.0	A	0.9	A

 HCS7™ Streets Version 7.2.1 Generated: 6/2/2017 9:49:13 AM

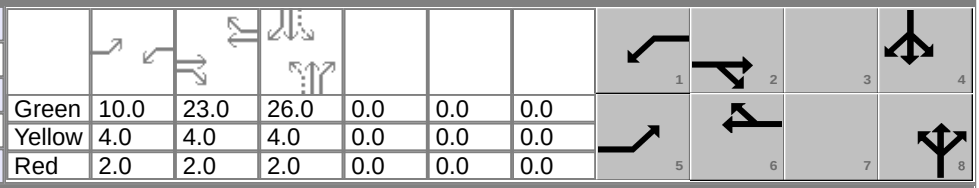
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Jul 25, 2014	Area Type	Other
Jurisdiction	Boylston	Time Period	7:30 - 8:30 AM	PHF	0.90
Urban Street	Route 140	Analysis Year	2014	Analysis Period	1> 7:30
Intersection	Route 140/Route 70	File Name	14_Rt 140 & Rt 70_AM-proj.xus		
Project Description	Projected 2026				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	94	842	20	104	320	86	19	83	127	95	162	19

Signal Information			
Cycle, s	77.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	10.0	23.0	26.0	0.0	0.0	0.0	1	2	3	4	
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	5	6	7	8	
Red	2.0	2.0	2.0	0.0	0.0	0.0					

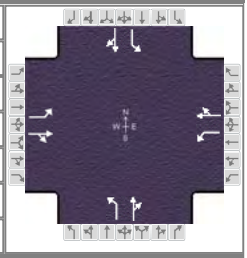
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	4.0	2.0	4.0		6.0		6.0
Phase Duration, s	16.0	29.0	16.0	29.0		32.0		32.0
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0		6.0		6.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1		3.2		3.2
Queue Clearance Time (g_s), s	6.3	25.0	6.8	19.4		9.2		14.5
Green Extension Time (g_e), s	0.0	0.0	0.0	1.5		1.0		0.9
Phase Call Probability	1.00	1.00	1.00	1.00		1.00		1.00
Max Out Probability	0.48	1.00	0.92	0.89		0.00		0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	104	957		116	443		21	206		106	198	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1725	1876		1725	1819		1175	1756		1167	1826	
Queue Service Time (g_s), s	4.3	23.0		4.8	17.4		1.0	6.8		5.7	6.2	
Cycle Queue Clearance Time (g_c), s	4.3	23.0		4.8	17.4		7.2	6.8		12.5	6.2	
Green Ratio (*g/C*)	0.13	0.30		0.13	0.30		0.34	0.34		0.34	0.34	
Capacity (*c*), veh/h	224	560		224	543		396	593		385	617	
Volume-to-Capacity Ratio (*X*)	0.466	1.707		0.516	0.816		0.053	0.347		0.274	0.321	
Back of Queue (*Q*), ft/ln (50 th percentile)	46	1577.5		51.8	217.1		7.1	66.3		38.8	63.2	
Back of Queue (*Q*), veh/ln (50 th percentile)	1.8	60.2		2.0	8.3		0.3	2.6		1.5	2.5	
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	31.0	27.0		31.2	25.0		21.6	19.1		23.8	18.9	
Incremental Delay (d_2), s/veh	0.6	325.8		0.9	8.8		0.0	0.1		0.1	0.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	31.6	352.8		32.2	33.8		21.7	19.3		24.0	19.1	
Level of Service (LOS)	C	F		C	C		C	B		C	B	
Approach Delay, s/veh / LOS	321.2	F		33.5	C		19.5	B		20.8	C	
Intersection Delay, s/veh / LOS	172.2						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.95	B	1.92	B	1.92	B	1.91	B
Bicycle LOS Score / LOS	2.24	B	1.41	A	0.86	A	0.99	A

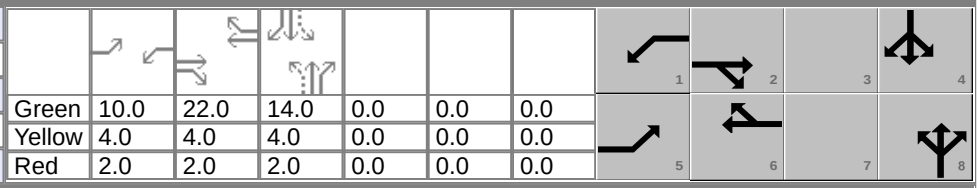
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Jul 25, 2014	Area Type	Other
Jurisdiction	Boylston	Time Period	4:30 - 5:30 PM	PHF	0.95
Urban Street	Route 140	Analysis Year	2014	Analysis Period	1> 4:30
Intersection	Route 140/Route 70	File Name	14_Rt 140 & Rt 70_PM-proj.xus		
Project Description	Projected 2026				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	49	393	29	152	905	86	42	178	142	129	99	75

Signal Information			
Cycle, s	64.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	10.0	22.0	14.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.0	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	4.0	2.0	4.0		6.0		6.0
Phase Duration, s	16.0	28.0	16.0	28.0		20.0		20.0
Change Period, ($Y+R_c$), s	6.0	6.0	6.0	6.0		6.0		6.0
Max Allow Headway (*MAH*), s	3.1	3.1	3.1	3.1		3.3		3.3
Queue Clearance Time (g_s), s	3.6	14.4	7.3	24.0		12.5		16.0
Green Extension Time (g_e), s	0.0	0.0	0.1	0.0		0.3		0.0
Phase Call Probability	1.00	1.00	1.00	1.00		1.00		1.00
Max Out Probability	0.00	1.00	1.00	1.00		1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	52	439		160	1040		44	315		136	163	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1925		1781	1916		1223	1813		1065	1756	
Queue Service Time (g_s), s	1.6	12.4		5.3	22.0		2.1	10.5		3.5	5.1	
Cycle Queue Clearance Time (g_c), s	1.6	12.4		5.3	22.0		7.2	10.5		14.0	5.1	
Green Ratio (*g/C*)	0.16	0.34		0.16	0.34		0.22	0.22		0.22	0.22	
Capacity (*c*), veh/h	278	662		278	659		282	397		171	384	
Volume-to-Capacity Ratio (*X*)	0.185	0.663		0.575	1.579		0.157	0.794		0.796	0.425	
Back of Queue (*Q*), ft/ln (50 th percentile)	16.2	133.3		56.8	1462.3		14.4	131.5		75.6	49.9	
Back of Queue (*Q*), veh/ln (50 th percentile)	0.6	5.2		2.2	57.6		0.6	5.2		3.0	2.0	
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh	23.5	17.9		25.0	21.0		24.6	23.6		31.3	21.5	
Incremental Delay (d_2), s/veh	0.1	2.0		1.9	267.7		0.1	9.8		20.9	0.3	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	23.6	19.9		26.9	288.7		24.7	33.4		52.1	21.8	
Level of Service (LOS)	C	B		C	F		C	C		D	C	
Approach Delay, s/veh / LOS	20.3	C		253.8	F		32.3	C		35.6	D	
Intersection Delay, s/veh / LOS	143.4						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.93	B	1.93	B	1.92	B	1.92	B
Bicycle LOS Score / LOS	1.30	A	2.47	B	1.08	A	0.98	A

Host Community of Shrewsbury

- **Corridor Profile Meeting, 10/31/17**
- **News Articles**
- **MassDOT Route 140 Bridge Design Public Hearing**
- **Traffic Counts**
- **Turning Movement Counts (TMCs)**
    - **Existing Level-of-Service Results**
    - **Projected 2025 Level-of-Service Results**

Rich,

Ironically we are meeting with our Traffic Consultant on Tuesday 10/31 concerning the 140 corridor. I know it is short notice, but could we meet **on Tuesday 10/31 at 11:00**?

Thanks, Jeff Howland

On Thu, Oct 26, 2017 at 3:51 PM, Richard Rydant <rrydant@cmrpc.org> wrote:

Hello All-
Hope all is well in Shrewsbury.

As CMRPC staff has reached a point with Corridor Profile materials for the town of Shrewsbury's section of Route 140, we would like to visit the town hall and meet with both yourselves to discuss the study effort. We will introduce the study, go over what has been compiled so far as well as accept any feedback you may have.

I suggest we convene sometime over the next two weeks. Tuesdays, Wednesdays and Thursdays are good for staff at either 10 AM or alternately 1:30 PM. We would require about an hour or so at this time. Please suggest a couple of options and we can confirm.

As I had indicated earlier to Bernard, staff has met with the West Boylston Transportation Committee and will, in the future, also meet with the Boylston Planning Board as we continue this study effort. Staff is aware of the challenges presented by the construction of the FedEx distribution facility in the neighboring community.

I look forward to hearing from you about when we can meet to discuss Route 140.

Best,

R

Rich Rydant

Transportation Project Manager
Railroad & Trucking Contact
Central Massachusetts Regional Planning Commission
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Worcester, MA 01604-4016
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telegram.com
WORCESTER, MASSACHUSETTS

Shrewsbury adds traffic-control option for proposed FedEx facility

By Elaine Thompson
Telegram & Gazette Staff
@EThompsonTG

Posted Jan 16, 2018 at 7:55 PM
Updated Jan 17, 2018 at 11:17 AM

SHREWSBURY - Selectmen are counting on improvements they have selected to significantly mitigate any traffic impact from a large FedEx facility to be built off Route 140 in neighboring Boylston.

Boylston town officials last March approved a proposed $84 million, 362,000-square-foot FedEx distribution facility to be built on 107 acres of wooded land at 160 Shrewsbury Street (Route 140) behind the Dragon 88 restaurant, near the Shrewsbury town line.

The proposed entrance to the site is on the western side of Route 140, between School Street in Boylston and Colonial Drive in Shrewsbury.

As part of the site plan approval process, Scannell Properties, the builder, provided Boylston with a traffic study. Shrewsbury officials, however, felt that the study did not sufficiently reflect the impact the proposed development would have on Shrewsbury through the Route 140 corridor and town center.

Consequently, Scannell agreed to pay for an extended traffic study done by a consultant of Shrewsbury's choosing. The subsequent traffic study by Marlboro-based MDM Transportation Consultants indicated the proposed development would generate approximately 2,680 new vehicle trips each weekday. In its Route 140 South Corridor Study, finalized in November, MDM said the trip increases along the portion of Route 140 at the Interstate 290 interchange "stand to materially impact roadway capacity and operations particularly at Colonial Drive." The truck traffic would also cause traffic increases on other roads, the study said.

Colonial Drive, though a dead-end street with 45 homes, is heavily traveled because traffic from about nine adjoining streets pours into it to reach Route 140.

The consultants provided three options to mitigate the impact of the increased truck traffic from the FedEx site. After reviewing the options with Scannell, Boylston officials and MassDOT, the Shrewsbury Board of Selectmen, at its meeting last week, selected Option A. The suggested improvement would change a proposed three-way intersection at the FedEx entrance and Route 140 to a four-way intersection.

Assistant Town Manager Kristen Las told selectmen that the fourth leg of the intersection, School Street Connector, would come out at the east side of Route 140 through private property that Boylston is looking to obtain. She said this would eliminate the need for a right turn onto Colonial Drive in Shrewsbury. Motorists coming from Colonial Drive would be directed to turn right onto School Street in Boylston and turn left onto the new leg of the four-way and exit onto Route 140 southbound. Colonial Drive would be restricted to right-in/right-out access.

Ms. Las in an interview Tuesday said officials from the two towns, the consultants and MassDOT are discussing how to make the option a reality.

"The board and town staff feel that option is the preferred option based upon the recommendation of the traffic study ... the constructability of Option A and the way it would help traffic flow," she said.

Scannell has agreed to pay for design of 80 percent of the recommended improvements, up to $350,000, including the $34,000 cost of the extended traffic study.

Ms. Las said the parties have not come up with an agreement on how to pay for the actual improvements. She said Shrewsbury could ask town meeting for funds up to $100,000, which should cover the cost.

The town is also investigating how school bus traffic on Colonial Drive could be least impacted. There are additional traffic concerns from possible future development near the Route 140 corridor, including the redevelopment of the Rand Whitney property north of the FedEx site.

Also, over the years, there has been some discussion about a possible 1 million-square-foot multi-use development on nearly 130 acres at Boylston Street in Shrewsbury. The property is owned by Leominster-based Secured Financial Trust. Peter E. Bovenzi, a Lunenburg developer, is president of the trust.

Traffic study for Rt. 140 : Sheet1

Traffic study for Rt. 140

		Proposed FedEx trips		
Period/direction	Automobile trips	Box truck trips	Trailer truck trips	Total trips
Weekday morning peak hour				
Entering	**190**	**64**	**1**	**255**
Exiting	**154**	**116**	**1**	**271**
Total	**344**	**180**	**2**	**526**
Weekday evening peak hour				
Entering	**166**	**116**	**1**	**283**
Exiting	**225**	**0**	**0**	**225**
Total	**391**	**116**	**1**	**508**
Weekday daily	**1,824**	**720**	**136**	**2,680**

Source: Route 140 Corridor Study T&G Staff/Don Landgren Jr.

Sheet1

telegram.com
WORCESTER, MASSACHUSETTS

Development plans at Shrewsbury-Boylston line raise concerns

By Elaine Thompson
Telegram & Gazette Staff
Posted Mar 15, 2017 at 6:39 PM
Updated Mar 15, 2017 at 11:29 PM

SHREWSBURY – A huge multi-use development that could be built off Route 140, on the Shrewsbury-Boylston line, would generate hefty tax revenue for the town. However, the current concern of town officials is the traffic that development and a nearby FedEx distribution center could dump on roads in the center of town.

Town Manager Daniel J. Morgado, selectmen and other town officials have met and gone to Boylston to discuss the traffic concerns they have about the development.

Boylston Town Administrator Martin McNamara said officials last week approved the construction of an $84 million, 362,000-square-foot FedEx distribution facility to be built on 107 acres of wooded land off Route 140 behind the Dragon 88 restaurant. The Planning Board also approved construction of an access road off Shrewsbury Street (Route 140) that will be used to get to the FedEx facility, as well as to nearly 130 acres at 490 Boylston St. in Shrewsbury, where a 1 million-square-foot multi-use development is being discussed. The property is owned by Leominster-based Secured Financial Trust. Developer Peter E. Bovenzi of Lunenburg is president.

Mr. Bovenzi is out of the country this week and could not be reached for comment Tuesday.

He has not filed any plans with either town regarding development of the property. But he has met with Shrewsbury officials several times over the years to discuss development, including commercial, retail and a hotel.

A traffic report presented at a hearing last month in Boylston on the access road indicated approximately 1 million square feet of office and commercial development, including a 300-room hotel and 400 units of senior housing, could be built on the portion of the property in Shrewsbury. On the Boylston property: 200,000 square feet of warehousing, 100,000 square feet of commercial and restaurant space, in addition to the FedEx facility.

Both towns welcome more commercial-based tax revenue.

Mr. McNamara said the FedEx facility will employ 25 full-time and 130 part-time employees and generate about $1.5 million in annual tax revenue for Boylston.

In Shrewsbury, where homeowners make up nearly 87 percent of the town's tax base, the large development would bring in a "significant amount" of needed commercial tax revenue.

"If the parcel in Shrewsbury gets developed, yes, we're talking about a substantial investment and obviously a generator of revenue for both communities, no question about that," Mr. Morgado said. "With that, of course, come issues of traffic, water and sewer. All of that has to get worked out."

According to the assessors' office, the 129.77 wooded acres at 409 Boylston St., was transferred to Mr. Bovenzi's Secured Financial Trust in 1995 and it is the only owner on record.

Mr. Bovenzi has been trying to develop the site for years. At one time, St. Vincent Hospital considered the site for construction of its new hospital, which eventually was built in downtown Worcester. There are issues with the property that doesn't make it development-friendly that have to be mitigated, including water, wastewater and access, which is being resolved with the construction of the recently-approved access road.

"Once the road gets built and he has more frontage and access to 140, the parcels become more readily available for development," Mr. Morgado explained.

While selectmen are interested in more commercial development, he said, the revenue being generated has to be

weighed against the impacts of traffic.

“One of the concerns the board has with FedEx is how much of that truck traffic would be going (I-)290 and 140 north? And how much would go southward into town center?”

Selectmen have conveyed their concerns about traffic impacts to the Boylston Planning Board and Board of Selectmen.

Scannell Properties, which is building the FedEx distribution center, has agreed to do additional traffic studies to look at the impacts from the truck traffic.

Selectmen are also concerned that the large development – if built in a series of small developments over a number of years – would not trigger the Massachusetts Environmental Policy Act process, which would look at conservation and traffic issues.

Selectmen are waiting to hear back from Boylston officials after recently sending a letter informing them that if they do not initiate the MEPA process, they will gather the required number of signatures from registered voters to force the process.

Maurice “Moe” DePalo, chairman of the Shrewsbury Board of Selectmen, said that would prevent the state review process from not being automatically triggered when a project is developed in a series of small developments over time. The entire project would have to go through the review process.

“The main reason for us is traffic,” Mr. DePalo said. “We are waiting for some comment from Boylston on how they’re planning to proceed.”

Before the land can be developed, Mr. Bovenzi will have to settle with the town.

The property is classified under state Chapter 61 as forest land and taxed at a vastly reduced rate. It is currently assessed at $6,850, which generates $88 in annual property taxes for the town. Before fiscal 2012, the property was not in Chapter 61, and had a much higher assessment and tax bill. For example, in the current fiscal year, it would be valued at $1,890,900 and the current tax rate of $12.83 per thousand valuation would apply.

Conversion of the land to another use will result in the owner having to pay the town the difference in the reduced taxes he paid for several years and what he would have paid if the land was not in Chapter 61.

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PUBLIC HEARING

Shrewsbury – Route 140 (Boylston Street)
Bridge No. S-14-018 over I-290

PROJECT LOCATION AND LIMITS:

The project is located between Wachusett Avenue and Colonial Drive in Shrewsbury, Massachusetts. The attached locus map shows the location of the project. The total length of the project is approximately 2,760 feet, which includes the bridge and roadway approaches.

PROJECT PURPOSE:

The purpose of the project is to replace the structurally deficient existing two span bridge superstructure with a two span continuous steel girder superstructure and a concrete deck capable of carrying standard highway loadings.

EXISTING CONDITIONS:

Route 140 is functionally classified as a Rural Minor Arterial, with an ADT of approximately 19,700 vehicles per day. The existing two span continuous steel girder bridge with a reinforced concrete slab was built in 1967 and originally designed for an AASHTO H20 truck. Each span length is 127'- 3 13/16" with a bridge skew of approximately 17 degrees. The total out to out width of the bridge is 46'-4 1/2", with a roadway width crossing the bridge of 36'-0" northbound and 36'-0" southbound measured from face of curb to face of curb. There is a 6'-0" wide median between the northbound and southbound roadways and a 5'-0" wide sidewalk on the west side of the bridge. The bridge railing is a steel 3-rail with an aluminum chain link fence. The bridge carries a 12 inch diameter insulated water line, an 8 inch diameter gas line and 4 inch diameter conduits for electric and cable service. There are no overhead utilities. The abutments, pier and wingwalls are of reinforced concrete construction.

