TECHNICAL MEMORANDUM

DATE: **December 15, 2022**
TO: **Michelle Tyler, Town of Randolph**
FROM: **Julie Dombroski, Boston Region MPO Staff**
RE: **Safety and Operations Analyses at Selected Intersections, FFY 2022—Crawford Square and Memorial Parkway at Route 28/139 in Randolph**

This memorandum summarizes the analyses and improvement strategies for the intersection known as Crawford Square, as well as the intersection of Memorial Parkway and North Main Street (Route 28 and Route 139).

This memorandum contains the following sections:

1. Study Background
2. Existing Conditions
3. Issues and Concerns
4. Crash Data Analysis
5. Existing Conditions Analysis
6. Proposed Short-term Improvements
7. Long-term Improvement Alternatives
8. Recommendations

The memorandum also includes technical appendices that contain data and methods applied in the study.

1 STUDY BACKGROUND

The purpose of the "Safety and Operations Analyses at Selected Intersections" studies is to examine safety, operations, and mobility issues at major intersections in the Boston Region Metropolitan Planning Organization's (MPO) planning area, particularly on arterial highways where many crashes occur, congestion during peak traffic periods may be heavy, or improvements for bus access and for those who walk or bike are needed.

For more than 10 years, the MPO has been conducting these planning studies with municipalities in the region. The communities find the studies beneficial, as they provide an opportunity to begin looking at the needs of problematic locations at the conceptual level before municipalities commit funds for design and engineering. Eventually, if a project qualifies for federal funds, the study's documentation will also be useful to the Massachusetts Department of Transportation (MassDOT) and its project-development process.

These studies support the MPO's visions and goals, which include increasing transportation safety, maintaining the transportation system, advancing mobility, and reducing congestion.

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FIGURE 1
Study Area

Safety and Operations at Selected Intersections
Town of Randolph

2 EXISTING CONDITIONS

The intersections studied are located in the town center of Randolph. The first, known as Crawford Square, is the intersection of North Main Street (Routes 139 and 28), Union Street (Route 139), South Main Street (Route 28), and North Street. Directly northwest of Crawford Square is the second intersection, at Memorial Parkway and North Main Street (Routes 139 and 28). There are several safety and operational issues at both intersections.

Most of the land adjacent to the study area is zoned in two districts: the Residential Single-Family High-Density District and the Crawford Square Business District. A few parcels near the study area are zoned as Business Professional Districts and Residential Multi-Family Districts. A majority of the parcels north of the study area contain various stores, restaurants, and banks. Single-family residences make up the majority of land use south and east of the study area. Randolph High School is located on Memorial Parkway, just west of the North Main Street and Memorial Parkway intersection.

Route 28 is an important connector in the Town of Randolph. Running parallel to and located just east of Route 24, Route 28 can be used as a local alternate route to access Interstate 93 and Milton to the north and Avon to the south. The 3.25 miles of Route 28 between Interstate 93 and Crawford Square is called North Main Street. At Crawford Square, Route 28 continues south as South Main Street until reaching the Avon town line, where the name changes again. In the town of Randolph, Route 28 is a two-lane roadway until it intersects with Oak Street, where it becomes a four-lane roadway north of the intersection. The roadway is classified as a principal arterial and has speed limit of 25 miles per hour in the study area.

Route 139 is a mostly east-west route through the town of Randolph. It connects the town to Stoughton to the southwest and Holbrook to the east. Route 139 intersects with Route 28 about one-quarter mile north of Crawford Square and then the routes separate at Crawford Square. At the intersection, Route 28 follows South Main Street and Route 139 follows Union Street. The roadway is classified as a principal arterial and has a speed limit of 30 miles per hour in the study area.

Memorial Parkway is a 1,400-foot section of roadway that connects Highland Avenue on its western end to North Main Street on its eastern end. Randolph High School sits on the southern side of Memorial Parkway and Randolph Plaza sits on the northern side. The main entrances to the school and shopping plaza are both located on Memorial Parkway. The roadway is classified as a minor road and has a speed limit of 20 miles per hour in the study area.

Crawford Square is a four-leg, signalized intersection. The southeast-bound approach (North Main Street) widens to three lanes from two—one lane to accommodate each traffic movement. The southwest-bound approach (North

Street) has a channelized right-turn lane, and two through lanes, one of which accommodates left-turning vehicles. The northwest-bound approach has two lanes—one for through and left-turning vehicles, and the other for through and right-turning vehicles. Lastly, the northeast-bound approach has a left-turn exclusive lane and a through-right lane. There is a crosswalk on each leg of the intersection, including across the slip lane on the southwest-bound approach. Pedestrian movements are actuated via push buttons.

The three-leg intersection of Memorial Parkway and North Main Street is signalized. Each approach at the intersection has two lanes. The eastbound approach has a left-turn lane and a right-turn lane. The northbound approach has a through-left lane and a through lane. The southbound approach has a through lane and a through-right lane. Crosswalks exist on each approach at this intersection. Pedestrian movements are actuated via push buttons and have an exclusive phase.

Three bus services serve Crawford Square: MBTA bus Routes 238 and 240, and Brockton Area Transit (BAT) bus Line 12. These routes and their variants operate on all four of the intersection approach roadways. MBTA Route 238 connects Holbrook/Randolph Station to Quincy Center Station. MBTA Route 240 connects Avon Square to Ashmont Station. BAT Line 12 provides a connection between Ashmont Station and Brockton (BAT Center Station and Campello Station).

Sidewalks varying between five and eight feet in width are located immediately adjacent all study intersection roadways. At the intersection of Memorial Parkway and North Main Street, crosswalks are present on each leg. The crossings are raised red brick and each curb ramp has grey detectable-warning pavers. Pedestrian push buttons are used to initiate the traffic signals' pedestrian-crossing phase. The intersection of North Main Street and North Street also has pedestrian crossings on each leg, including on the slip lane on North Street. The crosswalks are marked on the pavement with ladder-style white striping and grey detectable-warning pavers. As at the other intersection, grey detectable-warning pavers are on each curb ramp, and the pedestrian phase is actuated by push buttons. The slip lane on North Street is not a part of the pedestrian phasing at this intersection.

There are currently no bicycle accommodations present in the study area.

2.1 Corridor User Survey

Boston Region MPO staff prepared and conducted a survey to help determine the public's opinion about the issues and problems in the study area, and to gather ideas for resolving them. The online survey was posted on the Boston Region MPO's website and social media channels, as well as on the Town of Randolph's website and social media channels. The survey received 426 responses between July 6 and July 29, 2022.

2.1.1 Survey Questions and Answers

The survey contained the following questions:

1. How do you typically travel through the intersections?
2. Please indicate the purpose of your usual trips through these intersections.
3. Please indicate the destination of your usual trips through the intersections.
4. If you drive through these intersections, what problems do you encounter?
5. If you walk or use a mobility device in these intersections, what problems do you encounter?
6. If you bike through these intersections, what problems do you encounter?
7. Please indicate any improvements that you would like to see implemented in the intersections.
8. Where do you live? Please indicate the five-digit zip code of your residence.
9. Please use the space below to describe specific problem locations and improvements that you would like to see implemented in the corridor.

Questions 1 through 7 allowed multiple-choice responses and offered respondents the option of writing in a response (in the "Other" choice line). Question 8 asked for a single answer, while Question 9 required a written response. The number and percentage of answers to each question and respondents' written comments are summarized in Appendix E.

Question 8 was designed to understand the geographical distribution of the respondents. About 91 percent (361 respondents) of those who answered Question 8 live in Randolph. The rest of the respondents are mostly from neighboring communities—Avon, Braintree, Canton, Holbrook, Milton, Quincy, and Stoughton. A handful of responses came from other nearby areas.

Question 9 was a free-response question for the respondents to describe further viewpoints and to cover the problems and improvement ideas that the survey answers might not have included. Question 9 received 212 responses. Those comments are listed verbatim in Appendix E.

2.1.2 Summary of Survey Results

The following list includes notable conclusions drawn from the survey:

- Nearly all of the respondents indicated that they usually drive in the study area (97 percent). However, a noticeable portion of respondents said that they also walk in the study area (22 percent).
- A majority of users take trips through the study area for shopping (83 percent). Other considerable trip purposes include social/recreation, dining, and travel to work (by driving).

- The most popular destination of usual trips is Randolph Plaza (75 percent). Locations south of the study area and the shopping plaza at North Main Street and Warren Street warranted notable responses as well.
- There are many concerns about the two intersections in the study area, but respondents noted high traffic volumes most frequently (85 percent). Other problems include safety concerns, difficulty turning into and out of side streets, and long wait times at signals.
- For those who walk in the study area, the most significant concerns are high traffic volumes, drivers who do not pay close attention to people walking or using mobility devices, and high vehicle speeds.
- For those who bike through the study area, most respondents noted the lack of bike lanes or usable shoulders, drivers paying poor attention to bicyclists, and high vehicle speeds as the most pressing issues.
- Respondents listed desired improvements such as reducing traffic congestion and increasing safety for all road users most frequently.

Feedback from the survey was helpful to gauge community concerns and to solicit ideas for solutions to the existing problems. These ideas were considered when developing the improvement alternatives discussed in Section 7.

3 ISSUES AND CONCERNS

Based on MPO staff's field observations, discussions with Town officers, public survey results, and analyses of crash data and existing operations, major issues and concerns at the intersection include the following:

- *High-crash location*
  Although the study area is not on a top crash location list, it has a higher-than-average crash rate compared to other signalized intersections in MassDOT Highway District 6.
- *Traffic congestion during peak hours*
  Both intersections in the study area carry high traffic volumes during the AM and PM peak periods during the week. This volume includes traffic due to school start and release times. Queues form frequently during these hours and pour into the center of each intersection.
- *Left-turn issues at Crawford Square*
  Permissive left-turn phases on South Main Street and North Main Street cause delays and lead to vehicles blocking the intersection.
- *Pedestrian accessibility and safety concerns*
  Existing pedestrian infrastructure is relatively adequate and meets Americans with Disability Act (ADA) standards. However, field observations and survey results note that short clearance times, obstructed visibility of crossings, and illegal right-turn-on-red movements that endanger people walking in both intersections.

4 CRASH DATA ANALYSIS

Crash data analysis is essential to identify safety and operational problems at an intersection. Analyzing data on the frequency of crashes, types and patterns of collisions, and the circumstances under which crashes occur, such as the time of day and roadway surface conditions, also helps to develop improvement strategies.

4.1 Crash Statistics

MPO staff used the most recent six-year crash reports (January 2015–December 2021) for this study. Typically, five years of crash data is used, but an additional year of crash data was collected in order to account for the COVID-19 pandemic effects on vehicular travel in 2020. In total, there were 125 crashes in the recent six-year period in the study area. The majority of crashes occurred at the Crawford Square intersections, but the intersections of Memorial Parkway at North Main Street and Union Street at South Street, as well as Turner Lane at North Main Street were also high-crash areas.

The predominant crash types were angle crashes (41 total), rear-end crashes (35 total) and sideswipe, same-direction crashes (24 total). The remaining 25 crashes were 13 head-on, seven (7) single vehicle, and five (5) sideswipe, opposite direction. Table 1 summarizes the 125 crashes in terms of severity, collision type, pedestrian or bicycle involvement, time of the day, and weather and pavement conditions. Forty-two crashes (34 percent) caused personal injuries with no fatalities.

Fifty-five crashes (44 percent) occurred during peak periods (7:00 AM–10:00 AM and 2:30 PM–6:30 PM). School release schedules were accounted for when establishing peak hours, which resulted in an afternoon peak period of four hours, rather than three. More than a third (38 percent) of the collisions occurred during dark conditions.

Table 1
Randolph Crash Data, 2015-2021
Crawford Square and Memorial Drive at N. Main Street

Statistics Period		2015	2016	2017	2018	2019	2020	2021	6-Yr. Total	Annual Avg.
Total number of crashes		18	28	21	14	23	13	8	125	20.8
Severity	Property damage only	13	19	15	9	15	7	5	83	13.8
	Non-fatal injury	5	9	6	5	8	6	3	42	7.0
	Fatality	0	0	0	0	0	0	0	0	0.0
	Not reported/unknown	0	0	0	0	0	0	0	0	0.0
Collision type	Single vehicle	1	3	0	0	3	0	0	7	1.2
	Rear-end	8	4	9	3	5	5	1	35	5.8
	Angle	7	9	6	4	5	6	4	41	6.8
	Sideswipe, same direction	0	7	5	4	6	1	1	24	4.0
	Sideswipe, opposite direction	1	2	0	0	1	0	1	5	0.8
	Head-on	1	3	1	3	3	1	1	13	2.2
	Rear-to-rear	0	0	0	0	0	0	0	0	0.0
	Not reported/unknown	0	0	0	0	0	0	0	0	0.0
Involved pedestrian(s)		0	0	1	0	1	0	0	2	0.3
Involved cyclist(s)		0	0	0	0	0	0	0	0	0.0
Occurred during weekday peak periods*		6	13	12	8	10	5	1	55	9.2
Wet or icy pavement conditions		4	4	2	2	4	6	3	25	4.2
Dark conditions (lit or unlit)		9	10	8	5	6	5	4	47	7.8

* Peak periods are defined as 7:00a–10:00a and 2:30p-6:30p.

4.2 Collision Diagram and Crash Pattern Analysis

Based on the police reports, staff constructed a collision diagram (Figure 2) that shows the locations and patterns of all the crashes in the study area. The information about each crash, including date, time, severity, collision type, most harmful event, weather conditions, and driver contributing code are summarized in Appendix A.

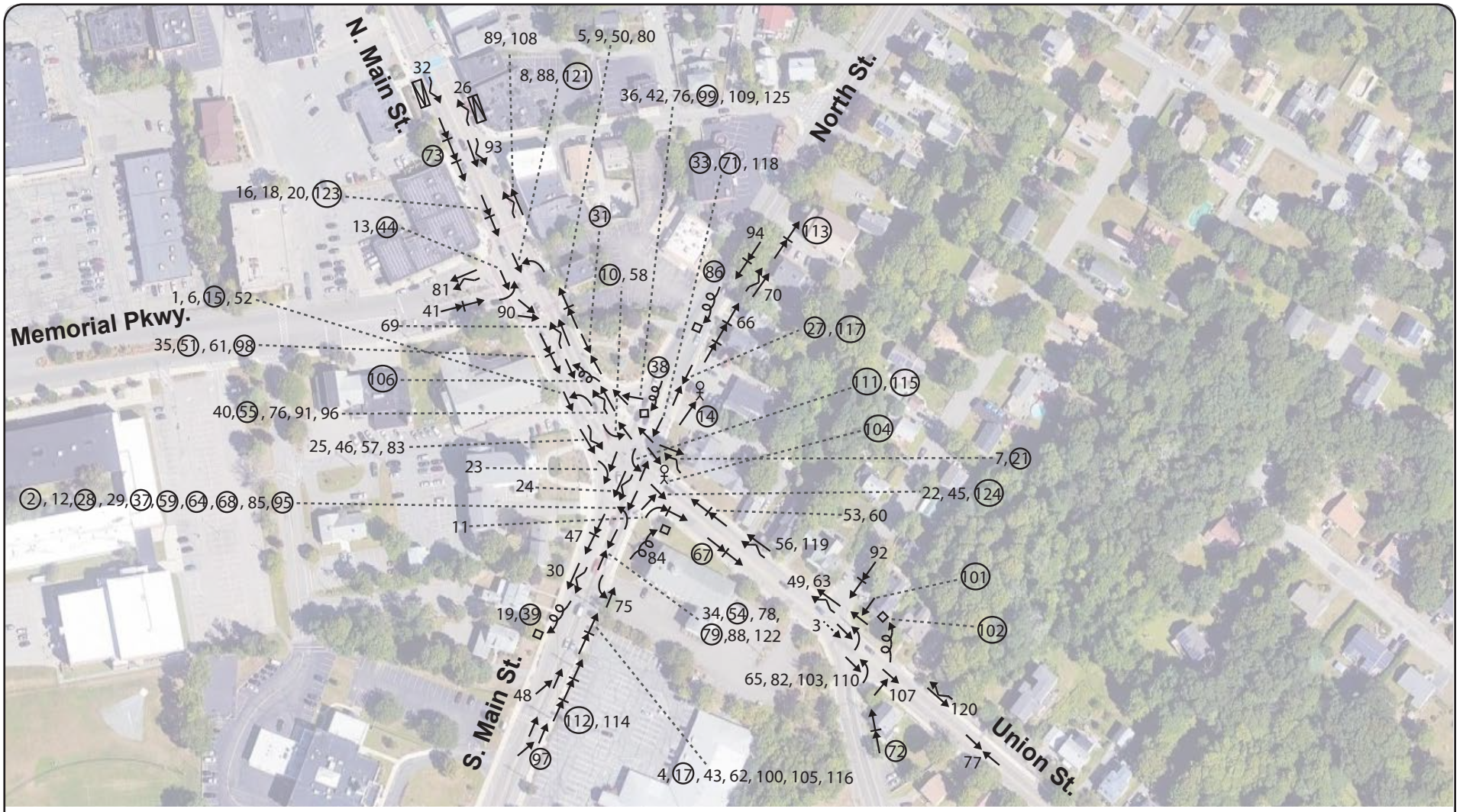

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FIGURE 2
Collision Diagram: Crawford Square in Randolph
Police Crash Reports 2015-21

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5 EXISTING CONDITIONS ANALYSIS

To examine the existing conditions, MPO staff requested MassDOT's assistance in collecting Automatic Traffic Recorder (ATR) counts on the approaching roadways and intersection turning movement counts (TMCs) for this study. The ATR counts were performed during the week of May 10–16, 2022. The TMCs were collected Thursday, May 12, 2022.

5.1 Daily Traffic Volumes

Based on the data, staff estimated the average weekday traffic volumes in roadway sections near the study intersections as follows:

- North Street, northeast of North Main Street/Union Street—7,800 vehicles, with a split of 3,510 (45 percent) northeast-bound vehicles and 4,290 (55 percent) southwest-bound vehicles.
- Union Street, southeast of South Main Street/North Street—16,900 vehicles, with a split of 8,450 (50 percent) southeast-bound vehicles and 8,450 (50 percent) northwest-bound vehicles.
- South Main Street, southwest of North Main Street/Union Street—13,700 vehicles, with a split of 6,850 (50 percent) northeast-bound vehicles and 6,850 (50 percent) southwest-bound vehicles.
- North Main Street, northwest of South Main Street/North Street—25,700 vehicles, with a split of 12,079 (47 percent) southeast-bound vehicles and 13,621 (53 percent) northwest-bound vehicles.
- Memorial Parkway, west of North Main Street—7,100 vehicles, with a split of 4,402 (62 percent) eastbound vehicles and 2,698 (38 percent) westbound vehicles.
- North Main Street, north of Memorial Parkway—20,400 vehicles, with a split of 11,628 (57 percent) southeast-bound vehicles and 8,772 (43 percent) northwest-bound vehicles.

5.2 Turning Movement Counts

MassDOT collected turning movement counts at the study intersections on Thursday, May 12, 2022, during the morning peak period (7:00 AM–10:00 AM) and the evening peak period (2:30 PM–6:30 PM), and on Saturday, May 14, 2022, during the midday peak period (10:00 AM–2:00 PM).

Staff adjusted TMC data using a 2019 MassDOT seasonal adjustment factor of 0.93 for an urban (U3) roadway.

Figures 3 and 4 summarize the adjusted 2022 AM and PM peak-hour traffic turning volumes by approach at each intersection.

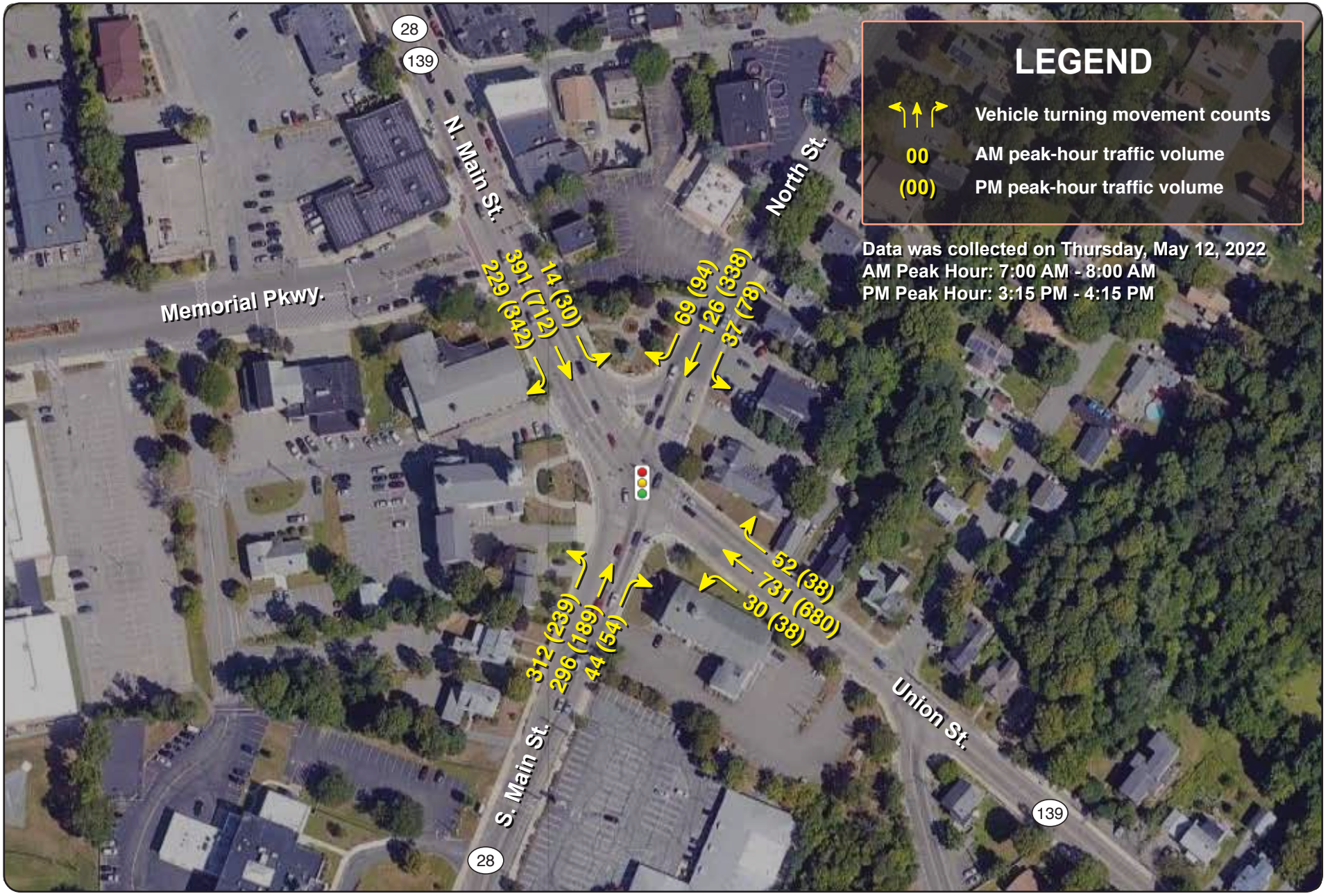

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FIGURE 3
Adjusted Peak-Hour Counts
Crawford Square in Randolph

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FIGURE 4
Adjusted Peak-Hour Counts
North Main Street (Rts. 28/139) at Memorial Parkway in Randolph

Safety and Operations at Selected Intersections
Town of Randolph

5.3 Intersection Capacity Analysis

Based on the estimated 2022 AM and PM peak-hour turning movements, staff conducted the intersection capacity analysis for the two study intersections by using the Synchro traffic analysis and simulation program.[1]

Staff conducted traffic operations analyses consistent with the Highway Capacity Manual (HCM) methodologies (included in Appendix C). HCM methodology demonstrates driving conditions at signalized and unsignalized intersections in terms of level-of-service (LOS) ratings from A through F. LOS A represents the best operating conditions (little to no delay), while LOS F represents the worst operating conditions (very long delay). LOS E represents operating conditions at capacity (limit of acceptable delay). Tables 2 and 3 present the control delays associated with each LOS for the signalized intersections.

