



CITY OF HAVERHILL CITY COUNCIL AGENDA

Tuesday, May 25, 2021 at 7:00 PM

Theodore A. Pelosi, Jr. Council Chambers, 4 Summer st, Room 202

In-Person/Remote Meeting

Due to the ongoing COVID-19 Pandemic, Governor Baker issued an Emergency Order temporarily suspending certain provisions of the Open Meeting Law, M.G.L. c. 30A sec. 20. Public bodies otherwise governed by the OML are temporarily relieved from the requirement that meetings be held in public places, open and physically accessible to the public, so long as measures are taken to ensure public access to the bodies' deliberations "through adequate, alternative means."

1. OPENING PRAYER
2. PLEDGE OF ALLEGIANCE
3. APPROVAL OF MINUTES OF PRIOR MEETING
4. ASSIGNMENT OF THE MINUTES REVIEW FOR THE NEXT MEETING
5. COMMUNICATIONS FROM THE MAYOR:
 - 5.1. Mayor Fiorentini requests to give an update on Haverhill's efforts regarding the Coronavirus (COVID-19) crisis along with Councillor Daly O'Brien.
 - 5.2. Mayor Fiorentini requests to speak regarding the FY22 Budget
 - 5.3. Mayor Fiorentini submits paperwork to be submitted to the Massachusetts School Building Authority Board (MSBA) which is necessary for renovations to the Moody School and a new roof at the Silver Hill School; and requests approvals of the 2 SOIs
6. COMMUNICATIONS FROM COUNCILLORS TO INTRODUCE AN INDIVIDUAL(S) TO ADDRESS THE COUNCIL.
 - 6.1. Councillors Jordan, LePage and Michitson to introduce Director of Facilities, Steve Dorrance to give an update on the status of school and city buildings
7. PUBLIC PARTICIPATION- REQUESTS UNDER COUNCIL RULE 28
8. COMMUNICATIONS AND REPORTS FROM CITY OFFICERS AND EMPLOYEES:
9. UTILITY HEARING(S) AND RELATED ORDER(S):
10. HEARINGS AND RELATED ORDERS:
 - 10.1. Document 32-B: Application for Special Permit CCSP 21-7; 0 Railroad av - Site Plan Review Major; from Attorney Michael Migliori representing PE Partners LLC to construct 290 apartment units and approximately 6,500 S.F. retail space on existing vacant parcels owned by the City on Railroad av; and Skateland site also on Railroad av
Applicant requests on April 13th to move Hearing to May 25 2021
Several related comments/documents are included
11. APPOINTMENTS:
 - 11.1. Confirming Appointments
 - 11.2. Non-Confirming Appointments
 - 11.3. Resignations
12. PETITIONS:
 - 12.1. Applications Handicap Parking Sign
 - 12.2. Amusement/Event Applications:
 - 12.3. Tag Days
 - 12.3.1. *HHS Wrestling June 12, 13*
 - 12.4. One Day Liquor License:
 - 12.5. Annual License Renewals:



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- 12.5.1. Hawker Peddlers License 2021 - Fixed location
- 12.5.2. Coin-Op License Renewals 2021
- 12.5.3. Drainlayer License for 2021 - with City Engineer approval
- 12.5.4. Christmas Tree Vendor
- 12.5.5. Taxi Driver Licenses for 2021
- 12.5.6. Taxi License/ Limo/Livery:
- 12.5.7. Junk Dealer License
- 12.5.8. Pool Tables
- 12.5.9. Sunday Pool
- 12.5.10. Bowling
- 12.5.11. Sunday Bowling
- 12.5.12. Buy & Sell Second Hand Articles
- 12.5.13. Buy & Sell Second Hand Clothing
- 12.5.14. Pawnbroker license
- 12.5.15. Fortune Teller
- 12.5.16. Buy & Sell Old Gold
- 12.5.17. Roller Skating Rink
- 12.5.18. Sunday Skating
- 12.5.19. Exterior Vending Machines – 2021 renewals
- 12.5.20. Limousine/Livery License/Chair Cars

13. MOTIONS AND ORDERS

14. ORDINANCES (FILE 10 DAYS)

15. COMMUNICATIONS FROM COUNCILLORS:

- 15.1. Council President Barrett and Councillor Michitson request to make remote, virtual participation in public hearings and meetings a permanent fixture of City government
- 15.2. Councillor Michael McGonagle requests removal of a handicap parking space at 58 Webster st, as it is no longer needed

16. UNFINISHED BUSINESS OF PRECEDING MEETING:

- 16.1. Document 62: Order – as part of FY 2022 annual budget \$208,510,412 be and is hereby raised and appropriated within the categories as designated and appropriated as listed and further that said appropriations be funded in the manner as listed:

\$210,581	Water Receipts
624,236	Wastewater Receipts
4,900.00	Free Cash
760,000	Transfer from Special Revenue (ARPA)
\$202,015,595	Taxation and Other Receipts

- 16.2. Document 62-B: Order – as part of FY 2022 annual budget the sum of \$45,000 be raised and appropriated from the Hospital Trust Funds and transferred into the General Fund as follows:

Public Health Salaries \$40,000
Public Health Expense \$5,000



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- 16.3. Document 62-C: Order – as part of FY 2022 annual budget the sum of \$100,261,618 be appropriated to operate the Water Dept for items marked as appropriation on the attached:

\$9,415,975 come from Water Revenue

\$2,056,224 come from available Retained Earnings

\$210,581 be appropriated in the General Fund and funded from Water Receipts

- 16.4. Document 62-D: Order – as part of the FY 2022 annual budget the sum of \$12,802,632 be appropriated to operate the Wastewater Dept for items marked as appropriation on the attached

\$13,392,665 come from Wastewater Revenue

\$34,202 come from available Retained Earnings

\$624,235 be appropriated in the General Fund and funded from Wastewater Receipts

- 16.5. Document 62-E: Order-that City council in accordance with the City Ordinance Chapter 83 set the annual budget for the following revolving funds:

Recreation and Youth Activities \$175,000

Veterans' Memorial Skating Rink 456,000

Citizen Center Rental 25,000

Council on Aging Activities 50,000

Wood School Daycare 100,000

Municipal Open Space Management 100,000

All budget orders are postponed from May 18 2021

17. RESOLUTIONS AND PROCLAMATIONS:

18. COUNCIL COMMITTEE REPORTS AND ANNOUNCEMENTS:

19. DOCUMENTS REFERRED TO COMMITTEE STUDY

20. LONG TERM MATTERS STUDY LIST

21. ADJOURN

JAMES J. FIORENTINI
MAYOR



CITY OF HAVERHILL
MASSACHUSETTS

511

CITY HALL, ROOM 100
FOUR SUMMER STREET
HAVERHILL, MA 01830
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May 21, 2021

City Council President Melinda Barrett and Members of the Haverhill City Council

RE: Communication from the Mayor regarding Coronavirus

Dear Madame President and Members of the Haverhill City Council:

I am requesting to address the City Council at their meeting on Tuesday, May 25th, to give an update on Haverhill's efforts regarding the Coronavirus (COVID-19) crisis.

Very truly yours,

James J. Fiorentini
Mayor

JJF/lyf

JAMES J. FIORENTINI
MAYOR



**CITY OF HAVERHILL
MASSACHUSETTS**

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CITY HALL, ROOM 100
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May 21, 2021

City Council President Melinda Barrett and Members of the Haverhill City Council

RE: Communication from the Mayor regarding FY2022 Budget

Dear Madame President and Members of the Haverhill City Council:

I wish to speak before the city Council Tuesday night concerning the FY 2022 Budget.

The budget this year, for the 18th year in a row, is balanced with no request for an override or a debt exclusion. While there are always needs, we also have to take into account the financial pain that our taxpayers are undergoing and their ability to pay. This budget balances meeting our needs with meeting the needs of the constituents we represent.

The big change in the budget is the request to create a new Department of Public Health. That Department of Public Health would consist of public health nurses, a social worker and an administrative assistant. If the Council approves the creation of this Department of Public Health I will ask our Citizens Center Public Health Nurse, Mary Connolly, to be the first ever Director of the Haverhill Department of Public Health.

This pandemic has shown us that we need to do more to improve the public health of our citizens. We need to provide more education. We need to do more outreach. We need to have more clinics in the neighborhoods. We need to do more testing and we need to do more vaccinations of every type.

We certainly cannot do everything in one year, nor should we try, nor can we do everything on our own. I envision a Department of Public Health that works closely with our medical providers, the hospital, PMA and particularly the Greater Lawrence Family Health Center in order to provide these services.

I would like to be before the Council to speak about this on Tuesday night.

Respectfully submitted,

James J. Fiorentini
Mayor

JJF/lyf

JAMES J. FIORENTINI
MAYOR



**CITY OF HAVERHILL
MASSACHUSETTS**

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May 21, 2021

City Council President Melinda Barrett and Members of the Haverhill City Council

RE: MSBA Application for Funding Renovations to the Moody School and the Silver Hill School

Dear Madame President and Members of the Haverhill City Council:

Enclosed please find paperwork to be submitted to the Massachusetts School Building Authority (MSBA) Board which is necessary for renovations to the Moody School and a new roof at the Silver Hill School.

Steve Dorrance, Facilities Maintenance Director, asked that we submit to the MSBA a request to replace the roof at the Moody School. In addition, he asked that we also submit an application to replace the windows and boilers at the Silver Hill School. I am inclined to support both requests but asked for more information.

There was discussion at the School Committee meeting about whether or not the Moody School was eligible to apply for this funding. When this first came up for discussion it did not appear that the Moody School was eligible under the MSBA guidelines. Mr. Dorrance asked that as a backup, and in the event the Moody School was not eligible, that we consider replacing the roof at the Silver Hill School. While the roof at the Silver Hill School is not leaking we do regularly check these roofs and Mr. Dorrance felt that it was nearing the end of its life expectancy. We agreed that this would be a good back up to the Moody School.

At the School Committee meeting on May 20, Mr. Dorrance was not able to attend. Assistant Superintendent Mike Pfifferling indicated that it now appeared that the Moody School was in fact eligible. The School Committee voted to submit applications for both schools projects at the same time.

I am in favor of supporting both school projects, however, we do not have any cost estimates. Even with greater than 70% reimbursement from the state, I cannot commit to paying the city share until I have a cost estimate.

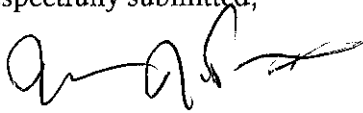
We also need more information on how the city's portion will be paid. The School Department is receiving millions of dollars in one-time money. The federal government has indicated to them that one portion of this one-time money should be used for one-time items. This would be an ideal use of the School Department one-time funds. Using one-time federal money to leverage obtaining state money so that we can do more is exactly the direction that we should be going in. We do not yet know if we can use that federal one-time school money in order to pay this.

It is my recommendation that we submit these applications to the MSBA with the understanding that we are not committing ourselves to do these projects until we know more about the total cost of

the projects and how they will be repaid. By submitting these applications we are not committed to go forward with both of these projects.

I am submitting 2 SOIs and it is my recommendation that you approve both.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'James J. Fiorentini', with a stylized flourish at the end.

James J. Fiorentini
Mayor

JJF/lyf

Silver Hill

REQUIRED FORM OF VOTE TO SUBMIT A STATEMENT OF INTEREST

REQUIRED VOTES

If the SOI is being submitted by a City or Town, a vote in the following form is required from both the City Council/Board of Aldermen **OR** the Board of Selectmen/equivalent governing body **AND** the School Committee.

If the SOI is being submitted by a regional school district, a vote in the following form is required from the Regional School Committee only.

**Current votes for each SOI submission are required.*

FORM OF VOTE

Please use the text below to prepare your City's, Town's or District's required vote(s).

Resolved: Having convened in an open meeting on May 25, 2021, prior to the SOI submission closing date, the City Council of Haverhill, Massachusetts, in accordance with its charter, by-laws, and ordinances, has voted to authorize the Superintendent to submit to the Massachusetts School Building Authority the Statement of Interest Form dated May 20, 2021 for the Silver Hill Elementary School located at 675 Washington Street, Haverhill, Massachusetts, which describes and explains the following deficiencies and the priority category(s) for which an application may be submitted to the Massachusetts School Building Authority in the future. Priority 5 - Replacement, renovation or modernization of school facility systems, such as roofs, windows, boilers, heating and ventilation systems, to increase energy conservation and decrease energy related costs in a school facility; and hereby further specifically acknowledges that by submitting this Statement of Interest Form, the Massachusetts School Building Authority in no way guarantees the acceptance or the approval of an application, the awarding of a grant or any other funding commitment from the Massachusetts School Building Authority, or commits the City/Town/Regional School District to filing an application for funding with the Massachusetts School Building Authority.

DOCUMENTATION OF VOTE

Documentation of each vote must be submitted **in hard copy** to the MSBA as follows:

- 1) For the vote of the City Council/Board of Aldermen or Board of Selectmen/equivalent governing body, a copy of the text of the vote must be submitted **with a certification** of the City/Town Clerk that the vote was duly recorded and the date of the vote must be provided.
- 2) For the vote of the School Committee, Minutes of the School Committee meeting at which the vote was taken must be submitted **with the original signature** of the Committee Chairperson.

Massachusetts School Building Authority

Next Steps to Finalize Submission of your FY 2021 Statement of Interest

Thank you for submitting your FY 2021 Statement of Interest (SOI) to the MSBA electronically. **Please note, the District's submission is not yet complete.** The District is required to mail all required supporting documentation, which is described below.

VOTES: Each SOI must be submitted with the proper vote documentation. This means that (1) the required governing bodies have voted to submit each SOI, (2) the specific vote language required by the MSBA has been used, and (3) the District has submitted a record of the vote in the format required by the MSBA.

- **School Committee Vote:** Submittal of all SOIs must be approved by a vote of the School Committee.
 - For documentation of the vote of the School Committee, Minutes of the School Committee meeting at which the vote was taken must be submitted with the original signature of the Committee Chairperson. The Minutes must contain the actual text of the vote taken which should be substantially the same as the MSBA's SOI vote language.
- **Municipal Body Vote:** SOIs that are submitted by cities and towns must be approved by a vote of the appropriate municipal body (e.g., City Council/ Aldermen/Board of Selectmen) in addition to a vote of the School Committee.
 - Regional School Districts do not need to submit a vote of the municipal body.
 - For the vote of the municipal governing body, a copy of the text of the vote, which shall be substantially the same as the MSBA's SOI vote language, must be submitted with a certification of the City/Town Clerk that the vote was taken and duly recorded, and the date of the vote must be provided.

ADDITIONAL DOCUMENTATION FOR SOI PRIORITIES #1 AND #3: If a District selects Priority #1 and/or Priority #3, the District is required to submit additional documentation with its SOI.

- If a District selects Priority #1, Replacement or renovation of a building which is structurally unsound or otherwise in a condition seriously jeopardizing the health and safety of the school children, where no alternative exists, the MSBA requires a hard copy of the engineering or other report detailing the nature and severity of the problem and a written professional opinion of how imminent the system failure is likely to manifest itself. The District also must submit photographs of the problematic building area or system to the MSBA.
- If a District selects Priority #3, Prevention of a loss of accreditation, the SOI will not be considered complete unless and until a summary of the accreditation report focused on the deficiency as stated in this SOI is provided.

ADDITIONAL INFORMATION: In addition to the information required above, the District may also provide any reports, pictures, or other information they feel will give the MSBA a better understanding of the issues identified at a facility.

If you have any questions about the SOI process please contact the MSBA at 617-720-4466 or SOI@massschoolbuildings.org.

Massachusetts School Building Authority

School District Haverhill

District Contact Margaret A Marotta TEL: (978) 265-4033

Name of School Silver Hill

Submission Date 5/19/2021

SOI CERTIFICATION

To be eligible to submit a Statement of Interest (SOI), a district must certify the following:

- ☒ The district hereby acknowledges and agrees that this SOI is NOT an application for funding and that submission of this SOI in no way commits the MSBA to accept an application, approve an application, provide a grant or any other type of funding, or places any other obligation on the MSBA.
- ☒ The district hereby acknowledges that no district shall have any entitlement to funds from the MSBA, pursuant to M.G.L. c. 70B or the provisions of 963 CMR 2.00.
- ☒ The district hereby acknowledges that the provisions of 963 CMR 2.00 shall apply to the district and all projects for which the district is seeking and/or receiving funds for any portion of a municipally-owned or regionally-owned school facility from the MSBA pursuant to M.G.L. c. 70B.
- ☒ The district hereby acknowledges that this SOI is for one existing municipally-owned or regionally-owned public school facility in the district that is currently used or will be used to educate public PreK-12 students and that the facility for which the SOI is being submitted does not serve a solely early childhood or Pre-K student population.
- ☒ After the district completes and submits this SOI electronically, the district must mail hard copies of the required documentation described under the "Vote" tab, on or before the deadline.
- ☒ The district will schedule and hold a meeting at which the School Committee will vote, using the specific language contained in the "Vote" tab, to authorize the submission of this SOI. This is required for cities, towns, and regional school districts.
- ☒ Prior to the submission of the SOI, the district will schedule and hold a meeting at which the City Council/Board of Aldermen or Board of Selectmen/equivalent governing body will vote, using the specific language contained in the "Vote" tab, to authorize the submission of this SOI. This is not required for regional school districts.
- ☒ On or before the SOI deadline, the district will submit the minutes of the meeting at which the School Committee votes to authorize the Superintendent to submit this SOI. The District will use the MSBA's vote template and the vote will specifically reference the school and the priorities for which the SOI is being submitted. The minutes will be signed by the School Committee Chair. This is required for cities, towns, and regional school districts.
- ☒ The district has arranged with the City/Town Clerk to certify the vote of the City Council/Board of Aldermen or Board of Selectmen/equivalent governing body to authorize the Superintendent to submit this SOI. The district will use the MSBA's vote template and submit the full text of this vote, which will specifically reference the school and the priorities for which the SOI is being submitted, to the MSBA on or before the SOI deadline. This is not required for regional school districts.
- ☒ The district hereby acknowledges that this SOI submission will not be complete until the MSBA has received all of the required vote documentation in a format acceptable to the MSBA. If Priority 1 is selected, your SOI will not be considered complete unless and until you provide the required engineering (or other) report, a professional opinion regarding the problem, and photographs of the problematic area or system. If Priority 3 is selected, your SOI will not be considered complete unless and until you provide a summary of the accreditation report focused on the deficiency as stated in this SOI.

**LOCAL CHIEF EXECUTIVE OFFICER/DISTRICT SUPERINTENDENT/SCHOOL COMMITTEE CHAIR
(E.g., Mayor, Town Manager, Board of Selectmen)**

Chief Executive Officer *	School Committee Chair	Superintendent of Schools
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(signature)	(signature)	(signature)
Date	Date	Date

* Local chief executive officer: In a city or town with a manager form of government, the manager of the municipality; in other cities, the mayor; and in other towns, the board of selectmen unless, in a city or town, some other municipal office is designated to the chief executive office under the provisions of a local charter. Please note, in districts where the Superintendent is also the Local Chief Executive Officer, it is required for the same person to sign the Statement of Interest Certifications twice.

Massachusetts School Building Authority

School District HaverhillDistrict Contact Margaret A Marotta TEL: (978) 265-4033Name of School Silver HillSubmission Date 5/19/2021

Note

The following Priorities have been included in the Statement of Interest:

1. ☒ Replacement or renovation of a building which is structurally unsound or otherwise in a condition seriously jeopardizing the health and safety of school children, where no alternative exists.
2. ☐ Elimination of existing severe overcrowding.
3. ☐ Prevention of the loss of accreditation.
4. ☐ Prevention of severe overcrowding expected to result from increased enrollments.
5. ☒ Replacement, renovation or modernization of school facility systems, such as roofs, windows, boilers, heating and ventilation systems, to increase energy conservation and decrease energy related costs in a school facility.
6. ☐ Short term enrollment growth.
7. ☐ Replacement of or addition to obsolete buildings in order to provide for a full range of programs consistent with state and approved local requirements.
8. ☐ Transition from court-ordered and approved racial balance school districts to walk-to, so-called, or other school districts.

SOI Vote Requirement

☒ I acknowledge that I have reviewed the MSBA's vote requirements for submitting an SOI which are set forth in the Vote Tab of this SOI. I understand that the MSBA requires votes from specific parties/governing bodies, in a specific format using the language provided by the MSBA. Further, I understand that the MSBA requires certified and signed vote documentation to be submitted with the SOI. I acknowledge that my SOI will not be considered complete and, therefore, will not be reviewed by the MSBA unless the required accompanying vote documentation is submitted to the satisfaction of the MSBA.

SOI Program: Accelerated Repair

Potential Project Scope: Accelerated Repair
 Roof
 Windows/ Doors
 Boiler

Is this SOI the District Priority SOI? Yes

School name of the District Priority SOI: Silver Hill

Is this part of a larger facilities plan? No

If "YES", please provide the following:

Facilities Plan Date: 1/1/2001

Planning Firm:

Please provide a brief summary of the plan including its goals and how the school facility that is the subject of this SOI fits into that plan:

Please provide the current student to teacher ratios at the school facility that is the subject of this SOI: 20 students per teacher

Please provide the originally planned student to teacher ratios at the school facility that is the subject of this SOI: 22 students per teacher

Does the District have a Master Educational Plan that includes facility goals for this building and all school buildings in District? Yes

If "YES", please provide the author and date of the District's Master Educational Plan.

Haverhill Public Schools District Curriculum Accommodation Plan (DCAP) Revised by the HPS DCAP Revision Committee, May 3, 2019 Beth Kitsos, Darshan Thakkar, Lorna Marchant, Tamii Lobo, Jami Dion, Patricia Juranovits, Kevin Higginbottom, and Sarah Gauvin

Is there overcrowding at the school facility? No

If "YES", please describe in detail, including specific examples of the overcrowding.

Has the district had any recent teacher layoffs or reductions? No

If "YES", how many teaching positions were affected? 0

At which schools in the district?

Please describe the types of teacher positions that were eliminated (e.g., art, math, science, physical education, etc.).

Has the district had any recent staff layoffs or reductions? No

If "YES", how many staff positions were affected? 0

At which schools in the district?

Please describe the types of staff positions that were eliminated (e.g., guidance, administrative, maintenance, etc.).

Please provide a description of the program modifications as a consequence of these teacher and/or staff reductions, including the impact on district class sizes and curriculum.

Does Not Apply

Please provide a description of the local budget approval process for a potential capital project with the MSBA. Include schedule information (i.e. Town Meeting dates, city council/town council meetings dates, regional school committee meeting dates). Provide, if applicable, the District's most recent budget approval process that resulted in a budget reduction and the impact of the reduction to the school district (staff reductions, discontinued programs, consolidation of facilities).

Upon approval of the Statement of Interest by the MSBA, the Mayor and the City Council will approve the roof replacement project, and a bid process will be initiated in cooperation with the MSBA. The Mayor anticipates that the City will fund the project and its cost share thereof from its available resources, so no bonding of the project is anticipated. The City Council meets weekly during much of the year, so it will act rapidly upon MSBA approval of the Statement of Interest.

General Description

BRIEF BUILDING HISTORY: Please provide a detailed description of when the original building was built, and the date(s) and project scopes(s) of any additions and renovations (maximum of 5000 characters).

Silver Hill Elementary School is a 3 story, 73,875 SF school which was built in 1993. The school services students in grade K through 5 along with Special Education programs. Aside from preventative maintenance work, minor repairs and limited masonry projects, all components of the building are from the original construction project.

TOTAL BUILDING SQUARE FOOTAGE: Please provide the original building square footage PLUS the square footage of any additions.

73875

SITE DESCRIPTION: Please provide a detailed description of the current site and any known existing conditions that would impact a potential project at the site. Please note whether there are any other buildings, public or private, that share this current site with the school facility. What is the use(s) of this building(s)? (maximum of 5000 characters).

The Silver Hill Elementary School abuts the Consentino Middle School and is surrounded by playing fields and wooded areas. There are no existing conditions that would impact any potential project at this site.

ADDRESS OF FACILITY: Please type address, including number, street name and city/town, if available, or describe the location of the site. (Maximum of 300 characters)

675 Washington Street
Haverhill, MA 01832

BUILDING ENVELOPE: Please provide a detailed description of the building envelope, types of construction materials used, and any known problems or existing conditions (maximum of 5000 characters).

The building is a brick structure consisting of three floors, constructed on a concrete slab. It still has its original roof, dating back to 1992, and the roof is in very poor condition. The Windows and Boilers are original and while maintained, have approached the end of their useful life.

Has there been a Major Repair or Replacement of the EXTERIOR WALLS? NO

Year of Last Major Repair or Replacement:(YYYY) 1992

Description of Last Major Repair or Replacement:

Does Not Apply

Roof Section A

Is the District seeking replacement of the Roof Section? YES

Area of Section (square feet) 24625

Type of ROOF (e.g., PVC, EPDM, Shingle, Slate, Tar & Gravel, Other (please describe)

Asphalt shingle roof

Age of Section (number of years since the Roof was installed or replaced) 30

Description of repairs, if applicable, in the last three years. Include year of repair:

The roof has been patched in the areas of leaks each year for more than the past three years. and the frequency of patch work has steadily increased.

Window Section A

Is the District seeking replacement of the Windows Section? YES

Windows in Section (count) 343

Type of WINDOWS (e.g., Single Pane, Double Pane, Other (please describe))

Both single pane and double pane windows. Windows include double hung, tilt out, stationary, sidelights and solarium.

Age of Section (number of years since the Windows were installed or replaced) 30

Description of repairs, if applicable, in the last three years. Include year of repair:

The district has repaired and/or replaced window balancers and screens as needed.

MECHANICAL and ELECTRICAL SYSTEMS: Please provide a detailed description of the current mechanical and electrical systems and any known problems or existing conditions (maximum of 5000 characters).

The electrical systems are original to the building. Minor lighting upgrades have occurred throughout the facility to increase energy efficiency. There have been no major improvements or upgrades to the electrical systems. The Mechanical Systems had a full audit and update in 2020, including all pneumatic systems, univentilators, dampers and BMS systems. The rooftop HVAC unit are scheduled for repair / replacement in 2021.

Boiler Section 1

Is the District seeking replacement of the Boiler? YES

Is there more than one boiler room in the School? NO

What percentage of the School is heated by the Boiler? 100

Type of heating fuel (e.g., Heating Oil, Natural Gas, Propane, Other)

Natural Gas

Age of Boiler (number of years since the Boiler was installed or replaced) 30

Description of repairs, if applicable, in the last three years. Include year of repair:

Preventative Maintenance is performed according to manufacturer's specifications.

Boiler Section 2

Is the District seeking replacement of the Boiler? YES

Is there more than one boiler room in the School? NO

What percentage of the School is heated by the Boiler? 100

Type of heating fuel (e.g., Heating Oil, Natural Gas, Propane, Other)

Natural Gas

Age of Boiler (number of years since the Boiler was installed or replaced) 30

Description of repairs, if applicable, in the last three years. Include year of repair:

Preventative Maintenance is performed according to manufacturer's specifications.

Has there been a Major Repair or Replacement of the HVAC SYSTEM? YES

Year of Last Major Repair or Replacement:(YYYY) 2020

Description of Last Major Repair or Replacement:

All Univent systems were cleaned, inspected and calibrated during the period of June 2020 through December 2020. Broken valves and motors were replaced. All pneumatic thermostat controls were repaired and calibrated. All damper systems were inspected, repaired and adjusted for outside air requirements. All BMS systems were inspected and repaired.

Has there been a Major Repair or Replacement of the ELECTRICAL SERVICES AND DISTRIBUTION SYSTEM? NO

Year of Last Major Repair or Replacement:(YYYY) 1993

Description of Last Major Repair or Replacement:

Does Not Apply

BUILDING INTERIOR: Please provide a detailed description of the current building interior including a description of the flooring systems, finishes, ceilings, lighting, etc. (maximum of 5000 characters).

The structure's interior building wall components include painted gypsum wallboard, exposed brick and various other architectural surfaces. Doors throughout the facility are original. Lockers throughout the facility are metal, and are in fair condition. The majority of the flooring throughout the facility consists of VCT, carpeting, and, in the

gymnasium, hardwood flooring. The majority of the ceiling material consists of gypsum wallboard, 2 x 2 and 2 x 4.

PROGRAMS and OPERATIONS: Please provide a detailed description of the current grade structure and programs offered and indicate whether there are program components that cannot be offered due to facility constraints, operational constraints, etc. (maximum of 5000 characters).

Silver Hill Elementary School offers a comprehensive elementary level program, for students in grades Kindergarten through 5th. After-school enrichment and instructional activities, evening school meetings, and use of the building by community groups and organizations for meeting and recreational programs, periodically occur.

EDUCATIONAL SPACES: Please provide a detailed description of the Educational Spaces within the facility, a description of the number and sizes (in square feet) of classrooms, a description of science rooms/labs including ages and most recent updates, a description of the cafeteria, gym and/or auditorium and a description of the media center/library (maximum of 5000 characters).

The school accommodates the needs of regular and special education pupils. It maintains adequate space for teaching and learning, as well as for library / media functions. Classrooms are adequate for current student enrollment and instructional purposes. The scope of these proposed projects do not change the number or configuration of existing classroom space.

CAPACITY and UTILIZATION: Please provide the original design capacity and a detailed description of the current capacity and utilization of the school facility. If the school is overcrowded, please describe steps taken by the administration to address capacity issues. Please also describe in detail any spaces that have been converted from their intended use to be used as classroom space (maximum of 5000 characters).

The building was designed for approximately 600 students. It is not overcrowded. No spaces have been converted from their intended use to be used as classroom space.

MAINTENANCE and CAPITAL REPAIR: Please provide a detailed description of the district's current maintenance practices, its capital repair program, and the maintenance program in place at the facility that is the subject of this SOI. Please include specific examples of capital repair projects undertaken in the past, including any override or debt exclusion votes that were necessary (maximum of 5000 characters).

The HPS performs maintenance work in all of its school buildings, primarily utilizing in-house personnel. The scope of work ranges from routine maintenance through emergency repairs, as well as various code inspection compliances. The Haverhill Public Schools ("HPS") uses an electronic maintenance work order program for all of its work order submissions, tracking, and documentation. Capital projects, preventive maintenance, and various other facility infrastructure improvements are prioritized and performed based on need and available funding. The City of Haverhill has engaged the services of a third party to launch a comprehensive energy conservation program. The program includes the replacement of various energy conservation-related equipment.

Priority 5

Question 1: Please provide a detailed description of the issues surrounding the school facility systems (e.g., roof, windows, boilers, HVAC system, and/or electrical service and distribution system) that you are indicating require repair or replacement. Please describe all deficiencies to all systems in sufficient detail to explain the problem.

The roof, boilers and windows are now 30 years old. In recent years, the roof has experienced an increasing number of leaks. It has reached the end of its functional life, and it requires emergency repairs (patching) with increasing frequency.