The bridge deck consists of a 8" thick reinforced concrete slab and a 2 ½" thick bituminous wearing surface. The deck is in poor condition with timber shielding placed under the deck between the girders to prevent debris from falling onto I-290 traffic.

PROPOSED IMPROVEMENTS:

The proposed bridge will be a two span continuous steel girder structure with a concrete deck and a bituminous wearing surface, in the same location and with the same horizontal and vertical roadway alignment, as the existing. The span length for each span will be 127'- 4", closely matching the existing span lengths. The bridge will provide a 32'-0" roadway width with one 12'-0" through lane, a 12'-0" merge lane, a 6'-0" outside shoulder and a 2'-0" inside shoulder in both the northbound and southbound direction. The east side of the bridge will have a 5'-6"wide concrete maintenance walk and the west side will have a 9'-6" wide sidewalk. A CP-PL2 Bridge Railing with a protective screen will be constructed along the outside of each walkway. The

existing utilities will be relocated from the west side of the bridge to the east side of the bridge. The bridge will provide for having a future sewer line in the outside bay on the west side of the bridge.

The abutments and pier will remain, with modifications to the pier cap beam and footing as well as the abutment bridge seats, backwall and stem. All four wingwalls will remain, with deteriorated areas repaired.

The roadway approaches will be cold planed approximately 2 inches deep then repaved with a Hot Mix Asphalt overlay. The approach sidewalks and curbing will be replaced as needed along with highway guardrail within the project limits. New pavement markings and traffic signs will be added, as well as all other incidental work within the project limits. The new roadway and bridge will provide for bicyclist and pedestrians with a 6'-0" wide outside shoulder and an 8'-0" wide sidewalk. The proposed design speed will be 50 MPH.

Five of the eight ramps to and from I-290 will have a segment of the ramp re-aligned as it merges with Route 140. The re-alignment will slow traffic and allow more time for pedestrians to cross the ramps when using the sidewalk.

The bridge will remain open to vehicular and pedestrian traffic during construction, with one lane of vehicular traffic provided in each direction. The use of the ramps during construction will be maintained with slight adjustments. During removal of the existing girders and erection of the new girders, Route 140 traffic will remain 1 lane in each direction with either I-290 EB or I-290 WB traffic being detoured using the existing on and off ramps. The detour of the I-290 traffic will only be done during night time hours.

RIGHT OF WAY:

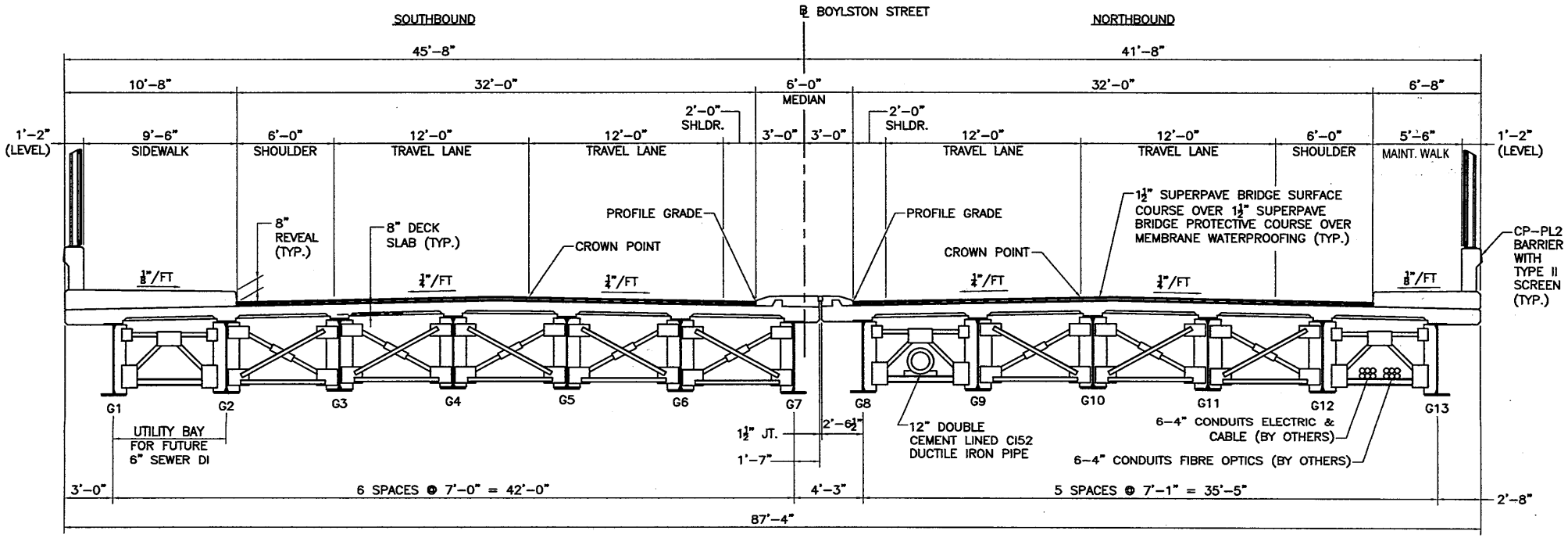
No right-of-way is anticipated for this bridge superstructure replacement project.

PROJECT COST:

The estimated preliminary construction cost of this project is $18,000,000 exclusive of utility costs.

PROJECT STATUS:

The plans on display tonight are in the preliminary design stage. Comments received this evening will be considered in determining the final design.



PROPOSED TRANSVERSE SECTION

SCALE: ¼" = 1'-0"

(LOOKING NORTH)

Public comment sought on bridge project

$18 million project planned by MassDOT to replace and upgrade aging bridge over Route 290

By Tom Godfrey
Wicked Local correspondent

Tthe Massachusetts Department of Transportation (MassDOT) held a public hearing to discuss a proposed bridge project on Rt. 140 on On Thursday, September 21, after press time. The proposed project would see major renovations on the bridge that brings Rte. 140 over I-290.

The project was proposed after MassDOT inspected the current bridge and found that the concrete deck was nearing the end of its useful life, said Patrick Marvin of the MassDOT communications office. Further, the current bridge has weight restrictions for the vehicles that can pass over it that exclude its use by large trucks.

Under the proposal, the superstructure of the bridge will be replaced. The final bridge will consist of two spans to accommodate northbound and southbound traffic. Steel girders will support the concrete deck, which will be able to accommodate heavier vehicles.

The bridge's southbound lane will have a shared use path that is 9 feet and 6 inches wide, along with a travel lane, merging lane, and shoulders. The northbound lane will have a maintenance and safety walk in addition to a travel lane, merging lane, and two shoulders. There will also be a 6 feet wide median dividing

See BRIDGE, A2

BRIDGE

From Page A1

the bridge, as well as the road that leads to the bridge.

While much of the proposed project focuses on the bridge itself, the approach to the bridge on both sides will receive improvements, also. According to a MassDOT notice, the approaches will see the installation of new pavement, pavement marking, curbs, signing, etc. The estimated cost for the project, which MassDOT hopes will begin in fall 2018 and be completed in about 18 months, is over $18 million.

However, because this is a MassDOT project, Shrewsbury residents will not be footing the bill.

"It is a MassDOT project and they are the clear leaders on it," said Shrewsbury Town Manager Kevin Mizikar, adding that Shrewsbury would have a say in what happens with the project.

Town Engineer Jeffrey Howland echoed this.

"Our involvement is on the periphery," said Howland.

Town duties would include attending coordination meetings between the design engineers and MassDOT, as well as assisting in town owned utility re-locations.

Current plans are for one lane on each side of the bridge to remain open during construction for vehicular and pedestrian traffic. This will lessen the impact the renovation will have on the town. This is something that is important to Mizikar.

"We're willing to provide input and ensure that the impacts are lessened to residents and that the outcome is in harmony with what the town sees in that part of the community," said Mizikar. He also said that town staff will consult with MassDOT and provide comments as needed.

In addition, Mizikar noted that there will be public involvement. The purpose of Thursday's public hearing was not only to inform the public about the project, but also to allow citizens to add their voice to the project.

Residents who were unable to attend the public hearing may submit their comments in writing to: Ms. Patricia Leavenworth P.E., Chief Engineer, Mass DOT – Highway Division, 10 Park Plaza, Boston, MA 02116, Attention: Bridge Project Management, Project File No. 606380. Mailed statements and exhibits intended for inclusion in the public hearing transcript must be postmarked within ten (10) business days of the Public Hearing.

Route 140 Corridor Profile:
Complete Traffic Volume Data Collection Effort

Town of Shrewsbury

ATRs: Route 140 south of I-290, **10/4/16**
Route 140 south of Hill Street, **9/15/16**
Route 140 south of Main Street, **9/15/16**
Route 140 south of Lake Street, **10/4/16**
Route 140 south of Route 9, **10/4/16**
Route 140 north of Route 20, **10/4/16**
Route 140 at Grafton Town Line, **10/12/16**

TMCs: Route 140/Prospect Street, **6/11/15**
Route 140/Main Street, **10/6/15**
Route 140/Lake Street, **9/24/15**
Route 140/Grafton Street, **9/22/15**

Town : Shewsbury
Street : Boylston Street Rt 140
Location : South of I-290

Site: 2016150

Weekly Volume

Interval Start	Mon 10/3/2016		Tue 10/4/2016		Wed 10/5/2016		Thu 10/6/2016		Fri 10/7/2016		Sat 10/8/2016		Sun 10/9/2016		Mon - Fri Average		Weekly Average	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
12:00 AM	-	-	48	38	38	43	-	-	-	-	-	-	-	-	43.0	40.5	43.0	40.5
1:00 AM	-	-	29	19	36	22	-	-	-	-	-	-	-	-	32.5	20.5	32.5	20.5
2:00 AM	-	-	11	21	14	14	-	-	-	-	-	-	-	-	12.5	17.5	12.5	17.5
3:00 AM	-	-	15	22	22	28	-	-	-	-	-	-	-	-	18.5	25.0	18.5	25.0
4:00 AM	-	-	35	43	41	41	-	-	-	-	-	-	-	-	38.0	42.0	38.0	42.0
5:00 AM	-	-	113	191	141	193	-	-	-	-	-	-	-	-	127.0	192.0	127.0	192.0
6:00 AM	-	-	305	518	375	438	-	-	-	-	-	-	-	-	340.0	478.0	340.0	478.0
7:00 AM	-	-	652	744	664	779	-	-	-	-	-	-	-	-	658.0	761.5	658.0	761.5
8:00 AM	-	-	547	756	623	751	-	-	-	-	-	-	-	-	585.0	753.5	585.0	753.5
9:00 AM	-	-	410	526	404	505	-	-	-	-	-	-	-	-	407.0	515.5	407.0	515.5
10:00 AM	379	399	389	380	396	448	-	-	-	-	-	-	-	-	388.0	409.0	388.0	409.0
11:00 AM	390	381	382	380	-	-	-	-	-	-	-	-	-	-	386.0	380.5	386.0	380.5
12:00 PM	412	414	390	377	-	-	-	-	-	-	-	-	-	-	401.0	395.5	401.0	395.5
1:00 PM	413	414	418	377	-	-	-	-	-	-	-	-	-	-	415.5	395.5	415.5	395.5
2:00 PM	510	497	520	472	-	-	-	-	-	-	-	-	-	-	515.0	484.5	515.0	484.5
3:00 PM	633	557	630	541	-	-	-	-	-	-	-	-	-	-	631.5	549.0	631.5	549.0
4:00 PM	711	565	792	626	-	-	-	-	-	-	-	-	-	-	751.5	595.5	751.5	595.5
5:00 PM	851	566	906	544	-	-	-	-	-	-	-	-	-	-	878.5	555.0	878.5	555.0
6:00 PM	636	403	675	490	-	-	-	-	-	-	-	-	-	-	655.5	446.5	655.5	446.5
7:00 PM	458	306	469	335	-	-	-	-	-	-	-	-	-	-	463.5	320.5	463.5	320.5
8:00 PM	314	207	337	247	-	-	-	-	-	-	-	-	-	-	325.5	227.0	325.5	227.0
9:00 PM	193	126	247	164	-	-	-	-	-	-	-	-	-	-	220.0	145.0	220.0	145.0
10:00 PM	98	81	130	96	-	-	-	-	-	-	-	-	-	-	114.0	88.5	114.0	88.5
11:00 PM	74	47	90	59	-	-	-	-	-	-	-	-	-	-	82.0	53.0	82.0	53.0
Totals	6072	4963	8540	7966	2754	3262	0	0	0	0	0	0	0	0	8489.0	7891.0	8489.0	7891.0
Combined	11035		16506		6016		0		0		0		0		16380.0		16380.0	
Split (%)	55.0	45.0	51.7	48.3	45.8	54.2	-	-	-	-	-	-	-	-	51.8	48.2	51.8	48.2

Peak Hours

12:00 AM - 12:00 PM	11:00 AM	10:00 AM	7:00 AM	8:00 AM	7:00 AM	7:00 AM	-	-	-	-	-	-	-	-	7:00 AM	7:00 AM	7:00 AM	7:00 AM
Volume	390	399	652	756	664	779	-	-	-	-	-	-	-	-	658.0	761.5	658.0	761.5
12:00 PM - 12:00 AM	5:00 PM	5:00 PM	5:00 PM	4:00 PM	-	-	-	-	-	-	-	-	-	-	5:00 PM	4:00 PM	5:00 PM	4:00 PM
Volume	851	566	906	626	-	-	-	-	-	-	-	-	-	-	878.5	595.5	878.5	595.5

Town : Shrewsbury
Street : Boylston Street (Rt 140)
Location : South of Hill Street

Site: 2016154

Weekly Volume

Interval Start	Mon 9/12/2016		Tue 9/13/2016		Wed 9/14/2016		Thu 9/15/2016		Fri 9/16/2016		Sat 9/17/2016		Sun 9/18/2016		Mon - Fri Average		Weekly Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	-	-	-	-	-	-	37	46	41	34	-	-	-	-	39.0	40.0	39.0	40.0
1:00 AM	-	-	-	-	-	-	26	27	24	34	-	-	-	-	25.0	30.5	25.0	30.5
2:00 AM	-	-	-	-	-	-	13	17	19	15	-	-	-	-	16.0	16.0	16.0	16.0
3:00 AM	-	-	-	-	-	-	14	16	26	19	-	-	-	-	20.0	17.5	20.0	17.5
4:00 AM	-	-	-	-	-	-	38	38	36	35	-	-	-	-	37.0	36.5	37.0	36.5
5:00 AM	-	-	-	-	-	-	138	106	131	107	-	-	-	-	134.5	106.5	134.5	106.5
6:00 AM	-	-	-	-	-	-	392	312	351	295	-	-	-	-	371.5	303.5	371.5	303.5
7:00 AM	-	-	-	-	-	-	598	577	513	628	-	-	-	-	555.5	602.5	555.5	602.5
8:00 AM	-	-	-	-	-	-	616	459	545	498	-	-	-	-	580.5	478.5	580.5	478.5
9:00 AM	-	-	-	-	-	-	467	404	414	343	-	-	-	-	440.5	373.5	440.5	373.5
10:00 AM	-	-	-	-	-	-	349	327	386	344	-	-	-	-	367.5	335.5	367.5	335.5
11:00 AM	-	-	-	-	-	-	345	388	-	-	-	-	-	-	345.0	388.0	345.0	388.0
12:00 PM	-	-	-	-	-	-	346	373	-	-	-	-	-	-	346.0	373.0	346.0	373.0
1:00 PM	-	-	-	-	-	-	368	384	-	-	-	-	-	-	368.0	384.0	368.0	384.0
2:00 PM	-	-	-	-	417	458	455	467	-	-	-	-	-	-	436.0	462.5	436.0	462.5
3:00 PM	-	-	-	-	496	520	510	539	-	-	-	-	-	-	503.0	529.5	503.0	529.5
4:00 PM	-	-	-	-	546	590	597	554	-	-	-	-	-	-	571.5	572.0	571.5	572.0
5:00 PM	-	-	-	-	535	634	552	675	-	-	-	-	-	-	543.5	654.5	543.5	654.5
6:00 PM	-	-	-	-	457	504	448	522	-	-	-	-	-	-	452.5	513.0	452.5	513.0
7:00 PM	-	-	-	-	333	330	361	380	-	-	-	-	-	-	347.0	355.0	347.0	355.0
8:00 PM	-	-	-	-	217	223	243	257	-	-	-	-	-	-	230.0	240.0	230.0	240.0
9:00 PM	-	-	-	-	179	156	164	186	-	-	-	-	-	-	171.5	171.0	171.5	171.0
10:00 PM	-	-	-	-	84	97	94	94	-	-	-	-	-	-	89.0	95.5	89.0	95.5
11:00 PM	-	-	-	-	68	55	69	70	-	-	-	-	-	-	68.5	62.5	68.5	62.5
Totals	0	0	0	0	3332	3567	7240	7218	2486	2352	0	0	0	0	7058.5	7141.0	7058.5	7141.0
Combined	0		0		6899		14458		4838		0		0		14199.5		14199.5	
Split (%)	-	-	-	-	48.3	51.7	50.1	49.9	51.4	48.6	-	-	-	-	49.7	50.3	49.7	50.3

Peak Hours

12:00 AM - 12:00 PM	-	-	-	-	-	-	8:00 AM	7:00 AM	8:00 AM	7:00 AM	-	-	-	-	8:00 AM	7:00 AM	8:00 AM	7:00 AM
Volume	-	-	-	-	-	-	616	577	545	628	-	-	-	-	580.5	602.5	580.5	602.5
12:00 PM - 12:00 AM	-	-	-	-	4:00 PM	5:00 PM	4:00 PM	5:00 PM	-	-	-	-	-	-	4:00 PM	5:00 PM	4:00 PM	5:00 PM
Volume	-	-	-	-	546	634	597	675	-	-	-	-	-	-	571.5	654.5	571.5	654.5

Town : Shrewsbury
Street : Grafton Street (Rt 140)
Location : South of Main Street