Table 2
Summary of Intersection Capacity Analyses
Crawford Square
Adjusted 2022 AM and PM Peak-Hour Traffic Conditions

Analysis Period Approach	AM LOS	AM Delay	AM V/C	PM LOS	PM Delay	PM V/C
Union Street NB	D	49.2	0.88	D	46.6	0.82
North Main Street SB	C	25.7	0.42	E	68.6	0.68
South Main Street NEB	D	40.2	0.71	D	36.5	0.60
North Street SWB	D	38.7	0.39	F	91.1	0.69
Intersection Average	D	39.3	-	E	62.1	-

Notes:
Approach: NEB = Northeast-bound. NB = Northbound. SB = Southbound. SWB = Southwest-bound.
All movements share a single lane on all approaches.
AM Peak Hour = 7:00 AM–8:00 AM. PM Peak Hour = 3:15 PM–4:15 PM.
Delay = Average delay per vehicle (seconds).
LOS = Level of service. V/C = Volume to capacity ratio.

[1] Staff used Synchro Version 10.3, developed and distributed by Trafficware Ltd. It can perform capacity analysis and traffic simulation (when combined with SimTraffic) for an individual intersection or a series of intersections in a roadway network.

Table 3
Summary of Intersection Capacity Analyses
Memorial Parkway at North Main Street
Adjusted 2022 AM and PM Peak-Hour Traffic Conditions

Analysis Period / Approach	AM LOS	AM Delay	AM V/C	PM LOS	PM Delay	PM V/C
North Main Street NB	E	77.2	0.88	E	76.4	0.85
North Main Street SB	C	22.2	0.42	C	26.2	0.64
Memorial Parkway EB	C	24.4	0.79	C	21.2	0.87
Intersection Average	D	52.5	-	D	44.8	-

Notes:
Approach: NB = Northbound. SB = Southbound. EB = Eastbound.
All movements share a single lane on all approaches.
AM Peak Hour = 7:00 AM–8:00 AM. PM Peak Hour = 3:15 PM–4:15 PM.
Delay = Average delay per vehicle (seconds).
LOS = Level of service. V/C = Volume to capacity ratio.

6 PROPOSED SHORT-TERM IMPROVEMENTS

Based on the above analyses, MPO staff developed a series of short- and long-term improvements to address safety and operational problems at the intersections. The proposed short-term improvements generally can be implemented within two years at a relatively low cost (usually less than $30,000). The proposed long-term improvements cover larger areas, require intensive planning and design, and require more significant funding. These improvements are analyzed in the next section. The proposed short-term improvements are summarized below, from the lowest to the highest cost:

- Limbing trees in the median along Memorial Parkway to improve drivers' visibility of people walking.
- Consider planting additional low-growing shrubs that discourage random crossing and jaywalking.
- Repaint faded pavement and lane markings on all approaches.
- Retime the traffic signals at both the intersections based on the study findings and recommendations.
- Consider painting *Manual of Uniform Traffic Control Devices (MUTCD)* shared-lane markings on all roadways and installing Bicycles May Use Full Lane regulatory signs (R4-11) on the roadside adjacent to the outside travel lanes.
- Consider painting a Do Not Block hatched box at Crawford Square and installing a MUTCD Do Not Block Intersection regulatory sign (R10-7) on the roadside adjacent to the box.
- Coordinate with the MBTA and BAT to move the bus stop on the northbound side of North Main Street at Memorial Parkway. Currently, buses block northbound through movements, especially during peak periods.
- Install Pedestrian Crossing Ahead signs (MUTCD W11-15 and W16-9P) before the easternmost mid-block crossing on Memorial Parkway.

- Install pedestrian crossing signs (MUTCD W11-15 and W16-7P) at the easternmost mid-block crossing on Memorial Parkway.
- Install MUTCD Do Not Block Intersection regulatory sign (R10-7) on Memorial Parkway eastbound just before the hatched box in front of the fire station to discourage queuing in front of the station driveway.
- Consider striping parking spaces along the northern side of Memorial Parkway to slow vehicular travel.
- Consider extending the eastern portion of the median on Memorial Parkway via striped pavement markings. This will better separate the roadway without obstructing emergency vehicle or truck movements, as a full median extension would.

7 LONG-TERM IMPROVEMENT ALTERNATIVES

The proposed long-term improvements would require additional planning and design and more significant funding. Based on the goals of maximizing safety and operational benefits for all transportation modes and minimizing construction impacts, staff identified two alternatives that are more feasible than others.

Staff also analyzed traffic operations for the alternatives and the base case (no-build scenario) under projected 2030 traffic conditions. For comparison purposes, the analysis includes a future year no-build scenario that contains only signal retiming with no geometry modifications and no signal system upgrade.

Key elements of the no-build scenario and the two alternatives are summarized below. Figures 5 and 6 show design alternatives as described below.

7.1 No-Build Scenario

The no-build alternative assumes that the intersections would remain the same as the existing conditions. The only improvement included is to retime and coordinate the signals.

7.2 Alternative One

Alternative One proposes to modify the layout of Turner Lane and upgrade the signal system for adding bicycle detection. Key elements of the alternative include

- closing off access to North Main Street from Turner Lane;
- installing an ADA-compliant, six-foot sidewalk at the existing access point from Turner Lane;
- installing a rectangular rapid flashing beacon (RRFB) at the easternmost mid-block crossing on Memorial Parkway to provide drivers with greater awareness of people crossing;
- retiming and coordinating the signals at both intersections;
- upgrading the signal system to include bicycle detection and new signal indications; and

- installing sharrows on North Main Street, Memorial Parkway, South Main Street, North Street, and Union Street for bicycle travel.

7.3 Alternative Two

Alternative Two proposes to modify the layout of Turner Lane and upgrade the signal system for adding bicycle detection. Key elements of the alternative include

- changing access to North Main Street from Turner Lane by creating a one-way, right-turn-only egress onto North Main Street;
- installing a crosswalk with ADA-compliant wheelchair ramps across the new egress from Turner Lane;
- installing an RRFB at the easternmost mid-block crossing on Memorial Parkway to provide drivers with greater awareness of people crossing;
- retiming and coordinating the signals at both intersections;
- upgrading the signal system to include bicycle detection and new signal indications; and
- installing sharrows on North Main Street, Memorial Parkway, South Main Street, North Street, and Union Street for bicycle travel.

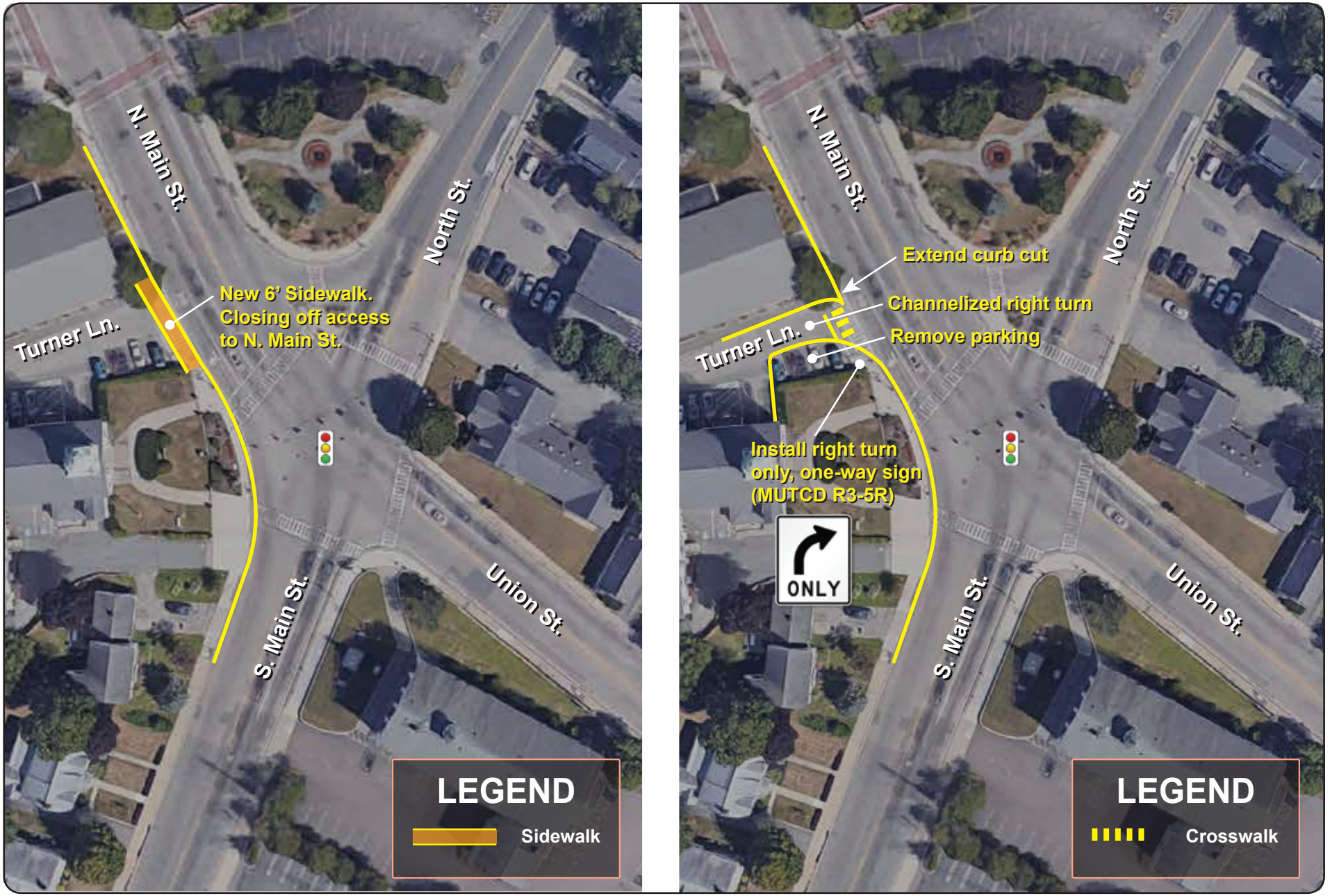

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FIGURE 5
Turner Lane
Design Alternatives

Safety and Operations at Selected Intersections
Town of Randolph

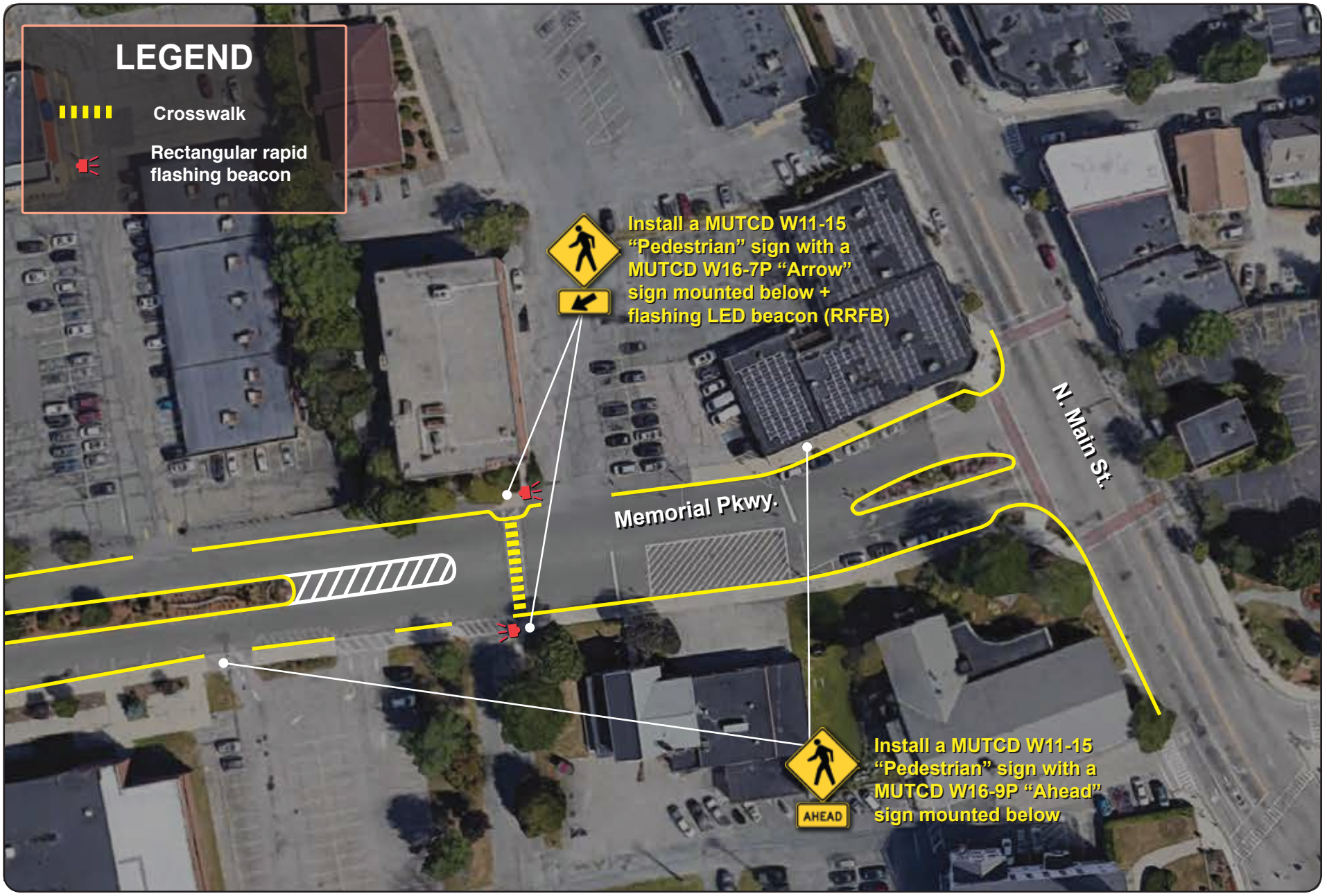

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FIGURE 6
Memorial Parkway
Mid-block Crossing Improvements

Safety and Operations at Selected Intersections
Town of Randolph

8 RECOMMENDATIONS

In this study, MPO staff performed a series of safety and operations analyses, identified issues and concerns, and proposed short- and long-term improvements for the intersection at Crawford Square and the intersection of Memorial Parkway and North Main Street. The proposed short-term improvements would enhance safety and operations for the intersections under the existing conditions. These improvements should be implemented as soon as resources are available from highway maintenance or local Chapter 90 funding.

The proposed long-term improvements would address the safety and operational problems at the intersections. The intersections urgently need retiming and coordination to operate at adequate levels. At this preliminary planning stage, after consulting with Town officials, staff recommend Alternative Two. However, both proposed alternatives should be included and further investigated at the functional design stage of project planning.

The Town of Randolph has jurisdiction of both intersections and shares jurisdiction of roadways in the study area with MassDOT. The Town should work with MassDOT to improve safety, mobility, connectivity, and operations of both intersections. There is the potential for the intersection at Crawford Square and adjacent roadways to better accommodate peak-hour traffic volumes and better serve people walking and biking through the center of Randolph, while reducing collisions. Improving safety and operations at these intersections is one essential component in remediating many of the existing issues in the study area.

This study gives the Town an opportunity to address the needs of each intersection and plan for design and engineering. The next steps would be to select the preferred alternative that is sensitive to the goals and needs of stakeholders and advance the project through the planning process. These steps will depend upon cooperation between MassDOT, the Town, and the MPO to begin MassDOT's project notification and review process and complete the project initiation form. After completing the initial steps, the Town and MassDOT can start preliminary design and work to have the project programmed in the Transportation Improvement Program. Project development is a process that takes transportation improvements from concept to construction and is influenced by factors such as financial limitations and agency programmatic commitments. (See Appendix D for an overview of this process.)

This study supports the MPO's visions and goals, which include increasing transportation safety, maintaining the transportation system, advancing mobility and access, reducing congestion, and expanding the opportunities for walking and bicycling, while making them safer. If implemented, the improvements proposed in this report would modernize the roadway and significantly improve safety and mobility of all users.

Appendix A: Crash Diagram Lookup Table

The Boston Region Metropolitan Planning Organization (MPO) operates its programs, services, and activities in compliance with federal nondiscrimination laws including Title VI of the Civil Rights Act of 1964 (Title VI), the Civil Rights Restoration Act of 1987, and related statutes and regulations. Title VI prohibits discrimination in federally assisted programs and requires that no person in the United States of America shall, on the grounds of race, color, or national origin (including limited English proficiency), be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination under any program or activity that receives federal assistance. Related federal nondiscrimination laws administered by the Federal Highway Administration, Federal Transit Administration, or both, prohibit discrimination on the basis of age, sex, and disability. The Boston Region MPO considers these protected populations in its Title VI Programs, consistent with federal interpretation and administration. In addition, the Boston Region MPO provides meaningful access to its programs, services, and activities to individuals with limited English proficiency, in compliance with U.S. Department of Transportation policy and guidance on federal Executive Order 13166.

The Boston Region MPO also complies with the Massachusetts Public Accommodation Law, M.G.L. c 272 sections 92a, 98, 98a, which prohibits making any distinction, discrimination, or restriction in admission to, or treatment in a place of public accommodation based on race, color, religious creed, national origin, sex, sexual orientation, disability, or ancestry. Likewise, the Boston Region MPO complies with the Governor's Executive Order 526, section 4, which requires that all programs, activities, and services provided, performed, licensed, chartered, funded, regulated, or contracted for by the state shall be conducted without unlawful discrimination based on race, color, age, gender, ethnicity, sexual orientation, gender identity or expression, religion, creed, ancestry, national origin, disability, veteran's status (including Vietnam-era veterans), or background.

A complaint form and additional information can be obtained by contacting the MPO or at http://www.bostonmpo.org/mpo_non_discrimination. To request this information in a different language or in an accessible format, please contact

Title VI Specialist
Boston Region MPO
10 Park Plaza, Suite 2150
Boston, MA 02116
civilrights@ctps.org

By Telephone:
857.702.3700 (voice)
For people with hearing or speaking difficulties, connect through the state MassRelay service:
Relay Using TTY or Hearing Carry-over: 800.439.2370
Relay Using Voice Carry-over: 866.887.6619
Relay Using Text to Speech: 866.645.9870

For more information, including numbers for Spanish speakers, visit https://www.mass.gov/massrelay.

APPENDIX A

Crash Diagram Lookup Table

Appendix A
Crash Data Lookup Table
MassDOT Crash Data 2015-2021

Index	Crash Date	Day	Time	Peak Hour	# Veh	# Injured	Crash Severity	Manner of Collision	Road Surface Conditions	Ambient Light Conditions	Weather Conditions	Vehicle Actions Prior Crash	Most Harmful Event	Driver Contributing Code
1	2015-01-08	Thu	9:47 AM	Peak	2	0	Property damage only	Angle	Dry	Daylight	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
2	2015-01-12	Mon	4:23 PM	Peak	2	1	Possible injury	Angle	Wet	Dark - lighted roadway	Rain	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic / Collision with ditch	Unknown
3	2015-01-23	Fri	6:33 PM	Off-peak	2	0	Property damage only	Rear-end	Dry	Dark - lighted roadway	Clear	Slowing or stopped in traffic	Collision with motor vehicle in traffic	No improper driving / Unknown
4	2015-01-26	Mon	12:20 PM	Off-peak	2	0	Property damage only	Rear-end	Dry	Daylight	Cloudy	Backing / Slowing or stopped in traffic	Collision with motor vehicle in traffic	Physical impairment / No improper driving
5	2015-02-11	Wed	11:35 AM	Off-peak	2	0	Property damage only	Rear-end	Snow	Daylight	Snow / Cloudy	Travelling straight ahead	Collision with motor vehicle in traffic	Driving too fast for conditions / No improper driving
6	2015-03-18	Wed	4:25 PM	Peak	2	0	Property damage only	Angle	Dry	Dawn	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
7	2015-06-22	Mon	10:58 AM	Off-peak	2	0	Property damage only	Sideswipe, opposite direction	Dry	Daylight	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Unknown
8	2015-06-30	Tue	2:01 PM	Off-peak	2	0	Property damage only	Angle	Dry	Daylight	Clear	Travelling straight ahead / Making U-turn	Collision with motor vehicle in traffic	No improper driving / Made an improper turn / Failed to yield right of way
9	2015-07-28	Tue	4:12 PM	Peak	2	0	Property damage only	Rear-end	Dry	Daylight	Clear	Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
10	2015-08-07	Fri	6:44 AM	Off-peak	2	1	Possible injury	Angle	Dry	Daylight	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
11	2015-08-07	Fri	8:00 AM	Peak	3	0	Property damage only	Rear-end	Dry	Daylight	Clear	Turning right / Travelling straight ahead	Collision with motor vehicle in traffic	No improper driving / Disregarded traffic signs, signals, road markings / Unknown
12	2015-08-09	Sun	12:53 AM	Off-peak	2	0	Property damage only	Angle	Dry	Dark - lighted roadway	Clear	Turning right / Travelling straight ahead	Collision with motor vehicle in traffic	No improper driving
13	2015-08-16	Sun	12:25 AM	Off-peak	2	0	Property damage only	Angle	Dry	Dark - lighted roadway	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Disregarded traffic signs, signals, road markings / Operating vehicle in erratic, reckless, careless, negligent or aggressive manner / No improper driving
14	2015-10-06	Tue	6:35 AM	Off-peak	1	1	Non-incapacitating	Single vehicle crash	Dry	Dawn	Clear	Travelling straight ahead	Collision with pedestrian	Failed to yield right of way
15	2015-11-02	Mon	3:18 PM	Peak	2	1	Non-incapacitating	Head-on	Dry	Daylight	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
16	2015-11-20	Fri	12:21 AM	Off-peak	2	0	Property damage only	Rear-end	Wet	Dark - lighted roadway	Rain	Slowing or stopped in traffic	Collision with motor vehicle in traffic	No improper driving / Visibility obstructed / Driving too fast for conditions
17	2015-12-03	Thu	1:14 AM	Off-peak	2	1	Possible injury	Unknown	Wet	Dark - lighted roadway	Rain	Slowing or stopped in traffic / Other	Collision with motor vehicle in traffic	Unknown
18	2015-12-06	Sun	2:06 AM	Off-peak	2	0	Property damage only	Rear-end	Dry	Dark - lighted roadway	Clear	Travelling straight ahead	Collision with motor vehicle in traffic	No improper driving / Followed too closely
19	2016-01-01	Fri	9:29 AM	Peak	1	0	Property damage only	Single vehicle crash	Dry	Daylight	Clear	Travelling straight ahead	Collision with tree	No improper driving
20	2016-01-05	Tue	8:10 PM	Off-peak	2	0	Property damage only	Rear-end	Dry	Dark - lighted roadway	Clear	Travelling straight ahead / Slowing or stopped in traffic	Collision with motor vehicle in traffic	No improper driving / Followed too closely
21	2016-01-13	Wed	5:39 PM	Peak	2	1	Possible injury	Sideswipe, opposite direction	Wet	Dark - lighted roadway	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffc	Unknown
22	2016-01-18	Mon	7:08 PM	Off-peak	2	0	Property damage only	Angle	Dry	Dark - lighted roadway	Clear	Turning right / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
23	2016-01-30	Sat	3:48 PM	Off-peak	2	0	Property damage only	Angle	Dry	Daylight	Clear	Turning right / Travelling straight ahead	Collision with motor vehicle in traffic	Disregarded traffic signs, signals, road markings / Operating vehicle in erratic, reckless, careless, negligent or aggressive manner / No improper driving
24	2016-02-05	Fri	7:01 PM	Off-peak	2	0	Property damage only	Sideswipe, same direction	Wet	Dark - lighted roadway	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving

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25	2016-03-02	Wed	3:50 PM	Peak	2	0	Property damage only	Sideswipe, same direction	Dry	Daylight	Clear	Travelling straight ahead / Changing lanes	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
26	2016-03-10	Thu	3:48 PM	Peak	2	0	Property damage only	Sideswipe, same direction	Dry	Daylight	Clear	Travelling straight ahead / Parked	Collision with parked motor vehicle	No improper driving
27	2016-03-19	Sat	9:23 PM	Off-peak	2	2	Non-incapacitating	Head-on	Dry	Dark - lighted roadway	Cloudy	Turning left / Travelling straight ahead	Collision with ditch	Failed to yield right of way / No improper driving
28	2016-03-30	Wed	7:38 AM	Peak	2	2	Possible injury	Angle	Dry	Daylight	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Unknown
29	2016-04-05	Tue	6:02 PM	Peak	2	0	Property damage only	Sideswipe, opposite direction	Dry	Daylight	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Unknown / Failed to yield right of way
30	2016-04-27	Wed	12:30 PM	Off-peak	2	0	Property damage only	Sideswipe, same direction	Dry	Daylight	Clear	Overtaking/passing / Slowing or stopped in traffic	Collision with motor vehicle in traffic	Failure to keep in proper lane or running off road / Operating defective equipment
31	2016-05-01	Sun	12:56 PM	Off-peak	2	3	Possible injury	Head-on	Dry	Daylight	Cloudy	Turning left / Travelling straight ahead	Reported but invalid / Collision with motor vehicle in traffic	Made an improper turn / No improper driving
32	2016-05-12	Thu	6:02 PM	Peak	2	0	Property damage only	Sideswipe, same dire	Dry	Daylight	Clear	Slowing or stopped in traffic / Parked	Collision with parked motor vehicle	No improper driving / Unknown
33	2016-05-13	Fri	4:47 AM	Off-peak	2	1	Possible injury	Angle	Dry	Dusk	Clear	Travelling straight ahead	Collision with motor vehicle in traffic	Unknown
34	2016-05-23	Mon	8:24 AM	Peak	2	0	Property damage only	Head-on	Dry	Daylight	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
35	2016-06-04	Sat	2:32 PM	Off-peak	1	0	Property damage only	Rear-end	Dry	Daylight	Clear	Travelling straight ahead	Collision with motor vehicle in traffic	No improper driving
36	2016-06-15	Wed	5:30 PM	Peak	2	0	Property damage only	Angle	Dry	Daylight	Clear	Travelling straight ahead	Collision with motor vehicle in traffic	No improper driving / Made an improper turn / Disregarded traffic signs, signals, road markings
37	2016-07-23	Sat	11:06 PM	Peak	2	1	Non-incapacitating	Angle	Dry	Dark - lighted roadway	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
38	2016-07-26	Tue	11:26 PM	Off-peak	1	1	Possible injury	Single vehicle crash	Dry	Dark - lighted roadway	Clear	Unknown	Collision with light pole or other post/support	Unknown
39	2016-08-20	Sat	2:18 AM	Off-peak	1	3	Non-incapacitating	Single vehicle crash	Dry	Dark - lighted roadway	Clear	Turning right	Collision with other fixed object (wall, building, tunnel, etc.)	Operating vehicle in erratic, reckless, careless, negligent or aggressive manner
40	2016-08-26	Fri	2:31 PM	Peak	2	0	Property damage only	Sideswipe, same direction	Wet	Daylight	Clear / Rain	Travelling straight ahead	Collision with motor vehicle in traffic	Unknown
41	2016-09-13	Tue	6:03 PM	Peak	2	0	Property damage only	Rear-end	Dry	Daylight	Clear	Travelling straight ahead / Slowing or stopped in traffic	Collision with motor vehicle in traffic	Inattention / No improper driving
42	2016-09-20	Tue	6:36 AM	Off-peak	2	0	Property damage only	Angle	Dry	Daylight	Clear	Entering traffic lane	Collision with ditch	Unknown
43	2016-10-14	Fri	12:30 PM	Off-peak	2	0	Property damage only	Rear-end	Dry	Daylight	Clear	Travelling straight ahead / Slowing or stopped in traffic	Collision with motor vehicle in traffic	No improper driving / Other improper action
44	2016-10-18	Tue	10:55 PM	Off-peak	1	1	Possible injury	Angle	Dry	Dark - lighted roadway	Clear	Turning left	Collision with motor vehicle in traffic	No improper driving
45	2016-11-14	Mon	9:29 AM	Peak	2	0	Property damage only	Angle	Dry	Daylight	Clear	Travelling straight ahead	Collision with motor vehicle in traffic	No improper driving / Disregarded traffic signs, signals, road markings
46	2016-12-17	Sat	2:45 PM	Off-peak	2	0	Property damage only	Sideswipe, same direction	Slush	Daylight	Cloudy / Rain	Travelling straight ahead / Changing lanes	Collision with motor vehicle in traffic	No improper driving / Inattention / Made an improper turn
47	2017-01-15	Sun	10:26 AM	Off-peak	2	0	Property damage only	Rear-end	Dry	Daylight	Clear	Travelling straight ahead / Slowing or stopped in traffic	Collision with motor vehicle in traffic	No improper driving
48	2017-01-26	Thu	9:29 PM	Off-peak	2	0	Property damage only	Angle	Dry	Dark - lighted roadway	Clear	Turning right / Changing lanes	Collision with motor vehicle in traffic	No improper driving / Failed to yield right of way / Failure to keep in proper lane or running off road
49	2017-01-27	Fri	5:27 PM	Peak	2	0	Property damage only	Sideswipe, same direction	Dry	Dark - lighted roadway	Clear	Travelling straight ahead	Collision with motor vehicle in traffic	Unknown

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50	2017-02-01	Wed	5:27 PM	Peak	2	0	Property damage only	Rear-end	Snow	Dark - lighted roadway	Snow	Travelling straight ahead / Slowing or stopped in traffic	Collision with pedestrian / Collision with motor vehicle in traffic	Inattention / No improper driving
51	2017-02-10	Fri	7:29 PM	Off-peak	2	1	Non-fatal injury	Rear-end	Wet	Dark - lighted roadway	Clear	Slowing or stopped in traffic	Collision with motor vehicle in traffic	No improper driving / Followed too closely
52	2017-02-28	Tue	8:30 AM	Peak	2	0	Property damage only	Angle	Dry	Daylight	Clear / Cloudy	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Unknown
53	2017-03-13	Mon	5:53 PM	Peak	2	0	Property damage only	Rear-end	Dry	Daylight	Clear	Travelling straight ahead / Slowing or stopped in traffic	Collision with motor vehicle in traffic	Inattention / No improper driving
54	2017-05-16	Tue	6:30 PM	Peak	2	7	Non-fatal injury	Head-on	Dry	Daylight	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
55	2017-07-08	Sat	10:45 AM	Peak	2	1	Non-fatal injury	Sideswipe, same direction	Dry	Daylight	Clear	Entering traffic lane / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
56	2017-07-25	Tue	3:50 PM	Peak	2	0	Property damage only	Sideswipe, same direction	Dry	Daylight	Clear	Travelling straight ahead	Collision with motor vehicle in traffic	No improper driving
57	2017-08-18	Fri	8:15 AM	Peak	2	0	Property damage only	Sideswipe, same direction	Dry	Daylight	Cloudy	Travelling straight ahead / Unknown	Collision with motor vehicle in traffic	Unknown
58	2017-09-08	Fri	2:28 PM	Peak	2	0	Property damage only	Angle	Dry	Daylight	Clear	Slowing or stopped in traffic / Turning left	Collision with motor vehicle in traffic	No improper driving / Other improper action
59	2017-09-09	Sat	2:30 PM	Off-peak	2	3	Non-fatal injury	Angle	Dry	Daylight	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
60	2017-10-13	Fri	12:42 PM	Off-peak	2	0	Property damage only	Rear-end	Dry	Daylight	Clear	Travelling straight ahead / Slowing or stopped in traffic	Collision with motor vehicle in traffic	Distracted / No improper driving
61	2017-11-06	Mon	3:00 PM	Peak	2	0	Property damage only	Rear-end	Dry	Daylight	Cloudy	Travelling straight ahead / Slowing or stopped in traffic	Collision with motor vehicle in traffic	No improper driving / Followed too closely
62	2017-11-11	Sat	6:21 PM	Off-peak	2	0	Property damage only	Rear-end	Dry	Dark - lighted roadway	Clear	Travelling straight ahead / Slowing or stopped in traffic	Collision with motor vehicle in traffic	No improper driving
63	2017-11-17	Fri	8:18 PM	Off-peak	2	0	Property damage only	Sideswipe, same direction	Dry	Dark - lighted roadway	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Unknown
64	2017-11-23	Thu	10:15 PM	Off-peak	2	2	Non-fatal injury	Angle	Dry	Dark - lighted roadway	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
65	2017-11-30	Thu	12:49 PM	Off-peak	2	0	Property damage only	Angle	Dry	Daylight	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
66	2017-12-20	Wed	5:09 PM	Peak	3	0	Property damage only	Rear-end	Dry	Dark - lighted roadway	Clear	Travelling straight ahead / Slowing or stopped in traffic	Collision with motor vehicle in traffic	No improper driving / Followed too closely
67	2017-12-30	Sat	12:30 PM	Peak	2	1	Non-fatal injury	Rear-end	Dry	Daylight	Cloudy	Travelling straight ahead / Slowing or stopped in traffic	Collision with motor vehicle in traffic	No improper driving / Followed too closely
68	2018-01-10	Wed	6:35 AM	Off-peak	2	1	Non-fatal injury	Angle	Dry	Daylight	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic / Collision with other movable object	No improper driving / Failed to yield right of way / Unknown
69	2018-01-11	Thu	5:14 PM	Peak	2	0	Property damage only	Sideswipe, same direction	Dry	Dark - lighted roadway	Clear	Travelling straight ahead / Slowing or stopped in traffic	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
70	2018-01-23	Tue	2:40 PM	Peak	2	0	Property damage only	Sideswipe, same direction	Dry	Daylight	Cloudy	Overtaking/passing / Slowing or stopped in traffic	Collision with motor vehicle in traffic	No improper driving / Unknown
71	2018-03-13	Tue	9:50 AM	Peak	2	1	Non-fatal injury	Angle	Snow	Daylight	Blowing sand, snow / Snow	Travelling straight ahead	Collision with motor vehicle in traffic	No improper driving / Visibility obstructed
72	2018-04-21	Sat	5:24 PM	Off-peak	2	2	Non-fatal injury	Rear-end	Dry	Daylight	Clear	Travelling straight ahead	Collision with motor vehicle in traffic	No improper driving / Unknown
73	2018-05-28	Mon	9:26 PM	Off-peak	3	3	Non-fatal injury	Rear-end	Dry	Dark - lighted roadway	Clear	Slowing or stopped in traffic	Collision with motor vehicle in traffic	No improper driving / Followed too closely
74	2018-06-28	Thu	9:50 AM	Peak	2	0	Property damage only	Angle	Wet	Daylight	Rain	Turning right / Slowing or stopped in traffic	Collision with motor vehicle in traffic	No improper driving
75	2018-07-28	Sat	11:20 AM	Peak	2	0	Property damage only	Angle	Dry	Daylight	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving

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76	2018-09-21	Fri	5:45 AM	Off-peak	2	0	Property damage only	Sideswipe, same direction	Dry	Dark - lighted roadway	Clear	Turning left	Collision with motor vehicle in traffic	No improper driving / Made an improper turn / Failed to yield right of way
77	2018-10-05	Fri	7:13 PM	Off-peak	2	0	Property damage only	Head-on	Dry	Dark - lighted roadway	Cloudy	No improper driving / Failed to yield right of way	Collision with motor vehicle in traffic	No improper driving
78	2018-10-23	Tue	5:42 PM	Peak	2	0	Property damage only	Head-on	Dry	Dusk	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	No improper driving / Visibility obstructed
79	2018-11-08	Thu	6:53 AM	Off-peak	2	1	Non-fatal injury	Head-on	Dry	Daylight	Cloudy	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
80	2018-11-30	Fri	2:45 PM	Peak	2	0	Property damage only	Rear-end	Dry	Daylight	Cloudy	Slowing or stopped in traffic	Collision with motor vehicle in traffic	No improper driving
81	2018-12-07	Fri	4:43 PM	Peak	2	0	Property damage only	Sideswipe, same direction	Dry	Dark - lighted roadway	Clear	Turning left	Collision with motor vehicle in traffic	Made an improper turn / No improper driving
82	2019-01-04	Fri	8:03 PM	Off-peak	2	0	Property damage only	Angle	Dry	Dark - lighted roadway	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / Unknown
83	2019-02-05	Tue	10:29 AM	Off-peak	2	0	Property damage only	Sideswipe, same direction	Wet	Daylight	Clear / Cloudy	Travelling straight ahead	Collision with motor vehicle in traffic	Failure to keep in proper lane or running off road / No improper driving
84	2019-02-14	Thu	2:13 PM	Off-peak	1	0	Property damage only	Single vehicle crash	Dry	Daylight	Clear	Turning right	Collision with light pole or other post/support	Failure to keep in proper lane or running off road
85	2019-02-20	Wed	4:04 PM	Peak	2	0	Property damage only	Sideswipe, opposite direction	Dry	Daylight	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
86	2019-03-23	Sat	12:01 AM	Off-peak	1	1	Non-fatal injury	Single vehicle crash	Dry	Dark - lighted roadway	Clear	Travelling straight ahead	Collision with light pole or other post/support	Fatigued/asleep
87	2019-04-01	Mon	9:17 AM	Peak	2	0	Property damage only	Head-on	Dry	Daylight	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
88	2019-04-09	Tue	8:13 PM	Off-peak	3	0	Property damage only	Head-on	Wet	Dark - lighted roadway	Rain	Slowing or stopped in traffic / Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
89	2019-04-10	Wed	7:05 PM	Off-peak	2	0	Property damage only	Sideswipe, same direction	Dry	Daylight	Cloudy	Travelling straight ahead / Slowing or stopped in traffic	Collision with motor vehicle in traffic	Failure to keep in proper lane or running off road / No improper driving
90	2019-05-15	Wed	12:00 AM	Off-peak	2	0	Property damage only	Angle	Dry	Daylight	Clear	Turning right	Collision with motor vehicle in traffic	Failure to keep in proper lane or running off road / No improper driving
91	2019-05-17	Fri	5:21 PM	Peak	2	0	Property damage only	Sideswipe, same direction	Wet	Daylight	Clear	Turning left	Collision with motor vehicle in traffic	No improper driving / Made an improper turn/ Failure to keep in proper lane or running off road
92	2019-06-07	Fri	5:54 PM	Peak	2	0	Property damage only	Rear-end	Dry	Daylight	Clear	Backing / Slowing or stopped in traffic	Collision with motor vehicle in traffic	No improper driving / Inattention / Other improper action
93	2019-07-02	Tue	9:10 AM	Peak	2	0	Property damage only	Sideswipe, same direction		Daylight	Cloudy	Travelling straight ahead / Slowing or stopped in traffic	Collision with motor vehicle in traffic	No improper driving
94	2019-08-20	Tue	5:00 PM	Peak	2	0	Property damage only	Rear-end	Dry	Daylight	Clear	Travelling straight ahead / Slowing or stopped in traffic	Collision with motor vehicle in traffic	No improper driving / Followed too closely
95	2019-08-22	Thu	7:12 PM	Off-peak	2	1	Non-fatal injury	Angle	Dry	Daylight	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
96	2019-09-11	Wed	6:16 PM	Peak	2	0	Property damage only	Sideswipe, same direction	Dry	Daylight	Clear	Travelling straight ahead	Collision with motor vehicle in traffic	Failure to keep in proper lane or running off road / No improper driving
97	2019-10-04	Fri	8:39 AM	Peak	3	1	Non-fatal injury	Sideswipe, same direction	Dry	Daylight	Clear	Travelling straight ahead / Turning right / Changing lanes	Collision with motor vehicle in traffic	Failure to keep in proper lane or running off road / No improper driving
98	2019-10-04	Fri	8:30 AM	Peak	2	2	Non-fatal injury	Rear-end	Dry	Daylight	Clear	Travelling straight ahead	Collision with motor vehicle in traffic	Unknown
99	2019-10-07	Mon	1:12 PM	Off-peak	2	1	Non-fatal injury	Rear-end	Dry	Daylight	Cloudy	Travelling straight ahead / Slowing or stopped in traffic	Collision with motor vehicle in traffic	Followed too closely / Over-correcting/over-steering / No improper driving
100	2019-10-19	Sat	9:28 PM	Off-peak	2	0	Property damage only	Rear-end	Dry	Dark - lighted roadway	Clear	Travelling straight ahead / Slowing or stopped in traffic	Collision with motor vehicle in traffic	Unknown / Inattention / No improper driving
101	2019-10-20	Sun	2:12 PM	Off-peak	2	1	Non-fatal injury	Angle	Dry	Daylight	Clear	Travelling straight ahead	Collision with motor vehicle in traffic	No improper driving / Disregarded traffic signs, signals, road markings
102	2019-11-15	Fri	7:13 AM	Peak	1	1	Non-fatal injury	Single vehicle crash	Dry	Daylight	Clear	Turning left	Collision with utility pole	Illness

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103	2019-11-20	Wed	6:04 AM	Off-peak	2	0	Property damage only	Angle	Wet	Dawn	Rain / Cloudy	Turning left / Travelling straight ahead	Collision with ditch	Unknown
104	2019-12-07	Sat	7:41 PM	Off-peak	1	1	Non-fatal injury	Head-on	Dry	Dark - lighted roadway	Clear	Travelling straight ahead	Collision with pedestrian	Failed to yield right of way
105	2020-01-03	Fri	10:48 PM	Off-peak	2	0	Property damage only	Rear-end	Wet	Dark - lighted roadway	Clear	Backing / Slowing or stopped in traffic	Collision with motor vehicle in traffic	No improper driving
106	2020-02-12	Wed	3:30 PM	Peak	2	5	Non-fatal injury	Angle	Wet	Daylight	Rain / Cloudy	Entering traffic lane / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
107	2020-02-17	Mon	2:20 PM	Off-peak	2	0	Property damage only	Angle	Dry	Daylight	Clear	No improper driving / Failed to yield right of way	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
108	2020-05-19	Tue	11:10 AM	Off-peak	2	0	Property damage only	Sideswipe, same direction	Dry	Daylight	Clear	Travelling straight ahead	Collision with motor vehicle in traffic	Unknown
109	2020-06-05	Fri	3:00 PM	Peak	2	0	Property damage only	Angle	Dry	Daylight	Clear	Travelling straight ahead / Changing lanes	Collision with motor vehicle in traffic	No improper driving / Failed to yield right of way / Failure to keep in proper lane or running off road
110	2020-07-02	Thu	3:16 PM	Peak	2	0	Property damage only	Angle	Dry	Daylight	Clear	No improper driving / Failed to yield right of way	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
111	2020-08-23	Sun	9:09 PM	Off-peak	2	2	Non-fatal injury	Angle	Wet	Dark - lighted roadway	Rain / Cloudy	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
112	2020-09-20	Sun	1:47 PM	Off-peak	3	1	Non-fatal injury	Rear-end	Dry	Daylight	Clear	Travelling straight ahead / Slowing or stopped in traffic	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
113	2020-10-22	Thu	2:20 PM	Off-peak	2	2	Non-fatal injury	Rear-end	Dry	Daylight	Clear	Travelling straight ahead	Collision with motor vehicle in traffic	No improper driving / Followed too closely / Distracted
114	2020-11-05	Thu	6:02 PM	Peak	3	0	Property damage only	Rear-end	Dry	Dark - lighted roadway	Clear	Travelling straight ahead / Slowing or stopped in traffic	Collision with motor vehicle in traffic	Inattention / No improper driving
115	2020-11-13	Fri	9:11 PM	Off-peak	2	2	Non-fatal injury	Angle	Wet	Dark - lighted roadway	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
116	2020-12-05	Sat	12:06 PM	Peak	2	0	Property damage only	Rear-end	Wet	Daylight	Rain / Cloudy	Travelling straight ahead / Slowing or stopped in traffic	Collision with motor vehicle in traffic	No improper driving
117	2020-12-16	Wed	9:48 PM	Off-peak	2	1	Non-fatal injury	Head-on	Snow	Dawn	Snow	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
118	2021-02-20	Sat	11:37 PM	Off-peak	2	0	Property damage only	Angle	Wet	Dark - lighted roadway	Snow / Sleet, hail (freezing rain or drizzle)	Travelling straight ahead	Collision with motor vehicle in traffic	Unknown
119	2021-03-25	Thu	6:11 PM	Peak	2	0	Property damage only	Sideswipe, same direction	Dry	Daylight	Clear	Travelling straight ahead	Collision with motor vehicle in traffic	No improper driving
120	2021-04-21	Wed	8:22 PM	Off-peak	2	0	Property damage only	Sideswipe, opposite direction	Wet	Dark - lighted roadway	Rain	Disregarded traffic digns, signals, road markings / No improper driving	Collision with ditch	No improper driving / Unknown
121	2021-05-31	Mon	12:53 AM	Off-peak	2	1	Non-fatal injury	Angle	Wet	Dark - lighted roadway	Rain	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
122	2021-06-14	Mon	11:03 PM	Off-peak	2	0	Property damage only	Head-on	Dry	Dark - lighted roadway	Clear	Turning left / Travelling straight ahead	Collision with motor vehicle in traffic	Failed to yield right of way / No improper driving
123	2021-07-05	Mon	6:50 PM	Off-peak	2	2	Non-fatal injury	Rear-end	Dry	Daylight	Clear	Travelling straight ahead / Slowing or stopped in traffic	Collision with motor vehicle in traffic	No improper driving / Inattention / Other improper action
124	2021-07-15	Thu	10:53 AM	Off-peak	2	1	Non-fatal injury	Angle	Dry	Daylight	Clear	Travelling straight ahead	Collision with motor vehicle in traffic	No improper driving / Disregarded traffic signs, signals, road markings
125	2021-08-07	Sat	6:20 PM	Off-peak	2	0	Property damage only	Angle	Dry	Daylight	Clear	Slowing or stopped in traffic / Turning left	Collision with motor vehicle in traffic	No improper driving