The windows were recently inspected in 2020. Minor repairs and adjustments were made during the summer of 2020 to allow for all windows to open due to Covid. Many windows do not open easily or do not stay open causing a potential safety hazard.

The boilers are operational and have been serviced, but are not efficient and have had numerous service calls over the past few years due to their age / nearing the end of their useful life.

Priority 5

Question 2: Please describe the measures the district has already taken to mitigate the problem/issues described in Question 1 above.

Haverhill Public Schools continues to patch the roof, fix / lubricate / tighten windows and maintain / repair boilers as needed. Preventative Maintenance continues to be performed on boilers.

Priority 5

Question 3: Please provide a detailed explanation of the impact of the problem/issues described in Question 1 above on your district's educational program. Please include specific examples of how the problem prevents the district from delivering the educational program it is required to deliver and how students and/or teachers are directly affected by the problem identified.

Roof leaks continue to hamper learning as it disrupts classrooms, causes unsafe slip hazards and costs time and resources to repair not only the roof, but also replace ceiling tiles, dry / clean carpeting and pay overtime wages.

Priority 5

Question 4: Please describe how addressing the school facility systems you identified in Question 1 above will extend the useful life of the facility that is the subject of this SOI and how it will improve your district's educational program.

All 3 items listed (roof / boilers / windows) have reached the end of their expected useful life. Replacing all three would greatly extend the life of the building. Silver Hill Elementary School is a solid learning environment and would only benefit from these needed upgrades.

Please also provide the following:

Have the systems identified above been examined by an engineer or other trained building professional?:

NO

If "YES", please provide the name of the individual and his/her professional affiliation (maximum of 250 characters):

Greenwood Roofing has examined roof on several occasions. Combustion Service Company provides all PM and emergency work on boilers. HPS maintenance technicians have worked with the window manufacturer to make adjustments and repairs to the windows.

The date of the inspection:

A summary of the findings (maximum of 5000 characters):

Vote

REQUIRED FORM OF VOTE TO SUBMIT AN SOI

REQUIRED VOTES

If the SOI is being submitted by a City or Town, a vote in the following form is required from both the City Council/Board of Aldermen **OR** the Board of Selectmen/equivalent governing body **AND** the School Committee.

If the SOI is being submitted by a regional school district, a vote in the following form is required from the Regional School Committee only. FORM OF VOTE Please use the text below to prepare your City's, Town's or District's required vote(s).

FORM OF VOTE

Please use the text below to prepare your City's, Town's or District's required vote(s).

Resolved: Having convened in an open meeting on _____, prior to the closing date, the

[City Council/Board of Aldermen,

Board of Selectmen/Equivalent Governing Body/School Committee] of _____ *[City/Town],* in accordance

with its charter, by-laws, and ordinances, has voted to authorize the Superintendent to submit to the Massachusetts School Building Authority the Statement of Interest dated _____ for the

[Name of School] located at

[Address] which

describes and explains the following deficiencies and the priority category(s) for which an application may be submitted to the Massachusetts School Building Authority in the future

_____ ; *[Insert a description of the priority(s) checked off on*

the Statement of Interest Form and a brief description of the deficiency described therein for each priority]; and hereby further specifically

acknowledges that by submitting this Statement of Interest Form, the Massachusetts School Building Authority in no way guarantees the acceptance or the approval of an application, the awarding of a grant or any other funding commitment from the Massachusetts School Building Authority, or commits the City/Town/Regional School District to filing an application for funding with the Massachusetts School Building Authority.

CERTIFICATIONS

The undersigned hereby certifies that, to the best of his/her knowledge, information and belief, the statements and information contained in this statement of Interest and attached hereto are true and accurate and that this Statement of Interest has been prepared under the direction of the district school committee and the undersigned is duly authorized to submit this Statement of Interest to the Massachusetts School Building Authority. The undersigned also hereby acknowledges and agrees to provide the Massachusetts School Building Authority, upon request by the Authority, any additional information relating to this Statement of Interest that may be required by the Authority.

Chief Executive Officer *	School Committee Chair	Superintendent of Schools
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(signature)	(signature)	(signature)
Date	Date	Date

* Local chief executive officer: In a city or town with a manager form of government, the manager of the municipality; in other cities, the mayor; and in other towns, the board of selectmen unless, in a city or town, some other municipal office is designated to the chief executive office under the provisions of a local charter. Please note, in districts where the Superintendent is also the Local Chief Executive Officer, it is required for the same person to sign the Statement of Interest Certifications twice.

Moody School

REQUIRED FORM OF VOTE TO SUBMIT A STATEMENT OF INTEREST

REQUIRED VOTES

If the SOI is being submitted by a City or Town, a vote in the following form is required from both the City Council/Board of Aldermen **OR** the Board of Selectmen/equivalent governing body **AND** the School Committee.

If the SOI is being submitted by a regional school district, a vote in the following form is required from the Regional School Committee only.

**Current votes for each SOI submission are required.*

FORM OF VOTE

Please use the text below to prepare your City's, Town's or District's required vote(s).

Resolved: Having convened in an open meeting on May 25, 2021, prior to the SOI submission closing date, the City Council of Haverhill, Massachusetts, in accordance with its charter, by-laws, and ordinances, has voted to authorize the Superintendent to submit to the Massachusetts School Building Authority the Statement of Interest Form dated May 20, 2021 for the Moody School located at 59 Margin Street, Haverhill, Massachusetts, which describes and explains the following deficiencies and the priority category(s) for which an application may be submitted to the Massachusetts School Building Authority in the future. Priority 5 - Replacement, renovation or modernization of school facility systems, such as roofs, windows, boilers, heating and ventilation systems, to increase energy conservation and decrease energy related costs in a school facility; and hereby further specifically acknowledges that by submitting this Statement of Interest Form, the Massachusetts School Building Authority in no way guarantees the acceptance or the approval of an application, the awarding of a grant or any other funding commitment from the Massachusetts School Building Authority, or commits the City/Town/Regional School District to filing an application for funding with the Massachusetts School Building Authority.

DOCUMENTATION OF VOTE

Documentation of each vote must be submitted **in hard copy** to the MSBA as follows:

- 1) For the vote of the City Council/Board of Aldermen or Board of Selectmen/equivalent governing body, a copy of the text of the vote must be submitted **with a certification** of the City/Town Clerk that the vote was duly recorded and the date of the vote must be provided.
- 2) For the vote of the School Committee, Minutes of the School Committee meeting at which the vote was taken must be submitted **with the original signature** of the Committee Chairperson.

Massachusetts School Building Authority

Next Steps to Finalize Submission of your FY 2021 Statement of Interest

Thank you for submitting your FY 2021 Statement of Interest (SOI) to the MSBA electronically. **Please note, the District's submission is not yet complete.** The District is required to mail all required supporting documentation, which is described below.

VOTES: Each SOI must be submitted with the proper vote documentation. This means that (1) the required governing bodies have voted to submit each SOI, (2) the specific vote language required by the MSBA has been used, and (3) the District has submitted a record of the vote in the format required by the MSBA.

- **School Committee Vote:** Submittal of all SOIs must be approved by a vote of the School Committee.
 - For documentation of the vote of the School Committee, Minutes of the School Committee meeting at which the vote was taken must be submitted with the original signature of the Committee Chairperson. The Minutes must contain the actual text of the vote taken which should be substantially the same as the MSBA's SOI vote language.
- **Municipal Body Vote:** SOIs that are submitted by cities and towns must be approved by a vote of the appropriate municipal body (e.g., City Council/ Aldermen/Board of Selectmen) in addition to a vote of the School Committee.
 - Regional School Districts do not need to submit a vote of the municipal body.
 - For the vote of the municipal governing body, a copy of the text of the vote, which shall be substantially the same as the MSBA's SOI vote language, must be submitted with a certification of the City/Town Clerk that the vote was taken and duly recorded, and the date of the vote must be provided.

ADDITIONAL DOCUMENTATION FOR SOI PRIORITIES #1 AND #3: If a District selects Priority #1 and/or Priority #3, the District is required to submit additional documentation with its SOI.

- If a District selects Priority #1, Replacement or renovation of a building which is structurally unsound or otherwise in a condition seriously jeopardizing the health and safety of the school children, where no alternative exists, the MSBA requires a hard copy of the engineering or other report detailing the nature and severity of the problem and a written professional opinion of how imminent the system failure is likely to manifest itself. The District also must submit photographs of the problematic building area or system to the MSBA.
- If a District selects Priority #3, Prevention of a loss of accreditation, the SOI will not be considered complete unless and until a summary of the accreditation report focused on the deficiency as stated in this SOI is provided.

ADDITIONAL INFORMATION: In addition to the information required above, the District may also provide any reports, pictures, or other information they feel will give the MSBA a better understanding of the issues identified at a facility.

If you have any questions about the SOI process please contact the MSBA at 617-720-4466 or SOI@massschoolbuildings.org.

Massachusetts School Building Authority

School District Haverhill

District Contact Margaret A Marotta TEL: (978) 265-4033

Name of School Moody

Submission Date 5/20/2021

SOI CERTIFICATION

To be eligible to submit a Statement of Interest (SOI), a district must certify the following:

- ☒ The district hereby acknowledges and agrees that this SOI is NOT an application for funding and that submission of this SOI in no way commits the MSBA to accept an application, approve an application, provide a grant or any other type of funding, or places any other obligation on the MSBA.
- ☒ The district hereby acknowledges that no district shall have any entitlement to funds from the MSBA, pursuant to M.G.L. c. 70B or the provisions of 963 CMR 2.00.
- ☒ The district hereby acknowledges that the provisions of 963 CMR 2.00 shall apply to the district and all projects for which the district is seeking and/or receiving funds for any portion of a municipally-owned or regionally-owned school facility from the MSBA pursuant to M.G.L. c. 70B.
- ☒ The district hereby acknowledges that this SOI is for one existing municipally-owned or regionally-owned public school facility in the district that is currently used or will be used to educate public PreK-12 students and that the facility for which the SOI is being submitted does not serve a solely early childhood or Pre-K student population.
- ☒ After the district completes and submits this SOI electronically, the district must mail hard copies of the required documentation described under the "Vote" tab, on or before the deadline.
- ☒ The district will schedule and hold a meeting at which the School Committee will vote, using the specific language contained in the "Vote" tab, to authorize the submission of this SOI. This is required for cities, towns, and regional school districts.
- ☒ Prior to the submission of the SOI, the district will schedule and hold a meeting at which the City Council/Board of Aldermen or Board of Selectmen/equivalent governing body will vote, using the specific language contained in the "Vote" tab, to authorize the submission of this SOI. This is not required for regional school districts.
- ☒ On or before the SOI deadline, the district will submit the minutes of the meeting at which the School Committee votes to authorize the Superintendent to submit this SOI. The District will use the MSBA's vote template and the vote will specifically reference the school and the priorities for which the SOI is being submitted. The minutes will be signed by the School Committee Chair. This is required for cities, towns, and regional school districts.
- ☒ The district has arranged with the City/Town Clerk to certify the vote of the City Council/Board of Aldermen or Board of Selectmen/equivalent governing body to authorize the Superintendent to submit this SOI. The district will use the MSBA's vote template and submit the full text of this vote, which will specifically reference the school and the priorities for which the SOI is being submitted, to the MSBA on or before the SOI deadline. This is not required for regional school districts.
- ☒ The district hereby acknowledges that this SOI submission will not be complete until the MSBA has received all of the required vote documentation in a format acceptable to the MSBA. If Priority 1 is selected, your SOI will not be considered complete unless and until you provide the required engineering (or other) report, a professional opinion regarding the problem, and photographs of the problematic area or system. If Priority 3 is selected, your SOI will not be considered complete unless and until you provide a summary of the accreditation report focused on the deficiency as stated in this SOI.

**LOCAL CHIEF EXECUTIVE OFFICER/DISTRICT SUPERINTENDENT/SCHOOL COMMITTEE CHAIR
(E.g., Mayor, Town Manager, Board of Selectmen)**

Chief Executive Officer * School Committee Chair Superintendent of Schools

(signature)	(signature)	(signature)
Date	Date	Date

* Local chief executive officer: In a city or town with a manager form of government, the manager of the municipality; in other cities, the mayor; and in other towns, the board of selectmen unless, in a city or town, some other municipal office is designated to the chief executive office under the provisions of a local charter. Please note, in districts where the Superintendent is also the Local Chief Executive Officer, it is required for the same person to sign the Statement of Interest Certifications twice.

Massachusetts School Building Authority

School District Haverhill

District Contact Margaret A Marotta TEL: (978) 265-4033

Name of School Moody

Submission Date 5/20/2021

Note

The following Priorities have been included in the Statement of Interest:

1. ☐ Replacement or renovation of a building which is structurally unsound or otherwise in a condition seriously jeopardizing the health and safety of school children, where no alternative exists.
2. ☐ Elimination of existing severe overcrowding.
3. ☒ Prevention of the loss of accreditation.
4. ☐ Prevention of severe overcrowding expected to result from increased enrollments.
5. ☒ Replacement, renovation or modernization of school facility systems, such as roofs, windows, boilers, heating and ventilation systems, to increase energy conservation and decrease energy related costs in a school facility.
6. ☐ Short term enrollment growth.
7. ☐ Replacement of or addition to obsolete buildings in order to provide for a full range of programs consistent with state and approved local requirements.
8. ☐ Transition from court-ordered and approved racial balance school districts to walk-to, so-called, or other school districts.

SOI Vote Requirement

☒ I acknowledge that I have reviewed the MSBA's vote requirements for submitting an SOI which are set forth in the Vote Tab of this SOI. I understand that the MSBA requires votes from specific parties/governing bodies, in a specific format using the language provided by the MSBA. Further, I understand that the MSBA requires certified and signed vote documentation to be submitted with the SOI. I acknowledge that my SOI will not be considered complete and, therefore, will not be reviewed by the MSBA unless the required accompanying vote documentation is submitted to the satisfaction of the MSBA.

SOI Program: Accelerated Repair

Potential Project Scope: Accelerated Repair
Roof
Windows/ Doors
Boiler

Is this SOI the District Priority SOI? Yes

School name of the District Priority SOI: Moody

Is this part of a larger facilities plan? No

If "YES", please provide the following:

Facilities Plan Date: 3/19/2021

Planning Firm:

Please provide a brief summary of the plan including its goals and how the school facility that is the subject of this SOI fits into that plan:

Please provide the current student to teacher ratios at the school facility that is the subject of this SOI: 15 students per teacher

Please provide the originally planned student to teacher ratios at the school facility that is the subject of this SOI: 15 students per teacher

Does the District have a Master Educational Plan that includes facility goals for this building and all school buildings in District? Yes

If "YES", please provide the author and date of the District's Master Educational Plan.

Haverhill Public Schools District Curriculum Accommodation Plan (DCAP) Revised by the HPS DCAP Revision Committee, May 3, 2019 Beth Kitsos, Darshan Thakkar, Lorna Marchant, Tamii Lobo, Jami Dion, Patricia Juranovits, Kevin Higginbottom, and Sarah Gauvin

Is there overcrowding at the school facility? No

If "YES", please describe in detail, including specific examples of the overcrowding.

Has the district had any recent teacher layoffs or reductions? No

If "YES", how many teaching positions were affected? 0

At which schools in the district?

Please describe the types of teacher positions that were eliminated (e.g., art, math, science, physical education, etc.).

Has the district had any recent staff layoffs or reductions? No

If "YES", how many staff positions were affected? 0

At which schools in the district?

Please describe the types of staff positions that were eliminated (e.g., guidance, administrative, maintenance, etc.).

Please provide a description of the program modifications as a consequence of these teacher and/or staff reductions, including the impact on district class sizes and curriculum.

Does Not Apply

Please provide a description of the local budget approval process for a potential capital project with the MSBA. Include schedule information (i.e. Town Meeting dates, city council/town council meetings dates, regional school committee meeting dates). Provide, if applicable, the District's most recent budget approval process that resulted in a budget reduction and the impact of the reduction to the school district (staff reductions, discontinued programs, consolidation of facilities).

Upon approval of the Statement of Interest by the MSBA, the Mayor and the City Council will approve the roof replacement project, and a bid process will be initiated in cooperation with the MSBA. The Mayor anticipates that the City will fund the project and its cost share thereof from its available resources, so no bonding of the project is anticipated. The City Council meets weekly during much of the year, so it will act rapidly upon MSBA approval of the Statement of Interest.

General Description

BRIEF BUILDING HISTORY: Please provide a detailed description of when the original building was built, and the date(s) and project scopes(s) of any additions and renovations (maximum of 5000 characters).

The Moody School building consists of approximately 27,000 square feet located on approximately .88 acres of land (38,498 square feet). The school is a three-story building with full basement constructed in 1914. The school will serve approximately 260 students from pre-kindergarten through kindergarten, for the 2019-2020 academic year. Recent improvements throughout the facility include routine painting and carpeting.

TOTAL BUILDING SQUARE FOOTAGE: Please provide the original building square footage PLUS the square footage of any additions.

27000

SITE DESCRIPTION: Please provide a detailed description of the current site and any known existing conditions that would impact a potential project at the site. Please note whether there are any other buildings, public or private, that share this current site with the school facility. What is the use(s) of this building(s)? (maximum of 5000 characters).

The school is sited upon .88 acres of land. No known existing conditions impact a potential project at the site.

ADDRESS OF FACILITY: Please type address, including number, street name and city/town, if available, or describe the location of the site. (Maximum of 300 characters)

59 Margin Street
Haverhill, MA 01832

BUILDING ENVELOPE: Please provide a detailed description of the building envelope, types of construction materials used, and any known problems or existing conditions (maximum of 5000 characters).

The building is a brick structure located on three floors. The roof was replaced in 1991 and is now in very poor condition.

Has there been a Major Repair or Replacement of the EXTERIOR WALLS? NO

Year of Last Major Repair or Replacement:(YYYY) 1914

Description of Last Major Repair or Replacement:

The exterior walls have been repointed periodically since the building was constructed in 1914.

Roof Section A

Is the District seeking replacement of the Roof Section? YES

Area of Section (square feet) 9075

Type of ROOF (e.g., PVC, EPDM, Shingle, Slate, Tar & Gravel, Other (please describe))
EPDM

Age of Section (number of years since the Roof was installed or replaced) 30

Description of repairs, if applicable, in the last three years. Include year of repair:

Patching as needed

Roof Section B

Is the District seeking replacement of the Roof Section? NO

Area of Section (square feet) 330

Type of ROOF (e.g., PVC, EPDM, Shingle, Slate, Tar & Gravel, Other (please describe))
EPDM

Age of Section (number of years since the Roof was installed or replaced) 2

Description of repairs, if applicable, in the last three years. Include year of repair:

This section of the roof was replaced in 2019

Roof Section C

Is the District seeking replacement of the Roof Section? NO

Area of Section (square feet) 2925

Type of ROOF (e.g., PVC, EPDM, Shingle, Slate, Tar & Gravel, Other (please describe))

EPDM

Age of Section (number of years since the Roof was installed or replaced) 2

Description of repairs, if applicable, in the last three years. Include year of repair:

This section of the roof was replaced in 2019

Window Section A

Is the District seeking replacement of the Windows Section? YES

Windows in Section (count) 122

Type of WINDOWS (e.g., Single Pane, Double Pane, Other (please describe))

Double Pane

Age of Section (number of years since the Windows were installed or replaced) 30

Description of repairs, if applicable, in the last three years. Include year of repair:

The district has repaired and/or replaced window balancers and screens as needed.

MECHANICAL and ELECTRICAL SYSTEMS: Please provide a detailed description of the current mechanical and electrical systems and any known problems or existing conditions (maximum of 5000 characters).

The electrical systems are original to the building. Minor lighting upgrades have occurred throughout the facility to increase energy efficiency. There have been no major improvements or upgrades to the electrical systems. The Mechanical Systems had a full audit and update in 2020, including all pneumatic systems, univentilators, dampers and BMS systems.

Boiler Section 1

Is the District seeking replacement of the Boiler? YES

Is there more than one boiler room in the School? NO

What percentage of the School is heated by the Boiler? 100

Type of heating fuel (e.g., Heating Oil, Natural Gas, Propane, Other)

Natural Gas

Age of Boiler (number of years since the Boiler was installed or replaced) 30

Description of repairs, if applicable, in the last three years. Include year of repair:

Preventative Maintenance is performed according to manufacturer's specifications.

Has there been a Major Repair or Replacement of the HVAC SYSTEM? NO

Year of Last Major Repair or Replacement:(YYYY) 1914

Description of Last Major Repair or Replacement:

The HVAC system has been repaired regularly during the life of the school.

Has there been a Major Repair or Replacement of the ELECTRICAL SERVICES AND DISTRIBUTION SYSTEM? NO

Year of Last Major Repair or Replacement:(YYYY) 1991

Description of Last Major Repair or Replacement:

The electrical services and distribution systems have been repaired and upgraded periodically during the life of the facility. In 1991, numerous outlets, and extensive replacement wiring, were installed.

BUILDING INTERIOR: Please provide a detailed description of the current building interior including a description of the flooring systems, finishes, ceilings, lighting, etc. (maximum of 5000 characters).

Interior building wall components include painted plasterboard, painted brick, exposed brick and various other architectural surfaces. The majority of the flooring throughout the facility consists of VCT and carpeting, with hardwood flooring in the gym. The majority of the ceiling material consists of 2 x 4 suspended ceilings.

PROGRAMS and OPERATIONS: Please provide a detailed description of the current grade structure and programs offered and indicate whether there are program components that cannot be offered due to facility constraints, operational constraints, etc. (maximum of 5000 characters).

For the 2021-2022 academic year, the school will offer a comprehensive education program for regular education and special education students in kindergarten, and also for some in pre-kindergarten programs.

EDUCATIONAL SPACES: Please provide a detailed description of the Educational Spaces within the facility, a description of the number and sizes (in square feet) of classrooms, a description of science rooms/labs including ages and most recent updates, a description of the cafeteria, gym and/or auditorium and a description of the media center/library (maximum of 5000 characters).

The school has classroom space for regular education and special education students. It maintains adequate space for teaching and learning for kindergarten, and also for some pre-kindergarten programs. The scope of this proposed roofing project does not change the number or configuration of existing classroom space.

CAPACITY and UTILIZATION: Please provide the original design capacity and a detailed description of the current capacity and utilization of the school facility. If the school is overcrowded, please describe steps taken by the administration to address capacity issues. Please also describe in detail any spaces that have been converted from their intended use to be used as classroom space (maximum of 5000 characters).

The building was designed for approximately 350 students, in 1914. It is not overcrowded.

MAINTENANCE and CAPITAL REPAIR: Please provide a detailed description of the district's current maintenance practices, its capital repair program, and the maintenance program in place at the facility that is the subject of this SOI. Please include specific examples of capital repair projects undertaken in the past, including any override or debt exclusion votes that were necessary (maximum of 5000 characters).

The Haverhill Public Schools ("HPS") performs routine maintenance work in all of its school buildings, primarily utilizing in-house personnel. The scope of work ranges from routine maintenance through emergency repairs, as well as various code inspection compliances. The HPS uses an electronic maintenance work order program for all of its work order submissions, tracking, and documentation. Capital projects, preventive maintenance, and various other facility infrastructure improvements are prioritized and performed based on need and available funding. The City of Haverhill has engaged the services of a third party to launch a comprehensive energy conservation program. The program includes the replacement of various energy conservation-related equipment.

Priority 5

Question 1: Please provide a detailed description of the issues surrounding the school facility systems (e.g., roof, windows, boilers, HVAC system, and/or electrical service and distribution system) that you are indicating require repair or replacement. Please describe all deficiencies to all systems in sufficient detail to explain the problem.

The roof, boilers and windows are now 30 years old. In recent years, the roof has experienced an increasing number of leaks. It has reached the end of its functional life, and it requires emergency repairs (patching) with increasing frequency.

The windows were recently inspected in 2020. Minor repairs and adjustments were made during the summer of 2020 to allow for all windows to open due to Covid. Many windows do not open easily or do not stay open causing a potential safety hazard.

The boiler is operational and have been serviced, but are not efficient and have had numerous service calls over the past few years due to their age / nearing the end of their useful life. The current boiler consists of 5 boiler units ganged together. Failure by any single section would be detrimental to operations of the Moody School.

Priority 5

Question 2: Please describe the measures the district has already taken to mitigate the problem/issues described in Question 1 above.

Haverhill Public Schools continues to patch the roof, fix / lubricate / tighten windows and maintain / repair boilers as needed. Preventative Maintenance continues to be performed on boilers.

Priority 5

Question 3: Please provide a detailed explanation of the impact of the problem/issues described in Question 1 above on your district's educational program. Please include specific examples of how the problem prevents the district from delivering the educational program it is required to deliver and how students and/or teachers are directly affected by the problem identified.

Roof leaks continue to hamper learning as it disrupts classrooms, causes unsafe slip hazards and costs time and resources to repair not only the roof, but also replace ceiling tiles, dry / clean carpeting and pay overtime wages.

Priority 5

Question 4: Please describe how addressing the school facility systems you identified in Question 1 above will extend the useful life of the facility that is the subject of this SOI and how it will improve your district's educational program.

All 3 items listed (roof / boilers / windows) have reached the end of their expected useful life. Replacing all three would greatly extend the life of the building. The Moody School is a solid learning environment and would only benefit from these needed upgrades.

Please also provide the following:

Have the systems identified above been examined by an engineer or other trained building professional?:

NO

If "YES", please provide the name of the individual and his/her professional affiliation (maximum of 250 characters):

Greenwood Roofing has examined roof on several occasions. Combustion Service Company provides all PM and emergency work on boilers. HPS maintenance technicians have worked with the window manufacturer to make adjustments and repairs to the windows.

The date of the inspection:

A summary of the findings (maximum of 5000 characters):

Vote

REQUIRED FORM OF VOTE TO SUBMIT AN SOI

REQUIRED VOTES

If the SOI is being submitted by a City or Town, a vote in the following form is required from both the City Council/Board of Aldermen **OR** the Board of Selectmen/equivalent governing body **AND** the School Committee.

If the SOI is being submitted by a regional school district, a vote in the following form is required from the Regional School Committee only. FORM OF VOTE Please use the text below to prepare your City's, Town's or District's required vote(s).

FORM OF VOTE

Please use the text below to prepare your City's, Town's or District's required vote(s).

Resolved: Having convened in an open meeting on _____, prior to the closing date, the

[City Council Board of Aldermen,
 Board of Selectmen Equivalent Governing Body School Committee] of _____
[City Town], in accordance

with its charter, by-laws, and ordinances, has voted to authorize the Superintendent to submit to the Massachusetts School Building Authority the Statement of Interest dated _____ for the

[Name of School] located at

[Address] which

describes and explains the following deficiencies and the priority category(s) for which an application may be submitted to the Massachusetts School Building Authority in the future

[Insert a description of the priority(s) checked off on

the Statement of Interest Form and a brief description of the deficiency described therein for each priority], and hereby further specifically

acknowledges that by submitting this Statement of Interest Form, the Massachusetts School Building Authority in no way guarantees the acceptance or the approval of an application, the awarding of a grant or any other funding commitment from the Massachusetts School Building Authority, or commits the City/Town/Regional School District to filing an application for funding with the Massachusetts School Building Authority.

CERTIFICATIONS

The undersigned hereby certifies that, to the best of his/her knowledge, information and belief, the statements and information contained in this statement of Interest and attached hereto are true and accurate and that this Statement of Interest has been prepared under the direction of the district school committee and the undersigned is duly authorized to submit this Statement of Interest to the Massachusetts School Building Authority. The undersigned also hereby acknowledges and agrees to provide the Massachusetts School Building Authority, upon request by the Authority, any additional information relating to this Statement of Interest that may be required by the Authority.

Chief Executive Officer * **School Committee Chair** **Superintendent of Schools**

(signature)	(signature)	(signature)
Date	Date	Date

* Local chief executive officer: In a city or town with a manager form of government, the manager of the municipality; in other cities, the mayor; and in other towns, the board of selectmen unless, in a city or town, some other municipal office is designated to the chief executive office under the provisions of a local charter. Please note, in districts where the Superintendent is also the Local Chief Executive Officer, it is required for the same person to sign the Statement of Interest Certifications twice.

CITY COUNCIL

MELINDA E. BARRETT

PRESIDENT

COLIN F. LePAGE

VICE PRESIDENT

JOSEPH J. BEVILACQUA

JOHN A. MICHITSON

THOMAS J. SULLIVAN

TIMOTHY J. JORDAN

MICHAEL S. MCGONAGLE

MARY ELLEN DALY O'BRIEN

WILLIAM J. MACEK



CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS 01830-5843

61
CITY HALL, ROOM 204
4 SUMMER STREET
HAVERHILL, MA 01830
TELEPHONE: 978 374-2328

www.cityofhaverhill.com
citycncl@cityofhaverhill.com

May 21, 2021

TO: President and Members of the City Council:

Councillors Jordan, LePage and Michitson would like to introduce Director of Facilities, Steve Dorrance to give the Council an update on the status of the school and city buildings.

Timothy Jordan
City Councillor Timothy Jordan

Colin LePage
City Councillor Colin LePage

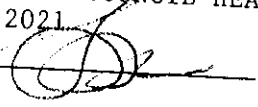
John Michitson
City Councillor John Michitson



City of Haverhill, MA

CCSP-21-7

City Council Special Permit

IN CITY COUNCIL: April 13 2021
VOTED: THAT COUNCIL HEARING BE HELD
MAY 25 2021
Attest:  City Clerk

04/08/2021

Status: Active**Date Created:** Apr 06, 2021**Applicant**

MichaelJ Migliori
railroadteam@procopiocompanies.com
18 Essex Street
Haverhill, MA 01832
978-884-6431

Location

0 RAILROAD ST
Bradford, MA 01835

Owner:

CITY OF HAVERHILL
4 SUMMER ST HAVERHILL, MA 01830

Important: Please Read Before Starting Your Application**Applicant Information****What is Your Role in This Process?**

Attorney/Agent

Applicant Business/Firm Phone

978 884 6431

Applicant Business/Firm City

Haverhill

Applicant Business/Firm Zip

01832

Client Business Name

PE REALTY PARTNERS, LLC

Client Email

railroadteam@procopiocompanies.com

Client City

Lynnfield

Applicant Business/Firm Name

Fiorello & Migliori

Applicant Business/Firm Address

18 Essex Street

Applicant Business/Firm State

MA

Client Name

PE REALTY PARTNERS, LLC

Client Phone

781 484 1554

Client Address

220 Broadway, Unit 302

Client State

MA

Client Zip

01940

Client County

essex

Client Business Structure

Limited Liability Corporation (LLC)

Property Information**Proposed Housing Plan Name**

The Beck

Proposed Street Name(s)

Railroad Avenue

How Long Owned by Current Owner?

under agreement

Type of Dwelling(s) Planned in Project

Apartments

Lot Dimension(s)

see attached plans

Registry Plat Number, Block & Lot

711-4-4

Zoning District Where Property Located

WD - Waterfront District

IF WATERFRONT, Which Sub-Zone?