Site: 2016217

Weekly Volume

Interval Start	Mon 9/12/2016		Tue 9/13/2016		Wed 9/14/2016		Thu 9/15/2016		Fri 9/16/2016		Sat 9/17/2016		Sun 9/18/2016		Mon - Fri Average		Weekly Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	-	-	-	-	-	-	35	49	33	36	-	-	-	-	34.0	42.5	34.0	42.5
1:00 AM	-	-	-	-	-	-	30	23	38	19	-	-	-	-	34.0	21.0	34.0	21.0
2:00 AM	-	-	-	-	-	-	20	22	22	21	-	-	-	-	21.0	21.5	21.0	21.5
3:00 AM	-	-	-	-	-	-	15	25	17	39	-	-	-	-	16.0	32.0	16.0	32.0
4:00 AM	-	-	-	-	-	-	33	46	32	39	-	-	-	-	32.5	42.5	32.5	42.5
5:00 AM	-	-	-	-	-	-	82	137	88	117	-	-	-	-	85.0	127.0	85.0	127.0
6:00 AM	-	-	-	-	-	-	220	356	231	331	-	-	-	-	225.5	343.5	225.5	343.5
7:00 AM	-	-	-	-	-	-	403	425	376	547	-	-	-	-	389.5	486.0	389.5	486.0
8:00 AM	-	-	-	-	-	-	389	360	412	336	-	-	-	-	400.5	348.0	400.5	348.0
9:00 AM	-	-	-	-	-	-	340	113	350	318	-	-	-	-	345.0	215.5	345.0	215.5
10:00 AM	-	-	-	-	-	-	357	363	328	385	-	-	-	-	342.5	374.0	342.5	374.0
11:00 AM	-	-	-	-	-	-	433	379	416	420	-	-	-	-	424.5	399.5	424.5	399.5
12:00 PM	-	-	-	-	-	-	424	355	-	-	-	-	-	-	424.0	355.0	424.0	355.0
1:00 PM	-	-	-	-	-	-	368	421	-	-	-	-	-	-	368.0	421.0	368.0	421.0
2:00 PM	-	-	-	-	-	-	488	421	-	-	-	-	-	-	488.0	421.0	488.0	421.0
3:00 PM	-	-	-	-	545	422	554	438	-	-	-	-	-	-	549.5	430.0	549.5	430.0
4:00 PM	-	-	-	-	588	345	565	413	-	-	-	-	-	-	576.5	379.0	576.5	379.0
5:00 PM	-	-	-	-	591	405	677	359	-	-	-	-	-	-	634.0	382.0	634.0	382.0
6:00 PM	-	-	-	-	493	455	491	513	-	-	-	-	-	-	492.0	484.0	492.0	484.0
7:00 PM	-	-	-	-	338	334	387	330	-	-	-	-	-	-	362.5	332.0	362.5	332.0
8:00 PM	-	-	-	-	273	213	286	239	-	-	-	-	-	-	279.5	226.0	279.5	226.0
9:00 PM	-	-	-	-	139	133	179	133	-	-	-	-	-	-	159.0	133.0	159.0	133.0
10:00 PM	-	-	-	-	79	99	104	85	-	-	-	-	-	-	91.5	92.0	91.5	92.0
11:00 PM	-	-	-	-	59	66	72	76	-	-	-	-	-	-	65.5	71.0	65.5	71.0
Totals	0	0	0	0	3105	2472	6952	6081	2343	2608	0	0	0	0	6840.0	6179.0	6840.0	6179.0
Combined	0		0		5577		13033		4951		0		0		13019.0		13019.0	
Split (%)	-	-	-	-	55.7	44.3	53.3	46.7	47.3	52.7	-	-	-	-	52.5	47.5	52.5	47.5

Peak Hours

12:00 AM - 12:00 PM	-	-	-	-	-	-	11:00 AM	7:00 AM	11:00 AM	7:00 AM	-	-	-	-	11:00 AM	7:00 AM	11:00 AM	7:00 AM
Volume	-	-	-	-	-	-	433	425	416	547	-	-	-	-	424.5	486.0	424.5	486.0
12:00 PM - 12:00 AM	-	-	-	-	5:00 PM	6:00 PM	5:00 PM	6:00 PM	-	-	-	-	-	-	5:00 PM	6:00 PM	5:00 PM	6:00 PM
Volume	-	-	-	-	591	455	677	513	-	-	-	-	-	-	634.0	484.0	634.0	484.0

Town : Shrewsbury
Street : Grafton Street Rt 140
Location : North of Grafton Circle

Site: 2016144

Weekly Volume

Interval Start	Mon 10/3/2016		Tue 10/4/2016		Wed 10/5/2016		Thu 10/6/2016		Fri 10/7/2016		Sat 10/8/2016		Sun 10/9/2016		Mon - Fri Average		Weekly Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	-	-	39	33	42	30	-	-	-	-	-	-	-	-	40.5	31.5	40.5	31.5
1:00 AM	-	-	21	20	25	23	-	-	-	-	-	-	-	-	23.0	21.5	23.0	21.5
2:00 AM	-	-	19	16	14	19	-	-	-	-	-	-	-	-	16.5	17.5	16.5	17.5
3:00 AM	-	-	24	21	36	27	-	-	-	-	-	-	-	-	30.0	24.0	30.0	24.0
4:00 AM	-	-	50	29	42	26	-	-	-	-	-	-	-	-	46.0	27.5	46.0	27.5
5:00 AM	-	-	107	100	105	102	-	-	-	-	-	-	-	-	106.0	101.0	106.0	101.0
6:00 AM	-	-	334	256	341	303	-	-	-	-	-	-	-	-	337.5	279.5	337.5	279.5
7:00 AM	-	-	649	407	672	434	-	-	-	-	-	-	-	-	660.5	420.5	660.5	420.5
8:00 AM	-	-	569	431	588	430	-	-	-	-	-	-	-	-	578.5	430.5	578.5	430.5
9:00 AM	-	-	407	336	427	333	-	-	-	-	-	-	-	-	417.0	334.5	417.0	334.5
10:00 AM	-	-	315	327	393	299	-	-	-	-	-	-	-	-	354.0	313.0	354.0	313.0
11:00 AM	358	367	352	302	-	-	-	-	-	-	-	-	-	-	355.0	334.5	355.0	334.5
12:00 PM	354	380	366	356	-	-	-	-	-	-	-	-	-	-	360.0	368.0	360.0	368.0
1:00 PM	404	387	342	343	-	-	-	-	-	-	-	-	-	-	373.0	365.0	373.0	365.0
2:00 PM	432	437	417	443	-	-	-	-	-	-	-	-	-	-	424.5	440.0	424.5	440.0
3:00 PM	456	542	468	523	-	-	-	-	-	-	-	-	-	-	462.0	532.5	462.0	532.5
4:00 PM	493	573	508	576	-	-	-	-	-	-	-	-	-	-	500.5	574.5	500.5	574.5
5:00 PM	496	607	545	642	-	-	-	-	-	-	-	-	-	-	520.5	624.5	520.5	624.5
6:00 PM	368	402	453	453	-	-	-	-	-	-	-	-	-	-	410.5	427.5	410.5	427.5
7:00 PM	271	243	303	279	-	-	-	-	-	-	-	-	-	-	287.0	261.0	287.0	261.0
8:00 PM	147	172	224	244	-	-	-	-	-	-	-	-	-	-	185.5	208.0	185.5	208.0
9:00 PM	121	125	113	153	-	-	-	-	-	-	-	-	-	-	117.0	139.0	117.0	139.0
10:00 PM	84	69	103	73	-	-	-	-	-	-	-	-	-	-	93.5	71.0	93.5	71.0
11:00 PM	57	65	50	55	-	-	-	-	-	-	-	-	-	-	53.5	60.0	53.5	60.0
Totals	4041	4369	6778	6418	2685	2026	0	0	0	0	0	0	0	0	6752.0	6406.5	6752.0	6406.5
Combined	8410		13196		4711		0		0		0		0		13158.5		13158.5	
Split (%)	48.0	52.0	51.4	48.6	57.0	43.0	-	-	-	-	-	-	-	-	51.3	48.7	51.3	48.7

Peak Hours

12:00 AM - 12:00 PM	11:00 AM	11:00 AM	7:00 AM	8:00 AM	7:00 AM	7:00 AM	-	-	-	-	-	-	-	-	7:00 AM	8:00 AM	7:00 AM	8:00 AM
Volume	358	367	649	431	672	434	-	-	-	-	-	-	-	-	660.5	430.5	660.5	430.5
12:00 PM - 12:00 AM	5:00 PM	5:00 PM	5:00 PM	5:00 PM	-	-	-	-	-	-	-	-	-	-	5:00 PM	5:00 PM	5:00 PM	5:00 PM
Volume	496	607	545	642	-	-	-	-	-	-	-	-	-	-	520.5	624.5	520.5	624.5

Town : Shrewsbury
Street : Grafton Street Rt 140
Location : South of Route 9

Site: 2016151

Weekly Volume

Interval Start	Mon 10/3/2016		Tue 10/4/2016		Wed 10/5/2016		Thu 10/6/2016		Fri 10/7/2016		Sat 10/8/2016		Sun 10/9/2016		Mon - Fri Average		Weekly Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	-	-	42	47	40	37	-	-	-	-	-	-	-	-	41.0	42.0	41.0	42.0
1:00 AM	-	-	33	21	29	21	-	-	-	-	-	-	-	-	31.0	21.0	31.0	21.0
2:00 AM	-	-	22	21	17	24	-	-	-	-	-	-	-	-	19.5	22.5	19.5	22.5
3:00 AM	-	-	25	12	24	18	-	-	-	-	-	-	-	-	24.5	15.0	24.5	15.0
4:00 AM	-	-	47	28	52	35	-	-	-	-	-	-	-	-	49.5	31.5	49.5	31.5
5:00 AM	-	-	85	44	67	44	-	-	-	-	-	-	-	-	76.0	44.0	76.0	44.0
6:00 AM	-	-	204	179	214	191	-	-	-	-	-	-	-	-	209.0	185.0	209.0	185.0
7:00 AM	-	-	575	339	573	396	-	-	-	-	-	-	-	-	574.0	367.5	574.0	367.5
8:00 AM	-	-	747	405	769	406	-	-	-	-	-	-	-	-	758.0	405.5	758.0	405.5
9:00 AM	-	-	544	408	582	385	-	-	-	-	-	-	-	-	563.0	396.5	563.0	396.5
10:00 AM	-	-	430	305	456	323	-	-	-	-	-	-	-	-	443.0	314.0	443.0	314.0
11:00 AM	-	-	388	299	425	296	-	-	-	-	-	-	-	-	406.5	297.5	406.5	297.5
12:00 PM	422	377	465	328	-	-	-	-	-	-	-	-	-	-	443.5	352.5	443.5	352.5
1:00 PM	450	410	405	383	-	-	-	-	-	-	-	-	-	-	427.5	396.5	427.5	396.5
2:00 PM	475	373	439	374	-	-	-	-	-	-	-	-	-	-	457.0	373.5	457.0	373.5
3:00 PM	531	493	515	473	-	-	-	-	-	-	-	-	-	-	523.0	483.0	523.0	483.0
4:00 PM	520	615	470	648	-	-	-	-	-	-	-	-	-	-	495.0	631.5	495.0	631.5
5:00 PM	602	606	621	642	-	-	-	-	-	-	-	-	-	-	611.5	624.0	611.5	624.0
6:00 PM	501	598	578	610	-	-	-	-	-	-	-	-	-	-	539.5	604.0	539.5	604.0
7:00 PM	360	367	398	392	-	-	-	-	-	-	-	-	-	-	379.0	379.5	379.0	379.5
8:00 PM	218	238	329	289	-	-	-	-	-	-	-	-	-	-	273.5	263.5	273.5	263.5
9:00 PM	148	190	158	220	-	-	-	-	-	-	-	-	-	-	153.0	205.0	153.0	205.0
10:00 PM	97	89	116	124	-	-	-	-	-	-	-	-	-	-	106.5	106.5	106.5	106.5
11:00 PM	77	80	93	75	-	-	-	-	-	-	-	-	-	-	85.0	77.5	85.0	77.5
Totals	4401	4436	7729	6666	3248	2176	0	0	0	0	0	0	0	0	7689.0	6639.0	7689.0	6639.0
Combined	8837		14395		5424		0		0		0		0		14328.0		14328.0	
Split (%)	49.8	50.2	53.7	46.3	59.9	40.1	-	-	-	-	-	-	-	-	53.7	46.3	53.7	46.3

Peak Hours

12:00 AM - 12:00 PM	-	-	8:00 AM	9:00 AM	8:00 AM	8:00 AM	-	-	-	-	-	-	-	-	8:00 AM	8:00 AM	8:00 AM	8:00 AM
Volume	-	-	747	408	769	406	-	-	-	-	-	-	-	-	758.0	405.5	758.0	405.5
12:00 PM - 12:00 AM	5:00 PM	4:00 PM	5:00 PM	4:00 PM	-	-	-	-	-	-	-	-	-	-	5:00 PM	4:00 PM	5:00 PM	4:00 PM
Volume	602	615	621	648	-	-	-	-	-	-	-	-	-	-	611.5	631.5	611.5	631.5

Town : Shrewsbury
Street : Memorial Drive 140
Location : North of Route 20

Site: 2016155

Weekly Volume

Interval Start	Mon 10/3/2016		Tue 10/4/2016		Wed 10/5/2016		Thu 10/6/2016		Fri 10/7/2016		Sat 10/8/2016		Sun 10/9/2016		Mon - Fri Average		Weekly Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	-	-	34	30	37	25	-	-	-	-	-	-	-	-	35.5	27.5	35.5	27.5
1:00 AM	-	-	18	22	22	21	-	-	-	-	-	-	-	-	20.0	21.5	20.0	21.5
2:00 AM	-	-	23	15	13	22	-	-	-	-	-	-	-	-	18.0	18.5	18.0	18.5
3:00 AM	-	-	33	25	43	29	-	-	-	-	-	-	-	-	38.0	27.0	38.0	27.0
4:00 AM	-	-	52	33	46	30	-	-	-	-	-	-	-	-	49.0	31.5	49.0	31.5
5:00 AM	-	-	115	67	99	71	-	-	-	-	-	-	-	-	107.0	69.0	107.0	69.0
6:00 AM	-	-	303	203	313	196	-	-	-	-	-	-	-	-	308.0	199.5	308.0	199.5
7:00 AM	-	-	616	295	596	296	-	-	-	-	-	-	-	-	606.0	295.5	606.0	295.5
8:00 AM	-	-	512	351	559	373	-	-	-	-	-	-	-	-	535.5	362.0	535.5	362.0
9:00 AM	-	-	364	266	352	261	-	-	-	-	-	-	-	-	358.0	263.5	358.0	263.5
10:00 AM	-	-	279	289	332	253	-	-	-	-	-	-	-	-	305.5	271.0	305.5	271.0
11:00 AM	-	-	252	291	278	289	-	-	-	-	-	-	-	-	265.0	290.0	265.0	290.0
12:00 PM	295	334	279	309	-	-	-	-	-	-	-	-	-	-	287.0	321.5	287.0	321.5
1:00 PM	341	328	276	311	-	-	-	-	-	-	-	-	-	-	308.5	319.5	308.5	319.5
2:00 PM	340	371	339	358	-	-	-	-	-	-	-	-	-	-	339.5	364.5	339.5	364.5
3:00 PM	370	493	356	476	-	-	-	-	-	-	-	-	-	-	363.0	484.5	363.0	484.5
4:00 PM	406	543	371	566	-	-	-	-	-	-	-	-	-	-	388.5	554.5	388.5	554.5
5:00 PM	403	589	401	639	-	-	-	-	-	-	-	-	-	-	402.0	614.0	402.0	614.0
6:00 PM	289	368	323	400	-	-	-	-	-	-	-	-	-	-	306.0	384.0	306.0	384.0
7:00 PM	190	235	240	263	-	-	-	-	-	-	-	-	-	-	215.0	249.0	215.0	249.0
8:00 PM	109	175	145	211	-	-	-	-	-	-	-	-	-	-	127.0	193.0	127.0	193.0
9:00 PM	76	119	81	138	-	-	-	-	-	-	-	-	-	-	78.5	128.5	78.5	128.5
10:00 PM	77	70	99	83	-	-	-	-	-	-	-	-	-	-	88.0	76.5	88.0	76.5
11:00 PM	54	70	48	58	-	-	-	-	-	-	-	-	-	-	51.0	64.0	51.0	64.0
Totals	2950	3695	5559	5699	2690	1866	0	0	0	0	0	0	0	0	5599.5	5630.0	5599.5	5630.0
Combined	6645		11258		4556		0		0		0		0		11229.5		11229.5	
Split (%)	44.4	55.6	49.4	50.6	59.0	41.0	-	-	-	-	-	-	-	-	49.9	50.1	49.9	50.1

Peak Hours

12:00 AM - 12:00 PM	-	-	7:00 AM	8:00 AM	7:00 AM	8:00 AM	-	-	-	-	-	-	-	-	7:00 AM	8:00 AM	7:00 AM	8:00 AM
Volume	-	-	616	351	596	373	-	-	-	-	-	-	-	-	606.0	362.0	606.0	362.0
12:00 PM - 12:00 AM	4:00 PM	5:00 PM	5:00 PM	5:00 PM	-	-	-	-	-	-	-	-	-	-	5:00 PM	5:00 PM	5:00 PM	5:00 PM
Volume	406	589	401	639	-	-	-	-	-	-	-	-	-	-	402.0	614.0	402.0	614.0

Town : Shrewsbury
Street : Route 140
Location : At Grafton TL

Site: 2016218

Weekly Volume

Interval Start	Mon 10/10/2016		Tue 10/11/2016		Wed 10/12/2016		Thu 10/13/2016		Fri 10/14/2016		Sat 10/15/2016		Sun 10/16/2016		Mon - Fri Average		Weekly Average	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
12:00 AM	-	-	-	-	24	11	26	8	26	14	-	-	-	-	25.3	11.0	25.3	11.0
1:00 AM	-	-	-	-	14	5	12	7	15	5	-	-	-	-	13.7	5.7	13.7	5.7
2:00 AM	-	-	-	-	13	12	8	7	13	11	-	-	-	-	11.3	10.0	11.3	10.0
3:00 AM	-	-	-	-	20	17	19	15	22	19	-	-	-	-	20.3	17.0	20.3	17.0
4:00 AM	-	-	-	-	18	33	14	26	15	32	-	-	-	-	15.7	30.3	15.7	30.3
5:00 AM	-	-	-	-	50	120	45	129	53	121	-	-	-	-	49.3	123.3	49.3	123.3
6:00 AM	-	-	-	-	162	349	156	370	164	312	-	-	-	-	160.7	343.7	160.7	343.7
7:00 AM	-	-	-	-	271	611	238	644	265	628	-	-	-	-	258.0	627.7	258.0	627.7
8:00 AM	-	-	-	-	283	538	306	533	-	-	-	-	-	-	294.5	535.5	294.5	535.5
9:00 AM	-	-	-	-	270	349	283	330	-	-	-	-	-	-	276.5	339.5	276.5	339.5
10:00 AM	-	-	296	289	271	275	263	270	-	-	-	-	-	-	276.7	278.0	276.7	278.0
11:00 AM	-	-	279	275	284	262	278	245	-	-	-	-	-	-	280.3	260.7	280.3	260.7
12:00 PM	-	-	285	290	271	277	335	306	-	-	-	-	-	-	297.0	291.0	297.0	291.0
1:00 PM	-	-	306	261	303	284	329	294	-	-	-	-	-	-	312.7	279.7	312.7	279.7
2:00 PM	-	-	365	285	412	318	359	317	-	-	-	-	-	-	378.7	306.7	378.7	306.7
3:00 PM	-	-	515	294	530	354	555	310	-	-	-	-	-	-	533.3	319.3	533.3	319.3
4:00 PM	-	-	637	294	656	319	638	287	-	-	-	-	-	-	643.7	300.0	643.7	300.0
5:00 PM	-	-	675	292	712	311	651	328	-	-	-	-	-	-	679.3	310.3	679.3	310.3
6:00 PM	-	-	449	276	483	274	438	277	-	-	-	-	-	-	456.7	275.7	456.7	275.7
7:00 PM	-	-	351	191	335	183	327	201	-	-	-	-	-	-	337.7	191.7	337.7	191.7
8:00 PM	-	-	295	85	293	92	289	107	-	-	-	-	-	-	292.3	94.7	292.3	94.7
9:00 PM	-	-	177	61	176	89	174	75	-	-	-	-	-	-	175.7	75.0	175.7	75.0
10:00 PM	-	-	129	43	124	50	144	46	-	-	-	-	-	-	132.3	46.3	132.3	46.3
11:00 PM	-	-	61	28	85	32	59	30	-	-	-	-	-	-	68.3	30.0	68.3	30.0
Totals	0	0	4820	2964	6060	5165	5946	5162	573	1142	0	0	0	0	5990.0	5102.7	5990.0	5102.7
Combined	0		7784		11225		11108		1715		0		0		11092.7		11092.7	
Split (%)	-	-	61.9	38.1	54.0	46.0	53.5	46.5	33.4	66.6	-	-	-	-	54.0	46.0	54.0	46.0