APPENDIX B

Intersection Capacity Analyses
2022 Adjusted AM & PM Peak Hours

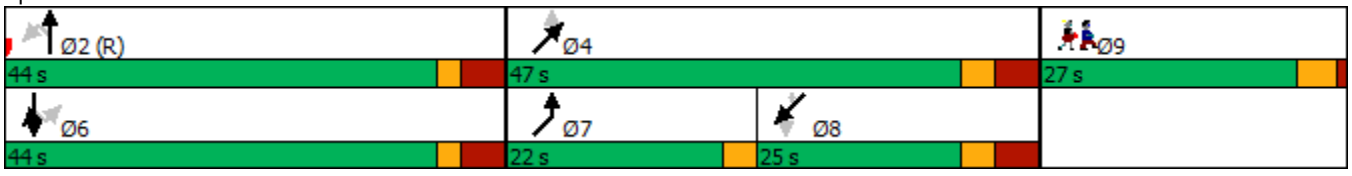
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	30	731	52	14	391	229	312	296	44	37	126	69
Future Volume (vph)	30	731	52	14	391	229	312	296	44	37	126	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor												
Frt		0.990				0.850		0.980				0.850
Flt Protected		0.998			0.998		0.950				0.989	
Satd. Flow (prot)	0	3333	0	0	3336	1495	1719	1773	0	0	3246	1468
Flt Permitted		0.919			0.850		0.538				0.769	
Satd. Flow (perm)	0	3070	0	0	2841	1495	974	1773	0	0	2524	1468
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				244		7				97
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		360			280			600			451	
Travel Time (s)		8.2			6.4			13.6			10.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.94	0.94	0.94	0.85	0.85	0.85	0.83	0.83	0.83
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	8%	8%	8%	5%	5%	5%	10%	10%	10%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	32	786	56	15	416	244	367	348	52	45	152	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	874	0	0	431	244	367	400	0	0	197	83
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		60	60		9	15		9
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		Perm	NA	Perm
Protected Phases		2			6	6	7	4			8	
Permitted Phases	2			6			4			8		8
Detector Phase	2	2		6	6	6	7	4		8	8	8
Switch Phase												
Minimum Initial (s)	38.0	38.0		38.0	38.0	38.0	15.0	30.0		15.0	15.0	15.0
Minimum Split (s)	44.0	44.0		44.0	44.0	44.0	22.0	37.0		22.0	22.0	22.0
Total Split (s)	44.0	44.0		44.0	44.0	44.0	22.0	47.0		25.0	25.0	25.0
Total Split (%)	37.3%	37.3%		37.3%	37.3%	37.3%	18.6%	39.8%		21.2%	21.2%	21.2%

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	6.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	23%

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Yellow Time (s)	2.0	2.0		2.0	2.0	2.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	4.0	4.0		4.0	4.0	4.0	0.0	4.0		4.0	4.0	4.0
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)		6.0			6.0	6.0	3.0	7.0			7.0	7.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	Max	Max		Max	Max	Max	Max	Max		Max	Max	Max
Act Effct Green (s)		38.0			38.0	38.0	44.0	40.0			18.0	18.0
Actuated g/C Ratio		0.32			0.32	0.32	0.37	0.34			0.15	0.15
v/c Ratio		0.88			0.47	0.38	0.76	0.66			0.51	0.27
Control Delay		49.2			34.1	5.4	41.6	38.9			51.2	8.8
Queue Delay		0.0			2.6	0.9	0.0	0.0			0.0	0.0
Total Delay		49.2			36.7	6.3	41.6	38.9			51.2	8.8
LOS		D			D	A	D	D			D	A
Approach Delay		49.2			25.7			40.2			38.7	
Approach LOS		D			C			D			D	
Queue Length 50th (ft)		327			137	0	221	254			73	0
Queue Length 95th (ft)		#442			187	57	297	338			103	28
Internal Link Dist (ft)		280			200			520			371	
Turn Bay Length (ft)												
Base Capacity (vph)		992			914	646	483	605			385	306
Starvation Cap Reductn		0			354	192	0	0			0	0
Spillback Cap Reductn		0			0	0	0	0			0	0
Storage Cap Reductn		0			0	0	0	0			0	0
Reduced v/c Ratio		0.88			0.77	0.54	0.76	0.66			0.51	0.27

Intersection Summary			
Area Type:	Other		
Cycle Length: 118			
Actuated Cycle Length: 118			
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green, Master Intersection			
Natural Cycle: 115			
Control Type: Pretimed			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 39.3		Intersection LOS: D	
Intersection Capacity Utilization 98.1%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: S Main St/North St & Union St



Lane Group	Ø9
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	Max
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

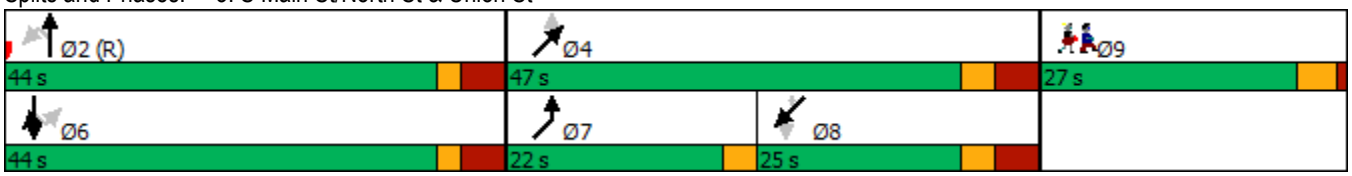
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	38	528	38	30	712	342	239	189	54	78	338	94
Future Volume (vph)	38	528	38	30	712	342	239	189	54	78	338	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor												
Frt		0.991				0.850		0.967				0.850
Flt Protected		0.997			0.998		0.950				0.991	
Satd. Flow (prot)	0	3430	0	0	3498	1568	1752	1784	0	0	3440	1553
Flt Permitted		0.715			0.848		0.216				0.823	
Satd. Flow (perm)	0	2460	0	0	2972	1568	398	1784	0	0	2857	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				376		13				104
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		360			280			600			451	
Travel Time (s)		8.2			6.4			13.6			10.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.91	0.91	0.91	0.88	0.88	0.88	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	3%	3%	3%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	41	574	41	33	782	376	272	215	61	87	376	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	656	0	0	815	376	272	276	0	0	463	104
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		60	60		9	15		9
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		Perm	NA	Perm
Protected Phases		2			6	6	7	4			8	
Permitted Phases	2			6			4			8		8
Detector Phase	2	2		6	6	6	7	4		8	8	8
Switch Phase												
Minimum Initial (s)	38.0	38.0		38.0	38.0	38.0	15.0	30.0		15.0	15.0	15.0
Minimum Split (s)	44.0	44.0		44.0	44.0	44.0	22.0	37.0		25.0	25.0	25.0
Total Split (s)	44.0	44.0		44.0	44.0	44.0	22.0	47.0		25.0	25.0	25.0
Total Split (%)	37.3%	37.3%		37.3%	37.3%	37.3%	18.6%	39.8%		21.2%	21.2%	21.2%

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	6.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	23%

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Yellow Time (s)	2.0	2.0		2.0	2.0	2.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	4.0	4.0		4.0	4.0	4.0	0.0	4.0		4.0	4.0	4.0
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)		6.0			6.0	6.0	3.0	7.0			7.0	7.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	Max	Max		Max	Max	Max	Max	Max		Max	Max	Max
Act Effct Green (s)		38.0			38.0	38.0	44.0	40.0			18.0	18.0
Actuated g/C Ratio		0.32			0.32	0.32	0.37	0.34			0.15	0.15
v/c Ratio		0.82			0.85	0.50	0.74	0.45			1.06	0.32
Control Delay		46.6			47.4	5.4	41.2	31.8			109.0	11.3
Queue Delay		0.0			49.9	1.1	0.0	0.0			0.0	0.0
Total Delay		46.6			97.3	6.5	41.2	31.8			109.0	11.3
LOS		D			F	A	D	C			F	B
Approach Delay		46.6			68.6			36.5			91.1	
Approach LOS		D			E			D			F	
Queue Length 50th (ft)		239			304	0	152	155			~204	0
Queue Length 95th (ft)		#320			#394	68	#227	229			#312	50
Internal Link Dist (ft)		280			200			520			371	
Turn Bay Length (ft)												
Base Capacity (vph)		796			957	759	366	613			435	325
Starvation Cap Reductn		0			329	190	0	0			0	0
Spillback Cap Reductn		0			0	0	0	0			0	0
Storage Cap Reductn		0			0	0	0	0			0	0
Reduced v/c Ratio		0.82			1.30	0.66	0.74	0.45			1.06	0.32

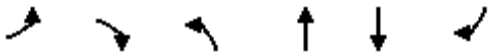
Intersection Summary			
Area Type:	Other		
Cycle Length: 118			
Actuated Cycle Length: 118			
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green, Master Intersection			
Natural Cycle: 120			
Control Type: Pretimed			
Maximum v/c Ratio: 1.06			
Intersection Signal Delay: 62.1		Intersection LOS: E	
Intersection Capacity Utilization 98.9%		ICU Level of Service F	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: S Main St/North St & Union St



Lane Group	Ø9
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	Max
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

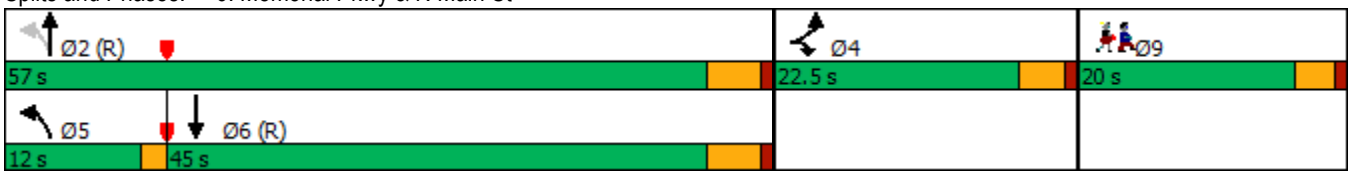


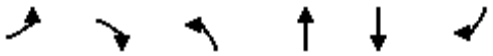
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Lane Configurations							
Traffic Volume (vph)	131	169	167	908	475	41	
Future Volume (vph)	131	169	167	908	475	41	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	
Grade (%)	0%			0%	0%		
Storage Length (ft)	0	0	0			0	
Storage Lanes	1	1	0			0	
Taper Length (ft)	25		25				
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	
Ped Bike Factor							
Frt		0.850			0.988		
Flt Protected	0.950			0.992			
Satd. Flow (prot)	1752	1568	0	3443	3272	0	
Flt Permitted	0.950			0.675			
Satd. Flow (perm)	1752	1568	0	2343	3272	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)		225			11		
Link Speed (mph)	30			30	30		
Link Distance (ft)	589			280	457		
Travel Time (s)	13.4			6.4	10.4		
Confl. Peds. (#/hr)							
Confl. Bikes (#/hr)							
Peak Hour Factor	0.75	0.75	0.94	0.94	0.92	0.92	
Growth Factor	100%	100%	100%	100%	100%	100%	
Heavy Vehicles (%)	3%	3%	4%	4%	9%	9%	
Bus Blockages (#/hr)	0	0	0	0	0	0	
Parking (#/hr)							
Mid-Block Traffic (%)	0%			0%	0%		
Adj. Flow (vph)	175	225	178	966	516	45	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	175	225	0	1144	561	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Turn Type	Prot	Prot	pm+pt	NA	NA		
Protected Phases	4	4	5	2	6		9
Permitted Phases			2				
Detector Phase	4	4	5	2	6		
Switch Phase							
Minimum Initial (s)	12.0	12.0	7.5	52.0	15.0		5.0
Minimum Split (s)	16.5	16.5	12.0	57.0	20.0		20.0
Total Split (s)	22.5	22.5	12.0	57.0	45.0		20.0
Total Split (%)	22.6%	22.6%	12.1%	57.3%	45.2%		20%

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Yellow Time (s)	3.5	3.5	2.0	4.0	4.0		3.0
All-Red Time (s)	1.0	1.0	0.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	4.5	4.5		5.0	5.0		
Lead/Lag			Lead		Lag		
Lead-Lag Optimize?			Yes		Yes		
Recall Mode	Max	Max	Max	Max	Max		Max
Act Effct Green (s)	18.0	18.0		52.0	40.0		
Actuated g/C Ratio	0.18	0.18		0.52	0.40		
v/c Ratio	0.55	0.48		0.88	0.42		
Control Delay	44.6	8.7		29.2	22.2		
Queue Delay	0.0	0.0		47.9	0.0		
Total Delay	44.6	8.7		77.2	22.2		
LOS	D	A		E	C		
Approach Delay	24.4			77.2	22.2		
Approach LOS	C			E	C		
Queue Length 50th (ft)	102	0		260	129		
Queue Length 95th (ft)	139	30		#344	176		
Internal Link Dist (ft)	509			200	377		
Turn Bay Length (ft)							
Base Capacity (vph)	316	467		1301	1321		
Starvation Cap Reductn	0	0		395	0		
Spillback Cap Reductn	0	0		0	0		
Storage Cap Reductn	0	0		0	0		
Reduced v/c Ratio	0.55	0.48		1.26	0.42		

Intersection Summary			
Area Type:	Other		
Cycle Length: 99.5			
Actuated Cycle Length: 99.5			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 95			
Control Type: Pretimed			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 52.5		Intersection LOS: D	
Intersection Capacity Utilization 79.9%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: Memorial Pkwy & N Main St



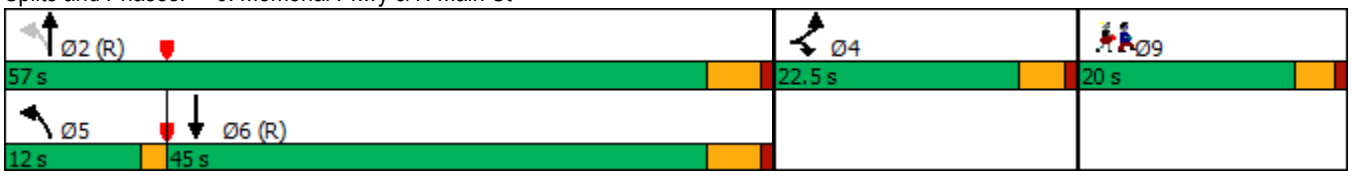


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Lane Configurations							
Traffic Volume (vph)	143	277	177	666	771	30	
Future Volume (vph)	143	277	177	666	771	30	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	
Grade (%)	0%			0%	0%		
Storage Length (ft)	0	0	0			0	
Storage Lanes	1	1	0			0	
Taper Length (ft)	25		25				
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	
Ped Bike Factor							
Frt		0.850			0.994		
Flt Protected	0.950			0.990			
Satd. Flow (prot)	1787	1599	0	3470	3518	0	
Flt Permitted	0.950			0.534			
Satd. Flow (perm)	1787	1599	0	1872	3518	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)		351			5		
Link Speed (mph)	30			30	30		
Link Distance (ft)	589			280	457		
Travel Time (s)	13.4			6.4	10.4		
Confl. Peds. (#/hr)							
Confl. Bikes (#/hr)							
Peak Hour Factor	0.79	0.79	0.91	0.91	0.89	0.89	
Growth Factor	100%	100%	100%	100%	100%	100%	
Heavy Vehicles (%)	1%	1%	3%	3%	2%	2%	
Bus Blockages (#/hr)	0	0	0	0	0	0	
Parking (#/hr)							
Mid-Block Traffic (%)	0%			0%	0%		
Adj. Flow (vph)	181	351	195	732	866	34	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	181	351	0	927	900	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Turn Type	Prot	Prot	pm+pt	NA	NA		
Protected Phases	4	4	5	2	6		9
Permitted Phases			2				
Detector Phase	4	4	5	2	6		
Switch Phase							
Minimum Initial (s)	12.0	12.0	10.0	52.0	15.0		5.0
Minimum Split (s)	16.5	16.5	12.0	57.0	20.0		20.0
Total Split (s)	22.5	22.5	12.0	57.0	45.0		20.0
Total Split (%)	22.6%	22.6%	12.1%	57.3%	45.2%		20%

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Yellow Time (s)	3.5	3.5	2.0	4.0	4.0		3.0
All-Red Time (s)	1.0	1.0	0.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	4.5	4.5		5.0	5.0		
Lead/Lag			Lead		Lag		
Lead-Lag Optimize?			Yes		Yes		
Recall Mode	Max	Max	Max	Max	Max		Max
Act Effct Green (s)	18.0	18.0		52.0	40.0		
Actuated g/C Ratio	0.18	0.18		0.52	0.40		
v/c Ratio	0.56	0.61		0.85	0.64		
Control Delay	44.7	9.0		27.4	26.2		
Queue Delay	0.0	0.0		48.9	0.0		
Total Delay	44.7	9.0		76.4	26.2		
LOS	D	A		E	C		
Approach Delay	21.2			76.4	26.2		
Approach LOS	C			E	C		
Queue Length 50th (ft)	106	0		192	235		
Queue Length 95th (ft)	151	40		#252	297		
Internal Link Dist (ft)	509			200	377		
Turn Bay Length (ft)							
Base Capacity (vph)	323	576		1090	1417		
Starvation Cap Reductn	0	0		309	0		
Spillback Cap Reductn	0	0		0	0		
Storage Cap Reductn	0	0		0	0		
Reduced v/c Ratio	0.56	0.61		1.19	0.64		

Intersection Summary			
Area Type:	Other		
Cycle Length: 99.5			
Actuated Cycle Length: 99.5			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 95			
Control Type: Pretimed			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 44.8		Intersection LOS: D	
Intersection Capacity Utilization 87.7%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: Memorial Pkwy & N Main St



APPENDIX C

Intersection Capacity Analyses
No Build and Alternative Scenarios
2030 AM & PM Peak Hours

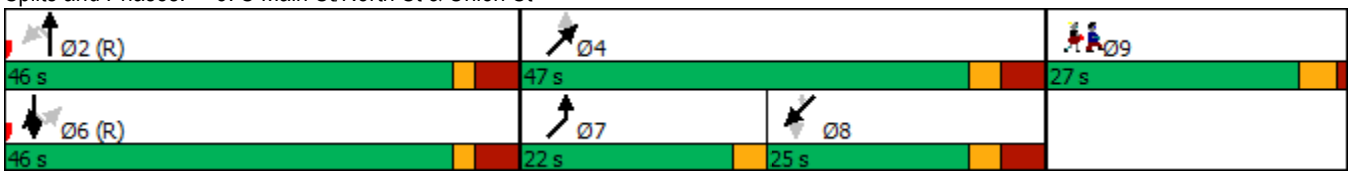
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	30	736	52	14	394	231	314	298	44	37	127	69
Future Volume (vph)	30	736	52	14	394	231	314	298	44	37	127	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor												
Frt		0.990				0.850		0.981				0.850
Flt Protected		0.998			0.998		0.950				0.989	
Satd. Flow (prot)	0	3333	0	0	3336	1495	1719	1775	0	0	3246	1468
Flt Permitted		0.921			0.912		0.539				0.769	
Satd. Flow (perm)	0	3076	0	0	3048	1495	975	1775	0	0	2524	1468
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				246		7				95
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		360			280			600			451	
Travel Time (s)		8.2			6.4			13.6			10.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.94	0.94	0.94	0.85	0.85	0.85	0.83	0.83	0.83
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	8%	8%	8%	5%	5%	5%	10%	10%	10%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	32	791	56	15	419	246	369	351	52	45	153	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	879	0	0	434	246	369	403	0	0	198	83
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		Perm	NA	Perm
Protected Phases		2			6	6	7	4			8	
Permitted Phases	2			6			4			8		8
Detector Phase	2	2		6	6	6	7	4		8	8	8
Switch Phase												
Minimum Initial (s)	38.0	38.0		38.0	38.0	38.0	15.0	30.0		15.0	15.0	15.0
Minimum Split (s)	44.0	44.0		44.0	44.0	44.0	22.0	37.0		25.0	25.0	25.0
Total Split (s)	46.0	46.0		46.0	46.0	46.0	22.0	47.0		25.0	25.0	25.0
Total Split (%)	38.3%	38.3%		38.3%	38.3%	38.3%	18.3%	39.2%		20.8%	20.8%	20.8%

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	6.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	23%

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Yellow Time (s)	2.0	2.0		2.0	2.0	2.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	4.0	4.0		4.0	4.0	4.0	0.0	4.0		4.0	4.0	4.0
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)		6.0			6.0	6.0	3.0	7.0			7.0	7.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	Max		Max	Max	Max
Act Effct Green (s)		67.0			67.0	67.0	44.0	40.0			18.2	18.2
Actuated g/C Ratio		0.56			0.56	0.56	0.37	0.33			0.15	0.15
v/c Ratio		0.51			0.26	0.26	0.78	0.68			0.52	0.27
Control Delay		17.6			12.6	2.8	44.0	40.6			52.4	9.4
Queue Delay		0.0			0.6	0.6	0.0	0.0			0.0	0.0
Total Delay		17.6			13.1	3.4	44.0	40.6			52.4	9.4
LOS		B			B	A	D	D			D	A
Approach Delay		17.6			9.6			42.2			39.7	
Approach LOS		B			A			D			D	
Queue Length 50th (ft)		210			86	31	229	263			75	0
Queue Length 95th (ft)		264			132	53	306	348			106	29
Internal Link Dist (ft)		280			200			520			371	
Turn Bay Length (ft)												
Base Capacity (vph)		1720			1701	943	475	596			382	302
Starvation Cap Reductn		0			853	394	0	0			0	0
Spillback Cap Reductn		0			0	0	0	0			0	0
Storage Cap Reductn		0			0	0	0	0			0	0
Reduced v/c Ratio		0.51			0.51	0.45	0.78	0.68			0.52	0.27

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 25.2		Intersection LOS: C	
Intersection Capacity Utilization 98.3%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 3: S Main St/North St & Union St