H - North Side of Railroad Avenue

--

Deed Recorded in Essex South Registry: Block Number

13677

Deed Recorded in Essex South Registry: Page

375

Does the Property Have Multiple Lots?

Yes

IF YES, How Many Lots?

3

IF YES, What Is/Are the Map, Block Lot (MBL) Number(s)?

711-4-4A, 712-684-1, 711-4-2

IF YES, Provide Additional Addresses if Different Than "Location" (or Enter NONE")

19 Railroad Ave.

Thoroughly Describe the Reason(s) for thre Special Permit

The mixed use proposal for residential apartments and retail space in the WD-H Zone requires a Special permit from the City Council (see table of uses for the Waterfront District, Sec 9.3).

Property Description

The various parcels total 6.81 acres located on Railroad Avenue and the Merrimack River.

Current Property Use

Vacant

TOTAL Number of Units Planned

290

TOTAL Number of Parking Spaces Planned

347

Special Circumstances**Building Coverage**☐**Front Yard Setback**☐**Rear Yard Setback**☐**Lot Depth**☐**Building Height**☐**Open Space**☐**Sign Size**☐**Other**☒**Dimensional Variance**☐**Side Yard Setback**☐**Lot Frontage**☐**Lot Area**☐**Floor Area Ratio**☐**Parking**☒**Use**☐**IF OTHER, Please Describe
Density****Hearing Waiver****Agrees**

Yes

Agreement & Signature**Agrees**☒**PLEASE READ**

Office Use Only**City Council Decision**

--

City Council Hearing Date

--

Reason for Council's Decision

--

City Council Members Absent

--

City Council Members Present

--

Continuance Meeting Date

--

Also Present

--

City Councilor Who Seconded Motion

--

City Councilor Who Made Motion

--

City Councilors Who Voted Against

--

City Councilors Who Abstained

--

Continuance Motion Decision

--

Who Submitted Continuance Request?

--

City Councilors Who Voted in Favor

--

Number of 12"x18" Mylar Copies

--

Appeal Expiration Date

--

Number of 24"x36" Mylar Copies

--

Number of 18"x24" Mylar Copies

--

Attachments

-  Signed P&S Railroad Ave.pdf
Uploaded by MichaelJ Migliori on Apr 01, 2021 10:32 AM
-  Cover letter to City Council with Narrative.pdf
Uploaded by MichaelJ Migliori on Apr 06, 2021 9:35 AM
-  Planning Board Approval Not Required.docx
Uploaded by MichaelJ Migliori on Apr 01, 2021 10:44 AM
-  Procopio Haverhill_Overall Site Plan.pdf
Uploaded by MichaelJ Migliori on Apr 01, 2021 10:42 AM
-  Civil.zip
Uploaded by MichaelJ Migliori on Apr 01, 2021 10:39 AM

- doc Narrative.doc
Uploaded by MichaelJ Migliori on Apr 01, 2021 10:36 AM
- doc Waiver Request.doc
Uploaded by MichaelJ Migliori on Apr 01, 2021 10:36 AM
- zip Floor Plans.zip
Uploaded by MichaelJ Migliori on Apr 01, 2021 10:40 AM
- zip Traffic Study, Peer Review & Response.zip
Uploaded by MichaelJ Migliori on Apr 01, 2021 10:40 AM
- csv Abutters 711.4.4A RR Ave.csv
Uploaded by Christine Webb on Apr 07, 2021 9:02 AM
- pdf Mailing Labels 711.4.4A RR Ave.pdf
Uploaded by Christine Webb on Apr 07, 2021 9:02 AM
- csv Abutters 712.684.1 RR Ave.csv
Uploaded by Christine Webb on Apr 07, 2021 9:03 AM
- pdf Mailing Labels 712.684.1 RR Ave.pdf
Uploaded by Christine Webb on Apr 07, 2021 9:03 AM
- csv Abutters 711.4.2 RR Ave.csv
Uploaded by Christine Webb on Apr 07, 2021 9:03 AM
- pdf Mailing Labels 711.4.2 RR Ave.pdf
Uploaded by Christine Webb on Apr 07, 2021 9:04 AM
- csv Abutters 701.630.C RR Ave.csv
Uploaded by Christine Webb on Apr 07, 2021 9:04 AM
- pdf Mailing Labels 701.630.C RR Ave.pdf
Uploaded by Christine Webb on Apr 07, 2021 9:05 AM
- csv Abutters 711.4.4 RR Ave.csv
Uploaded by Christine Webb on Apr 07, 2021 9:08 AM
- pdf Mailing Labels 711.4.4 RR Ave.pdf
Uploaded by Christine Webb on Apr 07, 2021 9:08 AM

History

Date	Activity
Mar 19 2021 12:59 pm	MichaelJ Migliori started a draft of Record CCSP-21-7
Apr 01 2021 10:40 am	MichaelJ Migliori added attachment Floor Plans.zip to Record CCSP-21-7
Apr 01 2021 10:40 am	MichaelJ Migliori added attachment Traffic Study, Peer Review & Response.zip to Record CCSP-21-7
Apr 06 2021 9:36 am	MichaelJ Migliori submitted Record CCSP-21-7
Apr 06 2021 9:46 am	completed payment step Special Permit Filing Fee on Record CCSP-21-7
Apr 06 2021 9:46 am	approval step Building Inspector Review was assigned to Tom Bridgewater on Record CCSP-21-7
Apr 06 2021 9:46 am	approval step Planning Director Review was assigned to William Pillsbury on Record CCSP-21-7
Apr 06 2021 9:46 am	approval step City Clerk Review - Hearing Dates Set was assigned to Maria Bevilacqua on Record CCSP-21-7

Date	Activity
Apr 06 2021 10:02 am	William Pillsbury approved approval step Planning Director Review on Record CCSP-21-7
Apr 06 2021 1:00 pm	LINDA KOUTOULAS assigned approval step City Clerk Review - Hearing Dates Set to LINDA KOUTOULAS on Record CCSP-21-7
Apr 06 2021 1:00 pm	LINDA KOUTOULAS approved approval step City Clerk Review - Hearing Dates Set on Record CCSP-21-7
Apr 06 2021 1:01 pm	LINDA KOUTOULAS assigned approval step City Council Clerk Notified to Barbara Arthur on Record CCSP-21-7
Apr 06 2021 1:01 pm	LINDA KOUTOULAS assigned approval step Assessor for Abutter's List to Christine Webb on Record CCSP-21-7
Apr 06 2021 1:01 pm	LINDA KOUTOULAS assigned approval step Conservation Department Review to Robert Moore on Record CCSP-21-7
Apr 06 2021 1:01 pm	LINDA KOUTOULAS assigned approval step DPW Review to Mike Stankovich on Record CCSP-21-7
Apr 06 2021 1:01 pm	LINDA KOUTOULAS assigned approval step Engineering Department Review to John Pettis on Record CCSP-21-7
Apr 06 2021 1:01 pm	LINDA KOUTOULAS assigned approval step Fire1 Department Review to Robert O'Brien on Record CCSP-21-7
Apr 06 2021 1:01 pm	LINDA KOUTOULAS assigned approval step Health Department Review to Bonnie Dufresne on Record CCSP-21-7
Apr 06 2021 1:01 pm	LINDA KOUTOULAS assigned approval step Police Department Review to Robert Pistone on Record CCSP-21-7
Apr 06 2021 1:01 pm	LINDA KOUTOULAS assigned approval step School Department Review to Mike Pfifferling on Record CCSP-21-7
Apr 06 2021 1:01 pm	LINDA KOUTOULAS assigned approval step Storm Water Review to Robert Ward on Record CCSP-21-7
Apr 06 2021 1:02 pm	LINDA KOUTOULAS assigned approval step Wastewater Review to Robert Ward on Record CCSP-21-7
Apr 06 2021 1:02 pm	LINDA KOUTOULAS assigned approval step Water Department Review to Robert Ward on Record CCSP-21-7
Apr 06 2021 1:02 pm	LINDA KOUTOULAS assigned approval step Water Supply Review to Robert Ward on Record CCSP-21-7
Apr 06 2021 1:02 pm	LINDA KOUTOULAS assigned approval step Planning Director Approval for Agenda to William Pillsbury on Record CCSP-21-7
Apr 06 2021 1:02 pm	LINDA KOUTOULAS assigned approval step Building Inspector Approval for Agenda to Tom Bridgewater on Record CCSP-21-7
Apr 06 2021 1:02 pm	LINDA KOUTOULAS assigned approval step First Ad Placement to Maria Bevilacqua on Record CCSP-21-7
Apr 06 2021 1:02 pm	LINDA KOUTOULAS assigned approval step Placed on Agenda to Maria Bevilacqua on Record CCSP-21-7
Apr 06 2021 1:02 pm	LINDA KOUTOULAS assigned approval step Abutter Notification to Maria Bevilacqua on Record CCSP-21-7
Apr 06 2021 1:02 pm	LINDA KOUTOULAS assigned approval step Second Ad Placement to Maria Bevilacqua on Record CCSP-21-7

Date	Activity
Apr 06 2021 1:02 pm	LINDA KOUTOULAS assigned approval step City Councilor A Review to Melinda Barrett on Record CCSP-21-7
Apr 06 2021 1:02 pm	LINDA KOUTOULAS assigned approval step City Councilor B Review to Colin LePage on Record CCSP-21-7
Apr 06 2021 1:02 pm	LINDA KOUTOULAS assigned approval step City Councilor C Review to Joe Bevilacqua on Record CCSP-21-7
Apr 06 2021 1:03 pm	LINDA KOUTOULAS assigned approval step City Councilor D Review to John Michitson on Record CCSP-21-7
Apr 06 2021 1:03 pm	LINDA KOUTOULAS assigned approval step City Councilor E Review to Thomas Sullivan on Record CCSP-21-7
Apr 06 2021 1:03 pm	LINDA KOUTOULAS assigned approval step City Councilor F Review to Tim Jordan on Record CCSP-21-7
Apr 06 2021 1:03 pm	LINDA KOUTOULAS assigned approval step City Councilor G Review to Michael McGonagle on Record CCSP-21-7
Apr 06 2021 1:03 pm	LINDA KOUTOULAS assigned approval step City Councilor H Review to Mary Ellen Daly O'Brien on Record CCSP-21-7
Apr 06 2021 1:03 pm	LINDA KOUTOULAS assigned approval step City Councilor I Review to William Macek on Record CCSP-21-7
Apr 06 2021 1:04 pm	LINDA KOUTOULAS assigned approval step City Council Meeting to Maria Bevilacqua on Record CCSP-21-7
Apr 06 2021 1:04 pm	LINDA KOUTOULAS assigned approval step Meeting Minutes & Decision Filed w/City Clerk to Barbara Arthur on Record CCSP-21-7
Apr 07 2021 9:02 am	Christine Webb added attachment Abutters 711.4.4A RR Ave.csv to Record CCSP-21-7
Apr 07 2021 9:02 am	Christine Webb added attachment Mailing Labels 711.4.4A RR Ave.pdf to Record CCSP-21-7
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Apr 07 2021 9:08 am	Christine Webb added attachment Abutters 711.4.4 RR Ave.csv to Record CCSP-21-7
Apr 07 2021 9:08 am	Christine Webb added attachment Mailing Labels 711.4.4 RR Ave.pdf to Record CCSP-21-7
Apr 07 2021 9:38 am	Robert O'Brien assigned approval step Fire1 Department Review to Eric Tarpay on Record CCSP-21-7

Scheduled for May 12/21

FIORELLO & MIGLIORI
ATTORNEYS AT LAW

KAREN L. FIORELLO
kfiorello@fimilaw.com

FIREHOUSE CONDOMINIUMS
18 ESSEX STREET
HAVERHILL, MASSACHUSETTS 01832
TEL 978/373-3003 FAX 978/373-3066

MICHAEL J. MIGLIORI
mmigliori@fimilaw.com

April 6, 2021

Melinda Barrett, President
Haverhill City Council
4 Summer St, Room 204
Haverhill, MA 01830

Re: The Beck
PE Realty Partners, LLC
Site Plan Review (Major) Zone WD-H
Map 711-4-3, 4, & 4A
Map 712-684-1
Map 711-4-2 (Skateland Site)

Dear President Barrett,

Please be advised that this office represents PE Realty Partners, LLC in connection with its request for a Site Plan Review (Major) to construct 290 apartment units and approximately 6,500 sq. ft of retail space on the existing vacant parcels owned by the City on Railroad Avenue along with the Skateland site also on Railroad Avenue.

As I am sure you are aware, the Procopio Companies were selected as the Preferred Developer for the purchase and development of the City owned property on Railroad Avenue in March of 2020.

The City and the Procopio Companies signed a purchase and sales agreement shortly thereafter and subsequently put together a visionary transit-oriented development plan for the site which also includes the Skateland site.

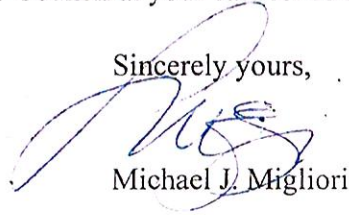
I have attached an outline of the Development Highlights that The Beck project will provide to the City which include transit-oriented housing, retail space, new public parks, extension of the Riverwalk, local traffic infrastructure improvements (\$1,950,000.00 MassWorks Grant), significant tax revenues, job creation and an overall transformation of a blighted site on the Merrimack River.

The Procopio Companies are excited to now proceed with the approval process and look forward to building this truly transformational project on the Merrimack River in a way the Master Plan intended, as soon as possible.

Page – 2 –

Please schedule a hearing before the Council at your earliest convenience.

Sincerely yours,

A handwritten signature in blue ink, appearing to read "Migliori", is written over the typed name.

Michael J. Migliori

MJM/dma

cc: Mayor,
Planning Director Pillsbury

The Procopio Companies are excited to present the City of Haverhill with a plan to develop a transit-oriented development (Bradford Station (MBTA Haverhill Commuter Rail Line) directly across the street) on Railroad Ave. along the banks of the Merrimack River.

Development Highlights

- **Two five-story wood-framed apartment buildings over steel and concrete podium parking structure**
 - Building A – C-shaped building
 - Building B – E-shaped building
 - Total Number of Units (Both Buildings – A and B) – 290 Apartment Units
(10 of the apartment units will be reserved as workforce housing at 100% AMI)
 - 30 Studios
 - 148 1-Bedrooms
 - 21 1-Bedroom with Dens
 - 91 2-Bedrooms
 - Residential units will include private patios and balconies (some units), specialty acoustic treatments, stainless steel appliances, recessed lighting, quartz counters, walk-in closets, built-in USB chargers, smart thermostats, locks and access controls
 - Residential amenities will include a state-of-the-art fitness center, common area Wi-Fi, pet wash, package room, self-serve grab and go market, club room, co-working space, bike storage, sports lounge, chef's kitchen and private dining room, maker space, paddle board storage, outdoor resort style pool, several fire pit/patio/BBQ/lawn areas
 - Buildings will incorporate sustainable design and strive to be LEED Silver Certified or higher
 - 347 parking spaces total (320 residential, 27 public park and retail)
 - 291 residential podium garage spaces
 - 26 residential surface spaces
 - 3 residential surface motor court spaces
 - 27 public park and retail surface spaces
 - Anticipated renter profile
 - Renters who work in Haverhill, other north of Boston communities, southern NH, and downtown Boston/Cambridge seeking affordable luxury residences near transit and shopping/restaurants
 - Employed at wide range of industries: Town government/services, financial services, medical, academic, tech/biotech, legal
 - Age range of residents is Gen Z up to Empty Nesters
 - Small amount of families with children are anticipated to live at this project (5-10 families projected, less than 15 children)
- **Retail space**
 - 6,750 sq. ft. of retail space in Building A adjacent to outdoor surface public parking lot, new public park, and riverwalk that will include a restaurant with outdoor seating
- **New public park space**
 - 1.4-acre public waterfront park featuring:
 - Hard space area to host food trucks, public markets, and other events
 - Fenced playground area
 - Fenced splash pad and water feature area
 - Fenced dog park area with separate sections for large and small dogs
 - Open lawn spaces
 - Pergolas for shaded spaces
 - Amphitheater with terraced seating
 - Seasonal kayak launch/dock on the Merrimack River
 - 1.8-acre, 1,700 linear foot Riverwalk lined with park benches and two patio terrace vista areas that will have tables, seating, etc.

- **Local traffic infrastructure improvements**
 - City of Haverhill was awarded a \$1.95m MassWorks Grant associated with this transit oriented mixed-use development to improve roadways and intersections adjacent to the project as well as the surrounding area to enhance safety and connectivity. The following are proposed improvements from the development team's traffic consultant (MDM Transportation Consultants) that will be funded by the MassWorks Grant:
 - Realign Laurel Avenue with South Elm Street to reduce open pavement areas, driver confusion and pedestrian crossing lengths. The realignment will also provide additional separation from the adjacent Blossom Street intersection.
 - Realign Railroad Avenue with South Elm Street to improve transit bus maneuverability to/from the MVRTA Fleet Maintenance Facility located along Railroad Avenue and improve access to the proposed mix-use development. MVRTA bus maneuvers from Railroad Avenue are currently constrained by the existing bridge abutments that support the overhead rail lines and require encroachment into opposing travel lanes.
 - Realign Blossom Street with South Elm Street to better define the intersection, minimize the skewed alignment and reduce pedestrian crossing lengths
 - Construct bicycle lanes to provide a direct connection from the surrounding area to the Bradford Rail Trail
 - Reconstruct sidewalks throughout the project limits and install an enhanced pedestrian crossing with curb extension and rapid rectangular flashing beacon (RRFB) at the Bradford Rail Trail terminus
 - Install traffic signal controls at two intersections to clearly define driver right-of-way and provide exclusive pedestrian crossing phasing
 - Mill and overlay the roadway within the project limits with select areas of full-depth reconstruction to address the deterioration of the existing surface course and pavement failures.
 - Development ownership has committed private dollars to install updated signaling gear, and re-sequence the signaling on the Haverhill side of the Joseph C. Comeau Bridge
- **Revenue generation for the City of Haverhill**
 - Over \$19m in total revenue generation projected for the city over the first 20 years of the project (Purchase of the Ornsteen site, permits/fees, and 20 years of net tax revenue)
- **Job creation**
 - Estimated 700 to 1,100 temporary construction jobs with preference given to Haverhill individuals, vendors and contractors
 - 6 permanent new jobs related to the apartment property management team, with preference given to Haverhill residents
 - 20-30 permanent new jobs related to the retail and restaurant spaces

Location Highlights

- Located across the Merrimack River from Downtown Haverhill, residents will be in walking distance to many shops, restaurants, and services
- Bradford Station (MBTA Haverhill Commuter Rail Line) directly across the street with service to North Station (Downtown Boston) (Approx. 1 hr. commute time)
- Short commute to major employers such as Amazon, Raytheon, Charles River Labs, and UMass Lowell

The Procopio Companies are respectfully asking for the following waiver requests to fulfill its plan to develop a transit-oriented development (Bradford Station (MBTA Haverhill Commuter Rail Line) directly across the street) on Railroad Ave. along the banks of the Merrimack River.

The following states zoning requirements in bold followed by our waiver requests. Please also see Zoning Analysis Table below provided by the project's civil engineer, Bohler Engineering:

1. **Preferred projects within Waterfront District H may increase density to 40 units per acre**
 - Our proposed project is for 290 units on 6.81 acres of land, which equates to 42.6 units per acre
 - A waiver to develop a project with 290 units is requested to satisfy the 290 units stated in the \$1.95m MassWorks Grant for traffic and infrastructure improvements associated with our transit oriented development
2. **19-foot long ninety-degree parking spaces are required pursuant to CH. 255 6.1.4.5**
 - We are requesting a waiver as the 291 ninety-degree podium garage parking spaces are dimensionally shorter than 19 feet. The vast majority of spaces planned in the podium garage are 18-feet long, with a few being 17-feet long. Smaller parking stall sizes are typical for garage parking spaces in the market and are generally more appropriate than larger surface lot spaces.
3. **491 parking spaces are required for the proposed mixed-use (Multifamily Residential, Retail & Restaurant) development plan per zoning**
 - Our proposed project currently plans to offer 347 parking spaces
 - A waiver is requested due to the project being a transit-oriented development with many residents commuting via public transportation provided at the Bradford MBTA Commuter Rail station directly across the street from the development, which also offers sufficient additional off-street parking options for the development's residents and visitors
 - The proposed amount of parking also mitigates the modest projected additional traffic volume of the project to area roads

ZONING ANALYSIS TABLE			
ZONING DISTRICT	WATERFRONT DISTRICT H, NORTH SIDE OF RAILROAD AVENUE (WD-H)		
OVERLAY DISTRICT	N/A		
REQUIRED PERMIT	SPECIAL PERMIT		
ZONE CRITERIA	REQUIRED	EXISTING	PROPOSED
MAX. BUILDING HEIGHT (FT.)	74	N/A	70
DENSITY (UNITS/ACRE)	40 (1)	N/A	42.6 (W) (290 UNITS / 6.81 ACRES)
PARKING SPACES	491* (SEE CALCULATION BELOW)	62	SURFACE = 56 (2) GARAGE = 291 (3) (W) TOTAL = 347 (W)
ACCESS PARKING SPACES		1	12 (2 VAN)
PARKING STALL CRITERIA STANDARD 8 FT x 19 FT PARALLEL 9 FT x 23 FT	REQUIRED PARKING CALCULATION USE/CATEGORY: MULTI-FAMILY RESIDENTIAL PARKING RATIO: 1.5 SPACES/UNIT NUMBER OF UNITS: 290 REQUIRED PARKING: 435 USE/CATEGORY: RETAIL PARKING RATIO: 1 SPACE/200 GSF GSF: 3,275 SF REQUIRED PARKING: 16 USE/CATEGORY: RESTAURANT PARKING RATIO: 1 SPACE/3 SEATS NUMBER OF SEATS: 120 REQUIRED PARKING: 40 TOTAL REQUIRED PARKING: = 435 SPACES + 16 SPACES + 40 SPACES = 491 SPACES 301-400 SPACES = 8 MIN. ACCESSIBLE SPACES 1 ACCESSIBLE VAN SPACE PER 6 STANDARD ACCESSIBLE SPACES (MIN.)		
ACCESS PARKING CRITERIA STANDARD: 8 FT x 18 FT STALL (MIN.) 5 FT x 18 FT AISLE (MIN.) VAN: 8 FT x 18 FT STALL (MIN.) 8 FT x 18 FT AISLE (MIN.)			

(1) PREFERRED PROJECTS WITHIN WATERFRONT DISTRICT H MAY INCREASE DENSITY TO 40 UNITS PER ACRE
 (2) THE PROPOSED NUMBER OF SURFACE PARKING SPACES DOES NOT INCLUDE 6 PROPOSED SPACES WITHIN RAILROAD AVE RIGHT-OF-WAY
 (3) THE 291 NINETY-DEGREE GARAGE PARKING SPACES ARE DIMENSIONALLY SHORTER THAN 19 FEET, WHERE 19-FOOT LONG NINETY-DEGREE PARKING SPACES ARE REQUIRED PURSUANT TO CH. 255 §6.1.4.5.
 (W) WAIVERS REQUESTED FOR PROPOSED PARKING SPACE QUANTITY, PARKING SPACE DIMENSIONS, AND UNIT DENSITY



City of Haverhill, MA

CCSP-21-7

05/20/2021

Fire2 Department Review

City Council Special Permit

Status: Complete**Assignee:** Michael Picard**Became Active:** 05/18/2021**Completed:** 05/18/2021

Applicant

Michael J Migliori
railroadteam@procopiocompanies.com
18 Essex Street
Haverhill, MA 01832
978-884-6431

Location

0 RAILROAD AVE
Bradford, MA 01835

Owner:

CITY OF HAVERHILL
4 SUMMER ST HAVERHILL, MA 01830

Comments

Michael Picard, May 18, 2021

The planning, design and construction of new buildings, renovation of existing buildings and structures to provide egress facilities, fire protection and built-in fire protection equipment shall be in accordance with 780 CMR; and any alterations, additions or changes in buildings required by the provisions of 527 CMR which in the scope of 780 CMR, 9th edition, shall be made in accordance therewith. (527 CMR 1.04(4) and 780 CMR 101.2). Additionally, 780 CMR (901.2.1) Document Submittal Process will be required.

Plans approved by the fire department are approved with the intent they comply in all respects to MSBC, 780 CMR 527 CMR 1.00, MGL Chapter 148 and any City of Haverhill ordinance. Any omissions or errors on the plans do not relieve the applicant of complying with applicable requirements.

Third Party Review of Fire Protection Systems will be required
Fire Department Vehicle Access to be reviewed
Hydrant locations and distances to be reviewed
Snow Storage location(s) to be reviewed



City of Haverhill, MA

CCSP-21-7

05/20/2021

Health Department Review

City Council Special Permit

Status: Complete

Assignee: Bonnie Dufresne

Became Active: 05/18/2021

Completed: 05/18/2021

Applicant

Michael J Migliori
railroadteam@procopiocompanies.com
18 Essex Street
Haverhill, MA 01832
978-884-6431

Location

0 RAILROAD AVE
Bradford, MA 01835

Owner:

CITY OF HAVERHILL
4 SUMMER ST HAVERHILL, MA 01830

Comments

Bonnie Dufresne, May 18, 2021

Municipal water and sewer proposed - trash pick up will be private - if units rented - rental permits required upon change of occupancy after initial occupancy issued through building dept. - amenities may require further approval, permits, review



City of Haverhill, MA

05/20/2021

CCSP-21-7

Conservation Department Review

City Council Special Permit

Status: Complete**Became Active:** 05/18/2021**Assignee:** LINDA KOUTOULAS**Completed:** 05/20/2021

Applicant

MichaelJ Migliori
railroadteam@procopiocompanies.com
18 Essex Street
Haverhill, MA 01832
978-884-6431

Location

0 RAILROAD AVE
Bradford, MA 01835

Owner:

CITY OF HAVERHILL
4 SUMMER ST HAVERHILL, MA 01830

Comments

Robert Moore, May 10, 2021

Project will require Notice of Intent filing with the Conservation Commission. Submittal should provide detailed specifics for construction impacts and future vegetation management, particularly as they relate to the riverfront trail along the building and the green space near the bridge. A comprehensive Long-Term Pollution Prevention Plan, incorporated all facets of the development, should be submitted with the Stormwater Management O&M Plan. Submittal should detail compliance with the Riverfront Area requirements for redevelopment of the eastern portion of the site.

I have no objections to granting a special permit to re-develop this site.



City of Haverhill, MA

05/20/2021

CCSP-21-7

Storm Water Review

City Council Special Permit

Status: Complete**Became Active:** 05/18/2021**Assignee:** LINDA KOUTOULAS**Completed:** 05/20/2021

Applicant

MichaelJ Migliori
railroadteam@procopiocompanies.com
18 Essex Street
Haverhill, MA 01832
978-884-6431

Location

0 RAILROAD AVE
Bradford, MA 01835

Owner:

CITY OF HAVERHILL
4 SUMMER ST HAVERHILL, MA 01830

Comments

Robert Moore, May 10, 2021

Applicant will presumably demonstrate compliance with the MA Stormwater Management Standards as part of the NOI filing with the Con Com. The Commission requires applicants to post escrow to fund the peer review of the design. With compliance regulated under an Order of Conditions, a local Stormwater Management Permit would not be required under C. 219 of the City Code.



City of Haverhill, MA

CCSP-21-7

05/20/2021

Police Department Review

City Council Special Permit

Status: Complete

Became Active: 05/18/2021

Assignee: Robert Pistone

Completed: 05/20/2021

Applicant

MichaelJ Migliori
railroadteam@procopiocompanies.com
18 Essex Street
Haverhill, MA 01832
978-884-6431

Location

0 RAILROAD AVE
Bradford, MA 01835

Owner:

CITY OF HAVERHILL
4 SUMMER ST HAVERHILL, MA 01830

Comments

Robert Pistone, May 20, 2021

Police Department approval per the traffic study/ peer review submitted.



City of Haverhill, MA

05/21/2021

CCSP-21-7

Wastewater Review

City Council Special Permit

Status: Complete**Became Active:** 05/18/2021**Assignee:** Robert Ward**Completed:** 05/21/2021

Applicant

MichaelJ Migliori
railroadteam@procopiocompanies.com
18 Essex Street
Haverhill, MA 01832
978-884-6431

Location

0 RAILROAD AVE
Bradford, MA 01835

Owner:

CITY OF HAVERHILL
4 SUMMER ST HAVERHILL, MA 01830

Comments

Robert Ward, May 21, 2021

The following comments were provided during the preliminary plan review.

- Show the existing 48" sewer interceptor in a plan and profile view.
- Provide the lowest footing foundation elevation for the garage, the sewer interceptor elevation, and the distance away from the sewer interceptor.
- Provide detail plan, profile and pipe size for each sewer service connection into the existing SMH with rim and invert elevation for existing SMH. Possible outside drop connection may be required.
- Provide standard detail for an outside drop sewer connection
- Provide standard detail for a sewer service
- It is difficult to view this plan as currently provided. An existing condition plan proposed changes or discontinuance to the City's infrastructure either in color or a bold font should be provided.
- Provide a discontinuance to the legend on Sheet C-100
- Sheet C-402 there is an existing 12" PVC drain that runs through the proposed building and garage. Is the plan to discontinue this drain? Show this discontinuance
- This pipe once removed, will be seal in two drain manholes with concrete provide a detail.
- Sheet C-406 there is a 6" drain shall be discontinued and seal this drain with concrete provide a detail.

- Proposed catch basins in each garage where is the discharge pipe connection made.
- Show profile for all storm water features drain pipes, catch basins, drain manholes, infiltration systems. City does not allow proposed catch basin without a 4-foot sump.

Additional comments will be provided once a revised plan is submitted.



Haverhill

Economic Development and Planning
Phone: 978-374-2330 Fax: 978-374-2315
wpillsbury@cityofhaverhill.com

May 21, 2021

TO: City Council President Melinda Barrett and members of the Haverhill City Council

FROM: William Pillsbury, Jr. Economic Development and Planning Director

**SUBJECT: Waterfront District Subzone H Special Permit- 0 Railroad Avenue--
290 residential units plus commercial space and a public Park**

The applicant requests action on a special permit to construct 290 residential units plus commercial space and a public park at the former Ornstein Site on Railroad Avenue. The role of the City Council is to conduct a public hearing relative to the special permit pursuant to the criteria in the Waterfront district ordinance.