Peak Hours

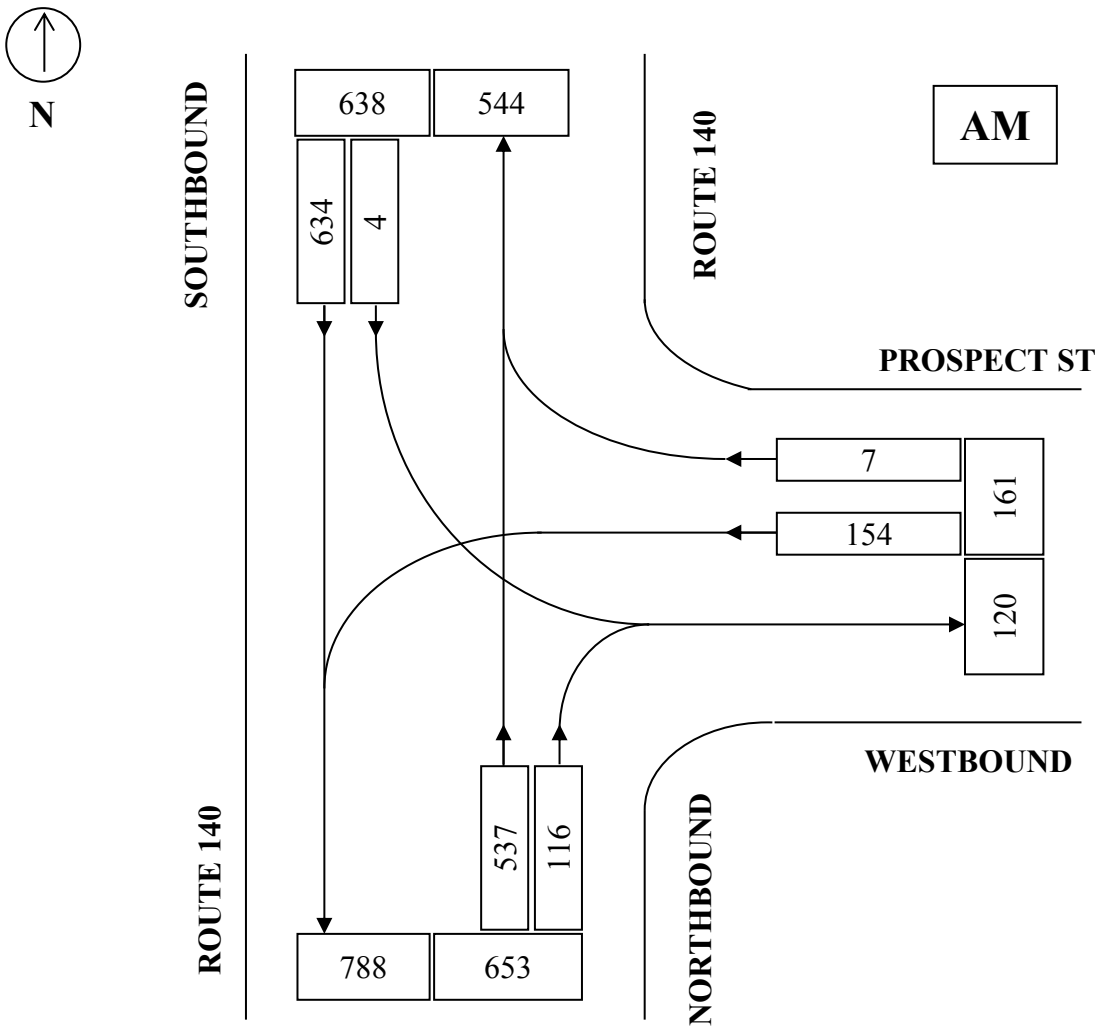
12:00 AM - 12:00 PM	-	-	10:00 AM	10:00 AM	11:00 AM	7:00 AM	8:00 AM	7:00 AM	7:00 AM	7:00 AM	-	-	-	-	8:00 AM	7:00 AM	8:00 AM	7:00 AM
Volume	-	-	296	289	284	611	306	644	265	628	-	-	-	-	294.5	627.7	294.5	627.7
12:00 PM - 12:00 AM	-	-	5:00 PM	3:00 PM	5:00 PM	3:00 PM	5:00 PM	5:00 PM	-	-	-	-	-	-	5:00 PM	3:00 PM	5:00 PM	3:00 PM
Volume	-	-	675	294	712	354	651	328	-	-	-	-	-	-	679.3	319.3	679.3	319.3

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Shrewsbury **DATE:** 6/11/2015 **DAY OF WEEK:** Thursday

INTERSECTION: Route 140 / Prospect Street



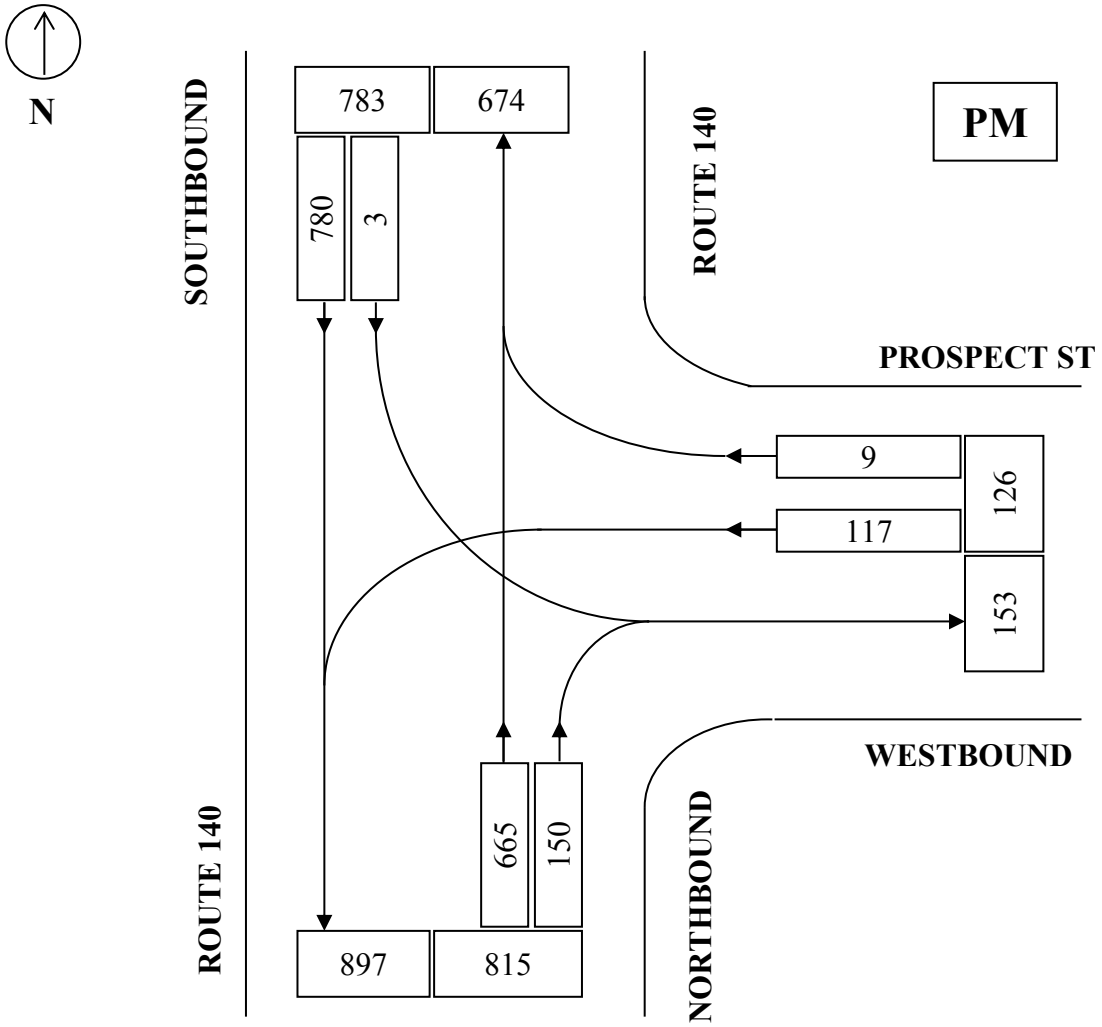
STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			8:00 - 9:00 AM
Prospect St WB	161	11.1%	
			PHF = .98
Route 140 NB	653	45.0%	
			VEHICLES COUNTED
Route 140 SB	638	43.9%	
			ALL VEHICLES: 1452
TOTAL	1452	100.00%	**TRUCKS:** 114
			PERCENT TRUCKS: 7.85%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Shrewsbury **DATE:** 6/11/2015 **DAY OF WEEK:** Thursday

INTERSECTION: Route 140 / Prospect Street



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			4:45 - 5:45 PM
Prospect St WB	126	7.3%	
			PHF = .97
Route 140 NB	815	47.3%	
			VEHICLES COUNTED
Route 140 SB	783	45.4%	
			ALL VEHICLES: 1724
TOTAL	1724	100.00%	**TRUCKS:** 62
			PERCENT TRUCKS: 3.60%

TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: Town of Shrewsbury

DATE: 6/11/2015

LOCATION: Route 140 / Prospect Street

DAY OF WEEK: Thursday

WEATHER: AM: Clear PM: Clear

TECHNICIAN: VG/MD

Time Period					Prospect St WB				Route 140 NB				Route 140 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15					27	0	1	2	0	145	13	9	3	110	0	11	299	
7:15 - 7:30					35	0	1	1	0	154	14	10	2	158	0	9	364	
7:30 - 7:45					31	0	2	3	0	169	15	18	0	197	0	12	414	
7:45 - 8:00					40	0	0	0	0	134	26	13	0	22	0	11	222	1299
8:00 - 8:15					34	0	2	2	0	146	31	14	1	153	0	15	367	1367
8:15 - 8:30					33	0	2	1	0	120	30	15	1	162	0	7	348	1351
8:30 - 8:45					42	0	2	2	0	136	33	11	2	152	0	11	367	1304
8:45 - 9:00					45	0	1	4	0	135	22	20	0	167	0	12	370	1452
TOTAL	0	0	0	0	287	0	11	15	0	1139	184	110	9	1121	0	88	2751	
		EBPct	0.0			**WBPct**	11.1			**NBPct**	45.0			**SBPct**	43.9			
Peak Sums:	**0**	**0**	**0**	**0**	**154**	**0**	**7**	**9**	**0**	**537**	**116**	**60**	**4**	**634**	**0**	**45**	**1452**	
Total Trucks	114					**TrkPct**	7.85			**PHF**	0.98							

Time Period					Prospect St WB				Route 140 NB				Route 140 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15					33	0	1	3	0	162	32	8	1	139	0	13	368	
4:15 - 4:30					21	0	0	0	0	144	39	9	1	146	0	9	351	
4:30 - 4:45					24	0	1	3	0	171	33	5	0	171	0	11	400	
4:45 - 5:00					25	0	4	2	0	173	36	8	0	197	0	9	435	1554
5:00 - 5:15					24	0	2	1	0	161	36	6	3	187	0	9	413	1599
5:15 - 5:30					40	0	1	1	0	176	28	6	0	186	0	5	431	1679
5:30 - 5:45					28	0	2	2	0	155	50	6	0	210	0	7	445	1724
5:45 - 6:00					26	0	1	0	0	135	46	10	0	154	0	8	362	1651
TOTAL	0	0	0	0	221	0	12	12	0	1277	300	58	5	1390	0	71	3205	
		EBPct	0.0			**WBPct**	7.3			**NBPct**	47.3			**SBPct**	45.4			
Peak Sums:	**0**	**0**	**0**	**0**	**117**	**0**	**9**	**6**	**0**	**665**	**150**	**26**	**3**	**780**	**0**	**30**	**1724**	
Total Trucks	62					**TrkPct**	3.60			**PHF**	0.97							

HCS7 Two-Way Stop-Control Report

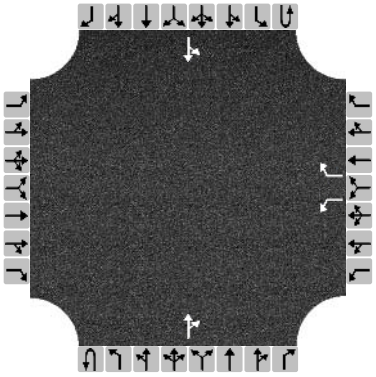
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	6/12/2015
Analysis Year	2015
Time Analyzed	8:00 - 9:00 AM
Intersection Orientation	North-South
Project Description	Balanced 2016

Site Information

Intersection	Route 140/Prospect St
Jurisdiction	Shrewsbury
East/West Street	Prospect St
North/South Street	Route 140
Peak Hour Factor	0.98
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	0	0	0	1	0
Configuration						L		R				TR		LT		
Volume, V (veh/h)						156		7			622	137		4	640	
Percent Heavy Vehicles (%)						2		2						8		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.42		6.22						4.20		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.52		3.32						2.30		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						159		7						4		
Capacity, c (veh/h)						161		436						804		
v/c Ratio						0.98		0.02						0.00		
95% Queue Length, Q_{95} (veh)						7.6		0.0						0.0		
Control Delay (s/veh)						123.4		13.4						9.5		
Level of Service, LOS						F		B						A		
Approach Delay (s/veh)						118.8								0.1		
Approach LOS						F										

HCS7 Two-Way Stop-Control Report

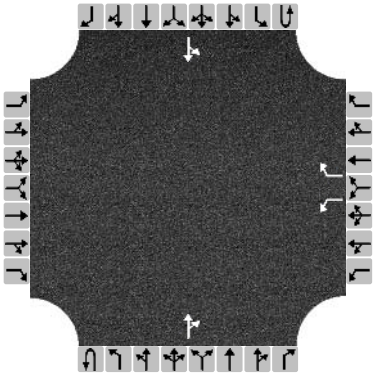
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	6/12/2015
Analysis Year	2015
Time Analyzed	4:45 - 5:45 PM
Intersection Orientation	North-South
Project Description	Balanced 2016

Site Information

Intersection	Route 140/Prospect St
Jurisdiction	Shrewsbury
East/West Street	Prospect St
North/South Street	Route 140
Peak Hour Factor	0.97
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	0	0	0	1	0
Configuration						L		R				TR		LT		
Volume, V (veh/h)						118		9			672	152		3	788	
Percent Heavy Vehicles (%)						1		1						4		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.41		6.21						4.10		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.51		3.31						2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						122		9						3		
Capacity, c (veh/h)						119		401						797		
v/c Ratio						1.03		0.02						0.00		
95% Queue Length, Q_{95} (veh)						7.0		0.1						0.0		
Control Delay (s/veh)						160.6		14.2						9.5		
Level of Service, LOS						F		B						A		
Approach Delay (s/veh)						150.6								0.1		
Approach LOS						F										

HCS7 Two-Way Stop-Control Report

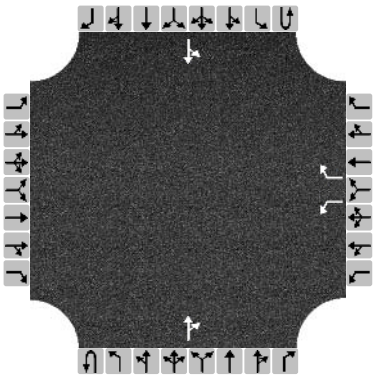
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	6/12/2015
Analysis Year	2015
Time Analyzed	8:00 - 9:00 AM
Intersection Orientation	North-South
Project Description	Projected 2026

Site Information

Intersection	Route 140/Prospect St
Jurisdiction	Shrewsbury
East/West Street	Prospect St
North/South Street	Route 140
Peak Hour Factor	0.98
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	0	0	0	1	0
Configuration						L		R				TR		LT		
Volume, V (veh/h)						172		8			721	151		4	741	
Percent Heavy Vehicles (%)						2		2						8		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.42		6.22						4.20		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.52		3.32						2.30		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						176		8						4		
Capacity, c (veh/h)						120		378						727		
v/c Ratio						1.46		0.02						0.01		
95% Queue Length, Q_{95} (veh)						12.3		0.1						0.0		
Control Delay (s/veh)						314.7		14.7						10.0		
Level of Service, LOS						F		B						A		
Approach Delay (s/veh)						301.3								0.2		
Approach LOS						F										

HCS7 Two-Way Stop-Control Report

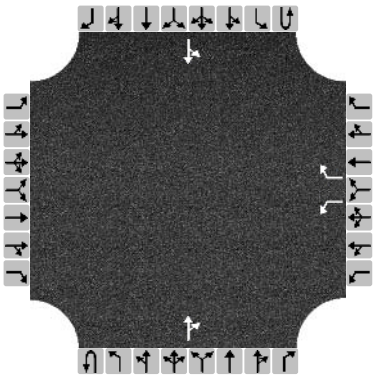
General Information

Analyst	KK
Agency/Co.	CMRPC
Date Performed	6/12/2015
Analysis Year	2015
Time Analyzed	4:45 - 5:45 PM
Intersection Orientation	North-South
Project Description	Projected 2026

Site Information

Intersection	Route 140/Prospect St
Jurisdiction	Shrewsbury
East/West Street	Prospect St
North/South Street	Route 140
Peak Hour Factor	0.97
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	0	0	0	1	0
Configuration						L		R				TR		LT		
Volume, V (veh/h)						130		10			778	168		3	902	
Percent Heavy Vehicles (%)						1		1						4		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.41		6.21						4.10		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.51		3.31						2.20		