Lane Group	Ø9
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

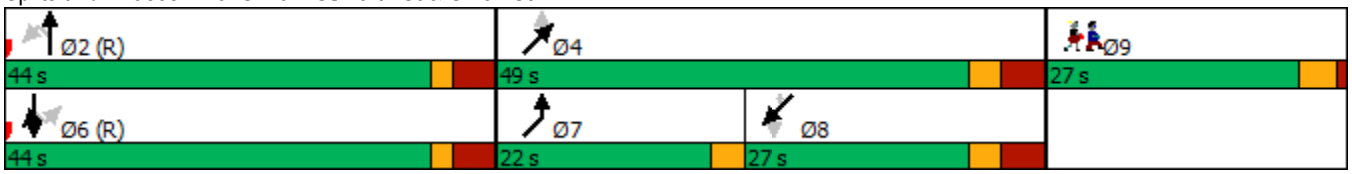
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	38	531	38	30	716	344	240	190	54	79	340	94
Future Volume (vph)	38	531	38	30	716	344	240	190	54	79	340	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor												
Frt		0.991				0.850		0.967				0.850
Flt Protected		0.997			0.998		0.950				0.991	
Satd. Flow (prot)	0	3333	0	0	3336	1495	1719	1750	0	0	3252	1468
Flt Permitted		0.848			0.901		0.211				0.817	
Satd. Flow (perm)	0	2835	0	0	3012	1495	382	1750	0	0	2681	1468
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				366		13				113
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		360			280			600			451	
Travel Time (s)		8.2			6.4			13.6			10.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.94	0.94	0.94	0.85	0.85	0.85	0.83	0.83	0.83
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	8%	8%	8%	5%	5%	5%	10%	10%	10%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	41	571	41	32	762	366	282	224	64	95	410	113
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	653	0	0	794	366	282	288	0	0	505	113
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		Perm	NA	Perm
Protected Phases		2			6	6	7	4			8	
Permitted Phases	2			6			4			8		8
Detector Phase	2	2		6	6	6	7	4		8	8	8
Switch Phase												
Minimum Initial (s)	38.0	38.0		38.0	38.0	38.0	15.0	30.0		15.0	15.0	15.0
Minimum Split (s)	44.0	44.0		44.0	44.0	44.0	22.0	37.0		25.0	25.0	25.0
Total Split (s)	44.0	44.0		44.0	44.0	44.0	22.0	49.0		27.0	27.0	27.0
Total Split (%)	36.7%	36.7%		36.7%	36.7%	36.7%	18.3%	40.8%		22.5%	22.5%	22.5%

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	6.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	23%

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Yellow Time (s)	2.0	2.0		2.0	2.0	2.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	4.0	4.0		4.0	4.0	4.0	0.0	4.0		4.0	4.0	4.0
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)		6.0			6.0	6.0	3.0	7.0			7.0	7.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	Max		Max	Max	Max
Act Effct Green (s)		65.0			65.0	65.0	46.0	42.0			21.0	21.0
Actuated g/C Ratio		0.54			0.54	0.54	0.38	0.35			0.18	0.18
v/c Ratio		0.42			0.49	0.37	0.81	0.46			1.08	0.32
Control Delay		17.3			16.2	2.9	47.0	31.8			111.4	10.6
Queue Delay		0.0			0.8	0.5	0.0	0.0			0.0	0.0
Total Delay		17.3			17.0	3.4	47.0	31.8			111.4	10.6
LOS		B			B	A	D	C			F	B
Approach Delay		17.3			12.7			39.3			93.0	
Approach LOS		B			B			D			F	
Queue Length 50th (ft)		150			193	49	159	164			~238	0
Queue Length 95th (ft)		196			264	61	#233	230			#308	41
Internal Link Dist (ft)		280			200			520			371	
Turn Bay Length (ft)												
Base Capacity (vph)		1538			1631	977	358	620			468	349
Starvation Cap Reductn		0			509	285	0	0			0	0
Spillback Cap Reductn		0			0	0	0	0			0	0
Storage Cap Reductn		0			0	0	0	0			0	0
Reduced v/c Ratio		0.42			0.71	0.53	0.79	0.46			1.08	0.32

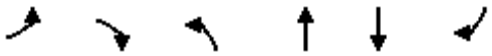
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.08			
Intersection Signal Delay: 35.3		Intersection LOS: D	
Intersection Capacity Utilization 99.0%		ICU Level of Service F	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: S Main St/North St & Union St



Lane Group	Ø9
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

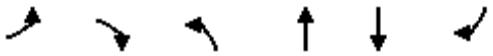


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Lane Configurations							
Traffic Volume (vph)	132	170	168	913	478	41	
Future Volume (vph)	132	170	168	913	478	41	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	
Grade (%)	0%			0%	0%		
Storage Length (ft)	0	0	0			0	
Storage Lanes	1	1	0			0	
Taper Length (ft)	25		25				
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	
Ped Bike Factor							
Frt		0.850			0.988		
Flt Protected	0.950			0.992			
Satd. Flow (prot)	1752	1568	0	3443	3272	0	
Flt Permitted	0.950			0.736			
Satd. Flow (perm)	1752	1568	0	2555	3272	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)		227			10		
Link Speed (mph)	30			30	30		
Link Distance (ft)	589			280	457		
Travel Time (s)	13.4			6.4	10.4		
Confl. Peds. (#/hr)							
Confl. Bikes (#/hr)							
Peak Hour Factor	0.75	0.75	0.94	0.94	0.92	0.92	
Growth Factor	100%	100%	100%	100%	100%	100%	
Heavy Vehicles (%)	3%	3%	4%	4%	9%	9%	
Bus Blockages (#/hr)	0	0	0	0	0	0	
Parking (#/hr)							
Mid-Block Traffic (%)	0%			0%	0%		
Adj. Flow (vph)	176	227	179	971	520	45	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	176	227	0	1150	565	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Turn Type	Prot	Prot	pm+pt	NA	NA		
Protected Phases	4	4	5	2	6		9
Permitted Phases			2				
Detector Phase	4	4	5	2	6		
Switch Phase							
Minimum Initial (s)	12.0	12.0	10.0	52.0	15.0		5.0
Minimum Split (s)	16.5	16.5	12.0	57.0	20.0		22.0
Total Split (s)	24.0	24.0	12.0	74.0	62.0		22.0
Total Split (%)	20.0%	20.0%	10.0%	61.7%	51.7%		18%

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Yellow Time (s)	3.5	3.5	2.0	4.0	4.0		3.0
All-Red Time (s)	1.0	1.0	0.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	4.5	4.5		5.0	5.0		
Lead/Lag			Lead		Lag		
Lead-Lag Optimize?			Yes		Yes		
Recall Mode	None	None	None	C-Max	C-Max		None
Act Effct Green (s)	16.6	16.6		93.9	93.9		
Actuated g/C Ratio	0.14	0.14		0.78	0.78		
v/c Ratio	0.73	0.55		0.58	0.22		
Control Delay	66.8	11.1		5.7	3.8		
Queue Delay	0.0	0.0		0.0	0.0		
Total Delay	66.8	11.1		5.8	3.8		
LOS	E	B		A	A		
Approach Delay	35.4			5.8	3.8		
Approach LOS	D			A	A		
Queue Length 50th (ft)	131	0		144	50		
Queue Length 95th (ft)	167	30		167	73		
Internal Link Dist (ft)	509			200	377		
Turn Bay Length (ft)							
Base Capacity (vph)	284	444		1999	2563		
Starvation Cap Reductn	0	0		70	0		
Spillback Cap Reductn	0	0		0	0		
Storage Cap Reductn	0	0		0	0		
Reduced v/c Ratio	0.62	0.51		0.60	0.22		

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 109 (91%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 10.9		Intersection LOS: B	
Intersection Capacity Utilization 79.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Memorial Pkwy & N Main St



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Lane Configurations							
Traffic Volume (vph)	144	279	179	670	776	30	
Future Volume (vph)	144	279	179	670	776	30	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	
Grade (%)	0%			0%	0%		
Storage Length (ft)	0	0	0			0	
Storage Lanes	1	1	0			0	
Taper Length (ft)	25		25				
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	
Ped Bike Factor							
Frt		0.850			0.994		
Flt Protected	0.950			0.990			
Satd. Flow (prot)	1752	1568	0	3436	3292	0	
Flt Permitted	0.950			0.608			
Satd. Flow (perm)	1752	1568	0	2110	3292	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)		372			4		
Link Speed (mph)	30			30	30		
Link Distance (ft)	589			280	457		
Travel Time (s)	13.4			6.4	10.4		
Confl. Peds. (#/hr)							
Confl. Bikes (#/hr)							
Peak Hour Factor	0.75	0.75	0.94	0.94	0.92	0.92	
Growth Factor	100%	100%	100%	100%	100%	100%	
Heavy Vehicles (%)	3%	3%	4%	4%	9%	9%	
Bus Blockages (#/hr)	0	0	0	0	0	0	
Parking (#/hr)							
Mid-Block Traffic (%)	0%			0%	0%		
Adj. Flow (vph)	192	372	190	713	843	33	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	192	372	0	903	876	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Turn Type	Prot	Prot	pm+pt	NA	NA		
Protected Phases	4	4	5	2	6		9
Permitted Phases			2				
Detector Phase	4	4	5	2	6		
Switch Phase							
Minimum Initial (s)	12.0	12.0	10.0	52.0	15.0		5.0
Minimum Split (s)	16.5	16.5	12.0	57.0	20.0		22.0
Total Split (s)	24.0	24.0	12.0	74.0	62.0		22.0
Total Split (%)	20.0%	20.0%	10.0%	61.7%	51.7%		18%

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Yellow Time (s)	3.5	3.5	2.0	4.0	4.0		3.0
All-Red Time (s)	1.0	1.0	0.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	4.5	4.5		5.0	5.0		
Lead/Lag			Lead		Lag		
Lead-Lag Optimize?			Yes		Yes		
Recall Mode	None	None	None	C-Max	C-Max		None
Act Effct Green (s)	17.0	17.0		93.5	93.5		
Actuated g/C Ratio	0.14	0.14		0.78	0.78		
v/c Ratio	0.77	0.69		0.55	0.34		
Control Delay	70.2	11.7		7.7	4.6		
Queue Delay	0.0	0.2		0.1	0.0		
Total Delay	70.2	11.9		7.8	4.6		
LOS	E	B		A	A		
Approach Delay	31.7			7.8	4.6		
Approach LOS	C			A	A		
Queue Length 50th (ft)	143	0		118	95		
Queue Length 95th (ft)	181	26		162	125		
Internal Link Dist (ft)	509			200	377		
Turn Bay Length (ft)							
Base Capacity (vph)	284	566		1643	2565		
Starvation Cap Reductn	0	0		78	0		
Spillback Cap Reductn	0	14		0	130		
Storage Cap Reductn	0	0		0	0		
Reduced v/c Ratio	0.68	0.67		0.58	0.36		

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 109 (91%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 12.4		Intersection LOS: B	
Intersection Capacity Utilization 87.8%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 6: Memorial Pkwy & N Main St

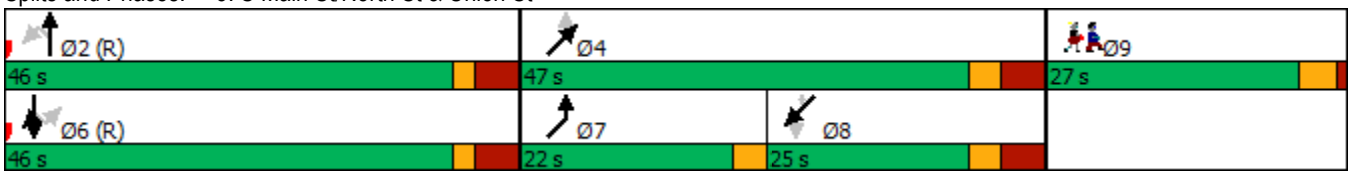
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	30	736	52	14	394	231	314	298	44	37	127	69
Future Volume (vph)	30	736	52	14	394	231	314	298	44	37	127	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor												
Frt		0.990				0.850		0.981				0.850
Flt Protected		0.998			0.998		0.950				0.989	
Satd. Flow (prot)	0	3333	0	0	3336	1495	1719	1775	0	0	3246	1468
Flt Permitted		0.921			0.912		0.539				0.769	
Satd. Flow (perm)	0	3076	0	0	3048	1495	975	1775	0	0	2524	1468
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				246		7				95
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		360			280			600			451	
Travel Time (s)		8.2			6.4			13.6			10.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.94	0.94	0.94	0.85	0.85	0.85	0.83	0.83	0.83
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	8%	8%	8%	5%	5%	5%	10%	10%	10%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	32	791	56	15	419	246	369	351	52	45	153	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	879	0	0	434	246	369	403	0	0	198	83
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		Perm	NA	Perm
Protected Phases		2			6	6	7	4			8	
Permitted Phases	2			6			4			8		8
Detector Phase	2	2		6	6	6	7	4		8	8	8
Switch Phase												
Minimum Initial (s)	38.0	38.0		38.0	38.0	38.0	15.0	30.0		15.0	15.0	15.0
Minimum Split (s)	44.0	44.0		44.0	44.0	44.0	22.0	37.0		25.0	25.0	25.0
Total Split (s)	46.0	46.0		46.0	46.0	46.0	22.0	47.0		25.0	25.0	25.0
Total Split (%)	38.3%	38.3%		38.3%	38.3%	38.3%	18.3%	39.2%		20.8%	20.8%	20.8%

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	6.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	23%

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Yellow Time (s)	2.0	2.0		2.0	2.0	2.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	4.0	4.0		4.0	4.0	4.0	0.0	4.0		4.0	4.0	4.0
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)		6.0			6.0	6.0	3.0	7.0			7.0	7.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	Max		Max	Max	Max
Act Effct Green (s)		67.0			67.0	67.0	44.0	40.0			18.2	18.2
Actuated g/C Ratio		0.56			0.56	0.56	0.37	0.33			0.15	0.15
v/c Ratio		0.51			0.26	0.26	0.78	0.68			0.52	0.27
Control Delay		17.6			9.8	1.1	44.0	40.6			52.4	9.4
Queue Delay		0.0			0.5	0.5	0.0	0.0			0.0	0.0
Total Delay		17.6			10.2	1.7	44.0	40.6			52.4	9.4
LOS		B			B	A	D	D			D	A
Approach Delay		17.6			7.1			42.2			39.7	
Approach LOS		B			A			D			D	
Queue Length 50th (ft)		210			38	0	229	263			75	0
Queue Length 95th (ft)		264			64	3	306	348			106	29
Internal Link Dist (ft)		280			200			520			371	
Turn Bay Length (ft)												
Base Capacity (vph)		1720			1701	943	475	596			382	302
Starvation Cap Reductn		0			815	373	0	0			0	0
Spillback Cap Reductn		0			0	0	0	0			0	0
Storage Cap Reductn		0			0	0	0	0			0	0
Reduced v/c Ratio		0.51			0.49	0.43	0.78	0.68			0.52	0.27

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 24.5		Intersection LOS: C	
Intersection Capacity Utilization 98.3%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 3: S Main St/North St & Union St



Lane Group	Ø9
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

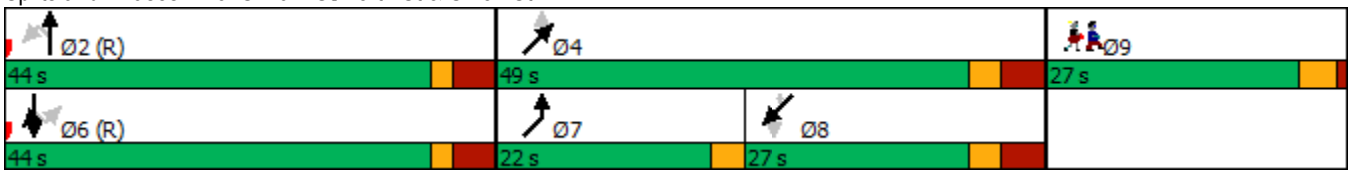
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	38	531	38	30	716	344	240	190	54	79	340	94
Future Volume (vph)	38	531	38	30	716	344	240	190	54	79	340	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor												
Frt		0.991				0.850		0.967				0.850
Flt Protected		0.997			0.998		0.950				0.991	
Satd. Flow (prot)	0	3333	0	0	3336	1495	1719	1750	0	0	3252	1468
Flt Permitted		0.848			0.901		0.211				0.817	
Satd. Flow (perm)	0	2835	0	0	3012	1495	382	1750	0	0	2681	1468
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				366		13				113
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		360			280			600			451	
Travel Time (s)		8.2			6.4			13.6			10.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.94	0.94	0.94	0.85	0.85	0.85	0.83	0.83	0.83
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	8%	8%	8%	5%	5%	5%	10%	10%	10%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	41	571	41	32	762	366	282	224	64	95	410	113
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	653	0	0	794	366	282	288	0	0	505	113
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		Perm	NA	Perm
Protected Phases		2			6	6	7	4			8	
Permitted Phases	2			6			4			8		8
Detector Phase	2	2		6	6	6	7	4		8	8	8
Switch Phase												
Minimum Initial (s)	38.0	38.0		38.0	38.0	38.0	15.0	30.0		15.0	15.0	15.0
Minimum Split (s)	44.0	44.0		44.0	44.0	44.0	22.0	37.0		25.0	25.0	25.0
Total Split (s)	44.0	44.0		44.0	44.0	44.0	22.0	49.0		27.0	27.0	27.0
Total Split (%)	36.7%	36.7%		36.7%	36.7%	36.7%	18.3%	40.8%		22.5%	22.5%	22.5%

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Bus Blockages (#/hr)	
Parking (#/hr)	
Mid-Block Traffic (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	6.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	23%

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Yellow Time (s)	2.0	2.0		2.0	2.0	2.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	4.0	4.0		4.0	4.0	4.0	0.0	4.0		4.0	4.0	4.0
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)		6.0			6.0	6.0	3.0	7.0			7.0	7.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	Max		Max	Max	Max
Act Effct Green (s)		65.0			65.0	65.0	46.0	42.0			21.0	21.0
Actuated g/C Ratio		0.54			0.54	0.54	0.38	0.35			0.18	0.18
v/c Ratio		0.42			0.49	0.37	0.81	0.46			1.08	0.32
Control Delay		17.3			13.4	1.3	47.0	31.8			111.4	10.6
Queue Delay		0.0			0.6	0.4	0.0	0.0			0.0	0.0
Total Delay		17.3			13.9	1.7	47.0	31.8			111.4	10.6
LOS		B			B	A	D	C			F	B
Approach Delay		17.3			10.1			39.3			93.0	
Approach LOS		B			B			D			F	
Queue Length 50th (ft)		150			162	0	159	164			~238	0
Queue Length 95th (ft)		196			235	5	#233	230			#308	41
Internal Link Dist (ft)		280			200			520			371	
Turn Bay Length (ft)												
Base Capacity (vph)		1538			1631	977	358	620			468	349
Starvation Cap Reductn		0			433	249	0	0			0	0
Spillback Cap Reductn		0			0	0	0	0			0	0
Storage Cap Reductn		0			0	0	0	0			0	0
Reduced v/c Ratio		0.42			0.66	0.50	0.79	0.46			1.08	0.32

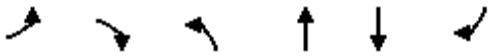
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green, Master Intersection			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.08			
Intersection Signal Delay: 34.3		Intersection LOS: C	
Intersection Capacity Utilization 99.0%		ICU Level of Service F	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: S Main St/North St & Union St



Lane Group	Ø9
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

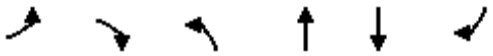


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Lane Configurations							
Traffic Volume (vph)	132	170	168	913	478	41	
Future Volume (vph)	132	170	168	913	478	41	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	
Grade (%)	0%			0%	0%		
Storage Length (ft)	0	0	0			0	
Storage Lanes	1	1	0			0	
Taper Length (ft)	25		25				
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	
Ped Bike Factor							
Frt		0.850			0.988		
Flt Protected	0.950			0.992			
Satd. Flow (prot)	1752	1568	0	3443	3272	0	
Flt Permitted	0.950			0.718			
Satd. Flow (perm)	1752	1568	0	2492	3272	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)		227			10		
Link Speed (mph)	30			30	30		
Link Distance (ft)	589			280	457		
Travel Time (s)	13.4			6.4	10.4		
Confl. Peds. (#/hr)							
Confl. Bikes (#/hr)							
Peak Hour Factor	0.75	0.75	0.94	0.94	0.92	0.92	
Growth Factor	100%	100%	100%	100%	100%	100%	
Heavy Vehicles (%)	3%	3%	4%	4%	9%	9%	
Bus Blockages (#/hr)	0	0	0	0	0	0	
Parking (#/hr)							
Mid-Block Traffic (%)	0%			0%	0%		
Adj. Flow (vph)	176	227	179	971	520	45	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	176	227	0	1150	565	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Turn Type	Prot	pt+ov	pm+pt	NA	NA		
Protected Phases	4	4 5	5	2	6		9
Permitted Phases			2				
Detector Phase	4	4 5	5	2	6		
Switch Phase							
Minimum Initial (s)	12.0		10.0	52.0	15.0		5.0
Minimum Split (s)	16.5		12.0	57.0	20.0		22.0
Total Split (s)	24.0		12.0	74.0	62.0		22.0
Total Split (%)	20.0%		10.0%	61.7%	51.7%		18%

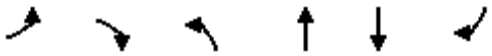
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Yellow Time (s)	3.5		2.0	4.0	4.0		3.0
All-Red Time (s)	1.0		0.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0			0.0	0.0		
Total Lost Time (s)	4.5			5.0	5.0		
Lead/Lag			Lead		Lag		
Lead-Lag Optimize?			Yes		Yes		
Recall Mode	None		None	C-Max	C-Max		None
Act Effct Green (s)	16.6	28.6		93.9	81.9		
Actuated g/C Ratio	0.14	0.24		0.78	0.68		
v/c Ratio	0.73	0.42		0.57	0.25		
Control Delay	66.8	6.9		5.3	7.8		
Queue Delay	0.0	0.0		0.1	0.0		
Total Delay	66.8	6.9		5.4	7.8		
LOS	E	A		A	A		
Approach Delay	33.1			5.4	7.8		
Approach LOS	C			A	A		
Queue Length 50th (ft)	131	0		137	80		
Queue Length 95th (ft)	167	27		146	112		
Internal Link Dist (ft)	509			200	377		
Turn Bay Length (ft)							
Base Capacity (vph)	284	541		2005	2236		
Starvation Cap Reductn	0	0		129	0		
Spillback Cap Reductn	0	0		0	0		
Storage Cap Reductn	0	0		0	0		
Reduced v/c Ratio	0.62	0.42		0.61	0.25		

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 109 (91%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 11.3		Intersection LOS: B	
Intersection Capacity Utilization 79.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Memorial Pkwy & N Main St



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Lane Configurations							
Traffic Volume (vph)	144	279	179	670	776	30	
Future Volume (vph)	144	279	179	670	776	30	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	
Grade (%)	0%			0%	0%		
Storage Length (ft)	0	0	0			0	
Storage Lanes	1	1	0			0	
Taper Length (ft)	25		25				
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	
Ped Bike Factor							
Frt		0.850			0.994		
Flt Protected	0.950			0.990			
Satd. Flow (prot)	1752	1568	0	3436	3292	0	
Flt Permitted	0.950			0.591			
Satd. Flow (perm)	1752	1568	0	2051	3292	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)		341			4		
Link Speed (mph)	30			30	30		
Link Distance (ft)	589			280	457		
Travel Time (s)	13.4			6.4	10.4		
Confl. Peds. (#/hr)							
Confl. Bikes (#/hr)							
Peak Hour Factor	0.75	0.75	0.94	0.94	0.92	0.92	
Growth Factor	100%	100%	100%	100%	100%	100%	
Heavy Vehicles (%)	3%	3%	4%	4%	9%	9%	
Bus Blockages (#/hr)	0	0	0	0	0	0	
Parking (#/hr)							
Mid-Block Traffic (%)	0%			0%	0%		
Adj. Flow (vph)	192	372	190	713	843	33	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	192	372	0	903	876	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9	15			9	
Turn Type	Prot	pt+ov	pm+pt	NA	NA		
Protected Phases	4	4 5	5	2	6		9
Permitted Phases			2				
Detector Phase	4	4 5	5	2	6		
Switch Phase							
Minimum Initial (s)	12.0		10.0	52.0	15.0		5.0
Minimum Split (s)	16.5		12.0	57.0	20.0		22.0
Total Split (s)	24.0		12.0	74.0	62.0		22.0
Total Split (%)	20.0%		10.0%	61.7%	51.7%		18%



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Yellow Time (s)	3.5		2.0	4.0	4.0		3.0
All-Red Time (s)	1.0		0.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0			0.0	0.0		
Total Lost Time (s)	4.5			5.0	5.0		
Lead/Lag			Lead		Lag		
Lead-Lag Optimize?			Yes		Yes		
Recall Mode	None		None	C-Max	C-Max		None
Act Effct Green (s)	17.0	29.0		93.5	81.5		
Actuated g/C Ratio	0.14	0.24		0.78	0.68		
v/c Ratio	0.77	0.58		0.54	0.39		
Control Delay	70.2	9.4		6.9	9.3		
Queue Delay	0.0	0.1		0.1	0.0		
Total Delay	70.2	9.5		7.0	9.3		
LOS	E	A		A	A		
Approach Delay	30.1			7.0	9.3		
Approach LOS	C			A	A		
Queue Length 50th (ft)	143	18		109	147		
Queue Length 95th (ft)	181	41		146	190		
Internal Link Dist (ft)	509			200	377		
Turn Bay Length (ft)							
Base Capacity (vph)	284	629		1678	2236		
Starvation Cap Reductn	0	0		161	0		
Spillback Cap Reductn	0	8		0	84		
Storage Cap Reductn	0	0		0	0		
Reduced v/c Ratio	0.68	0.60		0.60	0.41		

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 109 (91%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 13.4		Intersection LOS: B	
Intersection Capacity Utilization 87.8%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 6: Memorial Pkwy & N Main St

APPENDIX D

MassDOT Project Development Process

Overview of the Project Development Process

Transportation decision-making is complex and can be influenced by legislative mandates, environmental regulations, financial limitations, agency programmatic commitments, and partnering opportunities. Decision-makers and reviewing agencies, when consulted early and often throughout the project development process, can ensure that all participants understand the potential impact these factors can have on project implementation. Project development is the process that takes a transportation improvement from concept through construction.