The proposed project has resulted from the City's issuance of an RFP for the disposal of the former Ornstein Site on Railroad Avenue. The applicant Procopio was selected as the developer of the site and the proposal is the result of extensive interaction with the city departments. The project is located in subzone H of the city council approved Waterfront Zoning ordinance.

A key component of this project is the provision of a public park and rail trail extension/waterfront walkway connecting the downtown and the Bradford side of the Merrimack River. The proposed project includes these elements as part of the required design of a project in this subzone.

The applicants project incorporates the adjacent Skateland property into development. The removal of this underutilized property enhances the project design and allows the expansion of the public park and riverfront amenities provided by the project.

The ordinance allows for reports to be filed from city departments. I recommend that their comments and reports be made part of the approval action of the city council.

The role of the City Council under the Waterfront zoning ordinance is to act as Plan Approval Authority (PAA) for projects allowed by right and requiring approval of a special permit.



Haverhill

Economic Development and Planning
Phone: 978-374-2330 Fax: 978-374-2315
wpillsbury@cityofhaverhill.com

As Economic Development and Planning Director I have reviewed the application package for consistency with the ordinance and what follows is a recommendation based on a review of the project in light of the objectives of the ordinance and the specific requirements and standards of the Waterfront District Subzone H.

1. 255-9.3.1 **Purpose**

A detailed review of the project against Section 255-9.3.1: 1-17 indicates that the proposed project meets the relevant major objectives of the district.

2. 255-9.3.4: 8 **Subzones**

The goals for Subzone H states that a project proposed design should:

Create a residential node which compliments the downtown and the adjacent commuter rail station- the proposed project meets this criterion.

Ensure the continuation of visual corridors to the Merrimack River -the proposed project meets this criterion.

Extend upon the existing Rail Trail –a major benefit of this project is that the applicant proposes to provide easements for public access to and from Railroad Avenue at the property and provide public parking for the rail trail and public park

3. 255-9.3.5 **Design Guidelines**

The proposed project complies to the greatest extent possible with the relevant recommended design guidelines in 255-9.3.5: 1-11. The table of uses allows retail uses in particular as they support the neighborhood and are complimentary commercial use is warranted based on the size of the project.

4. 255-9.3.9 **Special Permit review criteria**

Proposed project complies to the greatest extent possible with all relevant special permit criteria 255-9.3.9-(1-10).

Proposed project complies with the review criteria of providing for physical access to the River and affords additional mitigation in the form of public parking for the rail trail and public Park.

Mitigation is provided to create adequate traffic circulation system in order to insure proper traffic control and minimize hazards to public health and safety as a result of traffic. The city has received the traffic study and conducted a peer review of the proposed traffic mitigation. The proposed mitigation involves a 2 million dollar MASSWORKS grant to



Haverhill

Economic Development and Planning
Phone: 978-374-2330 Fax: 978-374-2315
wpillsbury@cityofhaverhill.com

improve the circulation and traffic flow to this area. These improvements adequately mitigate the impacts if the project.

5. 255-9.3.11 and 12: **Density Regulations and Density Bonus**

The proposed project is entitled to a density bonus as follows: In Subzone H a maximum of 40 units per acre shall be permitted when a project proposes a public park on site. The area, location and amenities included in the park are an excellent enhancement to the project and a benefit to the city.

255-9.3.20: **Plan Approval Decision**

1. Waivers- Except where expressly prohibited herein, upon the request of the applicant the PAA may waive dimensional and other requirements of this article in the interests of design flexibility and overall project quality and upon a finding of consistency of such variation with the overall purpose and objectives of the WD or if the PAA finds that such waiver will allow the project to better achieve the intent and overall purposes of this article.

I believe the waivers are appropriate in the case of this individual project.

The density waiver is appropriate based on the lot size and width constraints and the need to construct vertically to achieve design flexibility and create a financially viable project.

The parking waiver is appropriate as it allows the project to comply with the intent of the ordinance as the project will provide public parking and direct public access to the Public Park and Rail Trail. The provision of a connection and access to the Rail Trail is a key component to the Waterfront ordinance. Further the project is appropriate considering the availability of surplus off street parking in the vicinity of the use being served and the proximity to an MBTA transit station. (see 255-9.3.16 (1 a.)

The PAA shall also consider whether the reduction in parking requirement is likely to encourage the use of public transportation or encourage a proposed development to be more pedestrian friendly (see 255-9.3.16 (1 e.)

3. Special Permit approval- The city council finds that the project is consistent with the purpose and intent of the section including that the applicant has:

1. submitted the required fees and information
2. meets the requirements and standards set forth in the section



Haverhill

Economic Development and Planning
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wpillsbury@cityofhaverhill.com

3. provided that impacts have been mitigated to the greatest extent possible

RECOMMENDATION: Based on a comprehensive review of the proposed project I recommend that the City Council **APPROVE** the requested waivers; and **APPROVE** the special permit making the findings necessary that the project as presented is consistent with the purpose and intent of the section.

Any specific requirements contained in the reports filed by the city departments shall be made part of this finding and carried forward into the development review/building permit process.



JAMES J. FIORENTINI
MAYOR

Haverhill Fire Department

4 Summer Street, Room 113
Haverhill, Massachusetts 01830
Telephone: 978 373-8460
Fax: 978 521-4441



ROBERT M. O'BRIEN
FIRE CHIEF

May 21, 2021

City Council President Melinda Barrett and Members of the Haverhill City Council
City of Haverhill
4 Summer Street
Room 202
Haverhill, MA 01830

Re: 21 Railroad Avenue

Dear Madame President and Members of the City Council:

The Procopio Company's proposal for the former Ornsteen property located at 21 Railroad Avenue provides the City of Haverhill with an excellent opportunity to revitalize an area of the community in desperate need of attention. Like other gateways, the Bradford Station (MBTA Haverhill Commuter Rail Line) provides riders with their first glimpse of the city. The Procopio proposal offers a state-of-the-art mixed occupancy development consisting of residential and commercial units supported by on-site parking.

The proposed design and construction of the new buildings will provide egress facilities, fire protection, and built-in fire protection equipment in accordance with 780 CMR (MSBC). The Haverhill Fire Department strives to ensure all building design plans comply with regulations outlined in 780 CMR, 527 CMR 1.00, M.G.L. 148, as well as all City of Haverhill ordinances. With a focus on providing firefighters with the highest level of safety during fire ground operations, the complex design allows for sufficient building access.

The recommendations from M.D.M. Transportation Consultant Group and the monies received from the Mass Works Grant offer improvements to the area's roadway and intersections safety issues. It is with this in mind; I support the proposed plans for 21 Railroad Avenue.

Respectfully,

Robert M. O'Brien

A handwritten signature in black ink, appearing to read "Robert M. O'Brien", with a stylized flourish at the end.

Fire Chief



City of Haverhill, MA

05/21/2021

CCSP-21-7

Building Inspector Approval for Agenda

City Council Special Permit

Status: Pending

Assignee: Tom Bridgewater

Became Active:

Completed:

Applicant

MichaelJ Migliori
railroadteam@procopiocompanies.com
18 Essex Street
Haverhill, MA 01832
978-884-6431

Location

0 RAILROAD AVE
Bradford, MA 01835

Owner:

CITY OF HAVERHILL
4 SUMMER ST HAVERHILL, MA 01830

Comments

Tom Bridgewater, May 21, 2021

After review I agree with the waivers that are requested.

Glenn Smith

THE BECK

FILE # : – CCSP-21-7

Dear Mr. Pillsbury;

This property is proposed for a MULTI STORY residential building with 293 RESIDENTIAL UNITS on a previously occupied location with. If this lot is approved, the Water Department will require the owner of the property, at their own expense:

- A Water System Flow Test must be provided to ensure the adequacy of the water supply system for this project
- There is a 12" Water Main in Railroad Avenue to be tapped for the Water Services. There is also a 6" Water Main that supplies some of the services that will need to be discontinued
- Please indicate the size of the proposed water service line(s) and connection configuration for Fire Protection and Consumptive water use. The proposed Title V Flows must be provided for this project. There shall be a Fire Sprinkler Line and a separate Domestic Water Service Line
- The existing Water Services that extend to this property must be discontinued at the Water Main Corporation Stop
- Provide estimated MAX Instantaneous Flow and estimated Water Usage per Day as outlined in Section 15.203 of the Massachusetts Title VI Regulations
- ** A FULL SET of plumbing plans, INTERNAL and EXTERNAL, for the facility must be submitted to the Water Maintenance Department for Backflow Device review.
- A water service application must be filed with the Haverhill Water Department for EACH service entrance, domestic and fire suppression if applicable.
- Water service shall be installed in accordance with the latest Water Department Regulations
- The Water Service(s) shall enter into a heated space and installed in a manner to prevent freezing or damage.
- All fees for Application, Entrance and Impact will be payable at the time of filing for a Water Service Application
- Schedule with the Haverhill Water Department for inspections during the installation of the NEW water service to be installed at the owners expense.



The Commonwealth of Massachusetts
HOUSE OF REPRESENTATIVES
ANDY X. VARGAS

April 12, 2021

Mayor James J. Fiorentini
Haverhill City Councilors
4 Summer St.
Haverhill, MA 01830

Dear Mayor Fiorentini and Haverhill City Councilors:

I write to respectfully offer my support for the pending development of the so-called "Ornsteen Property." Our office worked with the state to secure nearly \$2 million in MassWorks funding to help address the traffic and safety concerns to make this project happen. As you know, housing demand continues to exceed supply and Haverhill is well positioned to benefit from this primarily market rate project.

The MassWorks grant will be a conduit to construct a well-designed, transit-oriented and mixed used development along the Merrimack River. As a strong supporter of transit-oriented development, this project promises to provide greater economic opportunity via housing and transportation for the residents of Haverhill.

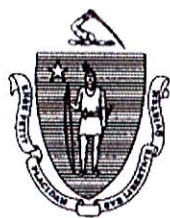
Furthermore, as the legislature works to preserve and grow funding for MassWorks and other housing and infrastructure programs, this project will help us continue to make the case that these state investments pay for themselves in both quality of life for residents and revenue generated. I am pleased to offer my support at this time and look forward to seeing the many long-term benefits that this project will have in Haverhill.

If my office can be of any assistance, please do not hesitate to reach out.

Yours in service,

A handwritten signature in black ink, appearing to read "Andy X. Vargas".

Andy X. Vargas
State Representative
Third Essex District



The Commonwealth of Massachusetts
MASSACHUSETTS SENATE

SENATOR DIANA DiZOGGIO

First Essex District

STATE HOUSE, ROOM 416B
BOSTON, MA 02133-1053

Chair
JOINT COMMITTEE ON COMMUNITY DEVELOPMENT
AND SMALL BUSINESS

April 9, 2021

Mayor James J. Fiorentini
City Hall, Room 100
4 Summer Street
Haverhill, MA 01830

City Council President Melinda E. Barrett
City Hall, Room 204
4 Summer Street
Haverhill, MA 01830

Dear Mayor Fiorentini and Council President Barrett,

As the project approaches construction, I write to express my strong support for Procopio Companies and its efforts around the development of the former Ornstein property in the City of Haverhill.

The infrastructure improvements proposed in the project build upon the City's continued efforts to turn Haverhill into a more pedestrian-friendly city. With the recently awarded MassWorks grant, this project is in a prime position to deliver results in three critical areas: sustainability, park and Riverwalk improvements, and traffic improvements.

As you know, sustainability is crucial as the City of Haverhill continues to grow. This project aligns with Haverhill's 2035 Master Plan and also poses an opportunity for installation of a PV solar panel renewable energy system. The project would result in a 1.4-acre public waterfront park, including a playground, dog park, open lawn space, and kayak docks, as well as a 1.8-acre Riverwalk, including park benches, tables, and lounge areas.

Also so important, the project would help address traffic issues facing the City. It would do so through the construction of bicycle lanes to provide a direct connection from the surrounding area to the Bradford Rail Trail; the reconstruction of sidewalks throughout the project limits; and the installation of an enhanced pedestrian crossing with curb extension and rapid rectangular flashing beacon (RRFB) at the Bradford Rail Trail terminus.

I believe all of these initiatives would be of great benefit to the City of Haverhill and again want to offer my strong support. If you have any questions or would like to further discuss, please feel free to contact me at any time.

Best Regards,



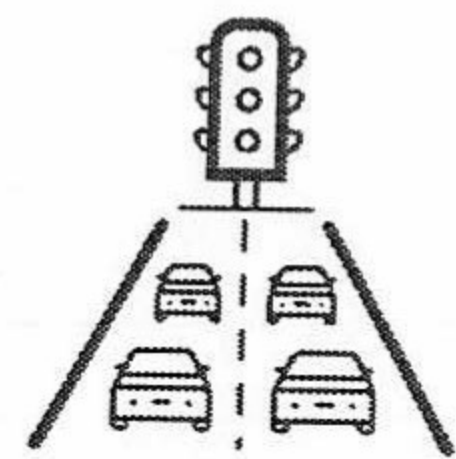
Diana DiZoglio

State Senator

1st Essex District

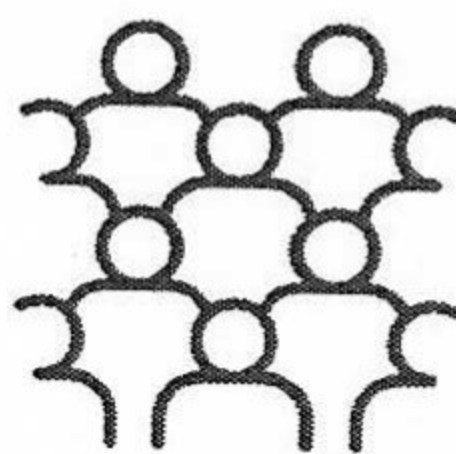
cc:

Council Vice President Colin F. LePage
Councillor Joseph J. Bevilacqua
Councillor Timothy J. Jordan
Councillor William J. Macek
Councillor Michael S. McGonagle
Councillor John A. Michitson
Councillor Mary Ellen Daly O'Brien
Councillor Thomas J. Sullivan



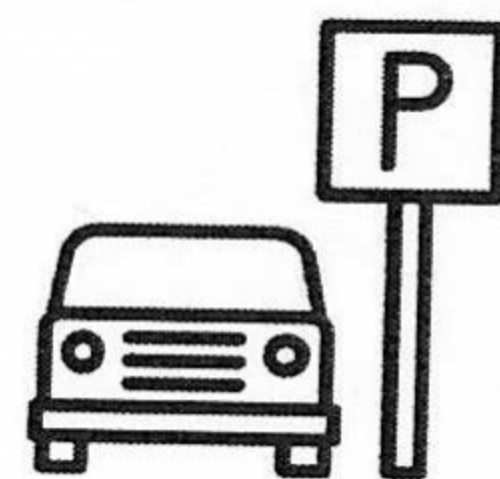
11%

of comments and feedback indicated a high priority and interest in the plan to fix Railroad Ave & South Elm, as well as improve the connectivity for pedestrians and bikes



1%

Commented on the project density in a negative manner



0%

Mentioned parking or lack of parking as being an issue relative to the development



15%

of people focused on the retail and restaurant uses in the development and provided input

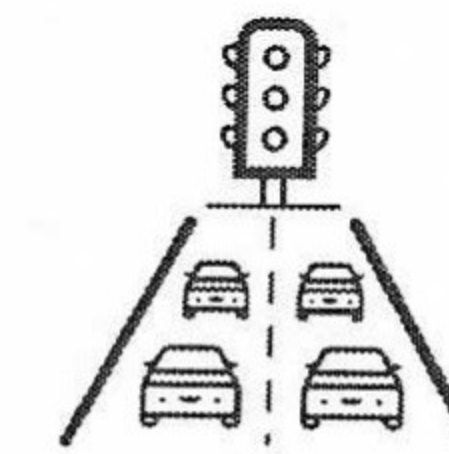


17%

of people provided detailed input on community uses, such as festivals, food trucks, farmers markets, music events, and other community programming

2%

Mentioned traffic as an issue



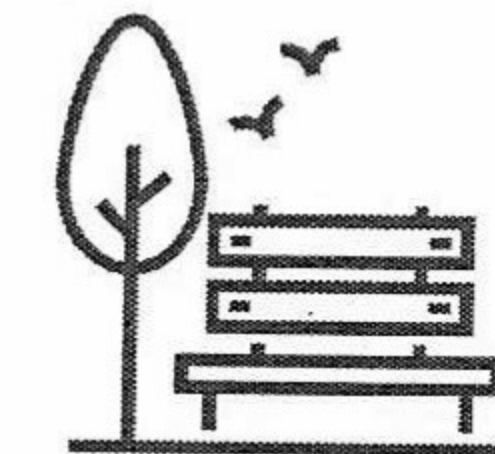
3%

Specifically mentioned support for even higher density at the MBTA station



26%

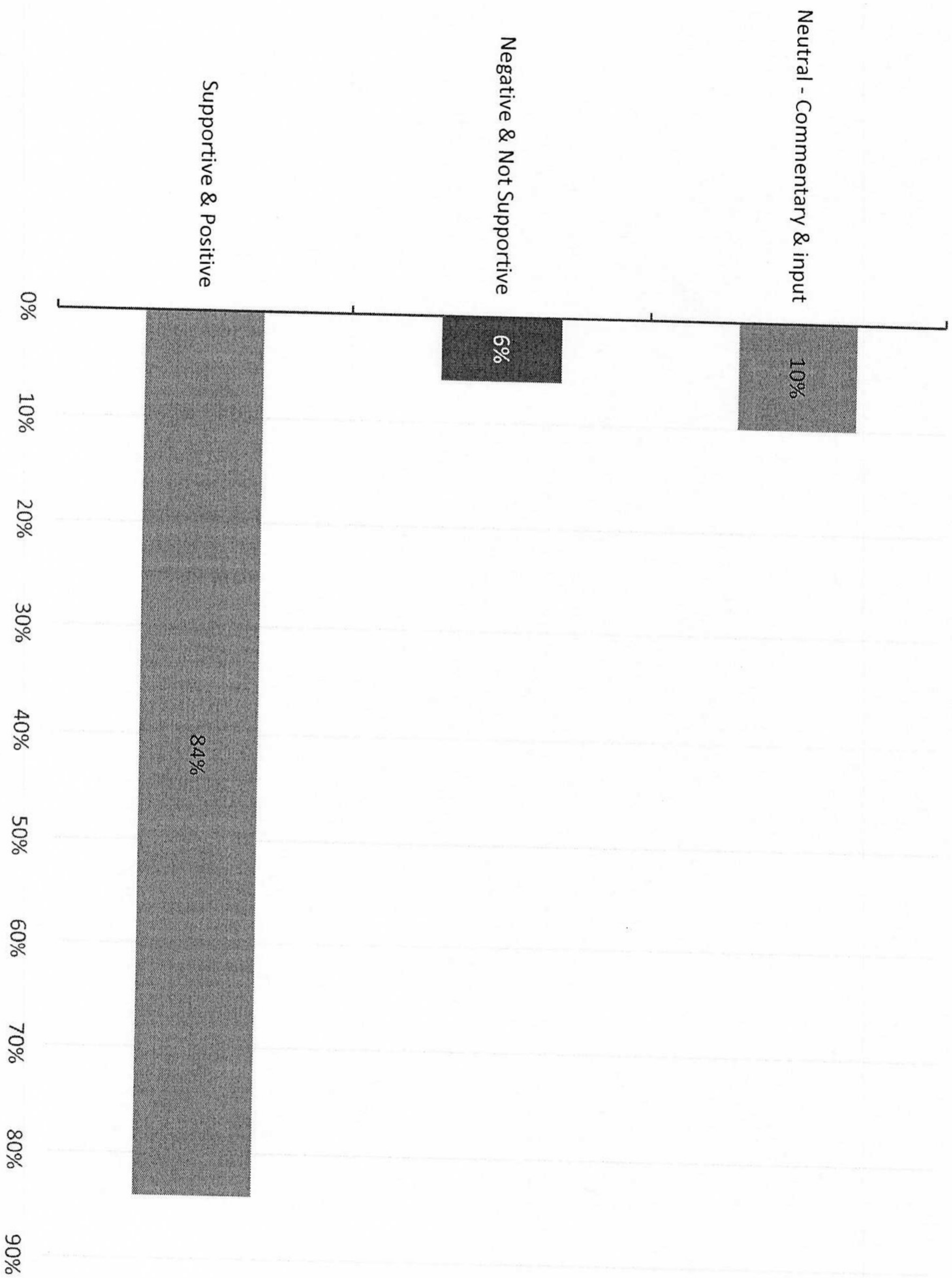
of people expressed excitement over the park and provided detailed input on its uses and design



41%

of people expressed a high level of desire for the river access and boardwalks, and provided detailed input for design, sustainability, connectivity and public access





Community Feedback - colUrbanize

PRINCIPALS

Robert J. Michaud, P.E.
Daniel J. Mills, P.E., PTOE

MEMORANDUM

DATE: December 14, 2020

TO: Mr. Michael Procopio
Procopio Enterprises, Inc.
220 Broadway, Unit 302
Lynnfield, MA 01940

FROM: Robert J. Michaud, P.E. – Managing Principal
Daniel A. Dumais, P.E. – Senior Project Manager

RE: **Proposed Mixed-Use Development**
19 Railroad Avenue, Haverhill, Massachusetts



MDM Transportation Consultants, Inc. (MDM) has conducted traffic impact and access study (TIAS) for a proposed mixed-use development to be located at 19 Railroad Avenue in Haverhill, Massachusetts. The location of the site relative to the adjacent roadway network is shown in **Figure 1**. This TIAS evaluates baseline and future-year traffic conditions for area roadways/intersections, quantifies traffic increases and impacts associated with Site development, and evaluates safety-related conditions at key study locations. Recommended multi-modal roadway and infrastructure improvements are identified to address existing and future-year safety and operational needs to support Site development along with a Transportation Demand Management (TDM) program to support multi-modal transportation objectives and to promote less reliance of auto use by patrons and visitors to the site.

Key findings of the assessment are as follows:

- *Measured Travel Speeds.* The observed 85th percentile travel speed along Railroad Avenue adjacent to the Site is 28 mph in the eastbound travel direction and 31 mph in the westbound travel direction. These observed travel speeds are the appropriate basis for determining driveway sight lines to conform with sight line criteria published by AASHTO.
- *Sight Line Safety Characteristics.* Clearing and regrading associated with construction of the proposed Site driveways will provide sight lines that exceed AASHTO's recommended criteria for both stopping sight distance (SSD) and intersection sight distance (ISD) based on observed 85th percentile travel speeds along Railroad Avenue. This will provide ample visibility for vehicles approaching and leaving the Site

driveway to properly exit/enter the Railroad Avenue traffic stream in a safe manner. Plantings (shrubs, bushes) and structures (walls, fences, etc.) shall be maintained at a height of 2 feet or less within the sight lines in vicinity of the Site Driveway intersections with Railroad Avenue to provide unobstructed sight lines.

- *Trip Generation.* The residential component of the proposed project is considered a transit-oriented development and, as such, a significant portion of the proposed residential component's population is expected to utilize the adjacent MBTA commuter rail services. Journey to work and ITE trip generation data indicate that approximately 19% of residents would use public transportation to/ from work. Overall, the proposed development is estimated to generate approximately 93 vehicular trips during the weekday morning peak hour (28 entering and 65 exiting) and 142 vehicular trips during the weekday evening peak hour (81 entering and 61 exiting).
- *Adequate Capacity.* The proposed development is expected to have minimal impact on the study area intersections and will not result in any notable changes in traffic operations in the study area relative to Baseline conditions. The assessment indicates that there is ample capacity at these study locations to accommodate these project-related traffic increases without the need for infrastructure enhancements. However, analysis indicates that certain geometric and traffic control improvements at the South Elm Street intersections with Railroad Avenue and Laurel Street are appropriate to support future growth in the area independent of the Project and to improve safety, traffic flow and pedestrian/bicycle accommodation at these intersections.
- *Offsite Multimodal Mitigation.* Proposed public infrastructure improvements, developed in coordination with the City of Haverhill and funded in part from a Massworks infrastructure grant, will provide much needed multimodal upgrades in the form of safe and accessible pedestrian, bicycle and vehicle access improvements to existing public amenities and the proposed mixed-use/transit-oriented development along Railroad Avenue. Specifically, this will include approximately 1,500 linear feet of roadway and intersection improvements which will enhance safety and connectivity at the convergence of the Bradford Rail Trail terminus, two arterial roadways, a number of neighborhood streets, the MBTA Bradford Commuter Rail Station and the Joseph C. Comeau Bridge which serves as a gateway to Downtown Haverhill. Additionally, safety and operational improvements are proposed at the northerly terminus of the Comeau Bridge at Washington Street independent of the Massworks grant, including signal equipment repair/upgrades and pedestrian accommodation enhancements.
- *Transportation Demand Management.* TDM programs include a series of measures that are designed to encourage the use of alternative modes of travel to single-occupant vehicles (SOVs) through influencing the choice of travel modes by residents, commercial tenant employees, and patrons. The Proponent has identified the framework of a TDM program to be implemented at the property that includes membership in the Merrimack

Valley Transportation Management Association (MVRTA), transit subsidy program, bicycle accommodation and integrated system of walkways/path connections to area amenities that is intended to foster and incentivize multimodal travel options.

In summary, trip generation for the development is projected to moderately increase traffic activity on area roadways relative to existing/baseline conditions with no material impact to operating conditions at the study intersections. The assessment indicates that there is ample capacity at these study locations to accommodate these project-related traffic increases without the need for major infrastructure enhancements. However, the Proponent has advanced design of multimodal infrastructure improvements in the vicinity of the MBTA overpass and South Elm Street intersections at Railroad Avenue and at Laurel Street ("Ornstein Intersection") that will promote multi connections to/from the property, address sight line limitations imposed by complex geometry near the overpass, and that provide enhanced vehicle maneuverability and emergency vehicle preemption/response to the property and the downtown area of the City. Further commitments to a Transportation Demand Management (TDM) program for the property will further these multi-modal objectives and will promote less reliance of auto use by patrons and visitors to the site.

PROJECT DESCRIPTION

The site consists of approximately 7.5± acres of land located along the northern side of Railroad Avenue. The existing Site includes the former Ornstein Heel factory site and Skateland. The Site includes four curb-cuts along Railroad Avenue.

Under the proposed Site programming the uses at the Site would include 290 residential apartments, 10,000± sf of commercial space, and a 1.7-acre community park. The project will include four (4) driveways along Railroad Avenue. On-site parking will be provided in a combination of surface and garage parking spaces. The preliminary site layout prepared by The Procopio Companies is presented in **Figure 2**.

BASELINE TRAFFIC & SAFETY CHARACTERISTICS

An overview of roadway classification and geometric characteristics is provided below for the adjacent study roadways.