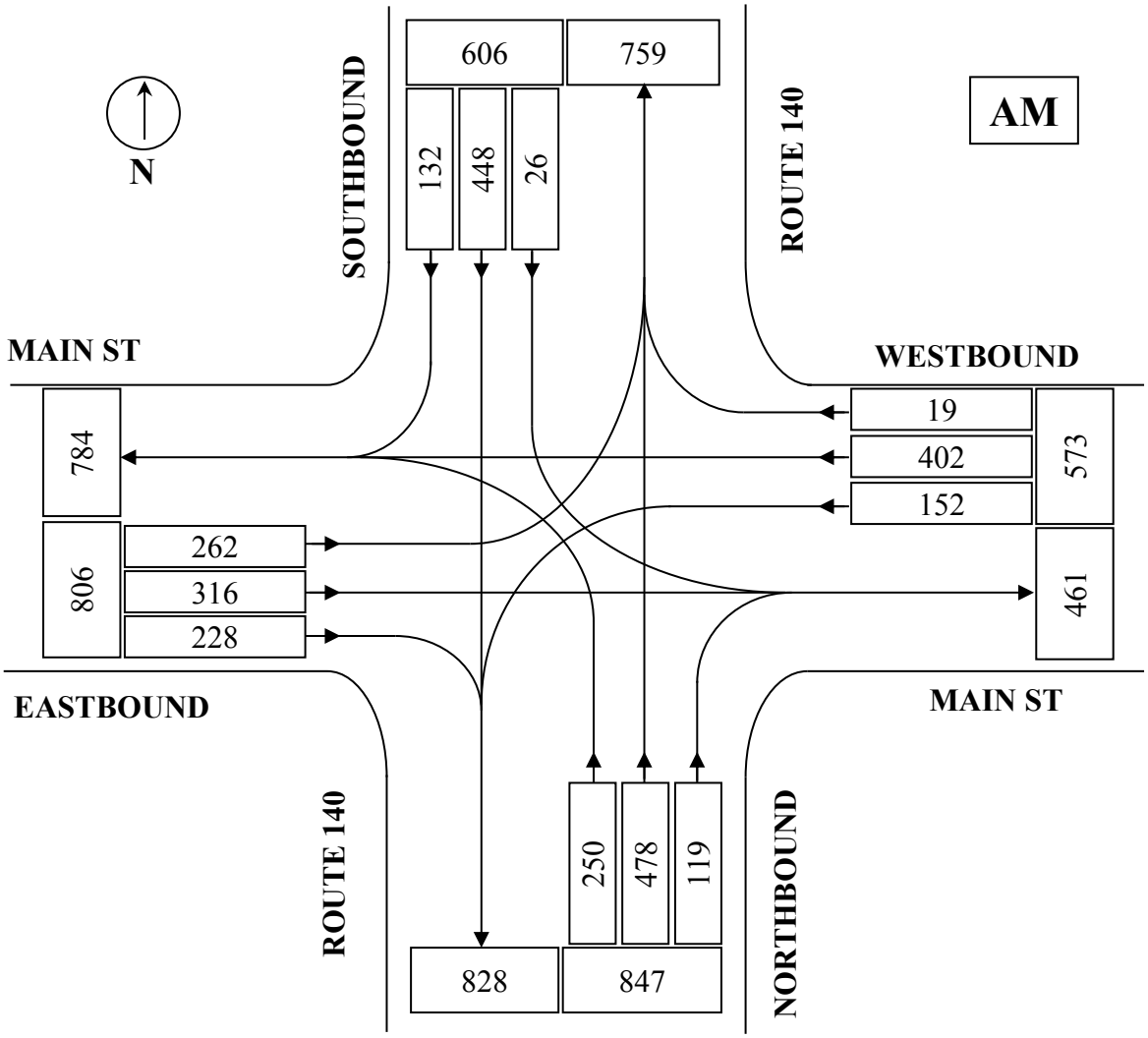
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						134		10						3		
Capacity, c (veh/h)						85		344						716		
v/c Ratio						1.58		0.03						0.00		
95% Queue Length, Q_{95} (veh)						10.8		0.1						0.0		
Control Delay (s/veh)						395.1		15.8						10.1		
Level of Service, LOS						F		C						B		
Approach Delay (s/veh)						368.0								0.1		
Approach LOS						F										

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Shrewsbury **DATE:** 10/6/15 **DAY OF WEEK:** Tuesday
INTERSECTION: Route 140 / Main Street

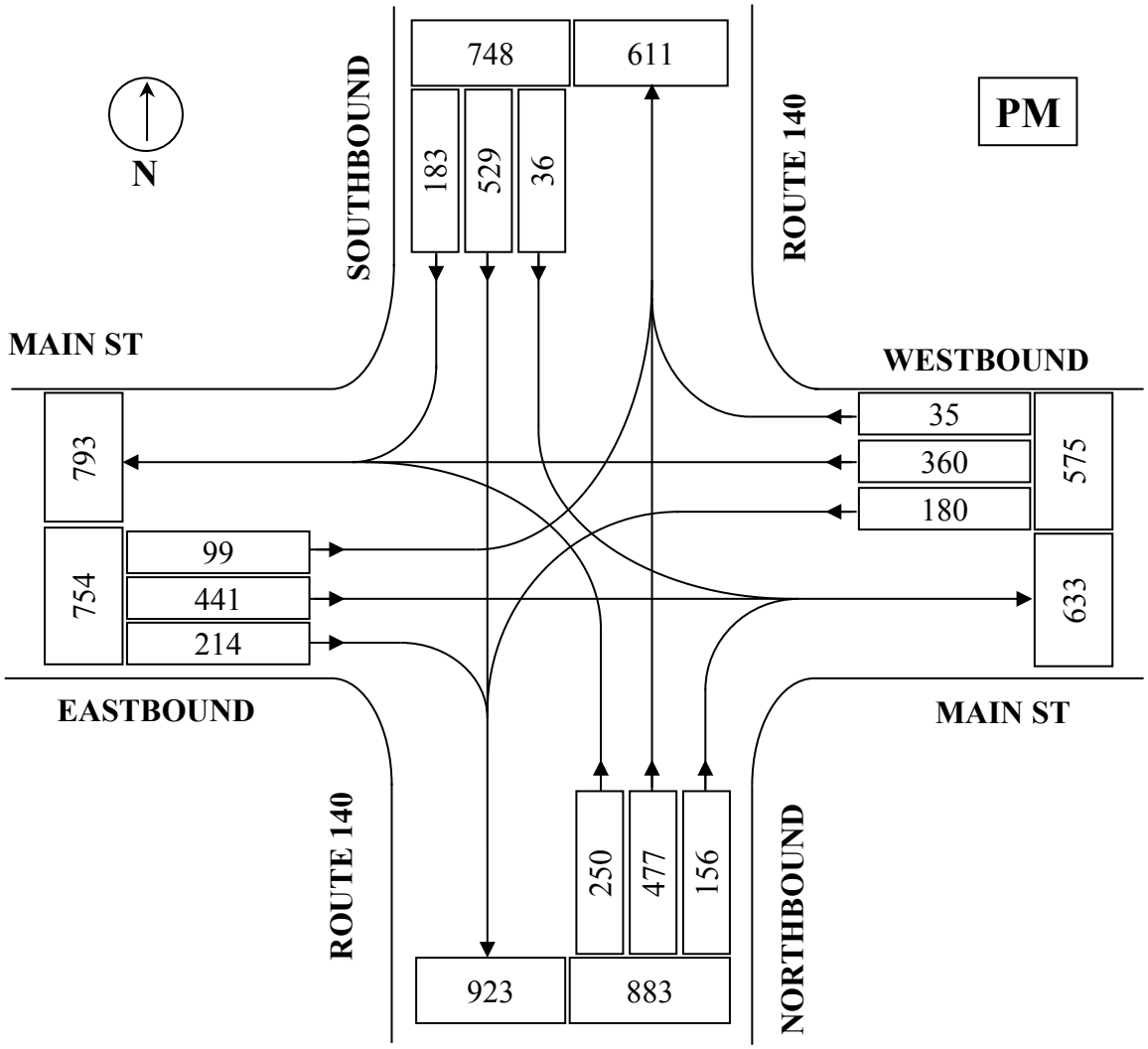


STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
Main St EB	806	28.5%	7:15 - 8:15 AM
Main St WB	573	20.2%	PHF = .95
Route 140 NB	847	29.9%	**VEHICLES COUNTED**
Route 140 SB	606	21.4%	**ALL VEHICLES:** 2832
TOTAL	2832	100.0%	**TRUCKS:** 158
			PERCENT TRUCKS: 5.58%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Shrewsbury **DATE:** 10/6/15 **DAY OF WEEK:** Tuesday
INTERSECTION: Route 140 / Main Street



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
Main St EB	754	25.5%	4:45 - 5:45 PM
Main St WB	575	19.4%	PHF = .96
Route 140 NB	883	29.8%	**VEHICLES COUNTED**
Route 140 SB	748	25.3%	**ALL VEHICLES:** 2960
TOTAL	2960	100.0%	**TRUCKS:** 61
			PERCENT TRUCKS: 2.06%

TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: Town of Shrewsbury

DATE: 10/6/2015

LOCATION: Route 140 / Main Street

DAY OF WEEK: Tuesday

WEATHER: AM: Clear PM: Clear

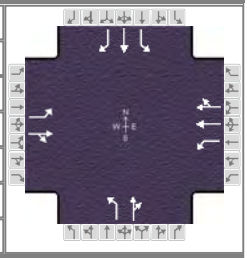
TECHNICIAN: VG

Time Period	Main St EB				Main St WB				Route 140 NB				Route 140 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15	58	85	61	9	35	98	4	11	58	114	27	6	6	92	27	6	665	
7:15 - 7:30	62	79	59	8	42	102	3	8	62	115	26	10	5	114	34	9	703	
7:30 - 7:45	66	82	56	10	38	105	5	9	64	121	31	12	6	95	31	5	700	
7:45 - 8:00	83	86	66	12	45	96	6	14	60	106	27	14	9	135	28	7	747	2815
8:00 - 8:15	51	69	47	9	27	99	5	9	64	136	35	14	6	104	39	8	682	2832
8:15 - 8:30	56	82	58	11	32	82	3	8	45	107	26	7	12	95	29	6	627	2756
8:30 - 8:45	46	90	60	9	49	87	8	10	50	101	30	3	12	90	25	3	648	2704
8:45 - 9:00	43	73	62	18	42	75	8	13	55	102	19	8	8	89	27	5	603	2560
TOTAL	465	646	469	86	310	744	42	82	458	902	221	74	64	814	240	49	5375	
		EBPct	28.5			**WBPct**	20.2			**NBPct**	29.9			**SBPct**	21.4			
Peak Sums:	**262**	**316**	**228**	**39**	**152**	**402**	**19**	**40**	**250**	**478**	**119**	**50**	**26**	**448**	**132**	**29**	**2832**	
Total Trucks	158					**TrkPct**	5.58			**PHF**	0.95							

Time Period	Main St EB				Main St WB				Route 140 NB				Route 140 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15	36	101	45	4	62	123	12	14	38	92	28	6	9	107	49	5	702	
4:15 - 4:30	45	97	38	12	46	81	11	4	50	91	31	3	5	104	41	2	640	
4:30 - 4:45	37	67	44	7	39	81	5	6	69	82	57	6	14	117	38	3	650	
4:45 - 5:00	22	99	43	7	48	85	9	6	74	123	37	2	5	136	47	3	728	2720
5:00 - 5:15	29	123	52	7	49	98	11	4	61	113	33	4	5	121	37	3	732	2750
5:15 - 5:30	23	110	63	5	46	105	9	3	54	125	39	3	12	137	49	0	772	2882
5:30 - 5:45	25	109	56	8	37	72	6	3	61	116	47	2	14	135	50	1	728	2960
5:45 - 6:00	20	109	58	7	51	83	8	5	53	122	39	4	9	116	43	3	711	2943
TOTAL	237	815	399	57	378	728	71	45	460	864	311	30	73	973	354	20	5663	
		EBPct	25.5			**WBPct**	19.4			**NBPct**	29.8			**SBPct**	25.3			
Peak Sums:	**99**	**441**	**214**	**27**	**180**	**360**	**35**	**16**	**250**	**477**	**156**	**11**	**36**	**529**	**183**	**7**	**2960**	
Total Trucks	61					**TrkPct**	2.06			**PHF**	0.96							

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Oct 13, 2015	Area Type	Other
Jurisdiction	Shrewsbury	Time Period	7:15 - 8:15 AM	PHF	0.95
Urban Street	Main Street	Analysis Year	2015	Analysis Period	1> 7:15
Intersection	Route 140/Main St	File Name	15_Route 140 & Main St_AM-bal.xus		
Project Description	Balanced 2016				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	265	319	230	154	406	19	253	483	120	31	527	153

Signal Information			
Cycle, s	144.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	25.0	30.0	25.0	40.0	0.0	0.0	5	6	7	8
Yellow	4.0	4.0	4.0	4.0	0.0	0.0				
Red	2.0	2.0	2.0	2.0	0.0	0.0				

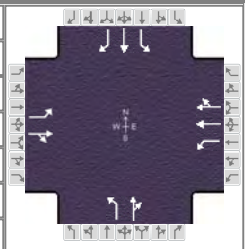
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6	3	8	7	4
Case Number	2.0	4.0		6.3	1.1	4.0	1.1	3.0
Phase Duration, s	31.0	67.0		36.0	31.0	46.0	31.0	46.0
Change Period, ($Y+R_c$), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	3.4		3.4	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	25.0	44.4		32.0	18.8	42.0	3.5	42.0
Green Extension Time (g_e), s	0.0	0.0		0.0	0.3	0.0	0.0	0.0
Phase Call Probability	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability	1.00	1.00		1.00	0.07	1.00	0.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	279	571		162	224	222	266	631		33	555	161
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1725	1686		815	1811	1784	1725	1750		1725	1811	1535
Queue Service Time (g_s), s	23.0	42.4		18.5	16.1	16.2	16.8	40.0		1.5	40.0	9.3
Cycle Queue Clearance Time (g_c), s	23.0	42.4		30.0	16.1	16.2	16.8	40.0		1.5	40.0	9.3
Green Ratio (*g/C*)	0.17	0.42		0.21	0.21	0.21	0.45	0.28		0.45	0.28	0.45
Capacity (*c*), veh/h	299	714		155	377	372	349	486		349	503	693
Volume-to-Capacity Ratio (*X*)	0.932	0.799		1.047	0.595	0.597	0.762	1.297		0.093	1.103	0.232
Back of Queue (*Q*), ft/ln (50 th percentile)	334.9	481.7		245.8	196.4	185.7	176.7	978.7		16.5	730.6	89
Back of Queue (*Q*), veh/ln (50 th percentile)	12.8	18.4		9.4	7.5	7.4	6.7	37.4		0.6	27.9	3.4
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00		2.12	0.00	0.00	1.54	0.00		0.13	0.00	0.00
Uniform Delay (d_1), s/veh	58.7	36.2		65.7	51.5	51.5	39.7	52.0		27.6	52.0	24.2
Incremental Delay (d_2), s/veh	34.0	5.9		85.3	1.8	1.8	8.6	148.2		0.0	71.2	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	92.6	42.1		151.0	53.3	53.4	48.3	200.2		27.7	123.2	24.3
Level of Service (LOS)	F	D		F	D	D	D	F		C	F	C
Approach Delay, s/veh / LOS	58.7	E		79.4	E		155.1	F		97.7	F	
Intersection Delay, s/veh / LOS	100.0						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.5	B	2.5	B	2.7	C
Bicycle LOS Score / LOS	1.9	B	1.0	A	2.0	B	1.7	B

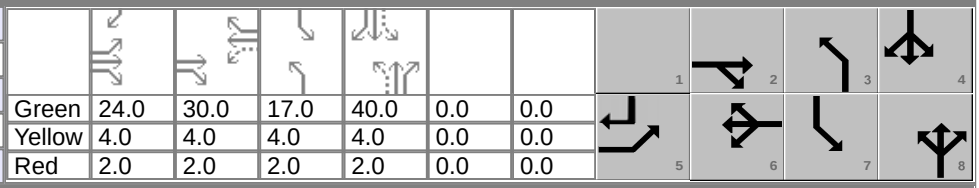
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Oct 13, 2015	Area Type	Other
Jurisdiction	Shrewsbury	Time Period	4:45 - 5:45 PM	PHF	0.96
Urban Street	Main Street	Analysis Year	2015	Analysis Period	1> 4:45
Intersection	Route 140/Main St	File Name	15_Route 140 & Main St_PM-bal.xus		
Project Description	Balanced 2016				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	170	445	216	182	364	53	253	571	158	42	619	215

Signal Information			
Cycle, s	135.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	24.0	30.0	17.0	40.0	0.0	0.0
Yellow	4.0	4.0	4.0	4.0	0.0	0.0
Red	2.0	2.0	2.0	2.0	0.0	0.0

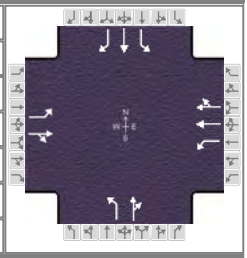
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6	3	8	7	4
Case Number	2.0	4.0		6.3	1.1	4.0	1.1	3.0
Phase Duration, s	30.0	66.0		36.0	23.0	46.0	23.0	46.0
Change Period, ($Y+R_c$), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	3.4		3.4	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	14.3	48.9		32.0	17.7	42.0	4.0	42.0
Green Extension Time (g_e), s	0.2	0.0		0.0	0.0	0.0	0.0	0.0
Phase Call Probability	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability	0.00	1.00		1.00	1.00	1.00	0.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	177	680		190	220	213	264	754		44	645	218
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1768		759	1870	1781	1781	1800		1781	1870	1585
Queue Service Time (g_s), s	12.3	46.9		13.1	14.0	14.3	15.7	40.0		2.0	40.0	11.3
Cycle Queue Clearance Time (g_c), s	12.3	46.9		30.0	14.0	14.3	15.7	40.0		2.0	40.0	11.3
Green Ratio (*g/C*)	0.18	0.44		0.22	0.22	0.22	0.42	0.30		0.42	0.30	0.47
Capacity (*c*), veh/h	317	786		127	416	396	278	533		278	554	751
Volume-to-Capacity Ratio (*X*)	0.559	0.866		1.496	0.530	0.538	0.949	1.414		0.158	1.164	0.290
Back of Queue (*Q*), ft/ln (50 th percentile)	141.5	551.5		343.1	167.2	159.7	223.5	1189.7		21.2	825.2	106.9
Back of Queue (*Q*), veh/ln (50 th percentile)	5.6	21.7		13.5	6.6	6.4	8.8	46.8		0.8	32.5	4.2
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00		2.96	0.00	0.00	1.94	0.00		0.16	0.00	0.00
Uniform Delay (d_1), s/veh	50.7	33.9		63.7	46.3	46.4	41.1	47.5		29.0	47.5	21.6
Incremental Delay (d_2), s/veh	1.4	9.6		259.9	0.7	0.8	40.0	197.1		0.1	92.1	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	52.0	43.5		323.7	46.9	47.2	81.0	244.6		29.1	139.6	21.7
Level of Service (LOS)	D	D		F	D	D	F	F		C	F	C
Approach Delay, s/veh / LOS	45.2	D		131.2	F		202.2	F		105.9	F	
Intersection Delay, s/veh / LOS	124.1						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.5	B	2.5	B	2.7	C
Bicycle LOS Score / LOS	1.9	B	1.0	A	2.2	B	2.0	B

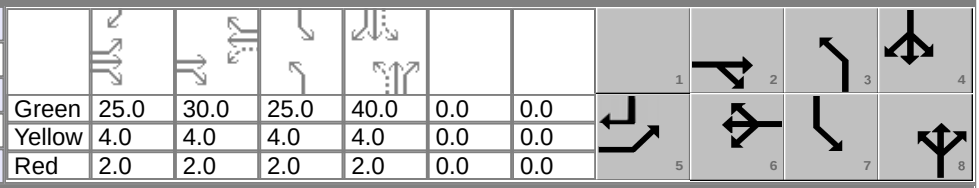
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Oct 13, 2015	Area Type	Other
Jurisdiction	Shrewsbury	Time Period	7:15 - 8:15 AM	PHF	0.95
Urban Street	Main Street	Analysis Year	2015	Analysis Period	1> 7:15
Intersection	Route 140/Main St	File Name	15_Route 140 & Main St_AM-proj.xus		
Project Description	Projected 2026				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	298	352	254	170	448	26	279	558	133	39	607	173