The MassDOT Highway Division has developed a comprehensive project development process which is contained in Chapter 2 of the *MassDOT Highway Division's Project Development and Design Guide*. The eight-step process covers a range of activities extending from identification of a project need, through completion of a set of finished contract plans, to construction of the project. The sequence of decisions made through the project development process progressively narrows the project focus and, ultimately, leads to a project that addresses the identified needs. The descriptions provided below are focused on the process for a highway project, but the same basic process will need to be followed for non-highway projects as well.

1. Needs Identification

For each of the locations at which an improvement is to be implemented, MassDOT leads an effort to define the problem, establishes project goals and objectives, and defines the scope of the planning needed for implementation. To that end, it has to complete a Project Need Form (PNF), which states in general terms the deficiencies or needs related to the transportation facility or location. The PNF documents the problems and explains why corrective action is needed. For this study, the information defining the need for the project will be drawn primarily, perhaps exclusively, from the present report. Also, at this point in the process, MassDOT meets with potential participants, such as the Metropolitan Planning Organization (MPO) and community members, to allow for an informal review of the project.

The PNF is reviewed by the MassDOT Highway Division district office whose jurisdiction includes the location of the proposed project. MassDOT also sends the PNF to the MPO, for informational purposes. The outcome of this step determines whether the project requires further planning, whether it is already well supported by prior planning studies, and, therefore, whether it is ready to move forward into the design phase, or whether it should be dismissed from further consideration.

2. Planning

This phase will likely not be required for the implementation of the improvements proposed in this planning study, as this planning report should constitute the outcome of this step. However, in general, the purpose of this implementation step is for the project proponent to identify issues, impacts, and approvals that may need to be obtained, so that the subsequent design and permitting processes are understood.

The level of planning needed will vary widely, based on the complexity of the project. Typical tasks include: define the existing context, confirm project need, establish goals and objectives, initiate public outreach, define the project, collect data, develop and analyze alternatives, make

recommendations, and provide documentation. Likely outcomes include consensus on the project definition to enable it to move forward into environmental documentation (if needed) and design, or a recommendation to delay the project or dismiss it from further consideration.

3. Project Initiation

At this point in the process, the proponent, MassDOT Highway Division, fills out a Project Initiation Form (PIF) for each improvement, which is reviewed by its Project Review Committee (PRC) and the MPO. The PRC is composed of the Chief Engineer, each District Highway Director, and representatives of the Project Management, Environmental, Planning, Right-of-Way, Traffic, and Bridge departments, and the MassDOT Federal Aid Program Office (FAPO). The PIF documents the project type and description, summarizes the project planning process, identifies likely funding and project management responsibility, and defines a plan for interagency and public participation. First the PRC reviews and evaluates the proposed project based on the MassDOT's statewide priorities and criteria. If the result is positive, MassDOT Highway Division moves the project forward to the design phase, and to programming review by the MPO. The PRC may provide a Project Management Plan to define roles and responsibilities for subsequent steps. The MPO review includes project evaluation based on the MPO's regional priorities and criteria. The MPO may assign project evaluation criteria score, a Transportation Improvement Program (TIP) year, a tentative project category, and a tentative funding category.

4. Environmental Permitting, Design, and Right-of-Way Process

This step has four distinct but closely integrated elements: public outreach, environmental documentation and permitting (if required), design, and right-of-way acquisition (if required). The outcome of this step is a fully designed and permitted project ready for construction. However, a project does not have to be fully designed in order for the MPO to program it in the TIP. The sections below provide more detailed information on the four elements of this step of the project development process.

Public Outreach

Continued public outreach in the design and environmental process is essential to maintain public support for the project and to seek meaningful input on the design elements. The public outreach is often in the form of required public hearings, but can also include less formal dialogues with those interested in and affected by a proposed project.

Environmental Documentation and Permitting

The project proponent, in coordination with the Environmental Services section of the MassDOT Highway Division, will be responsible for identifying and complying with all applicable federal, state, and local environmental laws and requirements. This includes determining the appropriate project category for both the Massachusetts Environmental Protection Act (MEPA) and the National Environmental Protection Act (NEPA). Environmental documentation and permitting is often completed in conjunction with the **Preliminary Design** phase described below.

Design
There are three major phases of design. The first is **Preliminary Design**, which is also referred to as the 25-percent submission. The major components of this phase include full survey of the project area, preparation of base plans, development of basic geometric layout, development of preliminary cost estimates, and submission of a functional design report. Preliminary Design, although not required to, is often completed in conjunction with the Environmental Documentation and Permitting. The next phase is **Final Design**, which is also referred to as the 75-percent and 100-percent submission. The major components of this phase include preparation of a subsurface exploratory plan (if required), coordination of utility relocations, development of traffic management plans through construction zones, development of final cost estimates, and refinement and finalization of the construction plans. Once Final Design is complete, a full set of **Plans, Specifications, and Estimates (PS&E)** is developed for the project.

Right-of-Way Acquisition
A separate set of Right-of-Way plans are required for any project that requires land acquisition or easements. The plans must identify the existing and proposed layout lines, easements, property lines, names of property owners, and the dimensions and areas of estimated takings and easements.

5. Programming (Identification of Funding)
Programming, which typically begins during the design phase, can actually occur at any time during the process, from planning to design. In this step, which is distinct from project initiation, the proponent requests that the MPO place the project in the region's Transportation Improvement Program (TIP). The proponent requesting the project's listing on the TIP can be the community or it can be one of the MPO member agencies (the Regional Planning Agency, MassDOT, and the Regional Transit Authority). The MPO then considers the project in terms of state and regional needs, evaluation criteria, and compliance with the regional Transportation Plan and decides whether to place it in the draft TIP for public review and then in the final TIP.

6. Procurement
Following project design and programming of a highway project, the MassDOT Highway Division publishes a request for proposals. It then reviews the bids and awards the contract to the qualified bidder with the lowest bid.

7. Construction
After a construction contract is awarded, MassDOT Highway Division and the contractor develop a public participation plan and a management plan for the construction process.

8. Project Assessment
The purpose of this step is to receive constituents' comments on the project development process and the project's design elements. MassDOT Highway Division can apply what is learned in this process to future projects.

Project Development Schematic Timetable

Description	Schedule Influence	Typical Duration
Step I: Problem/Need/Opportunity Identification The proponent completes a Project Need Form (PNF). This form is then reviewed by the MassDOT Highway District office which provides guidance to the proponent on the subsequent steps of the process.	The Project Need Form has been developed so that it can be prepared quickly by the proponent, including any supporting data that is readily available. The District office shall return comments to the proponent within one month of PNF submission.	1 to 3 months
Step II: Planning Project planning can range from agreement that the problem should be addressed through a clear solution to a detailed analysis of alternatives and their impacts.	For some projects, no planning beyond preparation of the Project Need Form is required. Some projects require a planning study centered on specific project issues associated with the proposed solution or a narrow family of alternatives. More complex projects will likely require a detailed alternatives analysis.	Project Planning Report: 3 to 24+ months
Step III: Project Initiation The proponent prepares and submits a Project Initiation Form (PIF) and a Transportation Evaluation Criteria (TEC) form in this step. The PIF and TEC are informally reviewed by the Metropolitan Planning Organization (MPO) and MassDOT Highway District office, and formally reviewed by the PRC.	The PIF includes refinement of the preliminary information contained in the PNF. Additional information summarizing the results of the planning process, such as the Project Planning Report, are included with the PIF and TEC. The schedule is determined by PRC staff review (dependent on project complexity) and meeting schedule.	1 to 4 months
Step IV: Design, Environmental, and Right of Way The proponent completes the project design. Concurrently, the proponent completes necessary environmental permitting analyses and files applications for permits. Any right of way needed for the project is identified and the acquisition process begins.	The schedule for this step is dependent upon the size of the project and the complexity of the design, permitting, and right-of-way issues. Design review by the MassDOT Highway district and appropriate sections is completed in this step.	3 to 48+ months
Step V: Programming The MPO considers the project in terms of its regional priorities and determines whether or not to include the project in the draft Regional Transportation Improvement Program (TIP) which is then made available for public comment. The TIP includes a project description and funding source.	The schedule for this step is subject to each MPO's programming cycle and meeting schedule. It is also possible that the MPO will not include a project in its Draft TIP based on its review and approval procedures.	3 to 12+ months
Step VI: Procurement The project is advertised for construction and a contract awarded.	Administration of competing projects can influence the advertising schedule.	1 to 12 months
Step VII: Construction The construction process is initiated including public notification and any anticipated public involvement. Construction continues to project completion.	The duration for this step is entirely dependent upon project complexity and phasing.	3 to 60+ months
Step VIII: Project Assessment The construction period is complete and project elements and processes are evaluated on a voluntary basis.	The duration for this step is dependent upon the proponent's approach to this step and any follow-up required.	1 month

Source: MassDOT Highway Division Project Development and Design Guide

APPENDIX E

Study Area Survey Results

Summary of Crawford Square Survey Results by Question and Answer

Q/A	1. How do you typically travel through the intersections? (Select all that apply)	426	Total Responses
1)	*Driving*	415	97.4%
2)	*Walking*	94	22.1%
3)	*Biking*	15	3.5%
4)	*Taking public bus services*	24	5.6%
5)	*Using a mobility device (a wheelchair, for example)*	1	0.2%
6)	*Other (please specify)*	6	1.4%
	Motorcycle		
	Longboard		
	B y watching TV morning and evening from Stetson Hall camera. The traffic lights control		

Q/A	2. Please indicate the purpose of your usual trips through these intersections. (Select all that apply.)	416	Total Responses
1)	*Work (by driving)*	156	37.5%
2)	*Work (to access commuter rail or bus service)*	32	7.7%
3)	*Shopping (including trips for pharmacy, banking, and other services)*	347	83.4%
4)	*Dining*	176	42.3%
5)	*Social/recreation*	202	48.6%
6)	*School/daycare*	35	8.4%
7)	*Walking, jogging, biking, or other fitness activities*	72	17.3%
8)	*Other (please specify)*	365	87.7%
	Errands in adjacent towns I live off of north street		
	Walking to other locations for work.		
	Apts, access to highway		
	To pick up trash on foot, clean up square		
	Go in and out of boston		
	Passing through to go to another town, (Holbrook to Abington; Avon to Brockton).		
	Going to the Turner Free Library		
	Live on South St		
	Most direct route for me when traveling through zHolbrook to medical appts		
	General travel to get to Holbrook/Whitman		
	To get to medical appointments		
	Lonrary		
	Access of my store,mailbox,restaurants and nearby businesses		
	Visiting people in other towns		
	to go from Holbrook to Route 24 or Blue Hills		
	Take care of elderly parent		
	Visiting		
	Just driving thru		
	To get to Town Hall		
	Driving to another town		
	Passing through on my way to Avon/Brockton, Braintree, Holbrook.		
	Traveling to and from home.		

Visiting friends and family
Church
Misc.
Travel to Holbrook or Abington
Connecting with family in other towns along / near route 139.
Town Hall
church, library
On bus to Ashmont Station, connecting to T for medical appointments, shopping, MFA.
Church
Access to highway network; travel to volunteer activities & medical appointments
medical appointments

Q/A	3. Please indicate the destination of your usual trips through the intersections. (Select all that apply)	404	Total Responses
1)	*Randolph High School*	50	12.4%
2)	*Randolph Plaza (location of Shaw's Market)*	304	75.2%
3)	*Shopping Plaza at N. Main and Warren St. (north of study area)*	200	49.5%
4)	*JFK Elementary School (northeast of study area)*	25	6.2%
5)	*South of the study area (locations on S. Main St., South St., and Union St.)*	244	60.4%
6)	*Other (please specify)*	95	23.5%

Turner Free Library
North st
work
Towns south of randolph
Accessing north street
North main and chestnut area
Traveling to Holbrook, Whitman
Braintree by way of south main to north street
Shopping in Avon & Brockton areas & visiting relatives
My home on Warren st
Traveling toward Braintree or toward Holbrook.
Route 139
Too many lights that make it slow to travel through during rush hours.
Randolph Intergenerational Community Center
Powers Farm
Library,Town Hall
Library
Avon Walmart
Town Hall, Gas station, florist, relative's homes
To adjoining towns Holbrook avon
North Randolph and RICC
Shops along North Main St.
Lynwood Pizza! Auto Mechanic in Holbrook. Friend's home in Holbrook
CVS CHURCH MGOING TO SOUTH MAIN STREET
route to 95
Community center

To north street to go home
Library, going to Avon
Stetson Hall, Turner Free Library.
RICC. CVS, Bank of Canton
Childcare going back and forth to the playground at the Town Hall
Shopping elsewhere
139 to get to Weymouth/Holbrook
Turner Free Library, my residence off North Street
CVS
Town Hall
RICC or Home
Stores on North main st heading north
Cranberry Pond Reservation, walking from bus stop on S Main
East toward Holbrook, Weymouth and Abington
Memorial Parkway stores
Commuter rail station
Daddies dairy
Going Avon Walmart
North street or access to highways
Bank of Canton, CVS, home (off Highland Ave.) short cut to RICC
Banking, restaurants, misc.
Rte 139 towards Holbrook
Walgreens
Randolph community middle school
Target
General travel as I live my life
Church
Congregational Church
Access to Boston and Quincy
Library, Bamboo Moon, CVS, Envision Bank, visiting relatives
Banking and haircut
Library, church
RICC, Restaurants across the street
In route to Brockton
BJ's....Rte. 24
RICC, Library, BHRHS, and all other areas in town as we reside off of union street
Shopping in Abington
Church, town hall
Passing through to Brockton or Holbrook.
Heading to Holbrook
Zack's Pizza
live in the area
SHAW'S
To 139 and North Street too
Visiting my mother in Hanson
Norwood

Destinations further north on Rt 28
Frank Leary Way
Drive through the intersection to access highway 24.
Work down school street
Congregational chirrch
Visit to Library
Envision Bank
Church; RICC; bank; DPW yard; South Shore Plaza; library; access to I-93;
Library, town hall
medical appointments
library

Q/A	4. If you drive through these intersections, what problems do you encounter? (Select all that apply)	393	Total Responses
1)	*Long wait at signals*	201	51.1%
2)	*High volume of traffic*	334	85.0%
3)	*Safety concerns, such as crashes and aggressive drivers*	250	63.6%
4)	*Difficulty turning into and out of side streets*	219	55.7%
5)	*Difficulty turning into and out of shopping areas*	147	37.4%
6)	*Poor line of sight*	122	31.0%
7)	*Poor street lighting*	49	12.5%
8)	*Other (please specify)*	79	20.1%

Poor habits of pedestrians

not enough clarity about designated turning lanes

backups due to warren st light conflicting with main traffic light

Constantly see drivers run red lights

Bus stop at top of North Street should be moved down to Mill St. too much congestion when the bus is parked at the top of the street

Badly timed lights

Cars going right on red when the sign states no ror. Also cars that can't make it through the intersection blocking it because they can't go.

The light going North when turn into has no arrow. Going north, the light turns green, oncoming traffic is stopped and all of a sudden they are not and they are angry. Dangerous. Needs turning arrow.

None. My biggest concern is that Randolph could have more economic power by placing popular stores and food markets/cafes

Pedestrian that don't wait for the signal to walk or do not cross at crosswalk , bus stop right in the middle of it, and people parking and people leaving there parking space.

Driving from N.Main St to Union St, there is a sign on the ground indicating left turn only onto North St but it's faded & I feel there should be a sign above near the traffic lights indicating LEFT TURN ONLY. There have been many instances where I've been traveling towards Union St from N.Main St & there have been rude & ignorant drivers that simply cut me off, almost causing an accident. I'm sure most of them are aware that it's a left turn only onto North St, but they disregard the signage on the ground. So if another method of indicating LEFT TURN ONLY can be implemented, I & so many other drivers will greatly appreciate it :)

Difficult to get across to South and Union Streets from Main Street

Those plantings between Shaw's Plaza and the high school make driving on Memorial Drive feel like a suicide mission. And please explain why everyone feels entitled to take a left from South Main Street onto North Main Street (where 139 and North Street meet Route 28) even though they're supposed to yield unless they have a green arrow

Accessing the Turner Free Library
On Memorial drive the trees and shrubs are lovely but they make it difficult to see going int or coming out of shaws plaza

People going through red lights constantly

Drivers not obeying stop signs, red lights, and "no right turn on red" signs.

Especially during school and after 4 PM rush hour
Drivers taking turns usually from North Main to South Main from middle lane on N Main

leaving shaw plaza...shrubs at island should be lower. turning left into memorial drive ...it would be helpful to have a small sign or light at island. at night it is often difficult to see exactly where to turn left onto memorial drive

Drivers turning left from s main to n main ignoring the red left turn signal.

The gardens in front of the high school often block views

Difficulty seeing pedestrians trying to cross

People turning left from the right lane and right from the left lane off of Cottage Street, plus occasionally people driving the wrong way on Cottage St.

Signals aren't synchronized and traffic congestion as so many nearby towns use Randolph as cut through to highway

Going toward union st, the lines on the street are not clear. There should be signs on the lights that say left/straight/right turn lane

No issues

None really

Finding parking for local businesses, dodging the MBTA Bus

Difficulty turning into Turner Free Library

No turn arrows. Only one there at this time.

Getting in and out of parking spaces snd business entrances

Some lights do not fall in line. So you can have a green light in your the square only to hit a red light taking the turn to Shaw's.

Unclear whether can go straight from N Main to Union from both lanes? People go from both, but need to merge quickly on Union. Headed N from Union to N Main, sometimes traffic backs up headed N on N Main, makes it hard to enter N Main safely from Union.

several drivers running red lights

Traffic signals are not timed for the direction of heavy flow at various times of day.

Light from S Main St should turn red when North St. Traffic's light turns green

Entering from so. main or union and traffic being backed up into the intersection by a red light at memorial dr.

The lengthy track of shrubbery across from the Randolph high school is a accident waiting to happen. Pedestrians dart out to the other side of the street... drivers can not see them coming from the other side.

People driving like idiots.

People not using cross walks or careless crossing

The two bus stops at Burger King and right across the street. They need to be moved so they are not so close to the intersection

The light cycle often skips a turn

Avoidance of cars entering the roadway or making turns.

Illegal left turns Every Minute

Traffic lights not synchronized and bus stops to close to the intersections
Drivers running red lights, pedestrians walking in the street & not using crosswalks.

Stopped bus causing congestion

Some drivers don't respect stop & yield signs - they literally ignore street lines and special cross lines at business entrances such the one at the McDonald - they ignore full stop signs

trucking

To add to the "safety concerns, aggressive drivers" Jay walkers, people walking in the street and not on sidewalks, mopeds/scooters weaving in and out of traffic, people running red lights and blocking intersections(which cause the long waits at lights) to name a few.
pedestrian lights should only affect requested street crossing direction, not all directions

Why does Highland Avenue, which leads to Shaw's and study area, have a speed limit of 25 mph? NOBODY (but me) drives slowly--mostly 40-50 mph. There are so many tailgaters, I just move to the right walk lane and let them pass. Perhaps change speed limit to 35 mph?
Those turning from North Main Street onto North St, are few but back up traffic.

Old Burger King property is an eyesore

Log jams of traffic because lights don't seem to be synchronized. Turning left from South Main to North Main gets backed up if the light at the intersection of Memorial Parkway is red.
Bad timing between the lights in the square and memorial Pkwy. The intersection gets blocked

Potentially unsafe pedestrians

Speeding. Lights are not timed correctly

Pedestrian crossing by like crazy

Rude and inexperienced drivers that don't follow basic road rules

No one knows how the suicide lane works
There isn't enough distance to come up either turn left from South Main or Union Street onto Memorial Drive.
Aggressive drivers! Illegal turns, and blocked streets so we can't cross traffic to turn.