Railroad Avenue

Railroad Avenue is generally a northeast-southwest roadway under local (City) jurisdiction within the study area. Railroad Avenue is classified by the Massachusetts DOT as a local roadway, and it provides a connection between the South Elm Street to the northeast and dead ends at the Bradford MBTA Station and Merrimack Valley Regional Transit Authority (MVRTA) to the southwest. Railroad provides one travel lane in each direction. Sidewalks are

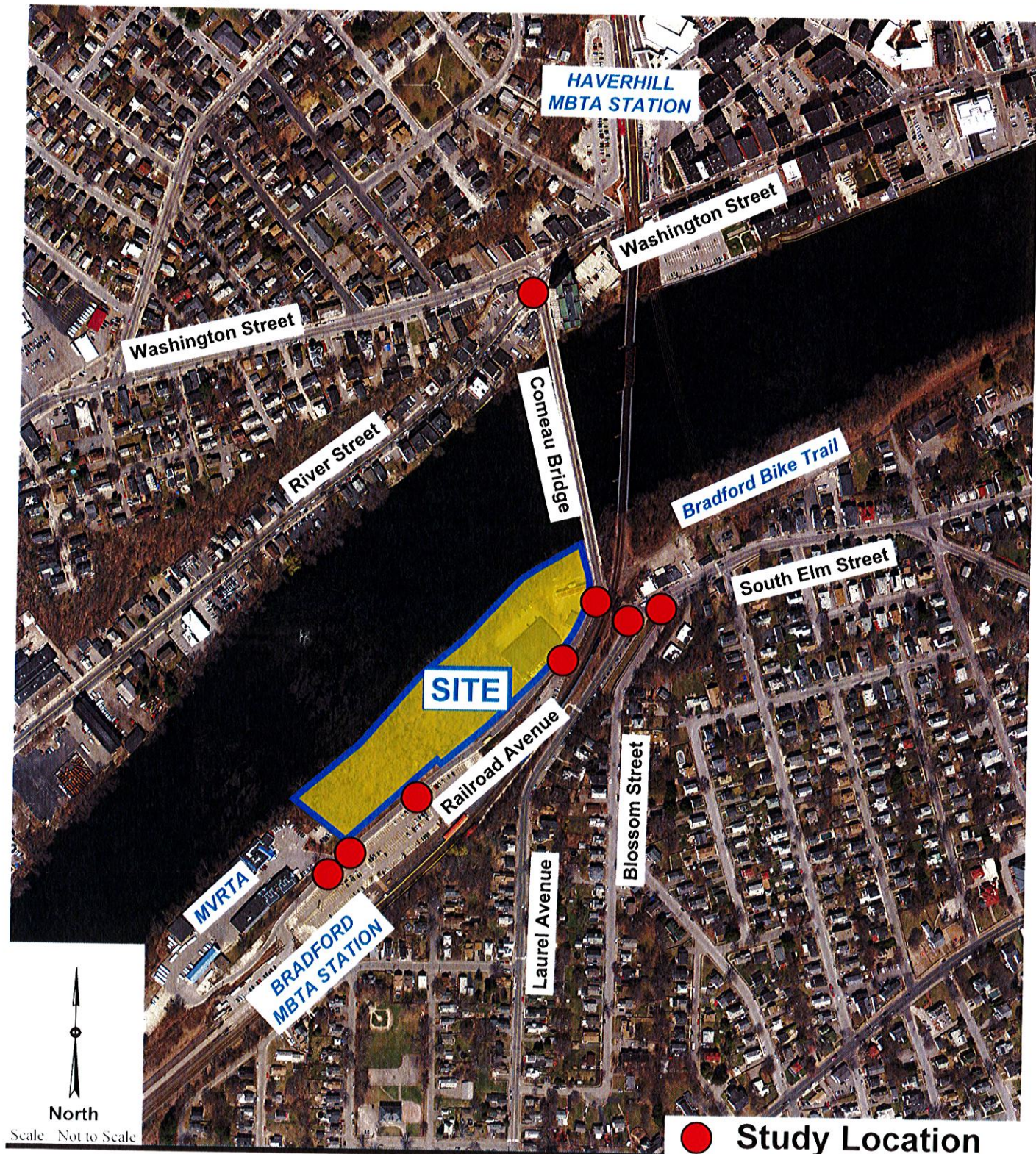
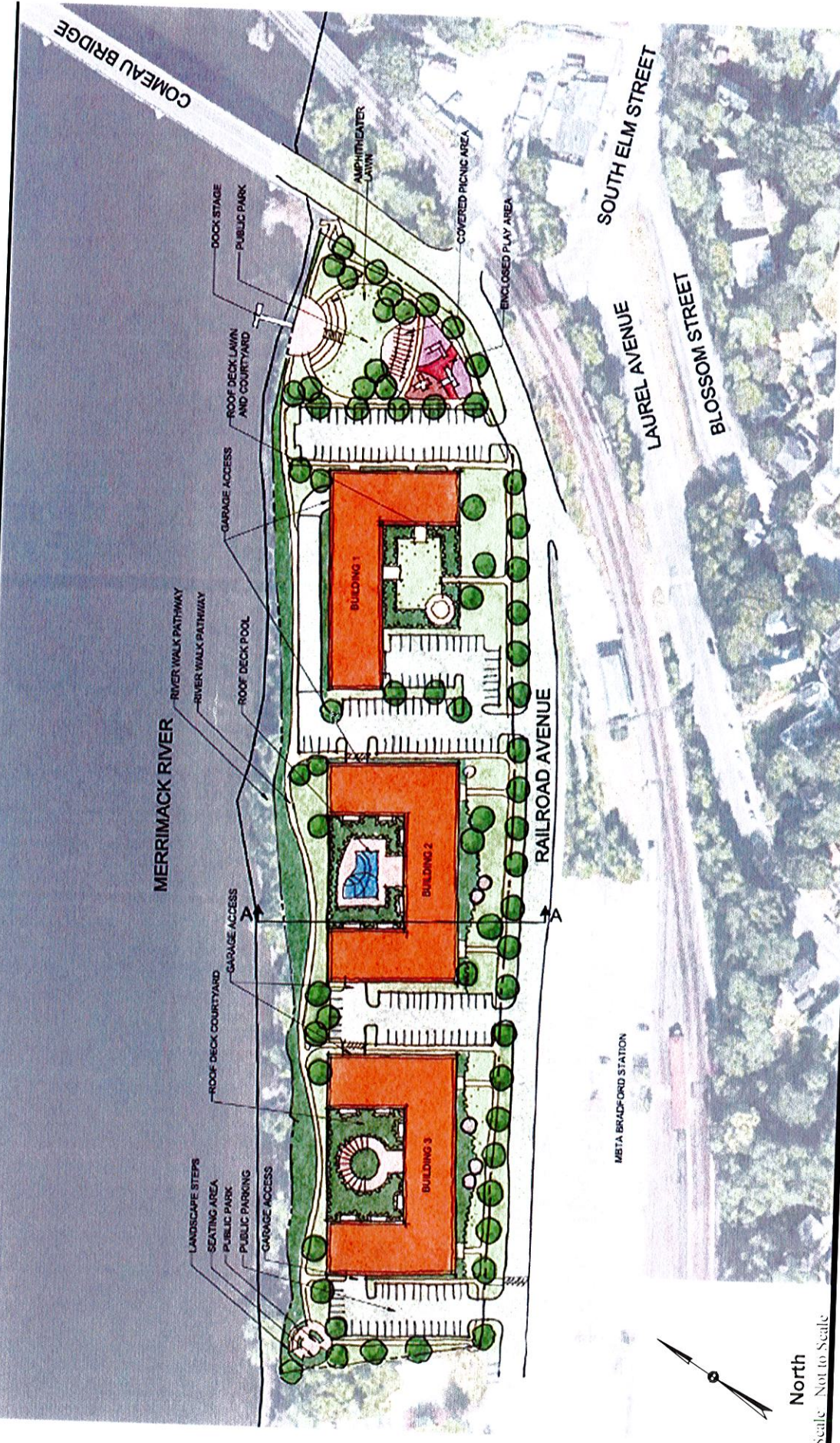


Figure 1

Site Location



Site Plan Source: The Procopio Companies
Figure 2

Preliminary Site Plan

provided along the northern side Railroad Avenue to the east of the MBTA Parking Lot and along the southern side to the west along the MBTA Parking Lot. The posted (regulatory) speed limit on Railroad Avenue is 20 mph near the MBTA Lot. Land uses along Railroad Avenue in the study area includes the Merrimack Valley Regional Transit Authority (MVRTA), MBTA Bradford Station, Steampunk Station Café, and Skateland (Site).

Comeau Bridge

Comeau Bridge is generally a north-south roadway under MassDOT (State) jurisdiction. Comeau Bridge is classified by the Massachusetts DOT as an Urban Minor Arterial roadway, and it provides a connection between Washington Street/River Street to the north and Railroad Avenue/South Elm Street to the south. Comeau Bridge provides one travel lane in each direction with sidewalks provided along both sides. The posted (regulatory) speed limit on Comeau Bridge is 25 mph. The bridge spans the Merrimack River.

South Elm Street

South Elm Street is generally an east-west roadway under local (City) jurisdiction within the study area. South Elm Street is classified by the Massachusetts DOT as an Urban Minor Arterial roadway, and it provides a connection between South Main Street and Salem Street to the east and the Comeau Bridge to the west. South Elm Street provides one travel lane in each direction. Sidewalks are provided along both sides of South Elm Street within the study area. The posted (regulatory) speed limit on South Elm Street is 30 mph. Land uses along South Elm Street in the immediate study area include but are not limited to the Bradford Rail Trail, an auto repair shop, a liquor store, and residential homes.

Baseline Traffic Data

Traffic volume data were collected at the primary study area intersections during the weekday morning (7:00 AM - 9:00 AM) and weekday evening (4:00 PM - 6:00 PM) periods to coincide with peak traffic activity of the proposed uses and the adjacent streets. Review of historical traffic data indicates that peak hour traffic volumes collected are below average conditions due to the Covid-19 pandemic. Accordingly, the weekday morning traffic volumes have been adjusted upwards by 34%, the weekday evening peak hour have been adjusted upwards by 26% to represent average traffic volume conditions. Furthermore, the vehicle trips through the study area have been increased to account for average use of the adjacent Bradford MBTA station based on historical station use. The weekday morning and weekday evening peak hour traffic volumes for the study intersections are shown in **Figure 3** and **Figure 4**. Traffic count data, count correction/calibration data and MBTA calibration factors/trip tracings are provided in the **Attachments**.

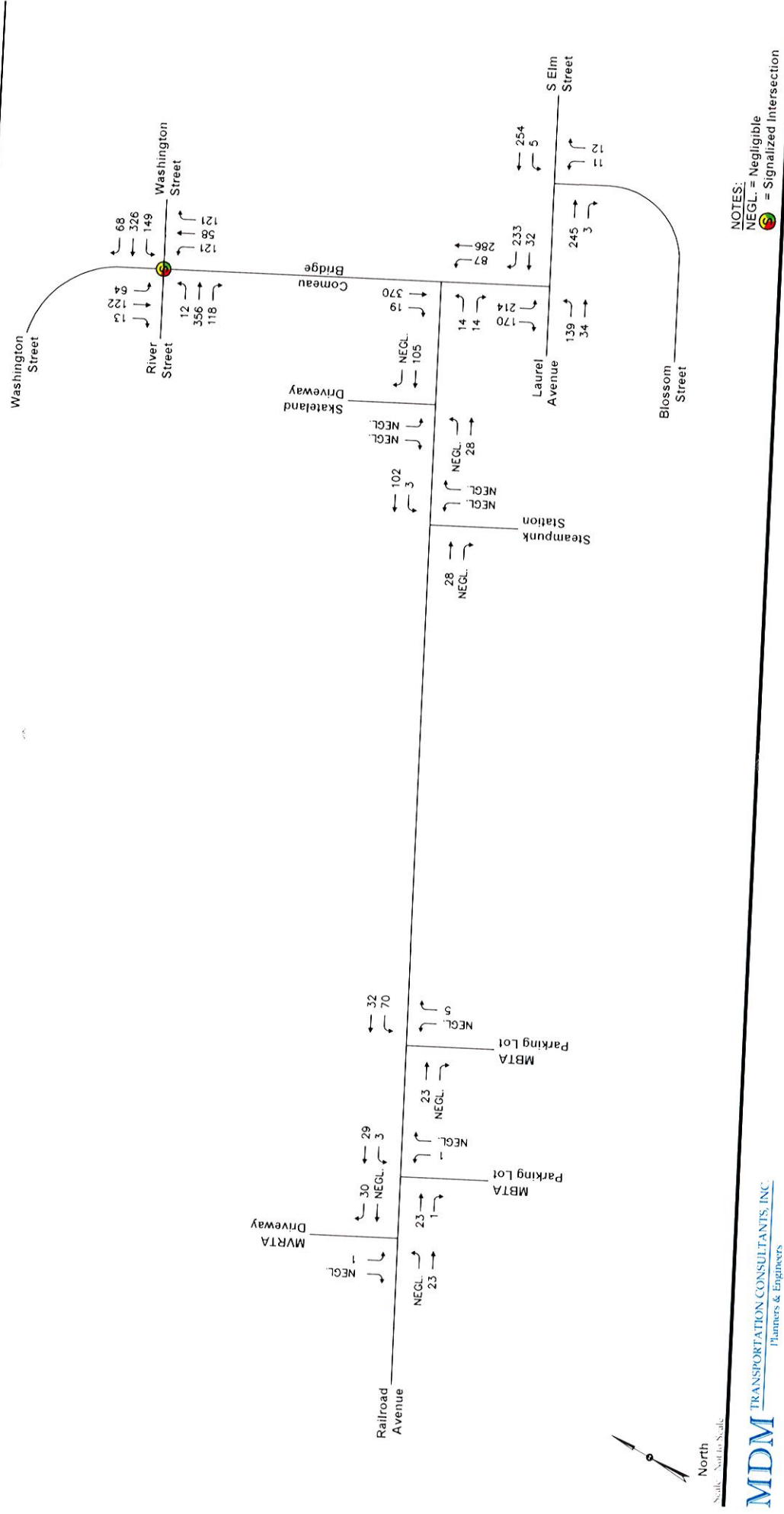
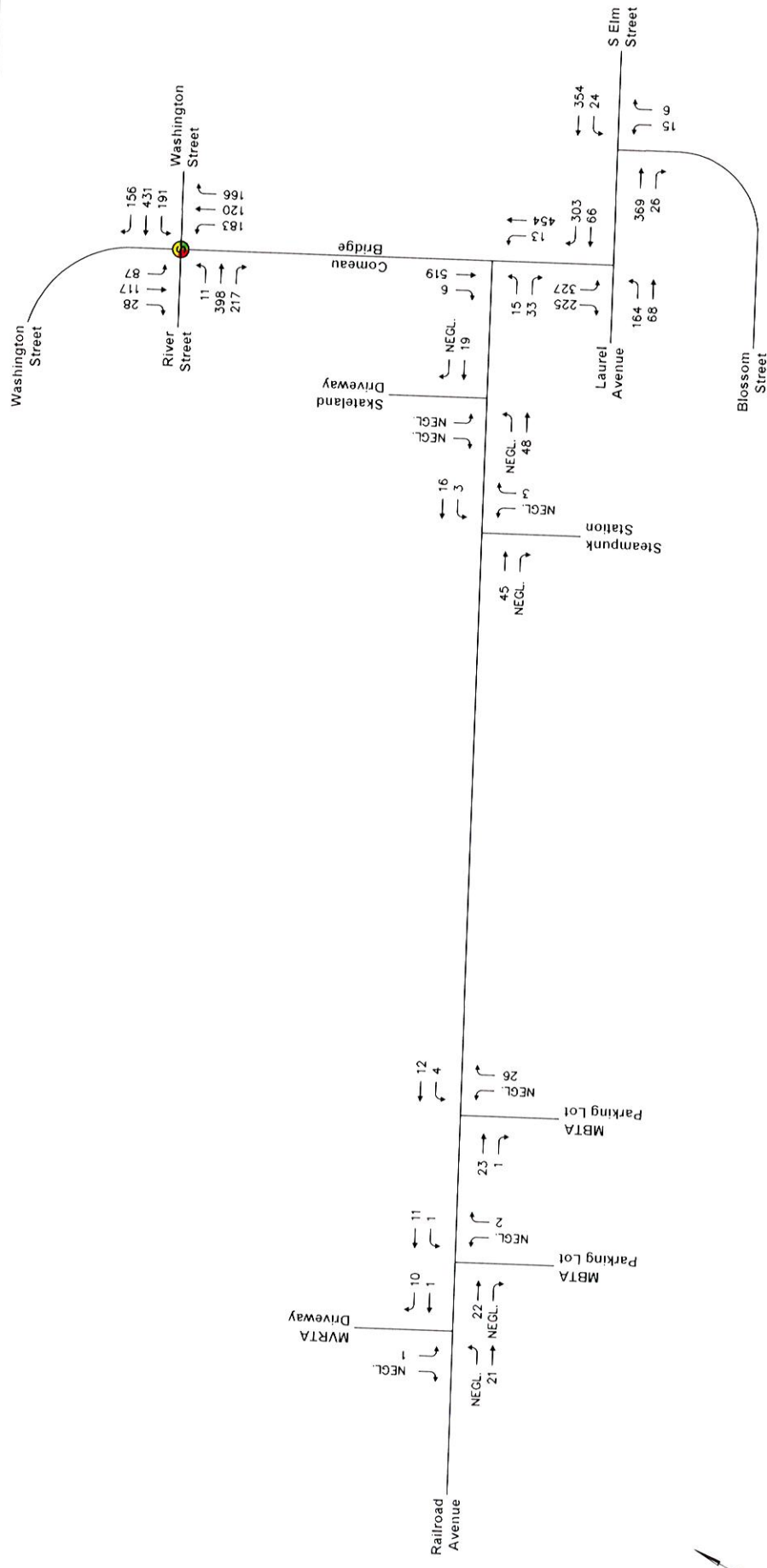


Figure 3

**Baseline Conditions
Weekday Morning Peak Hour Traffic Volumes**



North
Scale: Not to Scale

NOTES:
NEGL. = Negligible
Signalized Intersection

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Figure 4
Baseline Conditions
Weekday Evening Peak Hour Traffic Volumes

Daily Traffic Volumes

Daily traffic volumes along Railroad Avenue in the site vicinity and on the Comeau Bridge were collected in July 2020 using a radar based automatic traffic recorder (ATR) device and a video-based ATR. The results of the counts are summarized in **Table 1** and are discussed below.

TABLE 1
BASELINE TRAFFIC VOLUME SUMMARY

Time Period	Daily Volume (vpd) ¹	Percent Daily Traffic ²	Peak Hour Volume (vph) ³	Peak Flow Direction ⁴	Peak Hour Directional Volume (vph) ⁴
<i>Railroad Avenue east of MBTA Lot</i>					
Weekday Morning Peak Hour	1,260	10%	130	78% WB	102
Weekday Evening Peak Hour	1,260	5%	65	75% EB	49
<i>Comeau Bridge</i>					
Weekday Morning Peak Hour	10,740	7%	789	51% NB	400
Weekday Evening Peak Hour	10,740	9%	994	53% SB	525

¹Two-way daily traffic expressed in vehicles per day adjusted by 16% to reflect pre-pandemic conditions and adjustment to Railroad Avenue for the MBTA ridership under normal operation conditions.

²Two-way peak-hour volume expressed in vehicles per hour adjusted by 34% (AM) and 26% (PM) to reflect pre-pandemic conditions.

³Two-way peak-hour volume expressed in vehicles per hour.

⁴EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound

As summarized in **Table 1**:

- *Railroad Avenue.* The weekday daily traffic volume on Railroad Avenue to the east of the MBTA Lot 1 is approximately 1,260 vehicles per day (vpd). Peak hour traffic flow on Railroad Avenue ranges from approximately 65 to 130 vehicles per hour (vph) representing approximately 5 to 10 percent of daily traffic flow with a heavier westbound flow during the weekday morning peak hour and heavier flow eastbound during the weekday evening peak hour. These travel patterns are consistent with commuter travel patterns given the location of the MBTA Bradford Station and MVRTA Service Building along Railroad Avenue.
- *Comeau Bridge.* The weekday daily traffic volume on the Comeau Bridge is approximately 10,740 vehicles per day (vpd). Peak hour traffic flow on Comeau Bridge ranges from approximately 789 to 994 vehicles per hour (vph) representing approximately 7 to 9 percent of daily traffic flow.

Measured Travel Speeds

Vehicle speeds were obtained for the Railroad Avenue eastbound and westbound travel directions using a radar-equipped ATR in July 2020. **Table 2** summarizes the average and 85th percentile speeds for Railroad Avenue adjacent to the Site.

TABLE 2
SPEED STUDY RESULTS – RAILROAD AVENUE

Travel Direction	Travel Speeds		
	Regulatory ¹	Mean ²	85 th Percentile ³
Eastbound	20	23	28
Westbound	20	25	31

¹Regulatory (Posted) speed in mph.

²Arithmetic mean (mph).

³The speed at or below which 85 percent of the vehicles are traveling.

As summarized in **Table 2**, the mean (average) travel speed on Railroad Avenue traveling eastbound is 23 mph and the 85th percentile travel speed is 28 mph. In the westbound direction, the mean travel speed is 25 mph and the 85th percentile travel speed is 31 mph. This speed data provides a basis for determining appropriate sight lines for the proposed driveways along Railroad Avenue. The speed data is provided in the **Attachments**.

Intersection Crash History

In order to identify crash trends and safety characteristics for study area intersections, crash data were obtained from MassDOT for the City of Haverhill for the five-year period 2015 through 2019 (the most recent full year of data currently available). Crash data for the study intersections is summarized in **Table 3** with detailed data provided in the **Attachments**.

Crash rates were calculated for the study area intersections as reported in **Table 3**. This rate quantifies the number of crashes per million entering vehicles. MassDOT has determined the official District 4 (which includes the City of Haverhill) crash rate to be 0.73 for signalized intersections and 0.57 for unsignalized intersections. This rate represents MassDOT's "average" crash experience for District 4 communities and serves as a basis for comparing reported crash rates for the study intersections. Where calculated crash rates notably exceed the district average, some form of safety countermeasures may be warranted. A review of Highway Safety Improvement Project (HSIP) locations was also conducted.

TABLE 3
INTERSECTION CRASH SUMMARY
2015 THROUGH 2019¹

Data Category	Washington Street at River Street & Comeau Bridge	Railroad Avenue at S. Elm Street & Comeau Bridge	S. Elm Street at Laurel Avenue	S. Elm Street at Blossom Street
Traffic Control	Signalized	Unsignalized	Unsignalized	Unsignalized
Crash Rate ²	1.27	0.28	0.54	0.18
District 4 Avg ³	0.73	0.57	0.57	0.57
<i>Year:</i>				
2015	13	3	5	1
2016	10	1	3	0
2017	14	0	1	0
2018	8	0	3	1
2019	<u>11</u>	<u>2</u>	<u>1</u>	<u>1</u>
Total	56	6	13	3
<i>Type:</i>				
Angle	17	1	3	1
Rear-End	13	2	7	0
Head-On	9	1	0	0
Sideswipe	9	0	0	2
Single Vehicle	7	2	3	0
Other/Unknown	1	0	0	0
<i>Severity:</i>				
P. Damage Only	48	4	12	2
Personal Injury	6	2	1	1
Fatality	0	0	0	0
Unknown	2	0	0	0
<i>Conditions:</i>				
Dry	40	4	11	2
Wet	11	2	0	1
Snow	4	0	2	0
Other/Unknown	1	0	0	0
<i>Time:</i>				
7:00 to 9:00 AM	7	1	2	0
4:00 to 6:00 PM	8	0	4	0
Rest of Day	41	5	7	3

¹ Source: MassDOT Crash Database

² Crashes per million entering vehicles

³ District 3 averages = 0.66 (unsignalized)

As summarized in **Table 3**:

- *Washington Street at River Street & Comeau Bridge.* There were fifty-six (56) reported crashes at this study intersection resulting in a crash rate of 1.27. MassDOT has listed the intersection as located within a Highway Safety Improvement Program (HSIP) pedestrian cluster for 2008-2017 and listed as number 77 on the Top 200 Crash Cluster 2014-2016. The crashes included twenty-six (26) angle/sideswipe type collisions, thirteen (13) rear-end type collisions, nine (9) head-on type collisions, seven (7) single vehicle type collisions with fixed objects (utility pole, curb, etc) and one (1) unknown type crash. Eighty-six percent (86%) of the crashes resulted in property damage type collisions which are generally indicative of low-speed collisions. Seventy-three percent (73%) of the crashes occurred outside the peak commuter periods and seventy-one percent (71%) of the crashes occurred under dry roadway conditions. There were two pedestrian related crashes listed at the intersection over the five-year study period that both occurred between a southbound left turning vehicle and a pedestrian in the crosswalk resulting in a non-fatal injury type collision.
- *South Elm Street at Railroad Avenue.* There were six (6) reported crashes at this study intersection resulting in a crash rate of 0.28. The crashes included one (1) angle/sideswipe type collision, two (2) rear-end type collisions, one (1) head-on type collisions and two (2) single vehicle type collisions with fixed objects (utility pole, curb, etc). Sixty-seven percent (67%) of the crashes resulted in property damage type collisions. Eighty-three percent (83%) of the crashes occurred outside the peak commuter periods and sixty-seven percent (67%) of the crashes occurred under dry roadway conditions.
- *South Elm Street at Laurel Avenue.* There were thirteen (13) reported crashes at this study intersection resulting in a crash rate of 0.54. The crashes included three (3) angle/sideswipe type collisions, seven (7) rear-end type collisions, and three single vehicle type collisions. Ninety-two percent (92%) of the crashes resulted in property damage type collisions which are generally indicative of low-speed collisions. Fifty-three percent (53%) of the crashes occurred outside the peak commuter periods and eighty-five percent (85%) of the crashes occurred under dry roadway conditions.
- *South Elm Street at Blossom Street.* There were three (3) reported crashes at this study intersection resulting in a crash rate of 0.18. The crashes included three (3) angle/sideswipe type collisions. Two of the crashes resulted in property damage type collisions. All of the crashes occurred outside the peak commuter periods and two of the crashes occurred under dry roadway conditions.

In summary, based on review of MassDOT crash data, the Washington Street intersection with River Street and Comeau Bridge had a crash rate above the District 4 average and is listed as being located within a Highway Safety Improvement Program (HSIP) pedestrian cluster by MassDOT. Accordingly, this HSIP location may be eligible for HSIP funding subject to a Road Safety Audit (RSA) to be conducted to identify potential short-term, medium term and long-term safety/operational improvements. The Proponent will work with the City of Haverhill to identify and implement safety and operational improvements at the Washington Street intersection with River Street/Comeau Bridge this intersection to address near-term operational and safety needs of the intersection including traffic signal equipment repairs and upgrades and associated pedestrian infrastructure improvements as described under *Conclusions and Recommendations*. Additionally, multi-modal roadway and traffic control improvements at the intersections of Railroad Avenue, South Elm Street and Laurel Street will be designed and implemented by the Proponent working in collaboration with the City under the Massworks grant program to enhance travel safety and multi-modal travel options.

Sight Line Evaluation

An evaluation of sight lines was conducted at the proposed site driveway locations along Railroad Avenue to ensure that minimum recommended sight lines are available to safely exit onto Railroad Avenue. The evaluation documents existing sight lines for vehicles with comparison to recommended guidelines for the regulatory and observed travel speeds.

The American Association of State Highway and Transportation Officials' (AASHTO) standards¹ reference two types of sight distance which are relevant at the proposed site driveway intersections on Railroad Avenue: stopping sight distance (SSD) and intersection sight distance (ISD). Sight lines for critical vehicle movements at the proposed site driveway intersections with Railroad Avenue were compared to minimum SSD and ISD recommendations.

Stopping Sight Distance

Sight distance is the length of roadway visible to the motorist to a fixed object. The minimum sight distance available on a roadway should be sufficiently long enough to enable a below-average operator, traveling at or near a regulatory speed limit, to stop safely before reaching a stationary object in its path, in this case, a vehicle exiting the site driveways onto Railroad Avenue. The SSD criteria are defined by AASHTO based on design and operating speeds, anticipated driver behavior and vehicle performance, as well as physical roadway conditions. SSD includes the length of roadway traveled during the perception and reaction time of a driver to an object, and the distance traveled during brake application on wet level pavement. Adjustment factors are applied to account for roadway grades where applicable.

¹ A policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials (AASHTO), 2018.

SSD was estimated in the field using AASHTO standards for driver's eye (3.5 feet) and object height equivalent to the taillight height of a passenger car (2.0 feet) for the eastbound and westbound Railroad Avenue approaches to the proposed driveways. **Table 4** presents a summary of the available SSD for the Railroad Avenue segment approaches to the proposed site driveways and AASHTO's recommended SSD for the regulatory and observed 85th percentile travel speeds.

TABLE 4
STOPPING SIGHT DISTANCE SUMMARY
RAILROAD AVENUE APPROACH TO PROPOSED SITE DRIVEWAYS

Approach/ Travel Direction	Available SSD	AASHTO Recommended ¹	
		Regulatory Speed Limit ²	Observed 85 th Percentile Speed ³
Proposed Driveway (Eastern)			
Eastbound	350± Feet	115 Feet	180 Feet
Westbound	190± Feet	80 Feet ⁴	80 Feet ⁴
Proposed Driveway (Central)			
Eastbound	>400 Feet	115 Feet	210 Feet
Westbound	>400 Feet	115 Feet	210 Feet
Proposed Driveway (Central 2)			
Eastbound	>400 Feet	115 Feet	210 Feet
Westbound	350± Feet	115 Feet	210 Feet
Proposed Driveway (Western)			
Eastbound	400± Feet	115 Feet	210 Feet
Westbound	>400 Feet	115 Feet	210 Feet

¹Recommended sight distance based on AASHTO, A Policy on Geometric Design of Highways and Streets. Based on driver height of eye of 3.5 feet to object height of 2.0 feet and adjustments for roadway grade.

²Regulatory Speed Limit is 20 mph.

³Observed 85th Percentile Speed = 28 mph EB and 31 mph WB.

⁴Based on 15 mile per hour travel speed for vehicles turning from the Comeau Bridge/South Elm Street.

As summarized in **Table 4**, a preliminary review of the analysis results indicate that the available sight lines exceed AASHTO's recommended SSD criteria for the proposed site driveway locations based on the regulatory and 85th percentile travel speeds along Railroad Avenue.

Intersection Sight Distance

Clear sight lines provide sufficient sight distance for a stopped driver on a minor-road approach to depart from the intersection and enter or cross the major road. As stated under AASHTO's Intersection Sight Distance (ISD) considerations, "...If the available sight distance for an entering ...vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient sight distance to avoid collisions...To enhance traffic operations, intersection sight distances that exceed stopping sight distances are desirable along the major road." AASHTO's ISD criteria are defined into several "cases". For the proposed unsignalized site driveway locations, which are proposed to be under STOP sign control with left and right egress movements, the ISD in question relates to the ability to turn left or right from the proposed driveways at their intersections with Railroad Avenue.

Available ISD was estimated in the field using AASHTO standards for driver's eye (3.5 feet), object height (3.5 feet) and decision point (between 8 and 14.5 feet from the edge of the travel way) for the eastbound and westbound directions along Railroad Avenue. **Table 5** presents a preliminary summary of the available ISD for the departure from the proposed site driveways and AASHTO's minimum and ideal ISD recommendations.

TABLE 5
INTERSECTION SIGHT DISTANCE SUMMARY
PROPOSED SITE DRIVEWAY DEPARTURES TO RAILROAD AVENUE

Approach/ Travel Direction	Available ISD	AASHTO Minimum ¹	AASHTO Ideal ¹
		Regulatory Speed Limit ²	Regulatory Speed Limit ²
<i>Proposed Driveway (Eastern)</i>			
Looking East	190± Feet	80 Feet ⁴	145 Feet ⁴
Looking West	350± Feet	115 Feet	225 Feet
<i>Proposed Driveway (Central)</i>			
Looking East	>400 Feet	115 Feet	195 Feet
Looking West	>400 Feet	115 Feet	225 Feet
<i>Proposed Driveway (Central 2)</i>			
Looking East	350± Feet	115 Feet	195 Feet
Looking West	>400 Feet	115 Feet	225 Feet
<i>Proposed Driveway (Western)</i>			
Looking East	>400 Feet	115 Feet	195 Feet
Looking West	400± Feet	115 Feet	225 Feet

¹Recommended sight distance based on AASHTO, A Policy on Geometric Design of Highways and Streets. Based on driver height of eye of 3.5 feet and an object height of 3.5 feet. Minimum value as noted represents SSD per AASHTO guidance. Adjustments for driveway grade have been made as needed.

²Regulatory (posted) speed limit is 20 mph.

⁴Based on 15 mile per hour travel speed for vehicles turning from the Comeau Bridge/South Elm Street.

The results of the ISD analysis presented in **Table 5** indicate that with clearing and grading proposed as part of the site driveway installation, the available sight lines looking east and west from the proposed driveways onto Railroad Avenue will exceed the recommended sight line criteria from AASHTO. MDM recommends that any new plantings (shrubs, bushes) or physical landscape features to be located within driveway sight lines should also be maintained at a height of 2 feet or less above the adjacent existing roadway grade to ensure unobstructed lines of sight.

PROJECTED FUTURE TRAFFIC CONDITIONS

Evaluation of the proposed development impacts requires the establishment of a future baseline analysis condition. This section estimates future roadway and traffic conditions with and without the proposed development. For planning purposes, a seven-year planning horizon (year 2027) was selected consistent with MassDOT guidance and industry practice.

To determine the impact of site-generated traffic volumes on the roadway network under future conditions, baseline traffic volumes in the study area were projected to a future year condition. Traffic volumes on the roadway network at that time, in the absence of the development (the No-Build condition), includes existing traffic, new traffic due to general background traffic growth, and traffic related to specific developments by others that are currently under review at the local and/or state level. Consideration of these factors resulted in the development of No-Build traffic volumes. Anticipated site-generated traffic volumes were then superimposed upon these No-Build traffic-flow networks to develop future Build conditions.

The following sections provide an overview of future No-Build and Build traffic volumes.

Background Growth

Background traffic includes demand generated by other planned developments in the area as well as demand increases caused by external factors. External factors are general increases in traffic not attributable to a specific development and are determined using historical data.

Nearby permanent count station data published by MassDOT indicates a 0.5-percent per year growth rate. For purposes of this evaluation, a 1.0-percent compounded annual growth rate was used (7.2 percent increase over a 7-year horizon). This growth rate is slightly higher than historic rates, and, as such, is also expected to account for any small fluctuation in hourly traffic as may occur from time to time in the study area and traffic associated with other potential small developments or vacancies in the area. MassDOT permanent count station data and background growth calculations are provided in the **Attachments**.