Signal Information			
Cycle, s	144.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	25.0	30.0	25.0	40.0	0.0	0.0
Yellow	4.0	4.0	4.0	4.0	0.0	0.0
Red	2.0	2.0	2.0	2.0	0.0	0.0

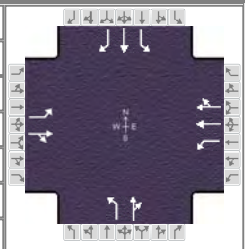
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6	3	8	7	4
Case Number	2.0	4.0		6.3	1.1	4.0	1.1	3.0
Phase Duration, s	31.0	67.0		36.0	31.0	46.0	31.0	46.0
Change Period, ($Y+R_c$), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	3.4		3.4	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	27.0	51.6		32.0	21.4	42.0	3.9	42.0
Green Extension Time (g_e), s	0.0	0.0		0.0	0.2	0.0	0.0	0.0
Phase Call Probability	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability	1.00	1.00		1.00	0.67	1.00	0.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	314	631		179	251	247	294	723		41	639	182
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1725	1686		771	1811	1777	1725	1752		1725	1811	1535
Queue Service Time (g_s), s	25.0	49.6		11.4	18.3	18.4	19.4	40.0		1.9	40.0	10.6
Cycle Queue Clearance Time (g_c), s	25.0	49.6		30.0	18.3	18.4	19.4	40.0		1.9	40.0	10.6
Green Ratio (*g/C*)	0.17	0.42		0.21	0.21	0.21	0.45	0.28		0.45	0.28	0.45
Capacity (*c*), veh/h	299	714		111	377	370	349	487		349	503	693
Volume-to-Capacity Ratio (*X*)	1.048	0.883		1.613	0.665	0.668	0.840	1.486		0.117	1.270	0.263
Back of Queue (*Q*), ft/ln (50 th percentile)	425.8	589.8		360.3	227.4	214.4	214	1267.5		20.8	969.9	102.3
Back of Queue (*Q*), veh/ln (50 th percentile)	16.3	22.5		13.8	8.7	8.6	8.2	48.4		0.8	37.0	3.9
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00		3.11	0.00	0.00	1.86	0.00		0.16	0.00	0.00
Uniform Delay (d_1), s/veh	59.5	38.2		68.9	52.4	52.4	42.1	52.0		27.8	52.0	24.6
Incremental Delay (d_2), s/veh	65.0	12.1		313.4	3.5	3.7	15.7	229.5		0.1	136.5	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	124.5	50.3		382.2	55.9	56.1	57.8	281.5		27.8	188.5	24.7
Level of Service (LOS)	F	D		F	E	E	E	F		C	F	C
Approach Delay, s/veh / LOS	75.0	E		142.3	F		216.9	F		146.3	F	
Intersection Delay, s/veh / LOS	146.8						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.93	B	2.14	B	2.14	B	2.14	B
Bicycle LOS Score / LOS	2.05	B	1.05	A	2.17	B	1.91	B

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Oct 13, 2015	Area Type	Other
Jurisdiction	Shrewsbury	Time Period	4:45 - 5:45 PM	PHF	0.96
Urban Street	Main Street	Analysis Year	2015	Analysis Period	1> 4:45
Intersection	Route 140/Main St	File Name	15_Route 140 & Main St_PM-proj.xus		
Project Description	Projected 2026				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	192	492	239	201	402	64	279	658	175	51	706	242

Signal Information			
Cycle, s	135.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	24.0	30.0	17.0	40.0	0.0	0.0	5	6	7	8
Yellow	4.0	4.0	4.0	4.0	0.0	0.0				
Red	2.0	2.0	2.0	2.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6	3	8	7	4
Case Number	2.0	4.0		6.3	1.1	4.0	1.1	3.0
Phase Duration, s	30.0	66.0		36.0	23.0	46.0	23.0	46.0
Change Period, ($Y+R_c$), s	6.0	6.0		6.0	6.0	6.0	6.0	6.0
Max Allow Headway (*MAH*), s	3.1	3.4		3.4	3.1	3.1	3.1	3.1
Queue Clearance Time (g_s), s	16.0	57.7		32.0	19.0	42.0	4.4	42.0
Green Extension Time (g_e), s	0.2	0.0		0.0	0.0	0.0	0.0	0.0
Phase Call Probability	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability	0.01	1.00		1.00	1.00	1.00	0.00	1.00

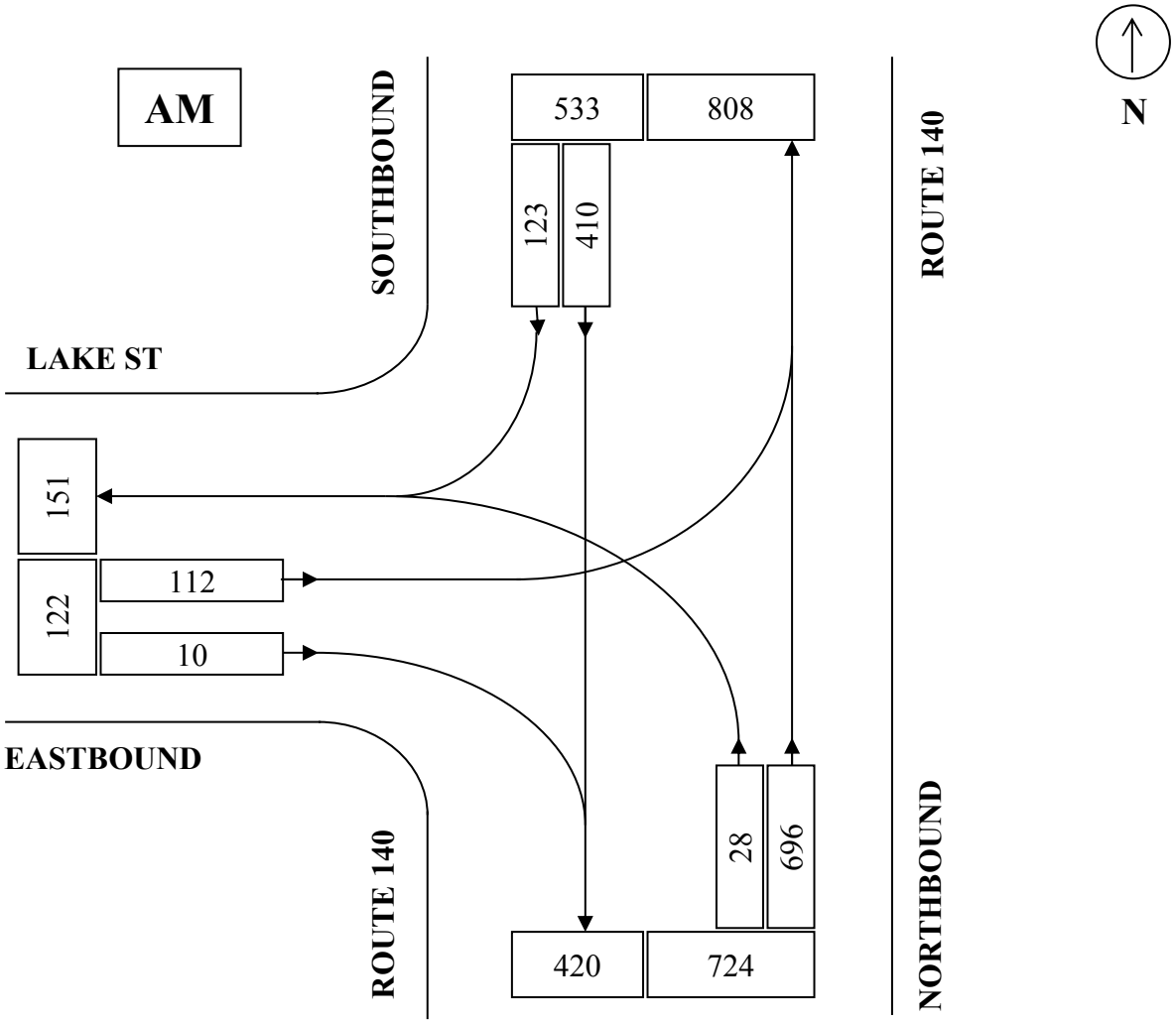
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	200	753		209	247	237	291	863		53	735	246
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1767		709	1870	1774	1781	1802		1781	1870	1585
Queue Service Time (g_s), s	14.0	55.7		4.3	16.0	16.2	17.0	40.0		2.4	40.0	13.0
Cycle Queue Clearance Time (g_c), s	14.0	55.7		30.0	16.0	16.2	17.0	40.0		2.4	40.0	13.0
Green Ratio (*g/C*)	0.18	0.44		0.22	0.22	0.22	0.42	0.30		0.42	0.30	0.47
Capacity (*c*), veh/h	317	785		76	416	394	278	534		278	554	751
Volume-to-Capacity Ratio (*X*)	0.632	0.959		2.762	0.594	0.602	1.047	1.615		0.191	1.327	0.327
Back of Queue (*Q*), ft/ln (50 th percentile)	165.5	715.4		509.3	192.9	183.4	285.2	1523.6		26	1088.3	123.1
Back of Queue (*Q*), veh/ln (50 th percentile)	6.5	28.2		20.1	7.6	7.3	11.2	60.0		1.0	42.8	4.8
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00	0.00		4.39	0.00	0.00	2.48	0.00		0.20	0.00	0.00
Uniform Delay (d_1), s/veh	51.4	36.3		66.9	47.0	47.1	42.4	47.5		29.2	47.5	22.1
Incremental Delay (d_2), s/veh	3.1	22.4		828.4	1.6	1.8	66.8	285.4		0.1	159.3	0.1
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	54.5	58.7		895.3	48.6	49.0	109.2	332.9		29.3	206.8	22.2
Level of Service (LOS)	D	E		F	D	D	F	F		C	F	C
Approach Delay, s/veh / LOS	57.8	E		304.3	F		276.5	F		153.8	F	
Intersection Delay, s/veh / LOS	194.1						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.93	B	2.15	B	2.13	B	2.14	B
Bicycle LOS Score / LOS	2.06	B	1.06	A	2.39	B	2.19	B

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Shrewsbury **DATE:** 9/24/15 **DAY OF WEEK:** Thursday
INTERSECTION: Route 140 / Lake Street

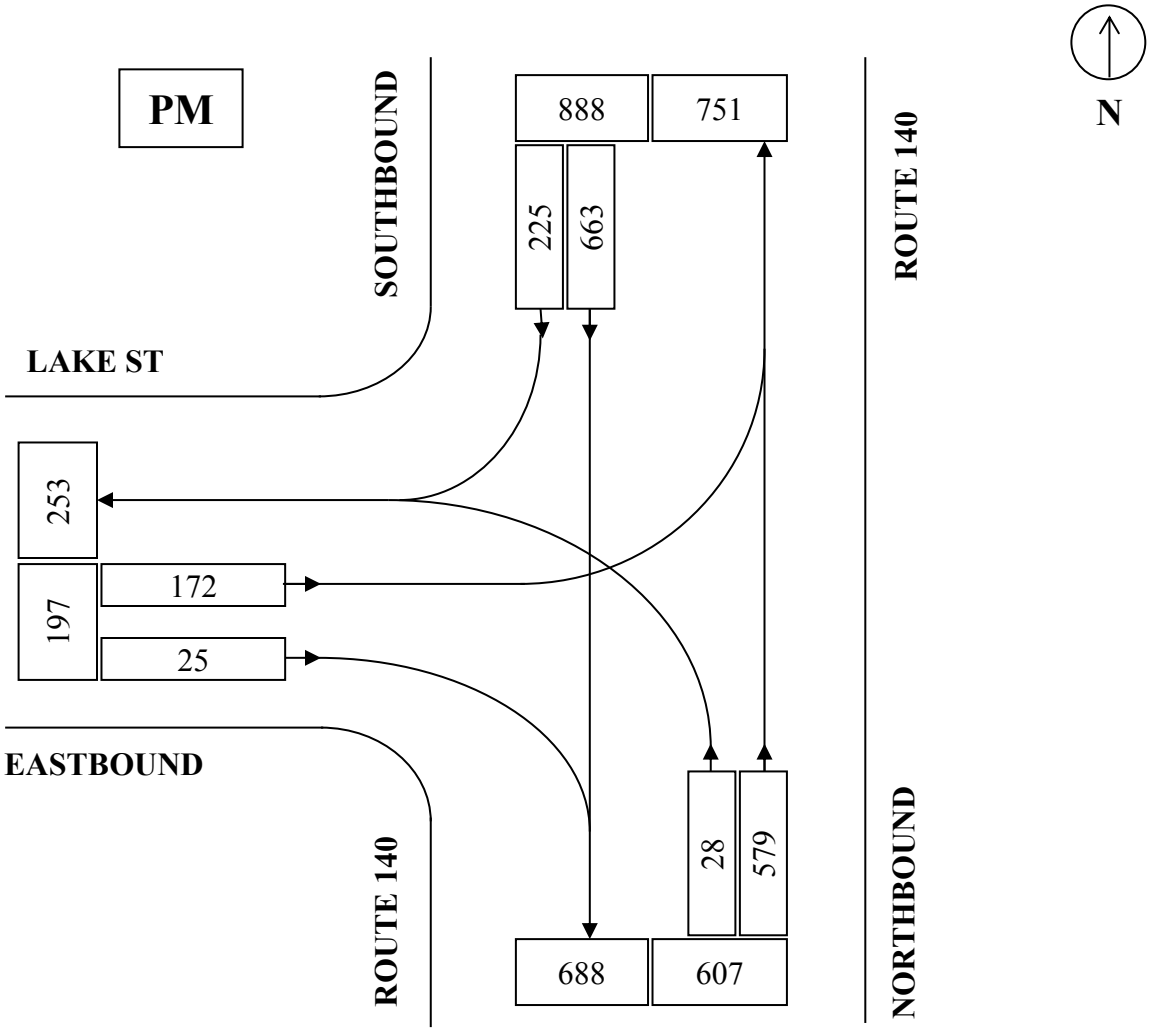


STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			7:15 - 8:15 AM
Lake St EB	122	8.8%	
			PHF = .83
Route 140 NB	724	52.5%	
			VEHICLES COUNTED
Route 140 SB	533	38.7%	
			ALL VEHICLES: 1379
TOTAL	1379	100.0%	**TRUCKS:** 88
			PERCENT TRUCKS: 6.38%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Shrewsbury **DATE:** 9/24/15 **DAY OF WEEK:** Thursday
INTERSECTION: Route 140 / Lake Street



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			4:45 - 5:45 PM
Lake St EB	197	11.6%	
			PHF = .95
Route 140 NB	607	35.9%	
			VEHICLES COUNTED
Route 140 SB	888	52.5%	
			ALL VEHICLES: 1692
TOTAL	1692	100.0%	**TRUCKS:** 67
			PERCENT TRUCKS 3.96%

TURNING MOVEMENT COUNT WORKSHEET

CMRPC

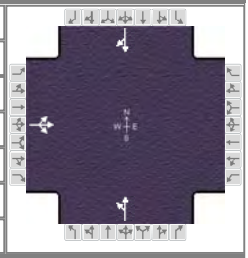
MUNICIPALITY: Town of Shrewsbury
DATE: 9/24/2015
LOCATION: Route 140 / Lake Street
DAY OF WEEK: Thursday
WEATHER: AM: Clear PM: Clear
TECHNICIAN: VG/MD

Time Period	Lake St EB								Route 140 NB				Route 140 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15	17	0	3	2					1	150	0	8	0	86	5	11	262	
7:15 - 7:30	15	0	0	1					7	168	0	13	0	84	20	8	294	
7:30 - 7:45	27	0	1	0					9	202	0	9	0	108	30	9	377	
7:45 - 8:00	47	0	6	4					10	194	0	12	0	115	41	9	413	1346
8:00 - 8:15	23	0	3	2					2	132	0	11	0	103	32	10	295	1379
8:15 - 8:30	26	0	2	1					5	142	0	8	0	89	26	10	290	1375
8:30 - 8:45	33	0	6	3					3	143	0	10	0	84	18	6	287	1285
8:45 - 9:00	23	0	0	4					1	152	0	12	0	108	36	11	320	1192
TOTAL	211	0	21	17	0	0	0	0	38	1283	0	83	0	777	208	74	2538	
		EBPct	8.8			**WBPct**	0.0			**NBPct**	52.5			**SBPct**	38.7			
Peak Sums:	**112**	**0**	**10**	**7**	**0**	**0**	**0**	**0**	**28**	**696**	**0**	**45**	**0**	**410**	**123**	**36**	**1379**	
Total Trucks	88					**TrkPct**	6.38			**PHF**	0.83							

Time Period	Lake St EB								Route 140 NB				Route 140 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15	24	0	14	0					9	103	0	12		123	50	11	323	
4:15 - 4:30	26	0	0	1					4	129	0	9		164	38	13	361	
4:30 - 4:45	39	0	2	0					5	151	0	6		170	43	8	410	
4:45 - 5:00	45	0	0	0					8	138	0	7		171	53	12	415	1509
5:00 - 5:15	45	0	9	2					8	158	0	6		143	58	11	421	1607
5:15 - 5:30	42	0	10	1					5	152	0	6		173	61	10	443	1689
5:30 - 5:45	40	0	6	0					7	131	0	3		176	53	9	413	1692
5:45 - 6:00	29	0	7	0					6	132	0	4		159	36	11	369	1646
TOTAL	290	0	48	4	0	0	0	0	52	1094	0	53	0	1279	392	85	3155	
		EBPct	11.6			**WBPct**	0.0			**NBPct**	35.9			**SBPct**	52.5			
Peak Sums:	**172**	**0**	**25**	**3**	**0**	**0**	**0**	**0**	**28**	**579**	**0**	**22**	**0**	**663**	**225**	**42**	**1692**	
Total Trucks	67					**TrkPct**	3.96			**PHF**	0.95							

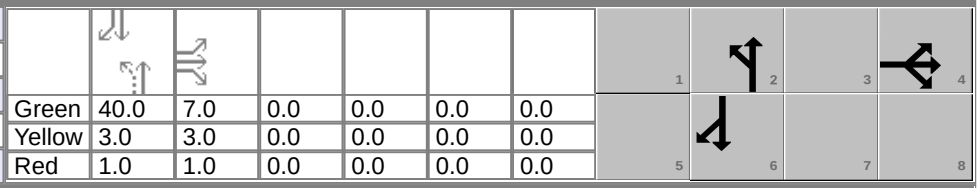
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Oct 9, 2015	Area Type	Other
Jurisdiction	Shrewsbury	Time Period	7:15 - 8:15 AM	PHF	0.83
Urban Street	Route 140	Analysis Year	2015	Analysis Period	1> 7:15
Intersection	Route 140/Lake St	File Name	15_Route 140 & Lake St_AM-bal.xus		
Project Description	Balanced 2016				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	113	0	10				28	703			494	144

Signal Information			
Cycle, s	55.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	40.0	7.0	0.0	0.0	0.0	0.0		
Yellow	3.0	3.0	0.0	0.0	0.0	0.0		
Red	1.0	1.0	0.0	0.0	0.0	0.0		