No green arrows for turning left
The traffic lights need to change in croford square. Especially while turning left onto north main from south main

Lights to close to one another which cause taffic issues
Hazardous to drive or walk, I try to avoid the area now after dodging too many aggressive drivers that don't respect red lights or walking signals
Cars stuck in the middle of the intersection when you have a green light. Then sitting there though a another red light.

The light on the big intersection by Stetson Hall is too short.

	Lights going from police department to Karate studio should allow drivers to turn left on one side first & right on the other first.
	Side parking in street clogs up traffic poor signal timing/improper & unsafe signal phasing/poor signal coordination; unsafe pedestrian environment
	Drivers travelling north on 28 often block the intersection at North St after the light turns red.
	The light at Memorial drive is RED when the light in Crawford SQ is Green , causing a backup
	Synchronize the lights at Memorial Drive with The lights at the square.
	Library entrance/exit onto main street is an accident waiting to happen
	Congestion, pedestrians crossing street not at crosswalks, lots of things happening at same time (bus stops, cars parking or pulling out of side streets, pedestrians, cars trying to make through lights)
	trees ,bushes, etc. in middle of memorial parklway block vision- students, etc. dart across between bushes -also when exitingi Shaw's Plaza, hard to see oncoming cars coming up from other side in front of schoolShaw's plaza,

Q/A	**5. If you walk or use a mobility device in these intersections, what problems do you encounter? (Select all that apply.)**	**83**	**Total Responses**
1)	*Lack of sidewalks*	9	10.8%
2)	*Lack of accessible curb/wheelchair ramps*	9	10.8%
3)	*Sidewalks too narrow or in poor condition*	16	19.3%
4)	*Insufficient pedestrian crossing times at intersections*	37	44.6%
5)	*High volume of traffic*	62	74.7%
6)	*High speed of vehicles*	58	69.9%
7)	*Poor street lighting*	9	10.8%
8)	*Drivers with poor attention to people who walk or use mobility devices*	60	72.3%
9)	*Personal safety concerns*	35	42.2%
10)	*Poor connectivity to places you need to go (residence, work, shopping, etc.)*	16	19.3%
11)	*Other (please specify)*	8	9.6%
	I've never had a problem running/walking in this area.		
	No incentive for drivers to slow down. Very few shops, not inviting. Treated like a super highway by drivers. Many take excessive risks: blow red lights, pass on the right, cut drivers off.		
	Aggressive Drivers including Town employees and the Police		
	Drivers who seem determined to never use their brake pedals.		
	Vehicles ignore traffic signals		
	Sidewalks starting to crack due to weather conditions, expanse and contraction, resulting in cracks.		
	Snowplows don't plough sidewalks in winter.		
	Not pedestrian friendly; width of roadways encourages unpredictable behavior by drivers		

Q/A	**6. If you bike through these intersections, what problems do you encounter? (Select all that apply.)**	**13**	**Total Responses**
1)	*Lack of bike lanes or useable shoulders*	11	84.6%

2)	*High volume of traffic*	6	46.2%
3)	*High speed of vehicles*	8	61.5%
4)	*Poor street lighting*	1	7.7%
5)	*Drivers with poor attention to bicyclists*	10	76.9%
6)	*Personal safety concerns*	6	46.2%
7)	*Poor connectivity to places you need to go (residence, work, shopping, etc.)*	2	15.4%
8)	*Other (please specify)*	2	15.4%

Aggressive Drivers including Town employees and the Police
N/A

Q/A	**7. Please indicate any improvements that you would like to see implemented in the intersections. (Select all that apply.)**	**399**	**Total Responses**
1)	*Increase safety for all road users*	307	76.9%
2)	*Improve accommodations for pedestrians (sidewalks, crossings, etc.)*	164	41.1%
3)	*Improve accommodations for bicyclists (bike lanes, bike path, access, etc.)*	62	15.5%
4)	*Reduce traffic congestion*	323	81.0%
5)	*Improve shuttle and local bus service*	68	17.0%
6)	*Other (please specify)*	68	17.0%

Despite great cross walks and signals pedestrians still just walk into traffic - go between cars and walk down the street not using sidewalks. ? Any way to enforce laws for pedestrians

too many cars merging into too little space for heavy traffic. smart coordinated ;lights to give extra time to backed up lanes might be a solution

Traffic lights need right & left hand turn only options to keep traffic moving and stop the bottleneck

Enforce traffic laws! Issue more tickets to stupid, reckless drivers, to those who do not know the rules of the road.

Widen top of union Street to have dedicated right turn lane on to South street.

Put a left turn only lane at the top of North St

Better use of traffic signals with arrows allowing one direction at a time

DO NOT ADD BIKE Lanes!!!! Also - the bus parks and blocks a lane going north from Crawford Sq on N Main St. Creates a huge mess and dangerous situation.

There will always be traffic let's make it worth something by adding Starbucks, Trader Joe's, tj maxx or Marshall's stores

Move bus stop on No Main Street across from Memorial Drive

Move bus stop a little further south

Driving from N.Main St to Union St, there is a sign on the ground indicating left turn only onto North St but it's faded & I feel there should be a sign above near the traffic lights indicating LEFT TURN ONLY. There have been many instances where I've been traveling towards Union St from N.Main St & there have been rude & ignorant drivers that simply cut me off, almost causing an accident. I'm sure most of them are aware that it's a left turn only onto North St, but they disregard the signage on the ground. So if another method of indicating LEFT TURN ONLY can be implemented, I & so many other drivers will greatly appreciate it :)

Timing of traffic signals, (South Main/North/Union > Memorial Parkway), to allow better traffic flow.

Traffic calming

view obstructed by trees exiting shaws

Cars on 139 in particular frequently run the lights (other areas as well). The town needs to pay special interest to 139 and highland st. By McDonald's. That is going to be a total nightmare and should be a priority.

Police presence for when drivers go through red lights
remove plantings , as they effect the line of site coming out of Shaws-
Traffic lights to close together, cars back up through lights

It was much easier to drive thru Crawford square BEFORE the traffic lights were installed. My recommendation is to ditch the lights and install a rotary. Rotaries save time money lives and energy look it up

entering the square from union street, attempting to bear left onto 28 is difficult. coming up memorial drive to center to go onto union st is difficult....the bear left or go straight being in the same lane is challenging. also the arrow to go to union street, is usually nearly visible

Time the lights better for traffic flow
Need to add a red left turn arrow from S. Main to N. Main St so people won't continue to take a left through the yellow as you come up North St. to go onto S, Main. This would be the simplest and less expensive fix for this intersection/

compliance with MA traffic laws

Also getting dangerous at the top of union (south st) where the 2 lanes merge

Seems to be fine as is

Have none.

Make it easier to drive through town.

Synchronize the lights better. Improve access to library and church shared parking lot. If room replace the intersection with a traffic circle (no lights). Maintain sidewalks better. Speed up activation of pedestrian traffic light.
the on street parking on North Main Street can be dangerous as cars don't always position their car or truck close to the curb

Better left turn traffic controls at North and Union

Better police presence

Clearer lane markings and signage

Allow for remote adjustments to traffic signals to allow for volume of traffic. Coordinate the traffic lights better so traffic isn't backed up into other intersections.
honestly it has been this way for so long and that is what we are used to I would leave it be...

Take a right on red

The Crawford Square District cannot flourish until traffic is diverted from downtown. It is basically not walkable due to speed of cars, heavy traffic congestion and violent crime (e.g., armed robberies, shootings). School/Moulton St. and other residential side streets are being overburdened by traffic that should be diverted around North & South Main, Union Streets etc.
The light cadence through Crawford square to St Mary's church is too congested and stops the flow of traffic

Especially difficult mergingi into traffic taking a right from North onto No. Main St. Implement delayed turn signals to allow that line to turn safely. Also after the turn onto North Main Street, the two lanes of traffic after the first traffic light leaves little space and causes potential dangers, as parked cars pull out onto the main road.

Left turn signal at both lights

Trim back the growth on Memorial Parkway. Although lovely to look at it presents a danger while turning into the shopping plaza and for seeing students crossing from the high school

Beautify the intersection and keep it clean and free of litter.

Better line of sight
Add signal light on North Main Street at shopping plaza with America's Food Basket

Police presence to stop aggressive drivers
1.Randolph PD does not enforce speed limit 2. Mass legislature does not pass bills increasing penalty for illegal left turns/failure to yield

I don't think we need to improve accommodations for pedestrians but, I'd like to see an education campaign for pedestrians about using sidewalks, crosswalks, and walk lights.
Purchase the old Burger King property to use as a bus stop and road improvements

More turning signals for every street

Rework traffic signal at Main St. and Memorial Dr. so that southbound Main St. traffic so vehicles can pass through five-way intersection without having to stop for red light twice.

Improve bus stop areas please

Lights...longer arrows
Longer turn signal from south main onto north main- better street signs/directions - unclear signage now

More traffic enforcement to help curb bad/unsafe drivers and basic pedestrian education would be helpful too, use a sidewalk if theres a sidewalk, look both ways... press the button to stop traffic to cross safely. please do not make it worse by adding bicycle lanes. Move bus stop away from Corkin Building

Driving or walking from Shaw's exit to Highland Avenue: drivers speed in both directions, hard to anticipate a space, to move into lane going same direction or cross over that lane into opposite direction. Drivers speed by on the right.

Green space in square maybe by vacant Burger King that allows for relaxing after shopping. Also, store fronts should upgrade signage that is more legible and looks professional. Some stores in other areas have one awning that encompass the names of all businesses across it.

Cross walks on South Main street please!! Near Frederickson Drive.

Blinking pedestrian crossing signs.

Increase traffic light time in all directions for pedestrians here and at other town intersections like N MAIN @ OAK. Many accidents have happened there and I have personally narrowly missed being killed. ALSO PEOPLE DRIVING WHILE USING DEVICES, LIKE A LAPTOP AGAINST STEERING WHEEL OR CELLPHONE TEXTING, DIALING WHILE DRIVING

Reducing traffic congestion would be ideal but I have no idea how this could be accomplished.

What the town should do is eminent domain the old Burger King and extend Memorial Drive. Creating one giant one way traffic circle with signaled crosswalks

No bike lanes

Line up west st and pleasant at and put in a light
Having traffic light on rt 139 work to know when to stop traffic not to cause backup in the center of town.
Careful design of any signal improvements; bypass of square to divert through traffic
Make two lane travel instead of a turn lane no one ever uses the turn lane anyway
Need more officer presence to monitor traffic and be more strict on giving out tickets

Q/A	8. Where do you live? Please indicate the five-digit zip code of your residence.	395	Total Responses
1)	*Randolph (02368)*	361	91.4%
2)	*Holbrook (02343)*	7	1.8%
3)	*Brockton, Whitman, Abington, Avon*	6	1.5%
4)	*Canton, Norwood*	6	1.5%
5)	*Braintree, North Weymouth, Quincy*	4	1.0%
6)	*East Bridgewater, Bridgewater, Middleborough*	3	0.8%
7)	*North Pembroke, Pembroke, Duxbury*	3	0.8%
8)	*South Yarmouth, East Falmouth*	2	0.5%
9)	*Boston*	2	0.5%
10)	*Clinton*	1	0.3%

Q/A	9. Please use the space below to describe specific problem locations and improvements that you would like to see implemented in the corridor.

The Turner Free Library at 2 N Main Street sees 8,000 visitors per month and turning onto Turner Lane from N. Main Street (going North) is next to impossible to access library/church parking.

Dangerous for pedestrians. Dangerous for drivers. Suggest longer lights for pedestrians, better signs. Left turn signal from Union St to South Main is very dangerous.

I'm not sure what can be done. But, good luck!

Getting on to main street off North st, (right turn by the old burger king)

Upto Liabrary

Better traffic moving through these areas.

turning from north st to north main is difficult at best, and very scary if you are turning onto warren. all it takes is for the warren light to be red when the union or south st turns green, and you quickly have a major problem

Drivers block intersection by driving through when it is backed up from Memorial Drive light and they cannot make it all the way through before light changes.

Turning on to North street

North to south main always backed up going rightnonto n main during peak times.

Better sync of lights.

When the light turns green at union/north main the light at memorial pkwy/north main is usually red, causing back up of traffic especially in the morning/evening commutes.

North main turning onto union needs clear lanes indicated on the ground and at the signal level.

Separate turn signals for left turns from union onto south Main Street. Laws being enforced for drivers, issue tickets or least detain unsafe drivers including Moped drivers that are not licensed.Maybe install rotary

Left turn lane as you approach lights in a northerly direction, becomes a problem with vehicles creating gridlock in the intersection at Crawford Square. The gridlock blocks the release of vehicles driving south from North St to South Main.

I live in Quincy and commute to Randolph for work. I also travel by foot and by car throughout Randolph for my job. In general, it's very difficult and unsafe to turn left anywhere in Randolph. Traffic is very busy and cars are driving very fast. I definitely feel nervous when walking around town. I would love to use public transit instead of driving but it more than doubles my commute time. I know that many teenagers and adults without vehicles struggle with getting around because the lack of public transportation options and the distance between locations in Randolph.

When heading towards the intersection from north street, to cross straight ahead onto South main st - the oncoming traffic coming from south main st never adheres to the lights. When they have a yield green, they rarely ever yield to the oncoming traffic, and I have see countless amounts of near crashes and a handful of crashes in just the 3 years I've been here. People also turn right on red fron north main onto main st. Constantly even though there is a no turn on red sign and clog traffic flow as a result. People also fly through the intersection forcing law abiding drivers to make split second decisions to avoid collisions.

time the lights at Memorial drive and Crawford square better.

Reduce traffic congestions so motorist stop cutting and speeding thru Howard ST to avoid it (from North St to Union St and vice versa). Install speed bumps on Howard ST.

Bike lanes in that area would be very helpful.

Crawford Square is a nightmare to navigate. Drivers ignore the yellow & red lights and drive right through causing many needless crashes. With properly timed lights and right & left hand turns fully enforced this may see a better flow of traffic. Also, the lights at Memorial drive must be properly aligned with the Crawford Sq lights - when the bus stops at Memorial Drive this also causes havoc. Eliminate that stop as there is another stop right in front of CVS - a short walk away.

Left turning arrow from up Union to South Main. Would love Crawford Square to be more walker friendly. Bikes great but need parking for shops. 139 is just too fast, like McGrath Hwy in Somerville.

Adjust traffic light at N. Main street and Memorial Drive to include dedicated right turn arrow signal from Memorial to N. Main with staggered dedicated left turn signal out of Bank-side/CVS driveway exit.

Coming north onto N. Main, many people cut from the left lane (left turn onto memorial only) over to the right at the last minute.

Heading from N. Main to Union, 2 lanes merge into 1 very quickly on the other side of the light, which causes near misses as people merge (or try to beat the other guy).

I'm no expert but IMHO making each option heading south into one lane (one for left, one for str8 onto Union, one for right onto S. Main) and taking the extra lane for northbound left turn, freeing up 2 lanes going forward onto N. Main may be an option. Light timing would need some tweaking I'm sure.

At Rush hours drivers cap the box and at other times just run the red lights. Maybe the police should do something besides drawing a salary and harassing pedestrians?

Top of North St left lane should be left turn only.

As mentioned, just after Crawford Sq heading north, the MBTA bus parks at the side of the road blocking that entire lane of traffic. This is unacceptable. Need to find a way the bus can pull off the road.
Also, still heading north, in front of church when turning left onto Warren, you have a green light and the oncoming traffic is stopped. Then all of a sudden you still have green and now they do too. We avoid making a turn there as it is incredibly dangerous. And it is dangerous going south as well because the oncoming drivers will cross in front of you.
I would like to suggest a left lane arrow lights at The intersection at crawford square.

The real problem in this area begins at West Street leading into Crawford Square heading North on Main Street. Once drivers are able to get past West Street traffic heading north after that is not bad. Traffic heading from North Street backs up pretty bad as drivers are coming from the Braintree area off the highway.

Nothing more than what I said

Better flow onto North Main Street at Crawford Square in all directions. Intersection is always crowded. Bus stop at top of the street backs traffic into the intersection and not safe for pedestrians trying to cross.

I live at the intersection of High Street and Chestnut West. I have witnessed multiple crashes and cars speeding. In the 10 years that I have lived here there have been 3 cars that have crashed into my fence. I would like to see a traffic light, a stop sign or speed bump in the road. My daughter and her friends get off the bus in front of my home.

NOT INVOLVED

Easier movement driving and walking throughout the whole area.

Coordinate the signals, move bus stop, create a town parking lot at the empty Burger King and then get rid of parking in Crawford square area.

At the intersection of Highland Ave and Memorial Parkway it is difficult to see if pedestrians are crossing and should have a blinking crossing signal.

The intersection of Highland Avenue and Mazzeo Drive is currently horrible with the backup on Highland Avenue. The addition of all the apartments on the corner is going to cause nightmarish traffic. There should be a back exit from the apartments that does not exit onto either of those extremely busy roads.

Enforcement of double parking on North Main Street must be enforced.

If the budget does not allow for a traffic signal at the intersection of Centre and South Main Street, at the very least, the road should be divided into two lanes at the end so that people going right are not waiting for people trying to make a left.

The intersection gets severely backed up down north street around 3pm. Finding ways to ease that traffic particularly for cars that aren't traveling through that major intersection would be helpful.

Enforcement of safety driving
The backups can spill over into the intersection, blocking traffic coming from different angles.

Driving from N.Main St to Union St, there is a sign on the ground indicating left turn only onto North St but it's faded & I feel there should be a sign above near the traffic lights indicating LEFT TURN ONLY. There have been many instances where I've been traveling towards Union St from N.Main St & there have been rude & ignorant drivers that simply cut me off, almost causing an accident. I'm sure most of them are aware that it's a left turn only onto North St, but they disregard the signage on the ground. So if another method of indicating LEFT TURN ONLY can be implemented, I & so many other drivers will greatly appreciate it :)

North Main St in general. I live on Rte 28, near Cartwright Funeral Home. Impossible to get in and out of driveway at any time of day and rush hour is nothing but stopped traffic

It is very hard to take a left turn if you're coming from Holbrook onto South Main Street.

The way I use the most - from South Main to North Main - the left turn signal should be longer before on coming traffic from Union Street to South Main is allowed to go.

I'd like to see some traffic calming measures introduced and possibly timed traffic lights if possible. I travel throughout the Commonwealth for work and Randolph has thee most aggressive drivers I have ever encountered. Drivers will routinely go through red lights, go around others to go through red lights, go down one ways to avoid traffic. I would like to see more traffic enforcement as well.

People taking right turns on red lights where there are signs no right on Red!
Cars going through red lights.
Road Rage!
Cars weaving in and out of traffic.
Drivers using cell phones while driving.

Just general traffic flow and safety

When I turn left from Main Street (in front of library) onto Union Street, it is difficult to get over to the right to go onto South Street. There should be a turning lane or some other accommodation.
Also, coming off South Street, it is nearly impossible at certain times of day to take a left onto union to go into Crawford Square. A light would be helpful.

cars running red lights on all sides, passing, pedestrians walking with everywhere, cars on 139 turning, it's a safety mess, I try to avoid driving through it

way too much traffic on North Street. view obstructed by trees exiting shaws onto memorial parkway

Need more st lights on pleasant st and sidewalk

All things considered I think the town of Randolph does a good job with it's financial resources. It would be useful to have more state and federal money to be able to continually improve, update and upgrade the area so everyone can move about as safely and comfortably as possible.

The town meant well by planting things. But the curb that randomly juts out beside the library on Memorial Drive to accommodate flowers will get someone killed. And, again, that tree-filled island between Shaw's Plaza and the high school defies words--you can't see when it's safe to walk or drive into the parking lot for the plaza or the high school. I avoid going to Shaw's unless it's an emergency. It's, like, all of Memorial Drive is a blind spot.

Would like to see something done about the traffic obeying the pedestrian right of way. The cars speed up on North main or fail to stop while people are in crosswalks. Especially near the JFK and RICC intersections.

Access to the Turner Free Library & more parking for the library

Cars blocking intersection due to lights not properly sequenced. Speeding trying to beat red light after light has already turned yellow. Include diagonal cross walks to minimize crossing time. Heading north on North Main Street is the primary issue regardless of which of the three sides you enter from.

Rte 139 and highland ace. Rte 139 at Main Street. South Main Street and center street

The lights are not synced traffic build up on north Main Street waiting to go through 3 different traffic signals that are not synced to allow flow of traffic

Timing of lights in Crawford Sq and at Memorial Pkwy result in traffic blocking Crawford Sq so that North St to S. Main St cannot get across.

Need some enforcement of traffic refs..drivers routinely run the light at N. Main and Mem Pkwy traveling north.
I typically come from down near Cole Terrace into Crawford, and the wait time just is not equal to the wait time from Union street

2 traffic light so close together always causes a major bottle neck especially if tractor trailers are at the lights. Some other system or timing would benefit

Dangerous intersection/ congestion on highland Ave/Mazzini drive

North Main Street always has a very high volume of traffic with a lot of aggressive drivers and congestion. Having it so narrow with the Main Street parking people are always cutting each other off or speeding to cut in the other lane.

Crosswalk at high school across Highland Ave - Poorly lit, have seen several pedestrians almost hit by cars.
Cole Terrace - better signage that each side of the divider is one way, maybe arrows painted to show the direction of traffic. Have had many cars driving towards me going the wrong way on that street.
Woodlawn Rd & South Main St - There is a recent convenience store built across from Woodlawn Rd, and the entrance/exit is almost directly across from Woodlawn. That should be a right turn only out of the parking lot, to avoid people cutting directly across or turning left into cars that are trying to turn out of Woodlawn or onto Woodlawn.

Short physical spans between lights creates traffic jams. Light cycles should be timed better to avoid this. Also white hash marks should be in the intersection with proper signage about not blocking the intersection followed by enforcement of this.

The so-called "beautification" of Memorial Drive is very dangerous as drivers who are trying to either enter Shaw's parking from the west or exiting the parking lot to the east cannot see oncoming traffic. This is very dangerous and even police officers have complained. Additionally, the taking of parking spaces from North Main and Memorial Drive by building out curbing only causes more angst. That was a waste of money.

All of Crawford Square is not equipped to handle the very large volume of cars and buses, as well as pedestrians. I do not see very many bicycles which I'm glad about because I believe they would be at risk.

I'd love to see bike lanes/walking paths or side walks all around town (similar to what Braintree has down connecting to North Street. I believe that this would promote a different means of transportation and it would also promote a healthier lifestyle for people in our town.

I never considered Bus traffic to be an issue until taking this survey but to add that into the high volume of cars and traffic during peak hours can be cumbersome to people who drive through it daily apart of their commute.

Light on north main st near Memorial p
PKWY TO SYNC with on coming traffic both ways from Holbrook and South Main street so it doesn't block traffic coming n
NORTH St

Sidewalks are often in poor condition and used for off street parking. The roads are in decent condition for driving but are difficult for cycling along all roads in the area of study. Pedestrians must do multiple street crossings to "cross the street" which leads to jaywalking. The lack of bike lanes lead to shared use of travel lanes which is not expected/welcomed by drivers.