Additionally, based on a review of the MEPA database and discussions with the City of Haverhill Planning Staff there are several site-specific development projects in the area at the time of the traffic counts that may increase baseline traffic at the study intersection as follows:

- *The Heights at Haverhill*. This mixed-use project is under construction and is located at 192 Merrimack Street. The development includes 48 residential units, a restaurant, and a function hall with an open-air lounge. Additionally, the development will include two floors of cooking incubator space run by the culinary arts and hospitality management program at Northern Essex Community College. Projected traffic for the project is based on ITE trip rate methodology.

- *181-215 Washington Street.* This residential development is under construction and includes 44 residential units along Washington Street. Trips for the project were included in this report. Projected traffic for the project is based on ITE trip rate methodology.
- *38 Railroad Street:* This residential development includes the construction of three, four-story buildings, each consisting of 20 condominium units. The project includes access/egress points along Railroad Street near the Crescent Yacht Club. Trips for the project are accounted for in the 1% background growth.

Site-specific trip tracings and trip generation estimates for the background developments are provided in the **Attachments**.

2027 No-Build Traffic Volume Networks

In summary, to account for future traffic growth in the study area future No-Build traffic volumes are developed by increasing the Baseline (2020) volumes by approximately 7.2 percent (1.0 percent compounded annually over 7 years). The resulting 2027 No-Build traffic volumes are displayed in **Figure 5** and **Figure 6**.

Site Trip Generation

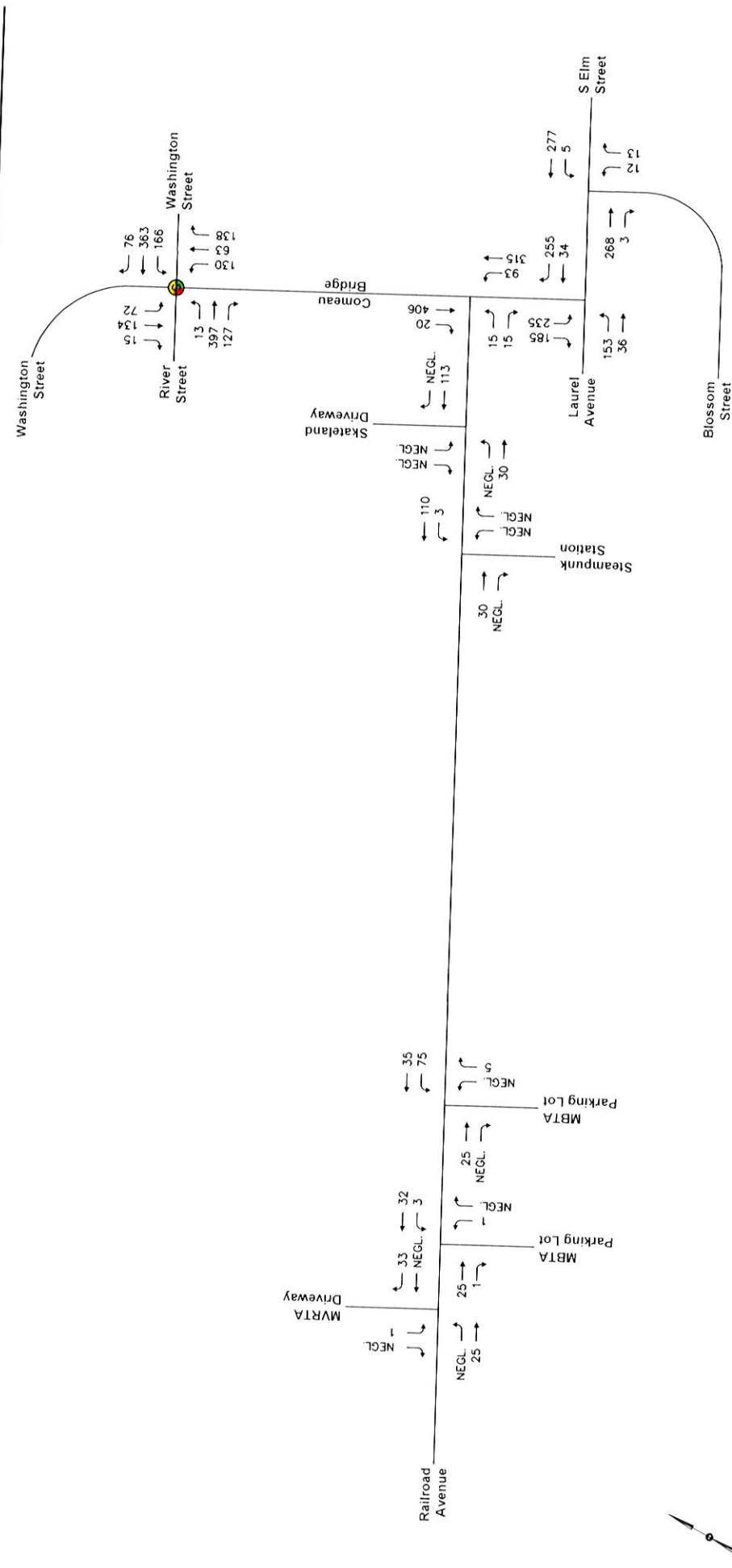
The trip generation estimates for the proposed mixed-use development are provided for the weekday morning and weekday evening peak hours, which correspond to the critical analysis periods for the proposed uses and adjacent street traffic flow.

New traffic generated by the project was estimated using trip rates published in ITE's *Trip Generation*² for Multifamily Housing – Mid Rise (LUC 221) and Shopping Center (LUC 820).

Trip estimates for the project are also reported for overall vehicle trip activity including “pass-by” traffic, which represents the portion of Site-generated trips that is drawn from the existing traffic stream and that is not “new” traffic to area roadways. Pass-by data as published by ITE in the *Trip Generation Handbook*³ indicates average pass-by rates of approximately 34 percent for general retail (shopping center) use; for this evaluation no pass-by is assumed for the retail use. Furthermore, no reduction has been made for walking/bicycle trips or internal trips between the various uses at the Site.

² *Trip Generation*, 10th Edition; Institute of Transportation Engineers; Washington, DC; 2017.

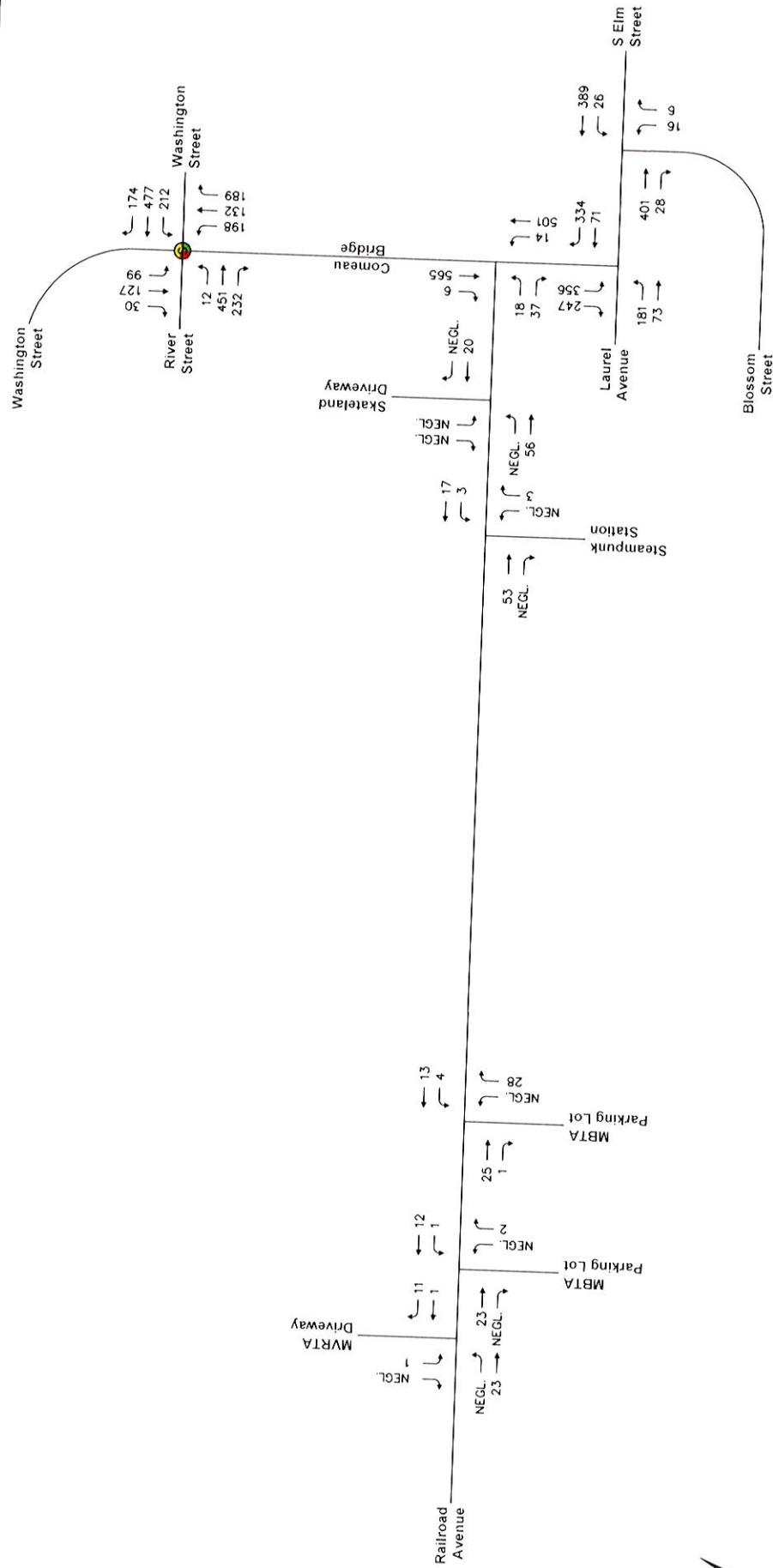
³ *Trip Generation Manual, 10th Edition, Volume 1: User's Guide and Handbook*. Institute of Transportation Engineers; 2017.



NOTES:
 NEGL. = Negligible
 = Signalized Intersection

Figure 5

2027 No-Build Conditions
 Weekday Morning Peak Hour Traffic Volumes



NOTES:
 NEGL. = Negligible
 = Signalized Intersection

Figure 6

2027 No-Build Conditions
 Weekday Evening Peak Hour Traffic Volumes

The residential component of the proposed project is considered a transit-oriented development and, as such, a significant portion of the proposed residential component's population is expected to utilize the adjacent MBTA commuter rail services. Journey to work and ITE trip generation data indicate that approximately 19% of residents in the immediate area use public transportation to/ from work. Therefore, the ITE trip generation estimates for the proposed 290-unit apartment building were adjusted (reduced) by 19% to reflect public transportation use. **Table 6** presents the trip-generation summary for the trips to be generated by the proposed mixed-use development based on ITE trip rate methodology. MDM notes that this projected transit mode share is appropriate for the site due to its direct proximity to the MBTA Bradford Station, walkability to the MBTA downtown Haverhill station, and proposed implementation of a Transportation Demand Management (TDM) program that will incentivize multi-modal travel as described in more detail under Conclusions and Recommendations.

TABLE 6
TRIP-GENERATION SUMMARY¹

Peak Hour/Direction	SITE TRIPS		
	Apartments ²	Retail ³	Total
<i>Weekday Morning Peak Hour:</i>			
Entering	22	6	28
Exiting	<u>62</u>	<u>3</u>	<u>65</u>
Total	84	9	93
<i>Weekday Evening Peak Hour:</i>			
Entering	63	18	81
Exiting	<u>41</u>	<u>20</u>	<u>61</u>
Total	104	38	142
<i>Daily (24 Hours):</i>	1,278	378	1,656

Source: ITE *Trip Generation*, Tenth Edition; 2017.

¹ITE LUC 221 – Multifamily Housing (Mid-Rise) applied to 290 Units reduced by 19% to account for transit use.

²ITE LUC 820 – Shopping Center applied to 10,000± sf with no reduction for pass-by.

As summarized in **Table 6**, based on industry-standard trip rates for the proposed development are estimated to generate approximately 93 trips during the weekday morning peak hour (28 entering and 65 exiting) and 142 trips during the weekday evening peak hour (81 entering and 61 exiting).

Trip Distribution

The distribution for projected traffic for the retail use is based on existing travel patterns in the study area and the distribution for the residential component is based on US Census Journey to Work Data. The resulting trip distribution patterns are presented in **Figure 7**.

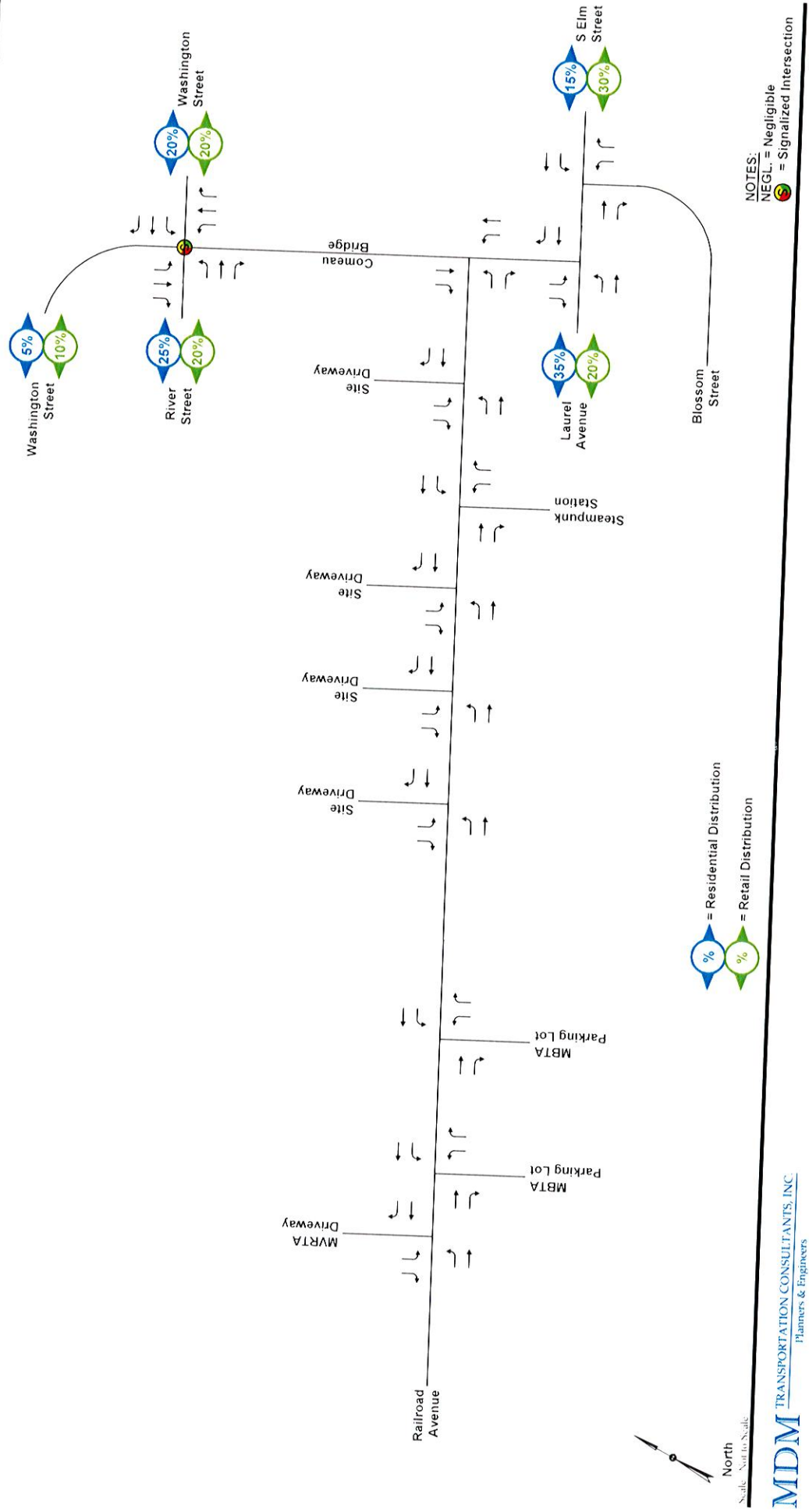


Figure 7

Trip Distribution

Development-related trips for the proposed mixed-use development are assigned to the roadway network using the ITE trip-generation estimates shown in **Table 6** and the distribution patterns presented in **Figure 7**. Development-related trips at each intersection approach for the weekday morning and weekday evening peak hour are quantified in **Figure 8** and **Figure 9**.

2027 Build Traffic Conditions

2027 Build condition traffic volumes are derived by adding incremental traffic increases for the proposed development of the Site to the 2027 No-Build conditions. **Figure 10** and **Figure 11** present the 2027 Build condition traffic-volume networks for the weekday morning and weekday evening peak hours. The trip tracing for the removal of the existing uses of the Site are provided in the **Attachments**.

OPERATIONS ANALYSIS

This section provides an overview of operational analysis methodology, and an assessment of intersection operations under Baseline and projected Design Year conditions.

Analysis Methodology

Intersection capacity analyses are presented in this section for the Baseline, 2027 No-Build and 2027 Build traffic-volume conditions. Capacity analyses, conducted in accordance with EEA/MassDOT guidelines, provide an index of how well the roadway facilities serve the traffic demands placed upon them. The operational results provide the basis for recommended access and roadway improvements in the following section.

Capacity analysis of intersections is developed using the Synchro® computer software, which implements the methods of the Highway Capacity Manual 6th Edition (HCM). The resulting analysis presents a level-of-service (LOS) designation for individual intersection movements. The LOS is a letter designation that provides a qualitative measure of operating conditions based on several factors including roadway geometry, speeds, ambient traffic volumes, traffic controls, and driver characteristics. Since the LOS of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of LOS, depending on the time of day, day of week, or period of year. A range of six levels of service are defined on the basis of average delay, ranging from LOS A (the least delay) to LOS F (delays greater than 50 seconds for unsignalized movements and delays greater than 80 seconds for signalized movements). The specific control delays and associated LOS designations are presented in the **Attachments**.

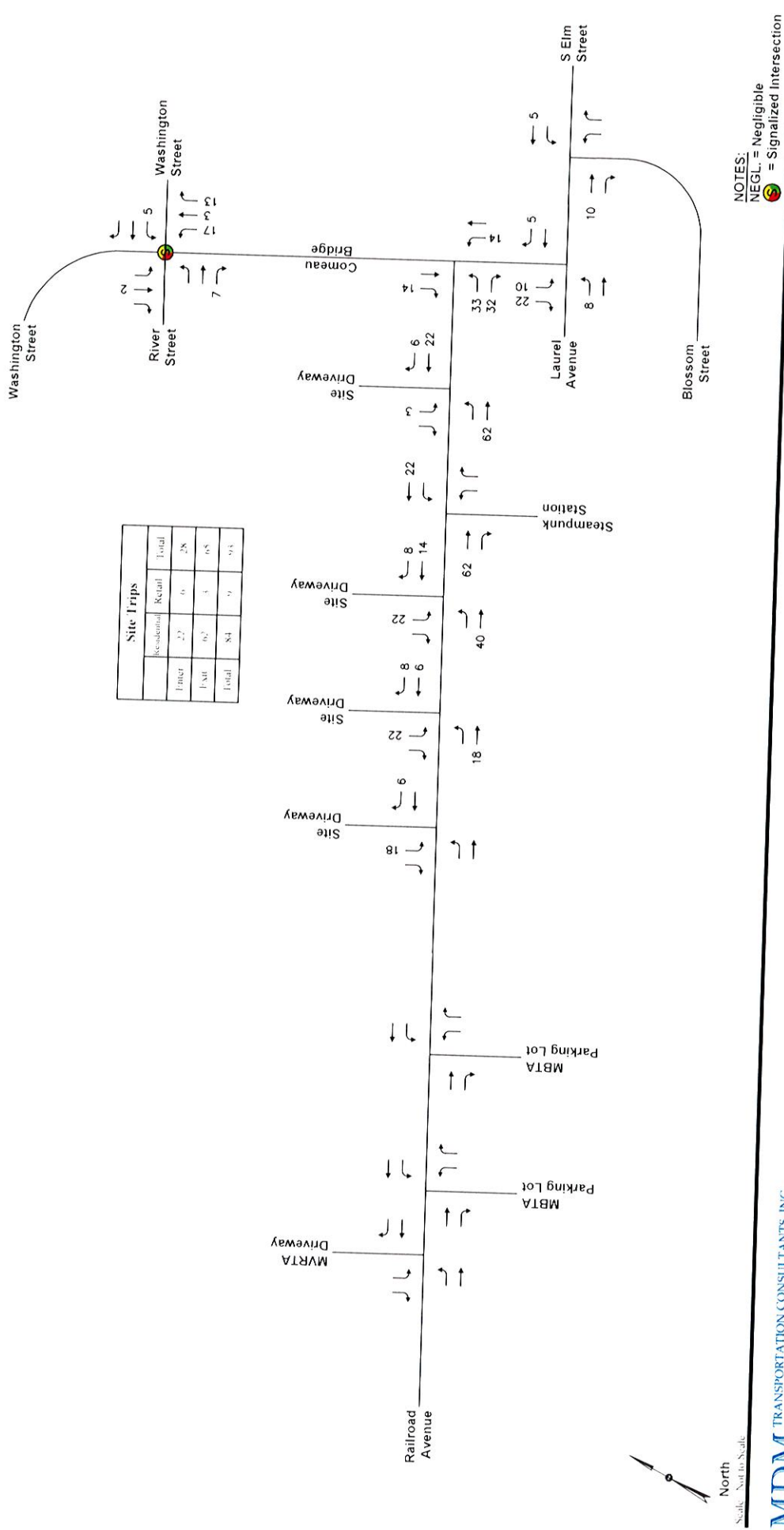
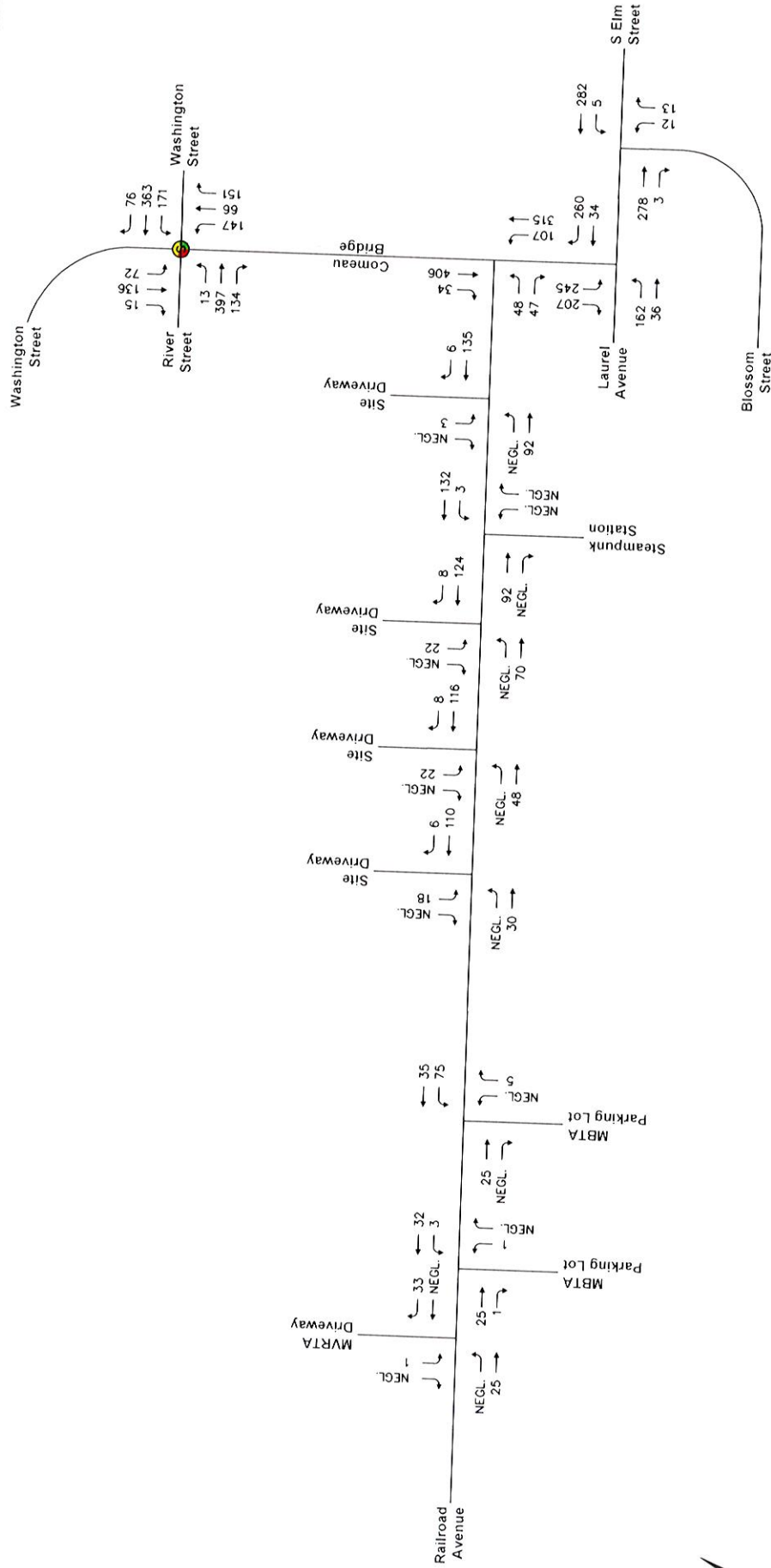


Figure 8
 Trip Generation
 Weekday Morning Peak Hour Traffic Volumes



Figure 9



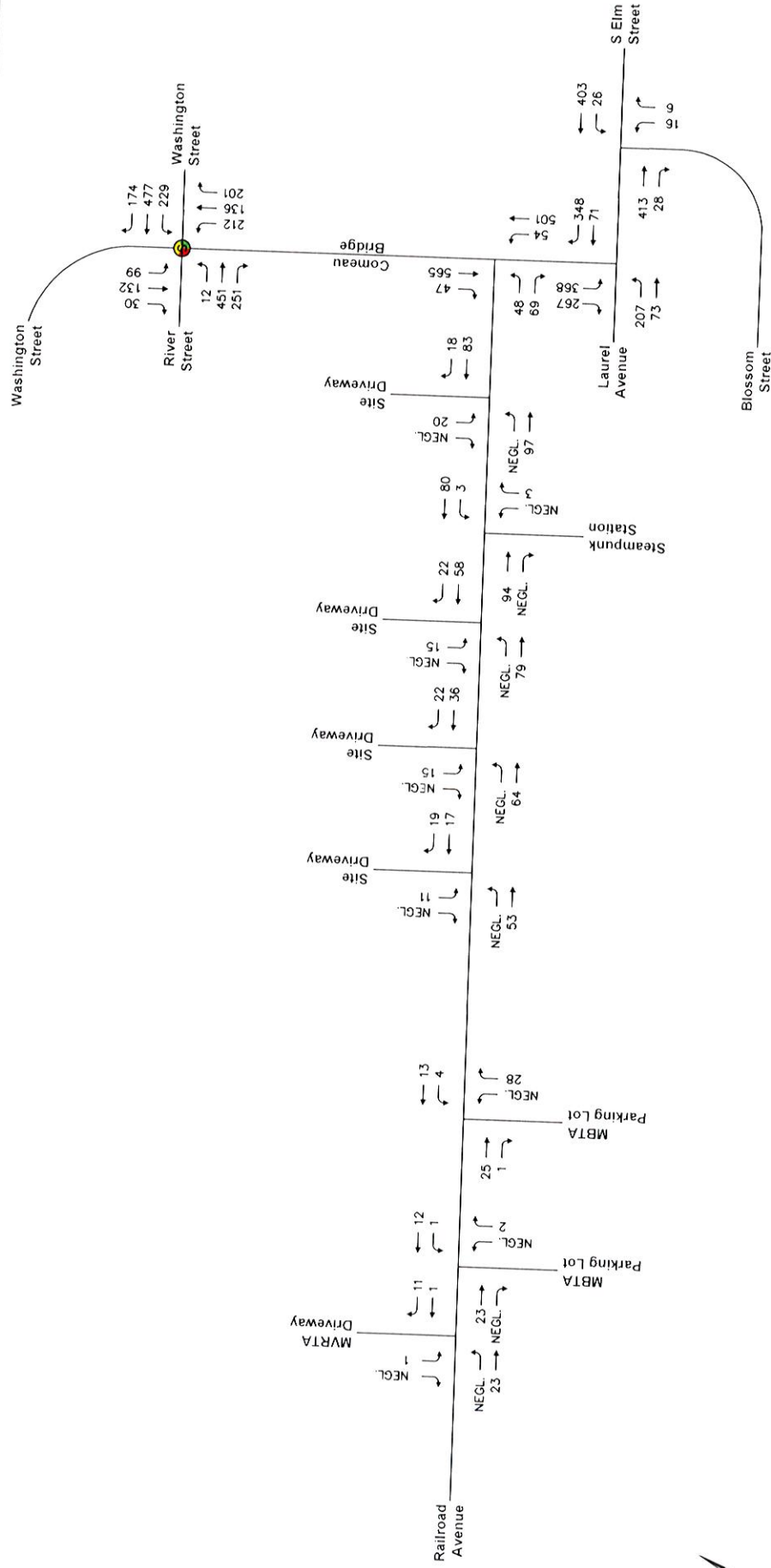
NOTES:
NEGL. = Negligible
Signalized Intersection

Figure 10

2027 Build Conditions
Weekday Morning Peak Hour Traffic Volumes

North
Scale: Not to Scale

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NOTES:
NEGL. = Negligible
Signalized Intersection

Figure 11

2027 Build Conditions
Weekday Evening Peak Hour Traffic Volumes

Intersection Capacity Analysis Results

Level-of-Service (LOS) analyses were conducted for the Baseline, No-Build and Build conditions for the study intersections. The results of the intersection capacity are summarized below in **Table 7** and **Table 8**. Detailed analysis results are presented in the **Attachments**.