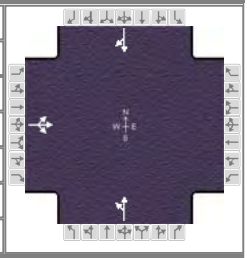
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2		6
Case Number		12.0				8.0		8.0
Phase Duration, s		11.0				44.0		44.0
Change Period, ($Y+R_c$), s		4.0				4.0		4.0
Max Allow Headway (*MAH*), s		3.1				3.1		3.1
Queue Clearance Time (g_s), s		6.2				16.2		13.3
Green Extension Time (g_e), s		0.0				4.2		4.3
Phase Call Probability		1.00				1.00		1.00
Max Out Probability		1.00				0.03		0.02

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14				5	2			6	16
Adjusted Flow Rate (*v*), veh/h		142						881			751	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1786						1760			1746	
Queue Service Time (g_s), s		4.2						0.0			11.3	
Cycle Queue Clearance Time (g_c), s		4.2						14.2			11.3	
Green Ratio (*g/C*)		0.13						0.73			0.73	
Capacity (*c*), veh/h		227						1348			1270	
Volume-to-Capacity Ratio (*X*)		0.625						0.653			0.591	
Back of Queue (*Q*), ft/ln (50 th percentile)		46.1						55.7			40.7	
Back of Queue (*Q*), veh/ln (50 th percentile)		1.8						2.1			1.6	
Queue Storage Ratio (*RQ*) (50 th percentile)		0.00						0.00			0.00	
Uniform Delay (d_1), s/veh		22.8						4.0			3.6	
Incremental Delay (d_2), s/veh		4.0						0.9			0.5	
Initial Queue Delay (d_3), s/veh		0.0						0.0			0.0	
Control Delay (*d*), s/veh		26.8						4.9			4.1	
Level of Service (LOS)		C						A			A	
Approach Delay, s/veh / LOS	26.8	C		0.0			4.9	A		4.1	A	
Intersection Delay, s/veh / LOS	6.3						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.1	B	1.8	B	1.3	A
Bicycle LOS Score / LOS	0.7	A			1.9	B	1.7	B

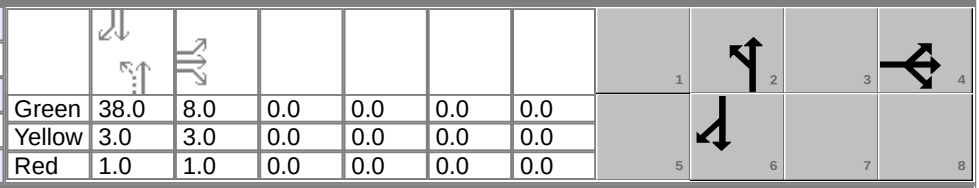
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Oct 9, 2015	Area Type	Other
Jurisdiction	Shrewsbury	Time Period	4:45 - 5:45 PM	PHF	0.95
Urban Street	Route 140	Analysis Year	2015	Analysis Period	1> 4:45
Intersection	Route 140/Lake St	File Name	15_Route 140 & Lake St_PM-bal.xus		
Project Description	Balanced 2016				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	174	0	25				28	585			670	227

Signal Information			
Cycle, s	54.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	38.0	8.0	0.0	0.0	0.0	0.0						
Yellow	3.0	3.0	0.0	0.0	0.0	0.0						
Red	1.0	1.0	0.0	0.0	0.0	0.0						

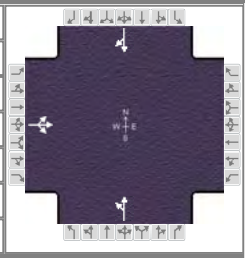
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2		6
Case Number		12.0				8.0		8.0
Phase Duration, s		12.0				42.0		42.0
Change Period, ($Y+R_c$), s		4.0				4.0		4.0
Max Allow Headway (*MAH*), s		3.1				3.1		3.1
Queue Clearance Time (g_s), s		7.9				10.6		19.7
Green Extension Time (g_e), s		0.0				4.2		4.0
Phase Call Probability		1.00				1.00		1.00
Max Out Probability		1.00				0.02		0.07

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14				5	2			6	16
Adjusted Flow Rate (*v*), veh/h		201						645			926	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1776						1767			1765	
Queue Service Time (g_s), s		5.9						0.0			17.7	
Cycle Queue Clearance Time (g_c), s		5.9						8.6			17.7	
Green Ratio (*g/C*)		0.15						0.70			0.70	
Capacity (*c*), veh/h		263						1314			1242	
Volume-to-Capacity Ratio (*X*)		0.764						0.491			0.746	
Back of Queue (*Q*), ft/ln (50 th percentile)		76.1						34.8			86.8	
Back of Queue (*Q*), veh/ln (50 th percentile)		3.0						1.3			3.4	
Queue Storage Ratio (*RQ*) (50 th percentile)		0.00						0.00			0.00	
Uniform Delay (d_1), s/veh		22.1						3.6			5.0	
Incremental Delay (d_2), s/veh		11.3						0.1			2.2	
Initial Queue Delay (d_3), s/veh		0.0						0.0			0.0	
Control Delay (*d*), s/veh		33.4						3.8			7.2	
Level of Service (LOS)		C						A			A	
Approach Delay, s/veh / LOS	33.4	C		0.0			3.8	A		7.2	A	
Intersection Delay, s/veh / LOS	8.9						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.2	B	1.8	B	1.3	A
Bicycle LOS Score / LOS	0.8	A			1.6	B	2.0	B

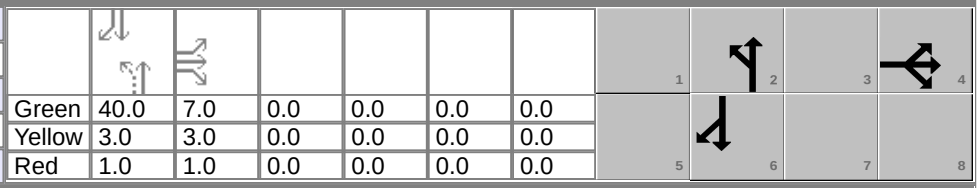
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Oct 9, 2015	Area Type	Other
Jurisdiction	Shrewsbury	Time Period	7:15 - 8:15 AM	PHF	0.83
Urban Street	Route 140	Analysis Year	2015	Analysis Period	1> 7:15
Intersection	Route 140/Lake St	File Name	15_Route 140 & Lake St_AM-proj.xus		
Project Description	Projected 2026				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	127	0	11				31	799			566	164

Signal Information			
Cycle, s	55.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	40.0	7.0	0.0	0.0	0.0	0.0		
Yellow	3.0	3.0	0.0	0.0	0.0	0.0		
Red	1.0	1.0	0.0	0.0	0.0	0.0		

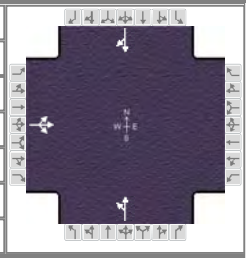
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2		6
Case Number		12.0				8.0		8.0
Phase Duration, s		11.0				44.0		44.0
Change Period, ($Y+R_c$), s		4.0				4.0		4.0
Max Allow Headway (*MAH*), s		3.1				3.1		3.1
Queue Clearance Time (g_s), s		6.7				20.5		16.6
Green Extension Time (g_e), s		0.0				5.2		5.4
Phase Call Probability		1.00				1.00		1.00
Max Out Probability		1.00				0.12		0.07

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14				5	2			6	16
Adjusted Flow Rate (*v*), veh/h		160						1000			861	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1785						1750			1746	
Queue Service Time (g_s), s		4.7						0.0			14.6	
Cycle Queue Clearance Time (g_c), s		4.7						18.5			14.6	
Green Ratio (*g/C*)		0.13						0.73			0.73	
Capacity (*c*), veh/h		227						1341			1270	
Volume-to-Capacity Ratio (*X*)		0.705						0.746			0.679	
Back of Queue (*Q*), ft/ln (50 th percentile)		58.3						81.2			58.2	
Back of Queue (*Q*), veh/ln (50 th percentile)		2.3						3.1			2.2	
Queue Storage Ratio (*RQ*) (50 th percentile)		0.00						0.00			0.00	
Uniform Delay (d_1), s/veh		23.0						4.6			4.0	
Incremental Delay (d_2), s/veh		8.2						2.1			1.2	
Initial Queue Delay (d_3), s/veh		0.0						0.0			0.0	
Control Delay (*d*), s/veh		31.2						6.6			5.3	
Level of Service (LOS)		C						A			A	
Approach Delay, s/veh / LOS	31.2	C		0.0			6.6	A		5.3	A	
Intersection Delay, s/veh / LOS	8.0						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.71	B	1.73	B	1.31	A	1.32	A
Bicycle LOS Score / LOS	0.75	A			2.14	B	1.91	B

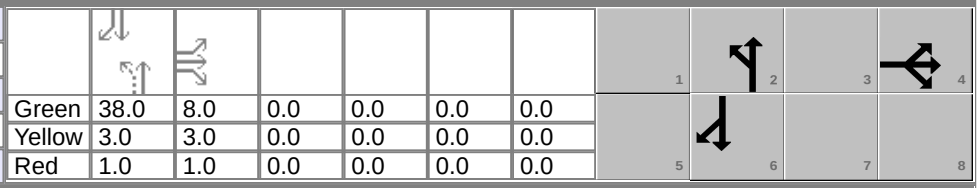
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Oct 9, 2015	Area Type	Other
Jurisdiction	Shrewsbury	Time Period	4:45 - 5:45 PM	PHF	0.95
Urban Street	Route 140	Analysis Year	2015	Analysis Period	1> 4:45
Intersection	Route 140/Lake St	File Name	15_Route 140 & Lake St_PM-proj.xus		
Project Description	Projected 2026				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	194	0	28				31	671			760	253

Signal Information			
Cycle, s	54.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	38.0	8.0	0.0	0.0	0.0	0.0						
Yellow	3.0	3.0	0.0	0.0	0.0	0.0						
Red	1.0	1.0	0.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2		6
Case Number		12.0				8.0		8.0
Phase Duration, s		12.0				42.0		42.0
Change Period, ($Y+R_c$), s		4.0				4.0		4.0
Max Allow Headway (*MAH*), s		3.1				3.1		3.1
Queue Clearance Time (g_s), s		8.7				28.2		25.4
Green Extension Time (g_e), s		0.0				3.9		4.4
Phase Call Probability		1.00				1.00		1.00
Max Out Probability		1.00				0.41		0.28

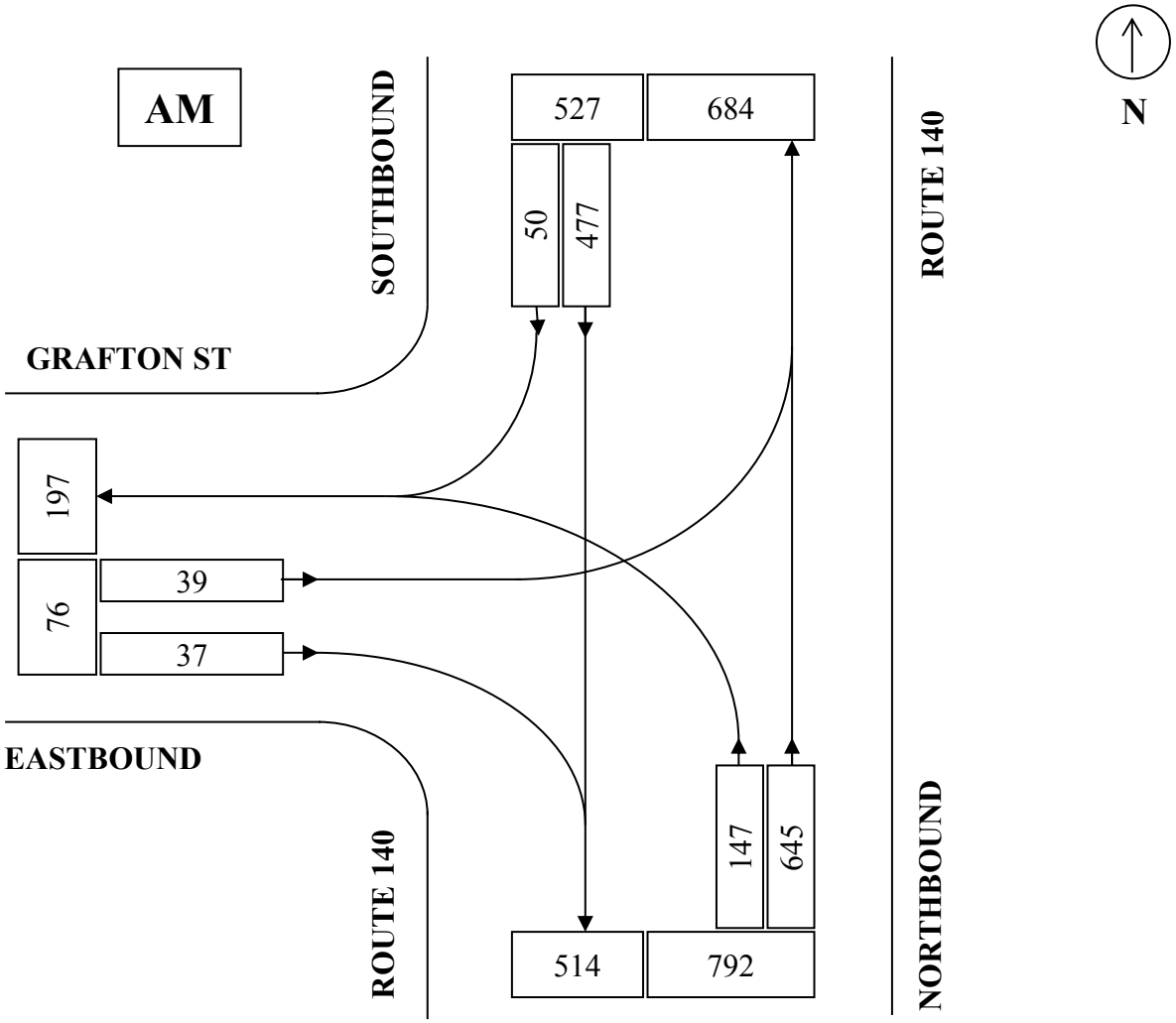
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14				5	2			6	16
Adjusted Flow Rate (*v*), veh/h		225						739			1048	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1775						1604			1765	
Queue Service Time (g_s), s		6.7						2.8			23.4	
Cycle Queue Clearance Time (g_c), s		6.7						26.2			23.4	
Green Ratio (*g/C*)		0.15						0.70			0.70	
Capacity (*c*), veh/h		263						1199			1242	
Volume-to-Capacity Ratio (*X*)		0.857						0.617			0.844	
Back of Queue (*Q*), ft/ln (50 th percentile)		103.9						49			134.9	
Back of Queue (*Q*), veh/ln (50 th percentile)		4.1						1.9			5.2	
Queue Storage Ratio (*RQ*) (50 th percentile)		0.00						0.00			0.00	
Uniform Delay (d_1), s/veh		22.4						4.2			5.8	
Incremental Delay (d_2), s/veh		22.4						0.7			5.2	
Initial Queue Delay (d_3), s/veh		0.0						0.0			0.0	
Control Delay (*d*), s/veh		44.8						4.9			11.0	
Level of Service (LOS)		D						A			B	
Approach Delay, s/veh / LOS	44.8	D		0.0			4.9	A		11.0	B	
Intersection Delay, s/veh / LOS	12.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.71	B	1.74	B	1.32	A	1.33	A
Bicycle LOS Score / LOS	0.86	A			1.71	B	2.22	B

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Shrewsbury **DATE:** 9/22/15 **DAY OF WEEK:** Tuesday
INTERSECTION: Route 140 / Grafton Street

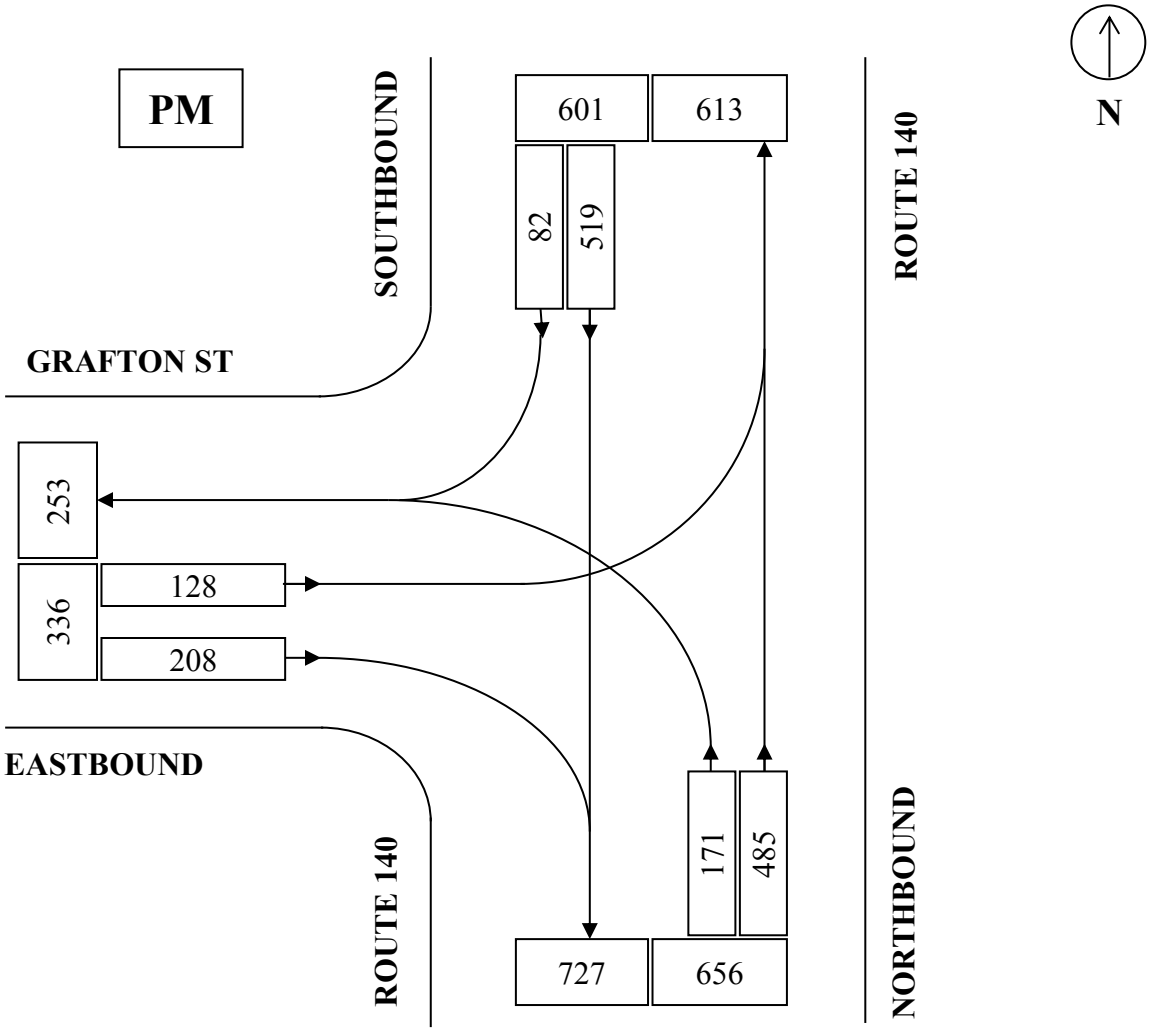


STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			7:15 - 8:15 AM
Grafton St EB	76	5.4%	
			PHF = .87
Route 140 NB	792	56.8%	
			VEHICLES COUNTED
Route 140 SB	527	37.8%	
			ALL VEHICLES: 1395
TOTAL	1395	100.0%	**TRUCKS:** 109
			PERCENT TRUCKS: 7.81%