Drivers continue through red lights to beat traffic (sometimes 3-5 cars) so that a pedestrian doesn't have time to completely cross the street. You get stuck in the middle island on Memorial Parkway.

Going north on S main taking left onto north main can be tough when light changes from cars entering the intersection from North St when that light turns green

I would need to more time to analyze the problem, in order to make suggestion.

Synchronized traffic signals. And for cars traveling on N. Main Street heading away from Crawford Square, the light at Warren Street should have left turn signals separated and should alert drivers taking a left turn onto Warren Street when it is no longer safe to turn, i.e., when the delayed green for traffic heading toward the Square changes. Cars making a left turn onto Warren are a total danger to those attempting to go straight, and every car that tries to beat the oncoming traffic takes that left at an increasingly sharper angle.

The intersections need more traffic lights.

Bottleneck traveling north on south main and Crawford square.
Double parked vehicles on north main heading south from Crawford square.

Poor lighting and visibility at memorial drive and highland ave. (hard to see pedestrians at night)

Traffic always seems to be tied up at the top of North St. trying to get over to South Main.
South St is a nightmare to get on to Union street

There have also been lots of accidents and injuries in that area from people crossing.

Covered in survey.

All pedestrian crossings should have signs that flash to indicate someone is crossing. Also there should be more light on pedestrian crossings at night.

I live three streets away from South Main Street and itâ€™s awful how many cars go over the speed limit and have their music blaring or their muffler missing. This goes on all night and I wish someone could ticket them.

Two things are needed in my opinion. 1. put a red left turn arrow at S, Main to go onto N. Main. Would fix the worst of the problems there. 2. Regular police enforcement there to ticket people who run through the red lights on all sides plus those idiots who want to avoid the long left turn light at S. Main and take a left from the right lane in front of Stetson Hall. I see this routinely

Painted lanes with arrows indicating left- or right- only turns from Cottage St. onto Main St. so that drivers in the center of the road will not block others from turning the other direction and that drivers will stop turning left from the right side and turning right from the left side, and to visually cue wrong-way drivers that they should not be turning onto Cottage St. from Main St.
From experience it doesn't matter what suggestions are made. The state engineers make the decisions and that is it.

At the main intersection n main/union- north st/south st the 3 lanes need to be clearer. As said previously, there should be the white and black signs attached to the lights that say left/straight/right turn lanes

The light by the old Burger King has a left turn only signal that is great, but when the light turns green for all, the people on the left lane only lane do not stop and always an absolute mess. It is very hard to take a left on rt 28 going down the street that burger king is on. The lights by the high school and the lights by burger king are too close and it gets backed up.

Ordinance against loud mufflers and careless speeders.
Ease congestion, make it pleasant to drive through those areas.

Gridlock during rush hours preventing vehicles from moving on green lights. Truck fumes spewing when they idle at lights. Pedestrians jaywalking. High traffic volume. As I mentioned earlier a no-lights traffic circle would help avoid general gridlock and idling trucks, and make everything go smoother.

The left turn at McDonald's when the light is green. Cars continue to drive forward from the location of Wendy's , and that shopping center.

At the intersection of North Street and North Main Street vehicles can go into 3 directions; right onto North Main, straight onto South Main or left onto Route 139. If vehicles are going left onto route 139 and vehicles are going right onto North Main Street you are block and cannot go straight onto South Main. If there was a lane on the right were the Burger King is cars going onto North Main could be that lane leaving a lane open to go straight onto South Main Street.

Lights at memorial drive & lights at union & main st need to be in sync

Traffic calming devices and less on street parking on North Main Street

Heading up North Street to head down 28 South is extremely hazardous as trafic turns left in front without stopping and rraffic heading up Union to 28 North blocks the intersection.

Better traffic flow,lower speed of vehicles,more police monitoring and citations handed out,easier access to businesses,better timed traffic lights

See previous "other" comments. Mainly issues with merging or congestion headed both ways between N Main and Union.
Move bus stop to further up North Main St. Don't allow left turns from North Main St onto North Street.
More police patrolling the main streets. Crack down on speeding and people who don't have a clue how to drive.

Previously mentioned - light for cars heading north into the square from South Main St should turn red when the North St. light turns green. Turning off the green arrow does nothing, most of the cars do not yield. They actually speed up. It is also very difficult to make a left turn onto Union St. as the cars heading down to North St. fly through that intersection.
Traffic gets bogged down coming thru the square because of the light at Memorial Parkway.

The road isn't wide enough in Crawford Square for 4 lanes of traffic and parking of wider vehicles on both sides. Parked pickups and larger cars stick out into the travel lane, forcing cars into the left lanes.
Maybe fewer cars would travel through Randolph if we had more traffic lights slowing down the drive through town. Lights at Center St., Pleasant/West St. intersection and a sensor light at Liberty or Allen would slow down traffic a bit and cut down on drivers making dangerous entries into traffic. I regularly travel Main Street in late afternoon and traffic is heavy and drivers are impatient.

The turning lanes facing Stetsin hall are very confusing. Ita hard to know who is going straight and who wants to turn left. The right side signal is great but turning left or going straight through the intersection is a free for all.
it seems to work the way it is and I have used this intersection for over 55 years
Sometimes people get impatient when the MBTA or BAT bus is parked in front of the WIC office and it holds up traffic.

Safety

The lengthy track of shrubbery across from the Randolph high school (memorial pkwy) is a accident waiting to happen. Pedestrians dart out to the other side of the street... drivers can not see them coming from the other side.

The 3 way intersection of Memorial Pkwy and Highland Ave (at back of America atm) needs a traffic signal. Not only is it dangerous for drivers but pedestrians crossing both ways also.

I would love to see protected bike lanes. I drive because biking in this area is so unsafe.

People drive way to fast. WAY TOO FAST.

Butter mark lanes at lights

Bus stops are too close to the intersection, causing back up when light is green. Too many drivers running the light.

Aggressive driving and speed is a major town wide problem,

parking infringes on lanes of travel

The town needs to create bypass roads or some type of flyover to take heavy traffic away from Crawford Sq. Residential side streets, such as School/Moulton, are being used by too many dangerous drivers speeding at all times of the day/night. Coupled with violent crime and too much trash, no sensible person would choose to walk or patronize the businesses in Crawford Sq. In order to feel safe, the area must actually be safe and clean.

too many drivers use Randolph as a drive thru when rt 24 has accidents. I live on High Street and that becomes too busy and backed up. St High and Canton you need real street lights, too many accidents!

Improved traffic flow, reduced congestion.

Drivers ignoring pedestrian crossing or running red lights. Also too many 18 wheeler trucks rumbling thru center causing pollution and deteriorating pavement. At intersection of square, drivers turn left ignoring drivers going straight. Some days itâ€™s a free for all with drivers going thru red lights too.

The light near the library. When people take a left from holbrook139 they should have a arrow

Maintain a strong connection with Randolph. Went to the office in Randolph for years. Worked in Randolph. Folks lived on Mill Street.

Finish the rail trail. Make it connect to the Red Line in Braintree. Provide a real option for folks.

End cars from pulling onto 28 and stopping traffic when emerging from South Street. Make it one way (south).

Put traffic lights at the intersections of Pleasant and North Main St, and the street beside the old Sudbury Farms Shopping Center and North Main Street. This would remove the difficulty of turning onto North Main Street from this streets, and slow traffic down in an area where there seems to be a lot of congestion and in and out.

When I was learning drive in 1992-93 the square it only just the blinking lights. But it like over I want say about 25 years since they put traffic lights. Now it's rime to change it right now. Like the light turning left on too warren st needs it own light for it self. I have seen almost carshs.

Intersection at Union St North St and S. Main traffic congestion

The light at Crawford square needs dedixated turn lanes and dedicated turn lights. Most often crashes happen from people turning when there is very little time to turn. Dedicated turn lanes and lights will help reduce crashes and hopefully improve the throughput of traffic.

Left turn at intersection of North St and North Main are very difficult; often have to wait through more than one light cycle

Cars do not pay attention to the lights posing a hazard to both pedestrians and other drivers.

North St./Union St./North Main-South Main St. intersection gets backed up from cars making a right from North St. and then trying to make a left on to Memorial Drive.

Striping through the intersection

the light signals need work coming from north st heading towards Avon is a challenge people on opposite side green arrow turn will block road,also the light at wic building bus stop needs to some how be adjusted will turn red causing backup for traffic trying to head to avon or union st

I would like to see the traffic signals at the Warren and North Main St intersection improved. Maybe delayed arrow for left turn onto North Main St. from Warren so that people coming from the Bank of America side can get out safely. Many drivers taking the left onto North Main from Warren seem to think that they have the right of way, even though they are taking a left turn.

Better traffic flow and more parking to accommodate business.

Just bike lanes on busy roads would help. Also the trees on the median between the shaws plaza and the high school can cause line of sight issues when taking a left out of shaws lot

An addition of signal lights near 300 N. Main Street at the plaza where America's Food Basket, Dollar Tree, and additional businesses is needed as it is very difficult and often times dangerous when there are cars trying to turn left or right onto N. Main Street out of the parking lot and cars are coming in both directions of N. Main Street. Sometimes a car will stop to let you go but many times not.

Drivers who enter an intersection knowing the light will change before they get through it because of congestion, but enter regardless. This blocks the intersection for the driver coming from a different direction

Specifically turning from South St onto Union St (left turn, toward N Main St) is difficult. Need to pull out more than comfortable to get line of sight in both directions.

Lights at West and North Main

CCTV generated traffic violation citations

Move the bus stops further down the road and have a spot for the bus to pull into. On a left turn arrow have next set of lights in sync for longer time.

Randolph Center is a shit show. Speeding, running red lights, turning on red when signage specifically says no turn on red, pedestrians not using crosswalks/walk lights or using the walk lights incorrectly.

Twice in the last month I've been stopped at an intersection, once to go straight once to turn left, when a driver has pulled up on my left in the opposing traffic lane and cut me off.

Good luck fixing it!

Keep 18 wheelers off the area during rush hours.

Use electronic signage to discourage wrong way driving on Diauto Drive.

Cars going through light at Memorial Dr. when traveling both north and south on route 28/139.

Not in your study but intersection of 28 and West St. is awful and dangerous! Need traffic light!

I grew up with just blinking yellow light at the Square....and Learned how drive threw with the blinking yellow light's.

I would love to see more turning signals. Should not let cars park on North Main, there are businesses out there but it is really a struggle to pass the set of lights across the library with the bus stop, cars trying to pass the bus, the cars coming from SMS, Union st.

I love living in Randolph. Anything to make the community better.

Bus stop at top of north main st. ALWAYS backs up traffic. Green arrows on that street should be green lights - these are never long enough and cause people to cut others off. Speed is a factor - I feel badly for pedestrians (especially kids going to and from high school).

Keep streets signs and lines paintings around the high school area in better shape so drivers can see them very well. Add crossing signs timing for pedestrians at Memorial Pkwy and Highland Avenue.

Please repaint all pavements lines.

Police present on Union street 139 East to many cars driving over the speed limit.

Union st starting at the intersection at stetson hall crossing onto union st. The 2 lane roadway its a blind spot when cars are turning right but one lane goes straight. The cars turning left onto union Street cannot see and cars going straight on union st cannot see either. Very dangerous.

Longer arrows at lights in general... Left to Memorial Dr needs to be longer & that light needs to be green faster & longer going straight down Main..as backup starts at previous light with a long red...or during heavy traffic times forbid/Detour travel to Main St from Memorial... Except obviously Fire Dept

Like Avon center, way too much speed and congestion, go back to single lanes, why is 28 single lane until the center of town then it turns to two lanes, same in Avon. reroute trucking where possible !!!

Safer crossing lanes from North Main St to Union St

Traffic study is a great place to start so long as its followed up with improvements being made.

Crawford square can be crazy to navigate during peak commuter times. North Main street from beginning to end is bumper to bumper parking lot during commuter times and can be a speedway at other no peak times.

People blocking the intersection at the square is a daily event and happens multiple times a day. (basic driving rules of the road I know...? Don't block an intersection? But perhaps signage, and a grid pattern painted in the intersection and a period of marked enforcement to deter?

Getting proper arrows painted for turn only lanes would help (and follow up with enforcement). Perhaps a green arrow turning left from N. Main to North St would be helpful?

Traffic lights should be explored for South St/Union St intersection (perhaps blinking during low/non peak hours but regular cycling during heavy traffic times (am/pm)?

A dedicated right turn lane onto Memorial Parkway would be helpful.

Overly aggressive drivers run lights and block intersections

Drivers running lights, clogging intersection

Main problem areas are intersection where N Main, S Main, North meet and Memorial Drive and N Main meet. The traffic lights between these two intersections are too close together and poorly synchronized, causing slot of bottlenecks particularly during peak travel times. I would like to see left turn lights at the major intersection. One street traffic flowing into the major intersection at a time. At issue, though, is how to address Memorial Drive and N Main intersection and its close proximity to the major intersection. While not part of this study, traffic lights are needed on N Main farther away from this intersection to slow the traffic heading up to these two intersections, reduce volume of accidents, and to improve pedestrian safety.

too many streets converge in same general area - including off north street. Lights do not match amount of traffic. Library and old BK in poor location.

This section of Randolph is very congested with traffic. Knowing this is a pass through route, it would be nice if we could reduce the number of speeding motorists in this area.

Not only are aggressive drivers (throughout Randolph) a major problem, but also pedestrians that ignore crosswalks and just walk right into traffic without looking are a hazard too.

Also, the decorative island plantings on Memorial Parkway, while beautiful, also present a visibility issue - it is very hard to see oncoming traffic when leaving the parking lots.

Uniform lighting, traffic safety, improved traffic pattern, introduce more trees and gardens in the area. Aesthetically and historically the center of Randolph had a lot of greenery.

Ability to turn left all directions in heavy traffic. Better sight lines especially from North Street and South Main Street.

The intersection just gets too congested and cars sit in the intersection. Creates log jam of cars unable to move.

Move bus stop. No bike lanes, direct them around this congested area.
Thank you for listening.

Need more crosswalks across Memorial Drive and Shaw's Plaza.
Two sidewalks on Highland Avenue, both plowed in winter.

To add to my comment about 25 mph speed limit on Highland Ave., no one observes 20 mph speed limit passing Randolph HS.

It is soo difficult to cross North or South Main Street. Not enough crosswalks. Drivers turn into lane even when their light is red, especially major intersections.

It's difficult to make the left (or right) turn where South Main continues on. Or to turn onto Union Street. Hard to anticipate when someone will speed by. Or have a break in traffic.

Those turning left from North Main Street onto North Street or left from Union St onto South Main Street are few but back up the traffic which is 95% going straight.

The speed limit is too high. I live on South Main Street. The posted speed limit is 40 mph. Drivers consistently exceed that limit. I've lived in Randolph for a little over a year and I've already seen three major crashes just within yards of my home.
Replace the Burger King property with a small park if no one wants to lease it. It's been empty for years and makes the town look bad.

Difficulty walking because of the flow of traffic. Traffic arrows needed to allow for drivers to make turns without getting stuck in an intersection.
Also, some streets don't allow traffic to merge easily because drivers don't slow down or even stop.
We also need some green space in square that allows for relaxing and even if you wanted to just sit and have something to eat.

The lights

Buses travel more frequently.
Better Street light coordination so that cars don't get stuck in the very short section next to the library.

More cross walks

N/a

My concerns are the following:
. Traffic congestion
. Long stop lights
. Difficulty exiting side streets
Cars traveling too fast - many go through red lights. Makes it difficult and/or dangerous for walkers crossing.

FREE Driving Law with spot-checks of drivers as once done with seatbelts

The time allowed pedestrians to cross N. MAIN or WARREN, S. MAIN, UNION and where I live at N MAIN @ OAK is too short and while the traffic is stopped North and South, drivers entering MAIN ST in either direction take off too fast. Some are going to fast to stop at a RED LIGHT and that takes time away from pedestrians trying to cross. Then others turning onto MAIN going N or S can also kill us even seeing pedestrians in the middle of a crossing

ENFORCE INTERSECTIONS WITH NO TURN ON RED SIGNS - MOST MOTORISTS CAN'T SEE THEM OR TOTALLY IGNORE THEM. This is how I am taking great risks every day when I walk trying to cross N MAIN at OAK

Right turn at Burger King onto Main trying to get into left lane to go down Memorial is very difficult. A street through BK parking lot with light at end straight onto Memorial and right turn only. Perfect!

The line of traffic approaching the light in the center is often very congested and multiples light cycles to get through, even mid-day. Furthermore, turning left toward JFK can feel challenging safety wise.

The traffic lights need to be timed for a better flow. It is very congested.

More stop signs and less traffic lights. More defined cross walks

Better left turn signal coming from main st.

Traffic from union street to north Main Street in the morning is horrible

Although there is a lot of congestion after 3:00pm along N Main St., I'm not sure anyone can fix this problem. There are simply a lot of people who use the road.

I'm driving almost every single day to the North Main st and would like to point out. There are people crossing without looking out for traffic. Making it worse than ever for driver. I would like to have police officers stay there and give tickets to whoever crossing wrong way!

Getting out of Shaws parking lot, particularly adjacent to Memorial Drive, Better signage and arrows to direct you to exit. Getting out of Silver St to Warren 139, cars speeding won't let you out. Trying to access Memorial Drive after passing Shaws on Highland Ave, People speed from opposite direction and take the right so you have to stop blocking drivers who are trying to exit Memorial Drive. Getting out of West street onto Main Street people cut you off by not stopping. Need more police or cameras to monitor out of control drivers.

The bus stop in front of the old WIC office creates SO much traffic on n main st, especially when turning right from the old burger king, you merge and then Immediately have to change lanes or wait behind the bus

More policing
Left turn from n main onto south st.
Left turn from a main onto n main

A little north of the study area between West St and Warren st is a traffic nightmare for pedestrians and people turning into and from the side streets and plazas. Drivers show no courtesy and ignore the crosswalk OR try to pass a car that is waiting in the turning lane and almost hitting pedestrians because they think N Main is a speedway.

Traffic law enforcement. Road repair. Visible street lines.

Poor line of site depending on your approach direction. Aggresive driving, and overall high volume area.

Drivers don't follow basic road rules. Not enough room on the lane for the turn onto the plaza with 5 guys going south on Main. Aggressive merging at the main intersection when the light turns green. excessive use of the Boston left. cars don't know how to utilize the middle lane for turning into area shops

Prohibit the left turn from Memorial Drive onto North Main Street. Extend Memorial drive to the Burger King. Make that a west bound one way. Make South Main Street a southbound one way to Crawford Square and make North Street a northbound one way. Put a giant green space park in the middle.

Many people do not stop for the red lights to allow pedestrians to cross, many times I have the white walking man to cross the road and people in cars come inches away from hitting me, because they do not stop. Then one I have passed that lane they are in they proceed through the red light. And the walking man is still lit up.

Delayed lights for turns. Some way to slow fast aggressive drivers. Thank you

Add a turn arrow for the traffic leaving bank of America parking lot.

Need to have a bike path throughout Randolph just like Braintree did.

There are limited green arrows for left-hand turns at the North/Main/South/Union intersection, which increases congestion and decreases safety. This is a particular problem when traveling south on North St to turn left onto Union. You are driving up a hill, so you cannot see oncoming traffic if there are any cars in the left-hand turn lane from South St.

In Crawford square the lights need to change. South main Street to North main Street. Change it to a blinking yellow light. People think they have the right away when it's a solid green light and don't wait for the people going strait when the light turns.

Don't see any

Coming from South Main towards Crawford Square, the left lane to get onto N Main definitely needs improvement. We take our child to school in Milton and have to go straight onto North and then a left on Mill to get to N Main. Not sure how to improve it because of the light by the bus stop and high school path. But that light, which I know is needed is what makes the traffic.

Drivers from adjacent towns that are impatient with traffic congestion block intersection at lights blocking turning traffic. Tractor trailer traffic is very high also block intersection.

Mid day congestion in Crawford sqLights take too long

Use eminent domain for the americas food basket plaza - line up pleasant and west st and put a light

Educate people about turning lanes

When driving straight from North Main and entering Union St. from the middle lane, drivers iN the left lane going straight try to crowd out the driver in the middle lane with a straight only arrow. Why isn't the left lane a left turn only lane? This has 2 lanes merging into 1 lane.
What about using left Turn only green arrow to reduce congestion?
Thank you for looking into this.

Not sure

need to have tough traffic enforcement at this intersection with consequences, you can't cross walking without fearing being hit....it prevents walking to the center of town,.

Make the lights timed properly. If youre not the first to go at the cvs light youll be sitting at a light in the center.

Dangerous--northbound traffic on S Main that turns left onto N Main continues to go after the green turn light shuts off. Left turning traffic runs into Southbound traffic.

Often there isn't enough room for cars turning left from S Main, to get onto North Main then the quick left lane to turn onto Memorial parkway.

Thank you!

There's always traffic stuck in the middle of the Crawford square due to the traffic light at memorial park way. Left turn signal needs to be longer. At the same time traffic light should stay green long enough to get traffic out of Crawford square. Or detour traffic from turning left onto memorial park at morning and evening rush hour traffic.

Crosswalks are not used, drivers are untrained or too aggressive, lack of enforcement..what gets monitored gets done!

Left-hand turn from S. Main Street NB to N. Main Street NB should be a separate signal phase. Current phasing creates unsafe conflicts with North Street SB traffic to S. Main Street.

Signals at Main Street/North Street/Union Street should be fully coordinated with signals at N. Main St/Memorial Drive.

There should be a dedicated right-hand turning lane from North St SB to N. Main Street NB.

Consider pedestrian overpass over N. Main Street at Memorial Drive.

Take the former Burger King property to give more space for improvements

Northbound drivers on 28 block the intersection at North St. when the light turns red.

I think previously it was much better for traffic because there was two lane travel previously now there a turn lane but no one ever uses it . I also think there should be a light installed infront of axp as there are multiple accidents.

Traffic backs up into the square when the lights at Memorial Drive are Red. The lights at both To Main Street and from the Center should be green at the same time. The backup happens when you go through the square and then stop at Memorial Drive.

Lights in Crawford square and North Street

The library entrance/exit right on main street just b4 intersection is dangerous. Also, Right turns with arrows would help.

exiting library to go down union st is almost impossible at time- lights are too slow, and traffic keeps coming up from memorial parkway and turning right which just complicates the problem

taking a left turn from north main st to north st is dangerous- oncoming union st traffic doesn't stop-

likewise taking a left turn from north st to union st at the intersection, one cannot see oncoming lane of cars who are speeding to get down north st. - when cars are stopped at square (coming from south main st.) trying to take a left turn onto north main st, visibility of cars in other lane trying to go down north st is dangerous.

taking a left turn from union st to south main st is very dangerous as oncoming southbound traffic to union st speeds up and causes drivers to switch lanes when trying to get by stopped car attempting to turn left.

horrible design of intersection and traffic control

Thank you for looking for solutions.