CMRPC

INTERSECTION TURNING MOVEMENT COUNT

CITY: Shrewsbury **DATE:** 9/22/15 **DAY OF WEEK:** Tuesday
INTERSECTION: Route 140 / Grafton Street



STREET	ENTERING VOLUMES	PERCENT OF FLOW	TIME OF COUNT
			4:30 - 5:30 PM
Grafton St EB	336	21.1%	
			PHF = .97
Route 140 NB	656	41.2%	
			VEHICLES COUNTED
Route 140 SB	601	37.7%	
			ALL VEHICLES: 1593
TOTAL	1593	100.0%	**TRUCKS:** 56
			PERCENT TRUCKS 3.52%

TURNING MOVEMENT COUNT WORKSHEET

CMRPC

MUNICIPALITY: Town of Shrewsbury

DATE: 9/22/2015

LOCATION: Route 140 / Grafton Street

DAY OF WEEK: Tuesday

WEATHER: AM: Clear PM: Clear

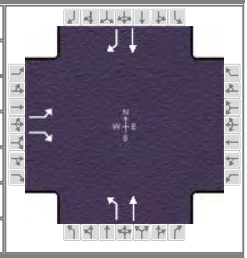
TECHNICIAN: VG

Time Period	Grafton St EB								Route 140 NB				Route 140 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
7:00 - 7:15	10	0	8	2					19	128	0	9	0	84	7	12	256	
7:15 - 7:30	12	0	5	1					21	162	0	17	0	110	9	9	319	
7:30 - 7:45	4	0	8	2					44	186	0	16	0	143	14	11	399	
7:45 - 8:00	7	0	13	0					36	154	0	11	0	117	12	14	339	1313
8:00 - 8:15	16	0	11	3					46	143	0	12	0	107	15	13	338	1395
8:15 - 8:30	13	0	10	3					30	132	0	12	0	83	16	6	284	1360
8:30 - 8:45	12	0	12	3					40	105	0	17	0	117	7	8	293	1254
8:45 - 9:00	21	0	16	6					32	108	0	17	0	98	11	16	286	1201
TOTAL	95	0	83	20	0	0	0	0	268	1118	0	111	0	859	91	89	2514	
		EBPct	5.4			**WBPct**	0.0			**NBPct**	56.8			**SBPct**	37.8			
Peak Sums:	**39**	**0**	**37**	**6**	**0**	**0**	**0**	**0**	**147**	**645**	**0**	**56**	**0**	**477**	**50**	**47**	**1395**	
Total Trucks	109					**TrkPct**	7.81			**PHF**	0.87							

Time Period	Grafton St EB								Route 140 NB				Route 140 SB				Total	Peak
	L	S	R	HV	L	S	R	HV	L	S	R	HV	L	S	R	HV		
4:00 - 4:15	31	0	36	0					34	83	0	5	0	129	10	9	323	
4:15 - 4:30	21	0	30	1					39	120	0	8	0	122	13	6	345	
4:30 - 4:45	35	0	45	2					44	114	0	7	0	143	26	8	407	
4:45 - 5:00	32	0	60	1					40	108	0	4	0	111	22	6	373	1448
5:00 - 5:15	40	0	48	0					35	137	0	3	0	131	18	8	409	1534
5:15 - 5:30	21	0	55	0					52	126	0	7	0	134	16	10	404	1593
5:30 - 5:45	36	0	42	0					42	93	0	5	0	169	20	10	402	1588
5:45 - 6:00	27	0	35	0					44	91	0	3	0	139	25	5	361	1576
TOTAL	243	0	351	4	0	0	0	0	330	872	0	42	0	1078	150	62	3024	
		EBPct	21.1			**WBPct**	0.0			**NBPct**	41.2			**SBPct**	37.7			
Peak Sums:	**128**	**0**	**208**	**3**	**0**	**0**	**0**	**0**	**171**	**485**	**0**	**21**	**0**	**519**	**82**	**32**	**1593**	
Total Trucks	56					**TrkPct**	3.52			**PHF**	0.97							

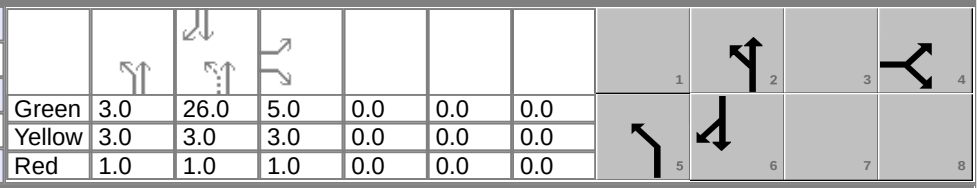
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Oct 9, 2015	Area Type	Other
Jurisdiction	Shrewsbury	Time Period	7:15 - 8:15 AM	PHF	0.87
Urban Street	Route 140	Analysis Year	2015	Analysis Period	1> 7:00
Intersection	Route 140/Grafton St	File Name	15_Route 140 & Grafton St_AM-bal.xus		
Project Description	Balanced 2016				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	39		37				148	651			482	51

Signal Information			
Cycle, s	46.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	3.0	26.0	5.0	0.0	0.0	0.0
Yellow	3.0	3.0	3.0	0.0	0.0	0.0
Red	1.0	1.0	1.0	0.0	0.0	0.0

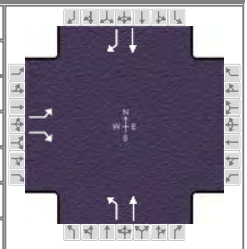
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			1.0	4.0		7.3
Phase Duration, s		9.0			7.0	37.0		30.0
Change Period, ($Y+R_c$), s		4.0			4.0	4.0		4.0
Max Allow Headway (*MAH*), s		3.2			3.1	3.0		3.0
Queue Clearance Time (g_s), s		3.1			3.7	11.4		11.0
Green Extension Time (g_e), s		0.0			0.0	2.7		2.8
Phase Call Probability		1.00			1.00	1.00		1.00
Max Out Probability		1.00			1.00	0.06		0.06

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2			6	16
Adjusted Flow Rate (*v*), veh/h	45		43				170	748			554	59
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1867		1662				1697	1781			1781	1510
Queue Service Time (g_s), s	1.0		1.1				1.7	9.4			9.0	0.8
Cycle Queue Clearance Time (g_c), s	1.0		1.1				1.7	9.4			9.0	0.8
Green Ratio (*g/C*)	0.11		0.11				0.67	0.72			0.57	0.57
Capacity (*c*), veh/h	203		181				567	1278			1007	853
Volume-to-Capacity Ratio (*X*)	0.221		0.235				0.300	0.586			0.550	0.069
Back of Queue (*Q*), ft/ln (50 th percentile)	9.9		9.4				5.6	22.1			54.8	4
Back of Queue (*Q*), veh/ln (50 th percentile)	0.4		0.4				0.2	0.8			2.1	0.2
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00		0.00				0.03	0.00			0.00	0.03
Uniform Delay (d_1), s/veh	18.7		18.8				4.4	3.2			6.3	4.5
Incremental Delay (d_2), s/veh	0.2		0.2				0.1	0.5			0.4	0.0
Initial Queue Delay (d_3), s/veh	0.0		0.0				0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh	18.9		19.0				4.5	3.6			6.7	4.5
Level of Service (LOS)	B		B				A	A			A	A
Approach Delay, s/veh / LOS	19.0		B	0.0			3.8		A	6.5		A
Intersection Delay, s/veh / LOS	5.6						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	0.6	A	2.2	B
Bicycle LOS Score / LOS		F			2.0	B	1.5	A

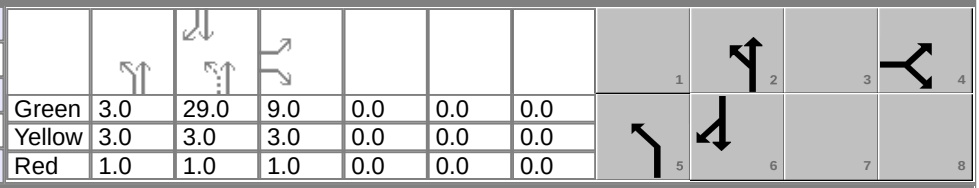
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Oct 9, 2015	Area Type	Other
Jurisdiction	Shrewsbury	Time Period	4:30 - 5:30 PM	PHF	0.97
Urban Street	Route 140	Analysis Year	2015	Analysis Period	1> 4:30
Intersection	Route 140/Grafton St	File Name	15_Route 140 & Grafton St_PM-bal.xus		
Project Description	Balanced 2016				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	129		210				173	490			565	90

Signal Information			
Cycle, s	53.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	3.0	29.0	9.0	0.0	0.0	0.0
Yellow	3.0	3.0	3.0	0.0	0.0	0.0
Red	1.0	1.0	1.0	0.0	0.0	0.0

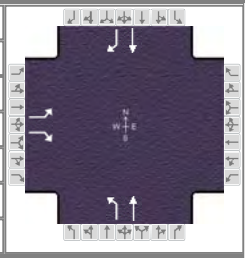
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			1.0	4.0		7.3
Phase Duration, s		13.0			7.0	40.0		33.0
Change Period, ($Y+R_c$), s		4.0			4.0	4.0		4.0
Max Allow Headway (*MAH*), s		3.3			3.1	3.1		3.1
Queue Clearance Time (g_s), s		8.6			4.2	8.7		13.7
Green Extension Time (g_e), s		0.0			0.0	2.4		2.3
Phase Call Probability		1.00			1.00	1.00		1.00
Max Out Probability		1.00			1.00	0.01		0.03

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2			6	16
Adjusted Flow Rate (*v*), veh/h	133		216				178	505			582	93
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1867		1662				1697	1781			1781	1510
Queue Service Time (g_s), s	3.4		6.6				2.2	6.7			11.7	1.6
Cycle Queue Clearance Time (g_c), s	3.4		6.6				2.2	6.7			11.7	1.6
Green Ratio (*g/C*)	0.17		0.17				0.64	0.68			0.55	0.55
Capacity (*c*), veh/h	317		282				491	1210			975	826
Volume-to-Capacity Ratio (*X*)	0.419		0.767				0.363	0.417			0.598	0.112
Back of Queue (*Q*), ft/ln (50 th percentile)	33.6		78.7				11.9	31.4			86.9	9.5
Back of Queue (*Q*), veh/ln (50 th percentile)	1.3		3.1				0.4	1.2			3.3	0.4
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00		0.00				0.07	0.00			0.00	0.06
Uniform Delay (d_1), s/veh	19.7		21.0				6.1	3.8			8.1	5.8
Incremental Delay (d_2), s/veh	0.3		10.9				0.2	0.1			0.7	0.0
Initial Queue Delay (d_3), s/veh	0.0		0.0				0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh	20.0		31.9				6.2	3.9			8.8	5.8
Level of Service (LOS)	B		C				A	A			A	A
Approach Delay, s/veh / LOS	27.4		C	0.0			4.5		A	8.4		A
Intersection Delay, s/veh / LOS	10.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	0.6	A	2.2	B
Bicycle LOS Score / LOS		F			1.6	B	1.6	B

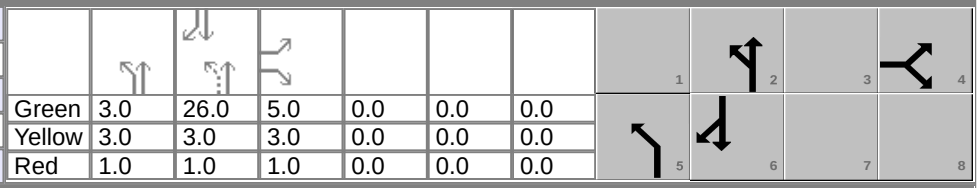
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Oct 9, 2015	Area Type	Other
Jurisdiction	Shrewsbury	Time Period	7:15 - 8:15 AM	PHF	0.87
Urban Street	Route 140	Analysis Year	2015	Analysis Period	1> 7:00
Intersection	Route 140/Grafton St	File Name	15_Route 140 & Grafton St_AM-proj.xus		
Project Description	Projected 2026				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	47		41				163	737			544	64

Signal Information			
Cycle, s	46.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	3.0	26.0	5.0	0.0	0.0	0.0
Yellow	3.0	3.0	3.0	0.0	0.0	0.0
Red	1.0	1.0	1.0	0.0	0.0	0.0

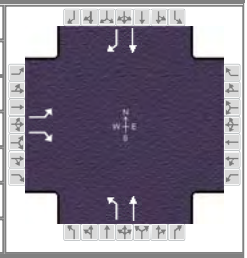
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			1.0	4.0		7.3
Phase Duration, s		9.0			7.0	37.0		30.0
Change Period, ($Y+R_c$), s		4.0			4.0	4.0		4.0
Max Allow Headway (*MAH*), s		3.2			3.1	3.0		3.0
Queue Clearance Time (g_s), s		3.2			3.9	13.8		12.8
Green Extension Time (g_e), s		0.0			0.0	3.1		3.2
Phase Call Probability		1.00			1.00	1.00		1.00
Max Out Probability		1.00			1.00	0.16		0.14

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2			6	16
Adjusted Flow Rate (*v*), veh/h	54		47				187	847			625	74
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1867		1662				1697	1781			1781	1510
Queue Service Time (g_s), s	1.2		1.2				1.9	11.8			10.8	1.0
Cycle Queue Clearance Time (g_c), s	1.2		1.2				1.9	11.8			10.8	1.0
Green Ratio (*g/C*)	0.11		0.11				0.67	0.72			0.57	0.57
Capacity (*c*), veh/h	203		181				519	1278			1007	853
Volume-to-Capacity Ratio (*X*)	0.266		0.261				0.361	0.663			0.621	0.086
Back of Queue (*Q*), ft/ln (50 th percentile)	11.9		10.5				6.3	32.4			68.9	5.1
Back of Queue (*Q*), veh/ln (50 th percentile)	0.5		0.4				0.2	1.2			2.6	0.2
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00		0.00				0.04	0.00			0.00	0.03
Uniform Delay (d_1), s/veh	18.8		18.8				5.1	3.5			6.7	4.6
Incremental Delay (d_2), s/veh	0.3		0.3				0.2	1.0			0.9	0.0
Initial Queue Delay (d_3), s/veh	0.0		0.0				0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh	19.1		19.1				5.3	4.5			7.6	4.6
Level of Service (LOS)	B		B				A	A			A	A
Approach Delay, s/veh / LOS	19.1		B	0.0			4.7		A	7.3		A
Intersection Delay, s/veh / LOS	6.5						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.93	B	1.93	B	0.62	A	1.86	B
Bicycle LOS Score / LOS		F			2.19	B	1.64	B

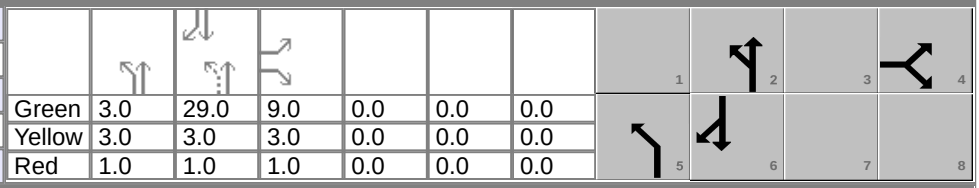
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CMRPC			Duration, h	0.25
Analyst	KK	Analysis Date	Oct 9, 2015	Area Type	Other
Jurisdiction	Shrewsbury	Time Period	4:30 - 5:30 PM	PHF	0.97
Urban Street	Route 140	Analysis Year	2015	Analysis Period	1> 4:30
Intersection	Route 140/Grafton St	File Name	15_Route 140 & Grafton St_PM-proj.xus		
Project Description	Projected 2026				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	147		232				191	561			639	104

Signal Information			
Cycle, s	53.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	3.0	29.0	9.0	0.0	0.0	0.0
Yellow	3.0	3.0	3.0	0.0	0.0	0.0
Red	1.0	1.0	1.0	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			1.0	4.0		7.3
Phase Duration, s		13.0			7.0	40.0		33.0
Change Period, ($Y+R_c$), s		4.0			4.0	4.0		4.0
Max Allow Headway (*MAH*), s		3.3			3.1	3.1		3.1
Queue Clearance Time (g_s), s		9.4			4.5	10.2		16.1
Green Extension Time (g_e), s		0.0			0.0	2.8		2.6
Phase Call Probability		1.00			1.00	1.00		1.00
Max Out Probability		1.00			1.00	0.02		0.09

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2			6	16
Adjusted Flow Rate (*v*), veh/h	152		239				197	578			659	107
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1867		1662				1697	1781			1781	1510
Queue Service Time (g_s), s	3.9		7.4				2.5	8.2			14.1	1.8
Cycle Queue Clearance Time (g_c), s	3.9		7.4				2.5	8.2			14.1	1.8
Green Ratio (*g/C*)	0.17		0.17				0.64	0.68			0.55	0.55
Capacity (*c*), veh/h	317		282				440	1210			975	826
Volume-to-Capacity Ratio (*X*)	0.478		0.848				0.448	0.478			0.676	0.130
Back of Queue (*Q*), ft/ln (50 th percentile)	38.7		103.3				13.5	38.2			109.9	11
Back of Queue (*Q*), veh/ln (50 th percentile)	1.5		4.1				0.5	1.4			4.1	0.4
Queue Storage Ratio (*RQ*) (50 th percentile)	0.00		0.00				0.08	0.00			0.00	0.07
Uniform Delay (d_1), s/veh	19.9		21.3				7.2	4.0			8.6	5.8
Incremental Delay (d_2), s/veh	0.4		19.8				0.3	0.1			1.5	0.0
Initial Queue Delay (d_3), s/veh	0.0		0.0				0.0	0.0			0.0	0.0
Control Delay (*d*), s/veh	20.3		41.2				7.4	4.1			10.2	5.9
Level of Service (LOS)	C		D				A	A			B	A
Approach Delay, s/veh / LOS	33.1		C	0.0			5.0		A	9.6		A
Intersection Delay, s/veh / LOS	12.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.94	B	1.94	B	0.64	A	1.87	B
Bicycle LOS Score / LOS		F			1.77	B	1.75	B

Central Massachusetts Regional Planning Commission

Member Communities

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Barre
Berlin
Blackstone
Boylston
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Dudley
East Brookfield
Grafton
Hardwick
Holden
Hopedale
Leicester
Mendon
Millbury
Millville
New Braintree
North Brookfield
Worcester
Northborough
Northbridge
Oakham
Oxford
Paxton
Princeton
Rutland
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Southbridge
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Sturbridge
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Uxbridge
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West Brookfield
Westborough

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