TABLE 7
INTERSECTION CAPACITY ANALYSIS RESULTS
WEEKDAY MORNING PEAK HOUR

Period	Approach	2020 Baseline			2027 No-Build			2027 Build		
		v/c ¹	Delay ²	LOS ³	v/c	Delay	LOS	v/c	Delay	LOS
<i>Washington Street at River Street and Comeau Bridge</i>	Eastbound	0.69	26	C	0.73	29	C	0.74	30	C
	Westbound	0.39	15	B	0.48	17	B	0.50	18	B
	Northbound	0.63	35	D	0.67	38	D	0.70	40	D
	Southbound	0.43	40	D	0.48	43	D	0.49	45	D
	Overall	0.69	26	C	0.73	29	C	0.74	30	C
<i>S Elm Street at Railroad Avenue</i>	Eastbound	0.08	16	C	0.10	18	C	0.34	23	C
	Northbound	0.11	<5	A	0.12	<5	A	0.14	<5	A
	Southbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
<i>S Elm Street at Laurel Avenue</i>	Eastbound	0.28	11	B	0.32	12	B	0.34	12	B
	Westbound	0.37	11	B	0.42	12	B	0.44	12	B
	Southbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
<i>S Elm Street at Blossom Street</i>	Eastbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Westbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Northbound	0.04	11	B	0.05	12	B	0.05	12	B
<i>Railroad Avenue at Steampunk Station Drive</i>	Eastbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Westbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Northbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
<i>Railroad Avenue at Eastern MBTA Drive</i>	Eastbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Westbound	0.05	5	A	0.05	5	A	0.05	5	A
	Northbound	0.01	8	A	0.01	8	A	0.01	9	A
<i>Railroad Avenue at Western MBTA Drive</i>	Eastbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Westbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Northbound	0.00	9	A	0.00	9	A	0.00	9	A
<i>Railroad Avenue at MVRTA drive</i>	Eastbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Westbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Southbound	0.00	9	A	0.00	9	A	0.00	9	A

¹Volume-to-capacity ratio

²Average control delay per vehicle (in seconds)

³Level of service

⁴n/a = not applicable

TABLE 7 (Cont.)
INTERSECTION CAPACITY ANALYSIS RESULTS
WEEKDAY MORNING PEAK HOUR

Period	Approach	2020 Baseline			2027 No-Build			2027 Build		
		v/c ¹	Delay ²	LOS ³	v/c	Delay	LOS	v/c	Delay	LOS
<i>Railroad Avenue at Skateland Drive</i>	Eastbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
<i>Proposed Eastern Driveway</i>	Westbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
	Southbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	10	A
<i>Railroad Avenue at Proposed Central Driveway</i>	Eastbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
	Westbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
	Southbound	n/a	n/a	n/a	n/a	n/a	n/a	0.03	10	A
<i>Railroad Avenue at Proposed Central Driveway (2)</i>	Eastbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
	Westbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
	Southbound	n/a	n/a	n/a	n/a	n/a	n/a	0.03	10	A
<i>Railroad Avenue at Proposed Western Driveway</i>	Eastbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
	Westbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
	Southbound	n/a	n/a	n/a	n/a	n/a	n/a	0.02	9	A

¹Volume-to-capacity ratio

²Average control delay per vehicle (in seconds)

³Level of service

n/a = not applicable

TABLE 8
INTERSECTION CAPACITY ANALYSIS RESULTS
WEEKDAY EVENING PEAK HOUR

Period	Approach	2020 Baseline			2027 No-Build			2027 Build		
		v/c ¹	Delay ²	LOS ³	v/c	Delay	LOS	v/c	Delay	LOS
<i>Washington Street at River Street and Comeau Bridge</i>	Eastbound	0.76	29	C	0.82	33	C	0.82	32	C
	Westbound	0.61	21	C	0.78	25	C	0.86	28	C
	Northbound	0.76	42	D	0.82	47	D	0.86	51	D
	Southbound	<u>0.51</u>	<u>48</u>	<u>D</u>	<u>0.57</u>	<u>52</u>	<u>D</u>	<u>0.58</u>	<u>52</u>	<u>D</u>
	Overall	0.76	31	C	0.82	35	C	0.86	37	D
<i>S Elm Street at Railroad Avenue</i>	Eastbound	0.11	18	C	0.19	19	C	0.47	30	D
	Northbound	0.02	<5	A	0.02	<5	A	0.07	<5	A
	Southbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
<i>S Elm Street at Laurel Avenue</i>	Eastbound	0.45	15	B	0.53	18	C	0.60	20	C
	Westbound	0.62	18	C	0.73	23	C	0.78	25	D
	Southbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
<i>S Elm Street at Blossom Street</i>	Eastbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Westbound	0.02	<5	A	0.03	<5	A	0.03	<5	A
	Northbound	0.06	15	B	0.07	16	C	0.07	17	C
<i>Railroad Avenue at Steampunk Station Dicy</i>	Eastbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Westbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Northbound	0.00	8	A	0.00	9	A	0.00	9	A
<i>Railroad Avenue at Eastern MBTA Dicy</i>	Eastbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Westbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Northbound	0.01	8	A	0.03	9	A	0.03	9	A
<i>Railroad Avenue at Western MBTA Dicy</i>	Eastbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Westbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Northbound	0.00	8	A	0.00	8	A	0.00	8	A
<i>Railroad Avenue at MVRTA dicy</i>	Eastbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Westbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Southbound	0.00	9	A	0.00	9	A	0.00	9	A

¹Volume-to-capacity ratio

²Average control delay per vehicle (in seconds)

³Level of service

⁴n/a = not applicable

TABLE 8 (Cont.)
INTERSECTION CAPACITY ANALYSIS RESULTS
WEEKDAY EVENING PEAK HOUR

Period	Approach	2020 Baseline			2027 No-Build			2027 Build		
		v/c ¹	Delay ²	LOS ³	v/c	Delay	LOS	v/c	Delay	LOS
<i>Railroad Avenue at Skateland Drive</i>	Eastbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
<i>Proposed Eastern Driveway</i>	Westbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
	Southbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	10	A
<i>Railroad Avenue at Proposed Central Driveway</i>	Eastbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
	Westbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
	Southbound	n/a	n/a	n/a	n/a	n/a	n/a	0.02	9	A
<i>Railroad Avenue at Proposed Central Driveway (2)</i>	Eastbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
	Westbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
	Southbound	n/a	n/a	n/a	n/a	n/a	n/a	0.02	9	A
<i>Railroad Avenue at Proposed Western Driveway</i>	Eastbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
	Westbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
	Southbound	n/a	n/a	n/a	n/a	n/a	n/a	0.01	9	A

¹Volume-to-capacity ratio

²Average control delay per vehicle (in seconds)

³Level of service

⁴n/a = not applicable

As summarized in **Table 7** and **Table 8**:

- *Washington Street at River Street and Comeau Bridge.* Under Build conditions the adjacent signalized intersection will operate at an overall LOS D or better during the weekday morning peak and weekday evening peak hour.
- *South Elm Street at Railroad Avenue.* Under Build conditions the Railroad Avenue approach to South Elm Street will operate at LOS D or better during the peak hours. Mainline travel along South Elm Street will continue to operate unimpeded with minimal delay.
- *South Elm Street at Laurel Avenue.* Under Build conditions the Laurel Street approach to South Elm Street will operate at LOS D during the peak hours. Mainline southbound travel along South Elm Street will continue to operate unimpeded with minimal delay.
- *South Elm Street at Blossom Street.* Under Build conditions the Blossom Street approach to South Elm Street will operate at LOS C during the peak hours. Mainline travel along South Elm Street will continue to operate unimpeded with minimal delay.
- *Railroad Avenue at Existing Driveways.* Under Build conditions the MBTA, MVRTA and Steampunk Café driveway approaches to Railroad Avenue will continue to operate at LOS A during the peak hours. Mainline travel along Railroad Avenue will continue to operate unimpeded with minimal delay.
- *Railroad Avenue at Proposed Site Driveways.* Under Build conditions the proposed site driveway approaches to Railroad Avenue will operate at LOS A during the peak hours. Mainline travel along Railroad Avenue will continue to operate unimpeded with minimal delay.

Signal Queue Impacts

The estimated average and 95th percentile vehicle queue lengths for signalized study intersection for 2027 No-Build and 2027 Build Year conditions is presented in **Table 9**. The estimated queue lengths are based on the capacity analysis results provided using Synchro® computer software.

TABLE 9
VEHICLE QUEUE ANALYSIS SUMMARY
WASHINGTON STREET AT RIVER STREET AND COMEAU BRIDGE

Approach	Available Queue Storage Length (feet)	2027 No-Build		2027 Build	
		Average Queue Length¹	Maximum Queue Length¹	Average Queue Length¹	Maximum Queue Length¹
Weekday Morning Peak Hour					
Eastbound L/T	>1000	228	414	237	424
Eastbound R	200±	<25	<25	<25	<25
Westbound L	150±	58	127	63	135
Westbound T	>1000	143	283	151	292
Westbound R	200±	<25	<25	<25	<25
Northbound L/T/R	>1000	175	321	198	354
Southbound L	200±	40	98	42	99
Southbound T/R	>1000	85	220	89	182
Weekday Evening Peak Hour					
Eastbound L/T	>1000	322	484	324	486
Eastbound R	200±	<25	<25	<25	<25
Westbound L	150±	99	225	108	266
Westbound T	>1000	265	404	266	406
Westbound R	200±	<25	<25	<25	<25
Northbound L/T/R	>1000	362	608	395	668
Southbound L	200±	71	129	71	129
Southbound T/R	>1000	110	185	114	190

¹Average and 95th percentile queue lengths are reported in feet per lane.

As presented in **Table 9**, average vehicle queues at the signalized study intersections will generally be contained within available storage lanes during peak hours to accommodate peak period queues. The project will not significantly change queue lengths compared to the No-Build conditions. We do note longer vehicle queues on the Comeau Bridge northbound approach during peak periods, periodically extending to approximately 18 vehicles (AM peak hours) and 30 vehicles (PM peak hours). While these vehicle queue extents are contained within the bridge itself, opportunity exists to reduce these vehicle queues by optimizing signal operations for appropriate emergency vehicle preemption and improved signal cycle time/phasing through equipment upgrades and repair. However, additional traffic generated by the project is not projected to materially increase these vehicle queues beyond No Build levels.

CONCLUSIONS AND RECOMMENDATIONS

MDM finds Railroad Avenue and roadways within the site vicinity can accommodate the modest traffic increases of the project. Relative traffic increases for the proposed project represents an inconsequential change in area roadway volumes - a level of change that falls well within normal day-to-day fluctuations in traffic entering and exiting the study intersections and is immaterial to traffic operations along Railroad Avenue and the adjacent roadway system. MDM identifies the following access/egress improvements, pedestrian/bicycle improvements, off-site improvements, and a preliminary list of Transportation Demand Management (TDM) measures that should be implemented to support development of the project, and that serve to enhance travel safety and multi-modal travel efficiency for vehicles, pedestrians, bicyclists, public transit and emergency response vehicles:

Access/Egress Improvements

- ❑ *Railroad Avenue Driveway Design.* Driveway alignment, widths and curb radii should be designed to achieve (a) approximate perpendicular orientation at Railroad Avenue; (b) total minimum width to facilitate access/egress via Railroad Avenue; and (c) minimum curb radii as required to accommodate the City's largest fire apparatus (ladder truck) and single unit delivery vehicles. Driveway grading and orientation should be designed to meet or exceed minimum recommended stopping sight distance presented herein. Signs and pavement markings that are compliant with the Manual on Uniform Traffic Control Devices (MUTCD) should be installed on the approaches to Railroad Avenue including a STOP sign (R1-1) and STOP line pavement markings.
- ❑ *Sight Line Triangles.* Plantings (shrubs, bushes) and structures (walls, fences, etc.) shall be maintained at a height of 2 feet or less within the sight lines in vicinity of the Site Driveways intersections with Railroad Avenue and at all internal intersections to provide unobstructed sight lines.

Pedestrian and Bicycle Accommodations

- ❑ *Pedestrian Connections.* The Site Plan should incorporate sidewalks that connect the proposed buildings to the on-site surface parking areas, proposed park, Bradford MBTA Station, and the system connecting to the Bradford Rail Trail via Railroad Avenue and South Elm Street.
- ❑ *Bicycle Amenities.* The Proponent should provide bicycle accommodations within the property including bike racks near the buildings entrances and the proposed Park/river walk to encourage and facilitate this mode of transportation to/from the Site. The Proponent anticipates providing secure weather-protected bike storage for the residents of the development. The Proponent will also work collaboratively with the

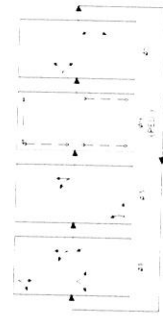
City to design and integrate conventional bicycle lanes and shared bike lanes ("Sharrows" lanes) along the Railroad Avenue and South Elm Street corridors as part of a "Complete Streets" design philosophy that will be included in offsite roadway improvements as described below.

Off-site Improvements

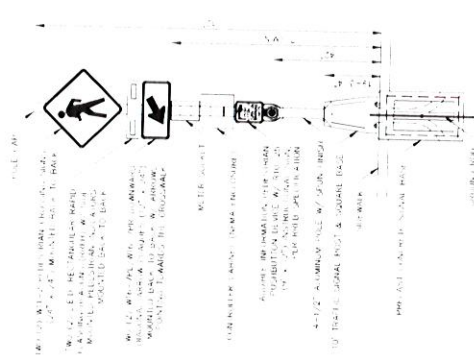
- *South Elm Street ("Ornstein Intersection") Signalization and Multimodal Improvements.* The project does not materially alter traffic operating conditions at any off-site location. However, roadway and traffic control improvements are appropriate at the nearby MBTA overpass, South Elm Street, Laurel Street and Blossom Street intersections to improve roadway alignment, vehicle maneuverability and sight lines, integrate multimodal infrastructure including bike lanes and enhanced sidewalks to the nearby Bradford Rail Trail. Geometric and traffic control improvements will also facilitate emergency vehicle access, improve public transit bus maneuverability, and will support future growth in the area. A review of the traffic volumes indicates that the South Elm Street intersections at Railroad Avenue and at Laurel Street satisfy one-hour and 4-hour peak hour traffic signal warrants. Accordingly, proposed improvements include proposed signal control at both of these locations as well.

The Proponent has worked collaboratively with the City in support of a MassWorks grant project application for funding of multi-modal transportation improvements that will support development of the property and provide the basis for future development in the area. Proposed improvements are identified in a 10% design package as presented in **Figure 12** that serves as the basis for the Massworks grant application and award. The Proponent is advancing the design of these improvements for City review and approval and will continue to work collaboratively with the City to implement these multimodal improvements under the Massworks grant program.

The proposed public infrastructure project will provide much needed multimodal upgrades in the form of safe and accessible pedestrian, bicycle and vehicle access improvements to existing public amenities and the proposed mixed-use/transit-oriented development along Railroad Avenue. Specifically, this will include approximately 1,500 linear feet of roadway and intersection improvements which will enhance safety and connectivity at the convergence of the Bradford Rail Trail terminus, two arterial roadways, a number of neighborhood streets, the MBTA Bradford Commuter Rail Station and the Joseph C. Comeau Bridge which serves as a gateway to Downtown Haverhill. In particular, said improvements will include the following:



PREFERENTIAL SIGNAL PHASING



DETAIL FOR RECTANGULAR RADIO FLASHING PEDESTRIAN BEACON

DRAFT

- NOTES**
1. All dimensions are in feet and inches.
 2. All dimensions are to the centerline of the road.
 3. All dimensions are to the centerline of the road.
 4. All dimensions are to the centerline of the road.
 5. All dimensions are to the centerline of the road.
 6. All dimensions are to the centerline of the road.
 7. All dimensions are to the centerline of the road.
 8. All dimensions are to the centerline of the road.
 9. All dimensions are to the centerline of the road.
 10. All dimensions are to the centerline of the road.

Conceptual Intersection Improvements Plan

SOUTHERN STREET / BRADFORD STREET / RAILROAD AVENUE

PREPARED FOR:

PROLOGO ENTERPRISES, INC.

220 BROADWAY, SUITE 402

EVANSTON, ILLINOIS 60201

MDM TRANSPORTATION CONSULTANTS, INC.

PLANNERS & ENGINEERS

DATE: December 11, 2008

SCALE: As Shown

PROJECT: Southern Street / Bradford Street / Railroad Avenue

SHEET 1 OF 1

1. Realign Laurel Avenue with South Elm Street to reduce open pavement areas, driver confusion and pedestrian crossing lengths. The realignment will also provide additional separation from the adjacent Blossom Street intersection.
2. Realign Railroad Avenue with South Elm Street to improve transit bus maneuverability to/from the MVRTA Fleet Maintenance Facility located along Railroad Avenue and improve access to the proposed mix-use development. MVRTA bus maneuvers from Railroad Avenue are currently constrained by the existing bridge abutments that support the overhead rail lines and require encroachment into opposing travel lanes.
3. Realign Blossom Street with South Elm Street to better define the intersection, minimize the skewed alignment and reduce pedestrian crossing lengths.
4. Construct bicycle lanes to provide a direct connection from the surrounding area to the Bradford Rail Trail.
5. Reconstruct sidewalks throughout the project limits and install an enhanced pedestrian crossing with curb extension and rapid rectangular flashing beacon (RRFB) at the Bradford Rail Trail terminus.
6. Install traffic signal controls at two South Elm Street intersections to clearly define driver right-of-way and provide exclusive pedestrian crossing phasing.
7. Signal emergency preemption equipment (Opticom) and coordination with the signal at the north end of the Comeau Bridge to ensure efficient response times/capability for responding City emergency vehicles (police and fire).
8. Mill and overlay the roadway within the project limits with select areas of full-depth reconstruction to address the deterioration of the existing surface course and pavement failures.
9. Signal equipment repair and/or upgrade at the Comeau Bridge intersection at Washington Street and River Street as required to ensure coordination capability with proposed signals at the South Elm Street intersections including emergency vehicle preemption. Associated upgrades to pedestrian crossings/infrastructure and signal equipment will also be implemented to ensure compliance with ADA requirements and to improve safety and operations at the intersection.

The capacity analysis and vehicle queue results for the weekday morning and weekday evening peak hour with a cluster traffic signal in place at the intersections is presented in **Table 10** and **Table 11** and are described below, with detailed analysis results and preliminary traffic signal warrants presented in the **Attachments**.

TABLE 10
INTERSECTION CAPACITY ANALYSIS RESULTS
WITH IMPROVEMENTS (SIGNALIZATION)
SOUTH ELM STREET AT RAILROAD AVENUE AND LAUREL STREET

Period	Approach	2027 Build (Unsignalized)			2027 Build (Signalized)		
		v/c ¹	Delay ²	LOS ³	v/c	Delay	LOS
Weekday Morning Peak Hour							
S Elm Street at Railroad Avenue	Eastbound	0.34	23	C	0.44	21	C
	Northbound	0.14	<5	A	0.46	6	A
	Southbound	<u>0.00</u>	<u><5</u>	<u>A</u>	<u>0.50</u>	<u>16</u>	<u>B</u>
	Overall	n/a	n/a	n/a	0.50	12	B
S Elm Street at Laurel Street	Eastbound	0.34	12	B	0.56	27	C
	Northbound	0.44	12	B	0.21	8	A
	Southbound	<u>0.00</u>	<u><5</u>	<u>A</u>	<u>0.55</u>	<u><5</u>	<u>A</u>
	Overall	n/a	n/a	n/a	0.56	10	A
Weekday Evening Peak Hour							
S Elm Street at Railroad Avenue	Eastbound	0.47	30	D	0.49	26	C
	Northbound	0.07	<5	A	0.48	7	A
	Southbound	<u>0.00</u>	<u><5</u>	<u>A</u>	<u>0.68</u>	<u>21</u>	<u>C</u>
	Overall	n/a	n/a	n/a	0.68	15	C
S Elm Street at Laurel Street	Eastbound	0.60	20	C	0.70	35	D
	Northbound	0.78	25	D	0.39	12	B
	Southbound	<u>0.00</u>	<u><5</u>	<u>A</u>	<u>0.72</u>	<u>7</u>	<u>A</u>
	Overall	n/a	n/a	n/a	0.72	15	B

Volume-to-capacity ratio

¹Volume-to-capacity ratio

²Average control delay per vehicle (in seconds)

³Level of service

n/a = not applicable

TABLE 11
VEHICLE QUEUE ANALYSIS SUMMARY – MITIGATED
SOUTH ELM STREET AT RAILROAD AVENUE AND LAUREL STREET

Period	Approach	Storage Length (feet)	2027 Build (Signalized)	
			Average Queue Length ¹	Maximum Queue Length ¹
<i>Weekday Morning Peak Hour</i>				
<i>S Elm Street at Railroad Avenue</i>	Eastbound L R	>500	<25	58
	Northbound L/T	125±	60	115
	Southbound T R	>1000	116	227
<i>S Elm Street at Laurel Street</i>	Eastbound L R	>1000	63	124
	Northbound L	125±	<25	35
	Northbound T	>1000	33	71
	Southbound L R	125±	<25	31
<i>Weekday Evening Peak Hour</i>				
<i>S Elm Street at Railroad Avenue</i>	Eastbound L R	>500	30	81
	Northbound L/T	125±	107	185
	Southbound T R	>1000	230	383
<i>S Elm Street at Laurel Street</i>	Eastbound L R	>1000	122	206
	Northbound L	125±	34	76
	Northbound T	>1000	66	117
	Southbound L R	125±	36	69

¹Average and 95th percentile queue lengths are reported in feet per lane.

¹Average and 95th percentile queue lengths are reported in feet per lane.

As shown in **Table 10** and **Table 11**, the signalized intersections would operate below capacity at LOS C during the weekday morning and weekday evening peak hours. The queue results indicate that a traffic signal would introduce limited vehicle queues on the northbound and southbound approaches of South Elm Street but would reduce vehicle queues on the Railroad Avenue and Laurel Street approaches to South Elm Street.

Transportation Demand Management (TDM)

TDM programs include a series of measures that are designed to encourage the use of alternative modes of travel to single-occupant vehicles (SOVs) through influencing the choice of travel modes by residents, commercial tenant employees, and patrons. The benefits that are derived from an effective TDM program include less congestion on the roadway network; improved air quality; reduced parking demands and the need for construction of new parking spaces; and health benefits through walking and bicycling. The Proponent is committed to reduce auto dependency by residents, commercial tenant employees and patrons by implementing a robust TDM program. These elements are also consistent with the Massachusetts Department of Environmental Protection (MADEP) directive to use all reasonable and feasible mitigation actions to reduce auto emissions. A preliminary list of potential TDM program elements may include the following which are currently under consideration by the Proponent:

- ❑ *Merrimack Valley TMA Membership.* The Proponent will become a member of the Merrimack Valley TMA. The TMA membership offers a host of TDM programs and incentives available to the Proponent and residents and commercial employees of the development that include carpool/ride matching services; marketing/promotional events to inform members of available TMA programs and incentives; assistance with developing a pre-tax transit benefit program; emergency ride home program; and route/trip matching programs for members who chose to walk/bike to work.
- ❑ *On-Site Transportation Coordinator.* The Proponent will designate a member of the leasing staff as transportation coordinator responsible disseminating relevant TDM information to residents and commercial building tenants including provision of a tenant manual that provides information on public transportation routes and schedules, bicycle parking, parking policies and Site amenities including car sharing spaces and preferential parking spaces.
- ❑ *Public Transportation Information & Promotion.* Service and schedule information for MBTA and MVRTA services will be posted and included in a tenant lease package to promote the use of public transportation by residents, employees and visitors.
- ❑ *Transit Subsidy Program.* The Proponent shall reimburse the cost of a one-month MBTA commuter rail pass to new tenants who move into the Project during the first year of lease-up. The subsidy shall be limited to two adults per unit. The availability of the transit subsidy program shall be expressly acknowledged in the marketing materials for the Project for prospective tenants and shall be included within the tenant welcome package at tenant lease-up.

- ❑ *Bicycle Facilities and Promotion.* Provide bicycle parking, including weather protected racks for residents and visible accessible racks for commercial employees and patrons proximate to the building entrances. Dissemination of area bicycle route maps as may be available will be postings in the building lobbies.
- ❑ *Car Sharing Spaces.* The Proponent will designate parking spaces on the Site for use by a car sharing services such as Zipcar. The number and location of these spaces will be determined in consultation with a car sharing service provider.
- ❑ *Preferential Parking and Incentives for Low-Emission Vehicles.* Preferential parking locations for residents who use low-emission vehicles will be provided. Charging stations for electric vehicles will also be provided on the Site.
- ❑ *Unbundled Parking.* The Proponent proposes unbundling residential parking to provide an option for residents to rent fewer or no parking spaces with their unit, thereby encouraging lower vehicle ownership at time of lease.
- ❑ *Pedestrian Infrastructure.* Sidewalk connections within the property will be provided along primary pedestrian desire lines that connect building entrances with the public sidewalk network and the bike lane connections that lead to the nearby Bradford Rail Trail. The Proponent will also post area maps that highlight area walking/bicycle routes to promote walking and bicycle travel to/from the Site and area businesses, recreational facilities and transit stops.

In summary, trip generation for the development is projected to only moderately increase traffic activity on area roadways relative to existing/baseline conditions with no material impact to operating conditions at the study intersections. The assessment indicates that there is ample capacity at these study locations to accommodate these project-related traffic increases without the need for major infrastructure enhancements. However, the Proponent has advanced design of multimodal infrastructure improvements in the vicinity of the MBTA overpass and South Elm Street intersections at Railroad Avenue and at Laurel Street (“Ornsteen Intersection”) that will promote multi connections to/from the property, address sight line limitations imposed by complex geometry near the overpass, and that provide enhanced vehicle maneuverability and emergency vehicle preemption/response to the property and the downtown area of the City. Further commitments to a Transportation Demand Management (TDM) program for the property will further these multi-modal objectives and will promote less reliance of auto use by patrons and visitors to the site.

ATTACHMENTS

- Traffic Volume Data
- Pedestrian and Bicycle Data
- Speed Data
- Crash Data
- Adjustment Calculations
- Seasonal/Yearly Growth Data
- Background Projects
- Trip Generation
- Trip Distribution
- Capacity Analysis
- Signal Warrant Analysis
- AutoTURN® Analysis

□ Traffic Volume Data

E/W: Railroad Avenue
East of 19 Railroad
Haverhill, MA

MDM TRANSPORTATION CONSULTANTS, INC.

Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA 01752

Page 1

Site Code: 1089

Start Time	08-Jul-20 Wed	Eastbound		Hour Totals		Westbound		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	7			2	10				
12:15		1	5			0	13				
12:30		5	5			1	5				
12:45		1	5			0	7				
01:00		3	6	7	22	3	8	3	35	10	57
01:15		1	11			0	6				
01:30		2	11			0	7				
01:45		1	5	7	33	0	13	3	34	10	67
02:00		1	9			1	12				
02:15		0	11			0	4				
02:30		0	3			0	1				
02:45		0	8	1	31	0	2	1	19	2	50
03:00		1	6			1	3				
03:15		0	2			0	3				
03:30		0	5			0	1				
03:45		0	1	1	14	1	2	2	9	3	23
04:00		2	2			4	3				
04:15		1	2			9	2				
04:30		3	3			8	2				
04:45		9	4	15	11	14	3	35	10	50	21
05:00		10	8			5	4				
05:15		11	4			10	1				
05:30		5	1			6	6				
05:45		6	5	32	18	2	3	23	14	55	32
06:00		2	5			3	4				
06:15		4	6			6	10				
06:30		0	11			5	14				
06:45		3	11	9	33	9	8	23	36	32	69
07:00		1	9			10	14				
07:15		1	6			9	1				
07:30		8	4			8	0				
07:45		9	0	19	19	6	1	33	16	52	35
08:00		4	5			4	1				
08:15		2	3			8	2				
08:30		5	2			10	2				
08:45		9	0	20	10	3	1	25	6	45	16
09:00		1	1			2	1				
09:15		3	1			1	1				
09:30		2	1			4	1				
09:45		2	0	8	3	2	2	9	5	17	8
10:00		6	0			3	2				
10:15		3	0			1	0				
10:30		5	0			5	2				
10:45		0	1	14	1	3	0	12	4	26	5
11:00		4	0			4	0				
11:15		4	0			5	1				
11:30		6	3			6	1				
11:45		8	0	22	3	8	2	23	4	45	7
Total		155	198			192	192			347	390
Percent		43.9%	56.1%			50.0%	50.0%			47.1%	52.9%
Combined											
Total		353				384				737	

S Elm Street
North of Railroad Avenue
Haverhill, MA

MDM TRANSPORTATION CONSULTANTS, INC.

Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA 01752

Page 1

Site Code: 1089

Start Time	08-Jul-20 Wed	Northbound		Hour Totals		Southbound		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		13	74			8	92				
12:15		13	76			9	98				
12:30		9	66			12	93				
12:45		3	75			9	84				
01:00		7	79	38	291	4	81	38	367	76	658
01:15		6	68			2	75				
01:30		6	72			2	89				
01:45		2	60			2	92				
02:00		4	81	21	279	1	95	10	337	31	616
02:15		1	75			2	89				
02:30		3	75			3	74				
02:45		5	74			2	94				
03:00		5	86	13	305	4	113	8	352	21	657
03:15		1	84			3	92				
03:30		2	109			4	105				
03:45		4	87			7	84				
04:00		4	98	12	366	7	86	18	394	30	760
04:15		5	88			9	108				
04:30		8	96			18	91				
04:45		10	82			18	106				
05:00		7	97	27	364	18	96	52	391	79	755
05:15		7	91			21	123				
05:30		15	97			23	82				
05:45		19	84			42	72				
06:00		21	82	48	369	47	88	104	373	152	742
06:15		16	64			66	80				
06:30		27	73			62	69				
06:45		39	58			83	49				
07:00		32	68	103	277	64	64	258	286	361	563
07:15		53	42			76	52				
07:30		32	34			66	64				
07:45		61	43			65	46				
08:00		66	41	178	187	69	59	271	226	449	413
08:15		40	40			64	46				
08:30		49	41			81	36				
08:45		55	35			75	45				
09:00		57	30	210	157	73	27	289	186	499	343
09:15		50	21			58	45				
09:30		51	32			58	29				
09:45		69	22			63	21				
10:00		63	18	227	105	70	29	252	122	479	227
10:15		75	21			66	23				
10:30		56	16			56	25				
10:45		66	10			67	13				
11:00		62	15	260	65	61	9	259	90	519	155
11:15		58	18			76	14				
11:30		60	15			67	7				
11:45		89	12	269	60	96	16	300	46	569	106
Total		1406	2825			1859	3170			3265	5995
Percent		33.2%	66.8%			37.0%	63.0%			35.3%	64.7%
Total		1406	2825			1859	3170			3265	5995
Percent		33.2%	66.8%			37.0%	63.0%			35.3%	64.7%
Combined Total		4231				5029				9260	

28 Lord Road, Suite 280
Marlborough, MA

File Name : 1089 Elm at Blossom Rotated
Site Code : 1089
Start Date : 7/8/2020
Page No : 1

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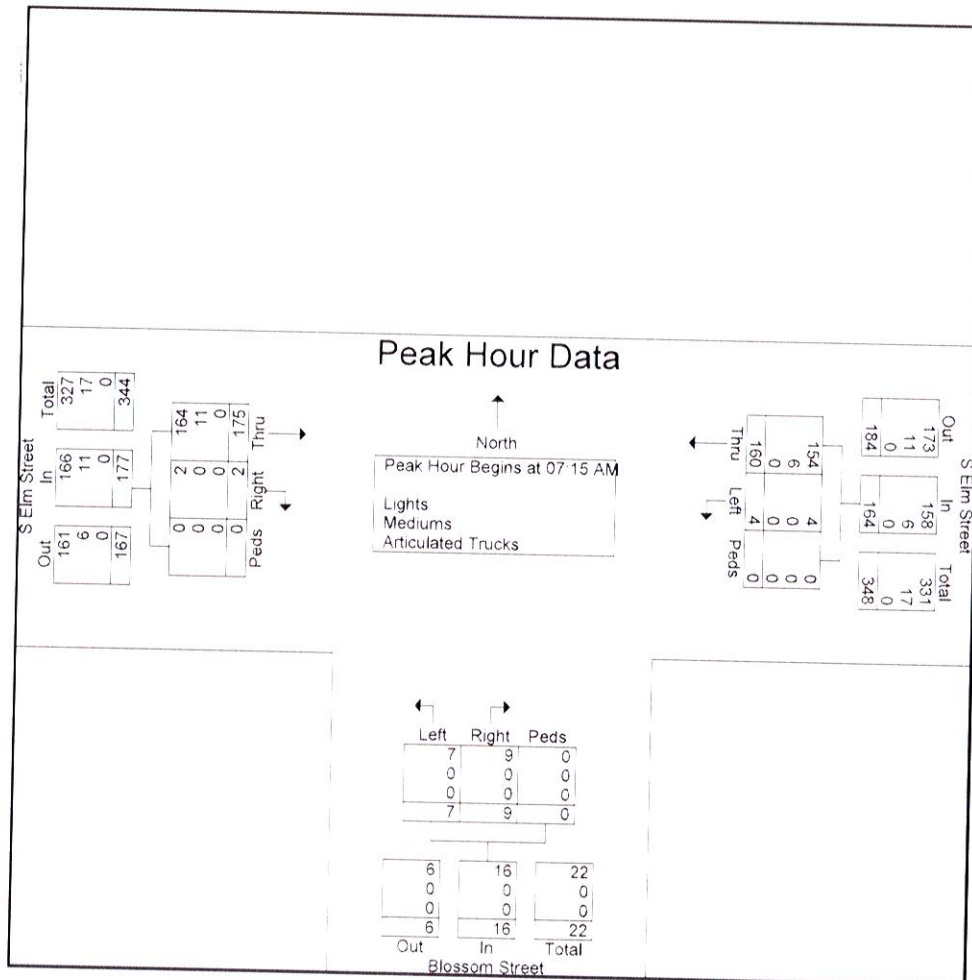
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

E/W: S Elm Street
NB: Blossom Street
Haverhill, MA

File Name : 1089 Elm at Blossom Rotated
Site Code : 1089
Start Date : 7/8/2020
Page No : 2

	S Elm Street From East				Blossom Street From South				S Elm Street From West				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	40	0	0	40	3	0	0	3	1	40	0	41	84
07:30 AM	31	2	0	33	2	1	0	3	1	45	0	46	82
07:45 AM	51	1	0	52				5					96
08:00 AM	38	1	0	39	1	4	0	5	0	51	0	51	95
Total Volume	160	4	0	164	9	7	0	16	2	175	0	177	357
% App. Total	97.6	2.4	0		56.2	43.8	0		1.1	98.9	0		
PHF	.784	.500	.000	.788	.750	.438	.000	.800	.500	.858	.000	.868	.930
Lights	154	4	0	158	9	7	0	16	2	164	0	166	340
% Lights	96.3	100	0	96.3	100	100	0	100	100	93.7	0	93.8	95.2
Mediums	6	0	0	6	0	0	0	0	0	11	0	11	17
% Mediums	3.8	0	0	3.7	0	0	0	0	0	6.3	0	6.2	4.8
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0



MDM TRANSPORTATION CONSULTANTS, INC.

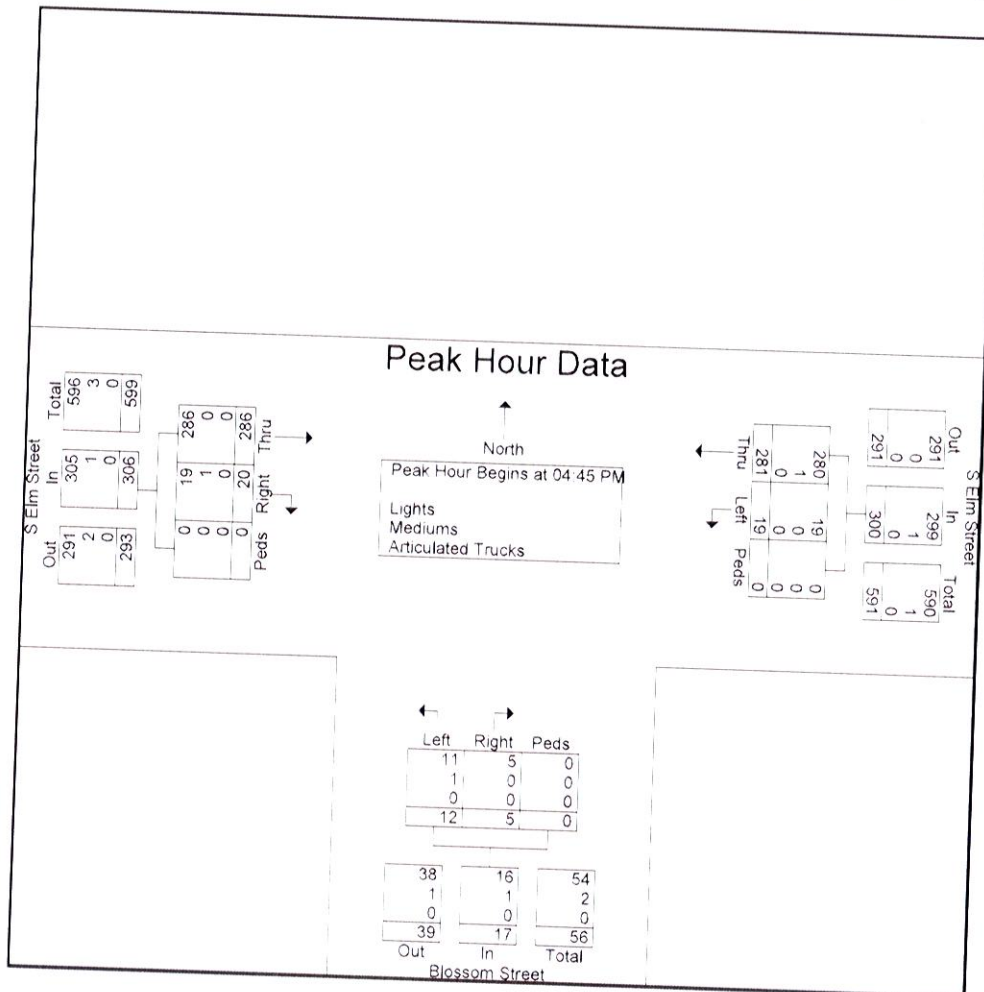
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

E/W: S Elm Street
NB: Blossom Street
Haverhill, MA

File Name : 1089 Elm at Blossom Rotated
Site Code : 1089
Start Date : 7/8/2020
Page No : 3

Start Time	S Elm Street From East				Blossom Street From South				S Elm Street From West				Int. Total	
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total		
Peak Hour Analysis From 12:00 PM to 06:00 PM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 04:45 PM														
04:45 PM	69	4	0	73	1	1	0	2	3	73	0	76	151	
05:00 PM	72	8	0	80	2	3	0	5	7	72	0	79	164	
05:15 PM	56	6	0	62	2	2	0	4	6	81	0	87	153	
05:30 PM	84	1	0	85		6	0	6						
Total Volume	281	19	0	300	5	12	0	17	20	286	0	306	623	
% App. Total	93.7	6.3	0		29.4	70.6	0		6.5	93.5	0			
PHF	.836	.594	.000	.882	.625	.500	.000	.708	.714	.883	.000	.879	.950	
Lights	280	19	0	299	5	11	0	16	19	286	0	305	620	
% Lights	99.6	100	0	99.7	100	91.7	0	94.1	95.0	100	0	99.7	99.5	
Mediums	1	0	0	1	0	1	0	1	1	0	0	1	3	
% Mediums	0.4	0	0	0.3	0	8.3	0	5.9	5.0	0	0	0.3	0.5	
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	



28 Lord Road, Suite 280
Marlborough, MA

File Name : 1089 Elm at Laurel
Site Code : 1089
Start Date : 7/8/2020
Page No : 1

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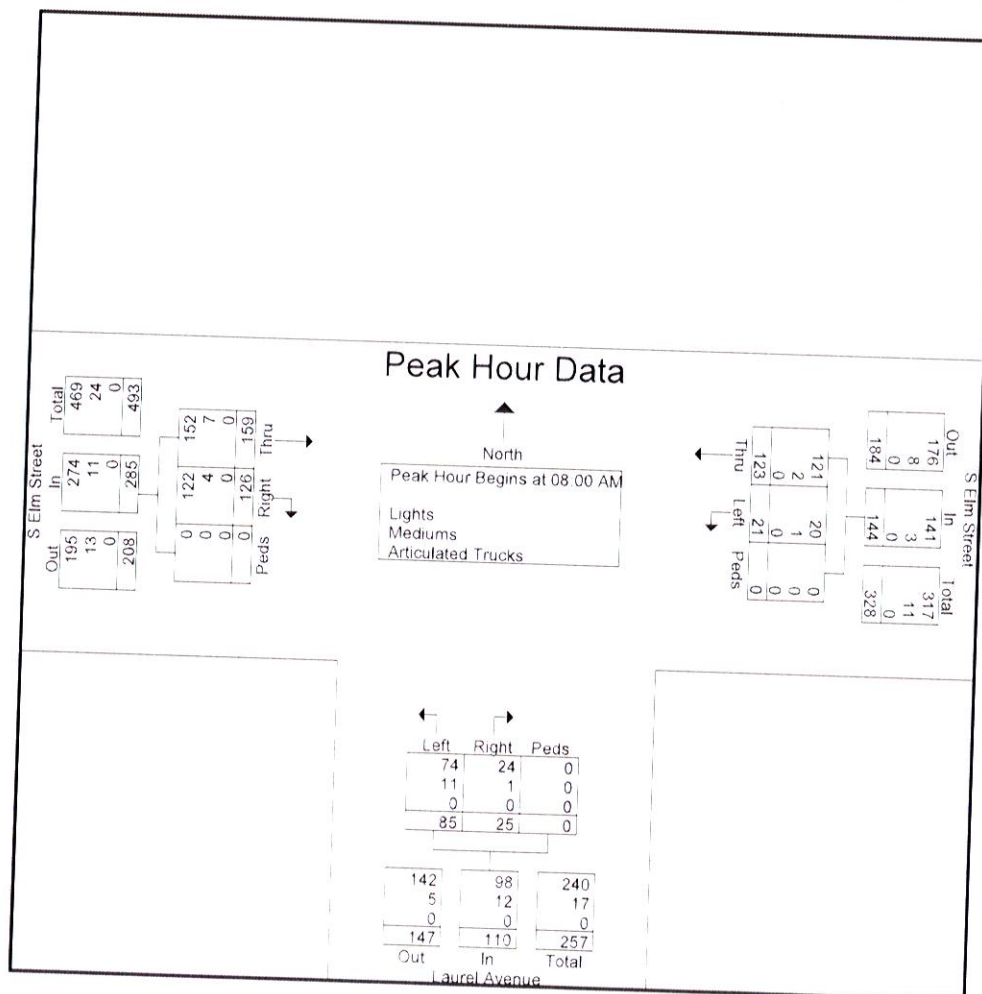
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

E/W: South Elm Street
NB: Laurel Avenue
Haverhill, MA

File Name : 1089 Elm at Laurel
Site Code : 1089
Start Date : 7/8/2020
Page No : 2

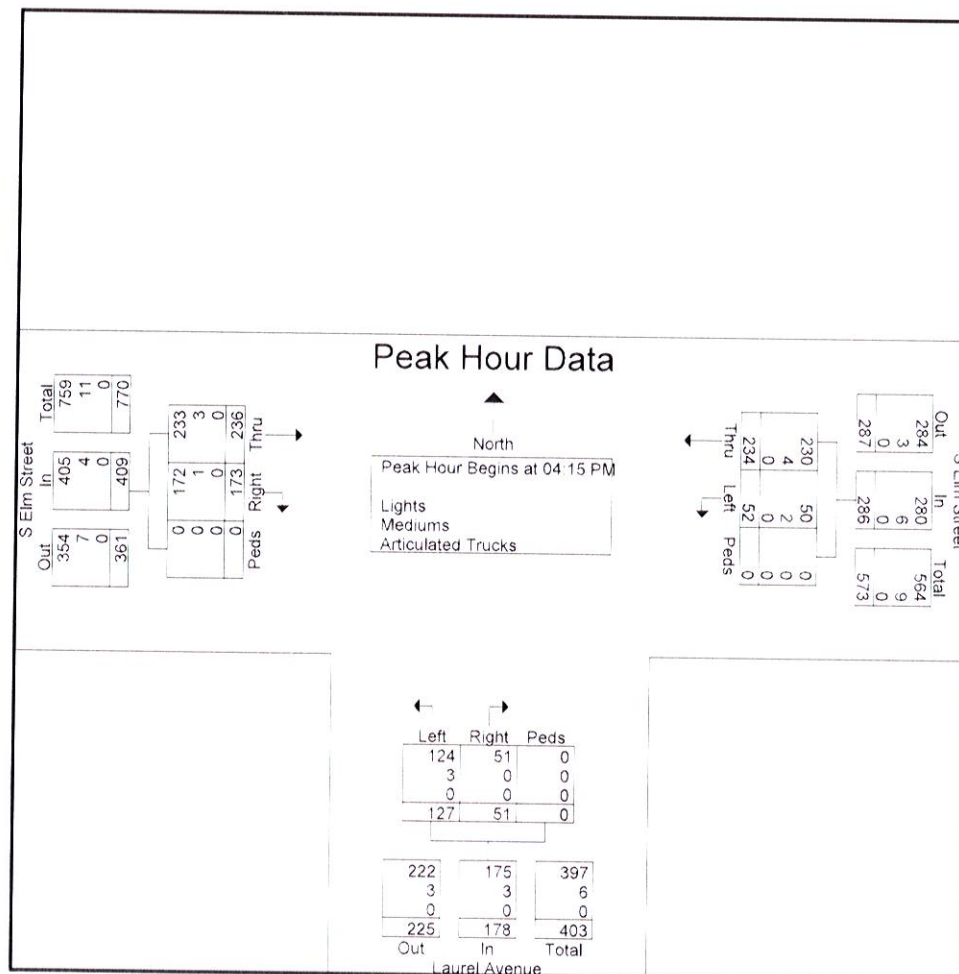
	S Elm Street From East				Laurel Avenue From South				S Elm Street From West				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 08:00 AM													
08:00 AM	32	10	0	42		26	0	29	21	48	0	69	140
08:15 AM	24	4	0	28	11	23	0	34					
08:30 AM	32	3	0	35	5	18	0	23	40	43	0	83	141
08:45 AM	35	4	0	39	6	18	0	24	35	40	0	75	138
Total Volume	123	21	0	144	25	85	0	110	126	159	0	285	539
% App. Total	85.4	14.6	0		22.7	77.3	0		44.2	55.8	0		
PHF	.879	.525	.000	.857	.568	.817	.000	.809	.788	.828	.000	.858	.956
Lights	121	20	0	141	24	74	0	98	122	152	0	274	513
% Lights	98.4	95.2	0	97.9	96.0	87.1	0	89.1	96.8	95.6	0	96.1	95.2
Mediums	2	1	0	3	1	11	0	12	4	7	0	11	26
% Mediums	1.6	4.8	0	2.1	4.0	12.9	0	10.9	3.2	4.4	0	3.9	4.8
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0



28 Lord Road, Suite 280
Marlborough, MA

E/W: South Elm Street
NB: Laurel Avenue
Haverhill, MA

File Name : 1089 Elm at Laurel
Site Code : 1089
Start Date : 7/8/2020
Page No : 3

[illegible]

MDM TRANSPORTATION CONSULTANTS, INC.

Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Elm Street/Comeau Bridge
EB: Railroad Avenue
Haverhill, MA

File Name : 1089 Railroad at Elm
Site Code : 1089
Start Date : 7/8/2020
Page No : 1

Groups Printed- Lights - Mediums - Articulated Trucks

Start Time	Comeau Bridge From North				Elm Street From South				Railroad Avenue From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
07:00 AM	6	59	0	65	33	3	0	36	2	0	0	2	103
07:15 AM	3	73	0	76	52	3	0	55	1	1	0	2	133
07:30 AM	5	60	0	65	28	2	0	30	4	4	0	8	103
07:45 AM	2	62	0	64	55	4	0	59	4	6	0	10	133
Total	16	254	0	270	168	12	0	180	11	11	0	22	472
08:00 AM	4	67	0	71	65	0	0	65	0	2	0	2	138
08:15 AM	2	62	0	64	38	8	0	46	1	1	0	2	112
08:30 AM	2	76	0	78	47	5	0	52	4	3	0	7	137
08:45 AM	4	71	0	75	49	0	0	49	6	5	0	11	135
Total	12	276	0	288	199	13	0	212	11	11	0	22	522
04:00 PM	3	83	0	86	97	1	0	98	3	1	0	4	188
04:15 PM	1	107	0	108	86	1	0	87	2	3	0	5	200
04:30 PM	3	88	0	91	90	3	0	93	2	5	0	7	191
04:45 PM	1	105	0	106	80	5	0	85	1	2	0	3	194
Total	8	383	0	391	353	10	0	363	8	11	0	19	773
05:00 PM	1	96	0	97	93	2	0	95	8	4	0	12	204
05:15 PM	1	120	0	121	90	0	0	90	2	1	0	3	214
05:30 PM	5	77	0	82	95	4	0	99	5	2	0	7	188
05:45 PM	3	69	0	72	83	1	0	84	1	2	0	3	159
Total	10	362	0	372	361	7	0	368	16	9	0	25	765
Grand Total	46	1275	0	1321	1081	42	0	1123	46	42	0	88	2532
Apprch %	3.5	96.5	0		96.3	3.7	0		52.3	47.7	0		
Total %	1.8	50.4	0	52.2	42.7	1.7	0	44.4	1.8	1.7	0	3.5	
Lights	35	1254	0	1289	1064	25	0	1089	39	36	0	75	2453
% Lights	76.1	98.4	0	97.6	98.4	59.5	0	97	84.8	85.7	0	85.2	96.9
Mediums	10	21	0	31	17	17	0	34	7	5	0	12	77
% Mediums	21.7	1.6	0	2.3	1.6	40.5	0	3	15.2	11.9	0	13.6	3
Articulated Trucks	1	0	0	1	0	0	0	0	0	1	0	1	2
% Articulated Trucks	2.2	0	0	0.1	0	0	0	0	0	2.4	0	1.1	0.1

MDM TRANSPORTATION CONSULTANTS, INC.

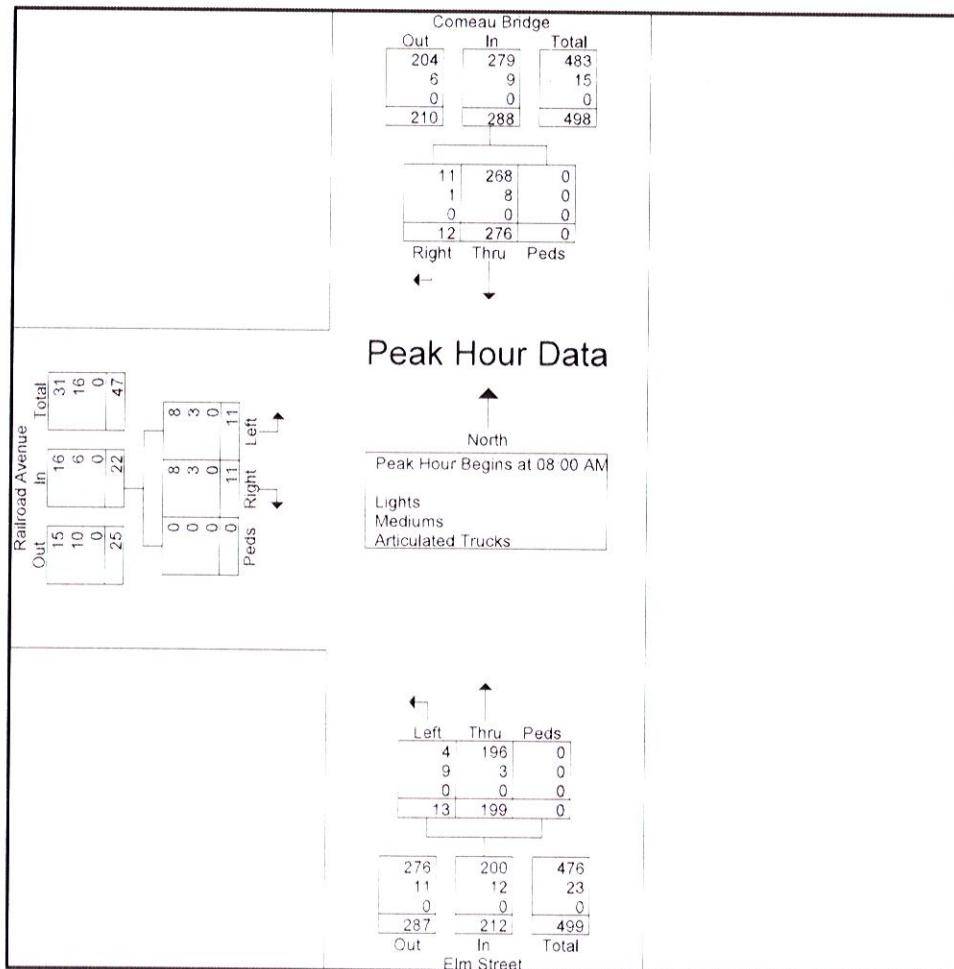
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Elm Street/Comeau Bridge
EB: Railroad Avenue
Haverhill, MA

File Name : 1089 Railroad at Elm
Site Code : 1089
Start Date : 7/8/2020
Page No : 2

	Comeau Bridge From North				Elm Street From South				Railroad Avenue From West				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 08:00 AM													
08:00 AM	4	67	0	71	65	0	0	65					138
08:15 AM	2	62	0	64	38	8	0	46	1	1	0	2	112
08:30 AM	2	76	0	78									
08:45 AM	4	71	0	75	49	0	0	49	6	5	0	11	135
Total Volume	12	276	0	288	199	13	0	212	11	11	0	22	522
% App. Total	4.2	95.8	0		93.9	6.1	0		50	50	0		
PHF	.750	.908	.000	.923	.765	.406	.000	.815	.458	.550	.000	.500	.946
Lights	11	268	0	279	196	4	0	200	8	8	0	16	495
% Lights	91.7	97.1	0	96.9	98.5	30.8	0	94.3	72.7	72.7	0	72.7	94.8
Mediums	1	8	0	9	3	9	0	12	3	3	0	6	27
% Mediums	8.3	2.9	0	3.1	1.5	69.2	0	5.7	27.3	27.3	0	27.3	5.2
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0



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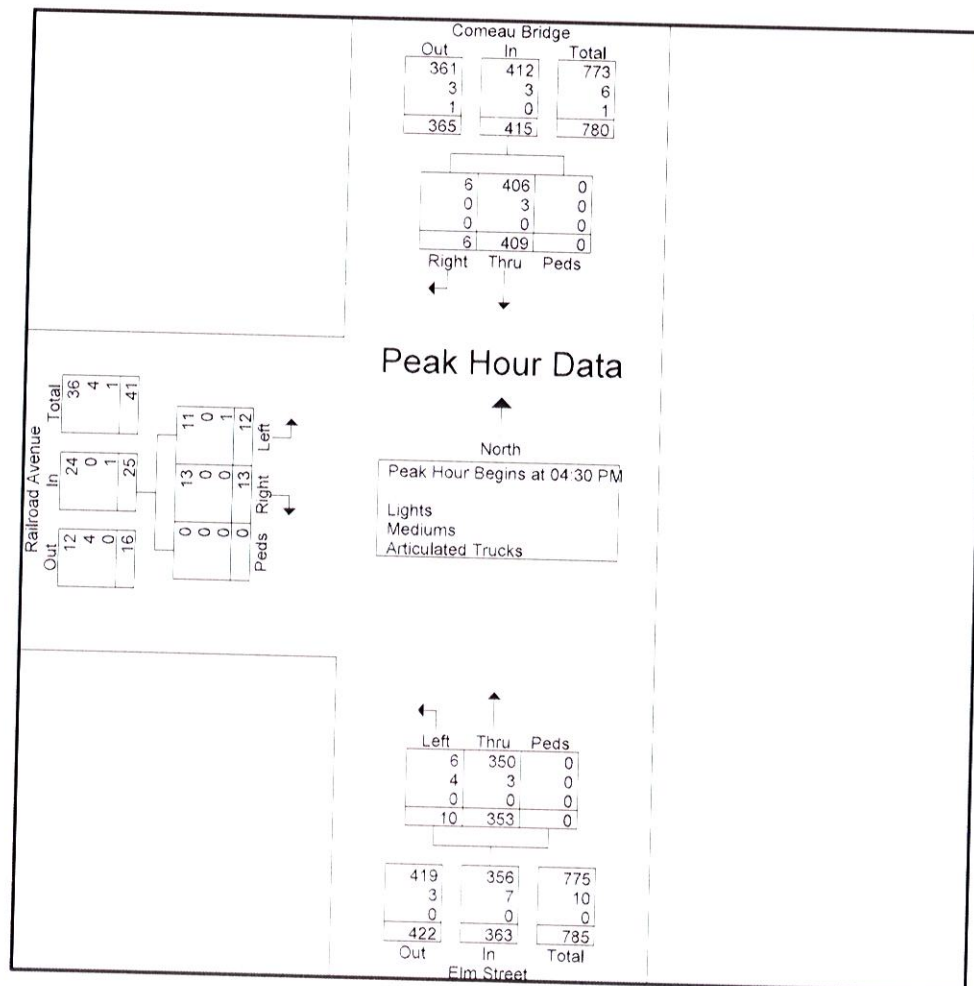
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Elm Street/Comeau Bridge
EB: Railroad Avenue
Haverhill, MA

File Name : 1089 Railroad at Elm
Site Code : 1089
Start Date : 7/8/2020
Page No : 3

	Comeau Bridge From North				Elm Street From South				Railroad Avenue From West				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
04:30 PM	3	88	0	91	90	3	0	93	2	5	0	7	191
04:45 PM	1	105	0	106	80	5	0	85	1	2	0	3	194
05:00 PM	1	96	0	97	93	2	0	95	8	4	0	12	204
05:15 PM	1	120	0	121									214
Total Volume	6	409	0	415	353	10	0	363	13	12	0	25	803
% App. Total	1.4	98.6	0		97.2	2.8	0		52	48	0		
PHF	.500	.852	.000	.857	.949	.500	.000	.955	.406	.600	.000	.521	.938
Lights	6	406	0	412	350	6	0	356	13	11	0	24	792
% Lights	100	99.3	0	99.3	99.2	60.0	0	98.1	100	91.7	0	96.0	98.6
Mediums	0	3	0	3	3	4	0	7	0	0	0	0	10
% Mediums	0	0.7	0	0.7	0.8	40.0	0	1.9	0	0	0	0	1.2
Articulated Trucks	0	0	0	0	0	0	0	0	0	1	0	1	1
% Articulated Trucks	0	0	0	0	0	0	0	0	0	8.3	0	4.0	0.1



MDM TRANSPORTATION CONSULTANTS, INC.

Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Railroad Avenue
E/W: MBTA & MVRTA
Haverhill, MA

File Name : 1089 Railroad at MBTA & MVRTA Driveway
Site Code : 1089
Start Date : 7/8/2020
Page No : 1

Groups Printed- Lights - Mediums - Articulated Trucks

Start Time	Railroad Avenue From North					MVRTA Driveway From East					Railroad Avenue From South					MBTA Parking Lot From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00 AM	5	0	1	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
07:15 AM	4	0	0	0	4	0	0	1	0	1	0	3	0	0	3	0	0	0	0	0	8
07:30 AM	3	1	0	0	4	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	10
07:45 AM	3	0	2	0	5	0	1	0	0	1	0	9	0	0	9	0	0	0	0	0	15
Total	15	1	3	0	19	0	1	1	0	2	0	18	0	0	18	0	0	0	0	0	39
08:00 AM	3	0	0	0	3	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	6
08:15 AM	9	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
08:30 AM	7	0	0	0	7	0	0	0	0	0	1	2	0	0	3	0	0	0	0	0	11
08:45 AM	4	0	0	0	4	1	0	0	0	1	0	8	0	0	8	0	0	0	0	0	13
Total	23	0	0	0	23	1	0	0	0	1	1	13	0	0	14	0	0	1	0	1	39
04:00 PM	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	2
04:15 PM	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
04:30 PM	3	0	0	0	3	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	6
04:45 PM	2	0	0	0	2	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	4
Total	6	0	0	0	6	1	1	0	0	2	0	6	0	0	6	0	0	0	0	0	14
05:00 PM	1	1	0	0	2	1	0	0	0	1	0	7	0	0	7	0	0	0	0	0	10
05:15 PM	0	0	1	0	1	1	0	0	0	1	0	1	0	0	1	0	0	1	0	0	4
05:30 PM	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	6
05:45 PM	2	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	4
Total	8	2	1	0	11	2	0	0	0	2	0	8	0	0	8	0	0	3	0	0	24
Grand Total	52	3	4	0	59	4	2	1	0	7	1	45	0	0	46	0	0	4	0	4	116
Approch %	88.1	5.1	6.8	0		57.1	28.6	14.3	0		2.2	97.8	0	0		0	0	100	0		
Total %	44.8	2.6	3.4	0	50.9	3.4	1.7	0.9	0	6	0.9	38.8	0	0	39.7	0	0	3.4	0	3.4	
Lights	25	3	4	0	32	4	1	1	0	6	0	32	0	0	32	0	0	4	0	4	74
% Lights	48.1	100	100	0	54.2	100	50	100	0	85.7	0	71.1	0	0	69.6	0	0	100	0	100	63.8
Mediums	26	0	0	0	26	0	1	0	0	1	1	12	0	0	13	0	0	0	0	0	40
% Mediums	50	0	0	0	44.1	0	50	0	0	14.3	100	26.7	0	0	29.3	0	0	0	0	0	34.5
Articulated Trucks																					
% Articulated Trucks	1.9	0	0	0	1.7	0	0	0	0	0	0	2.2	0	0	2.2	0	0	0	0	0	1.7

MDM TRANSPORTATION CONSULTANTS, INC.

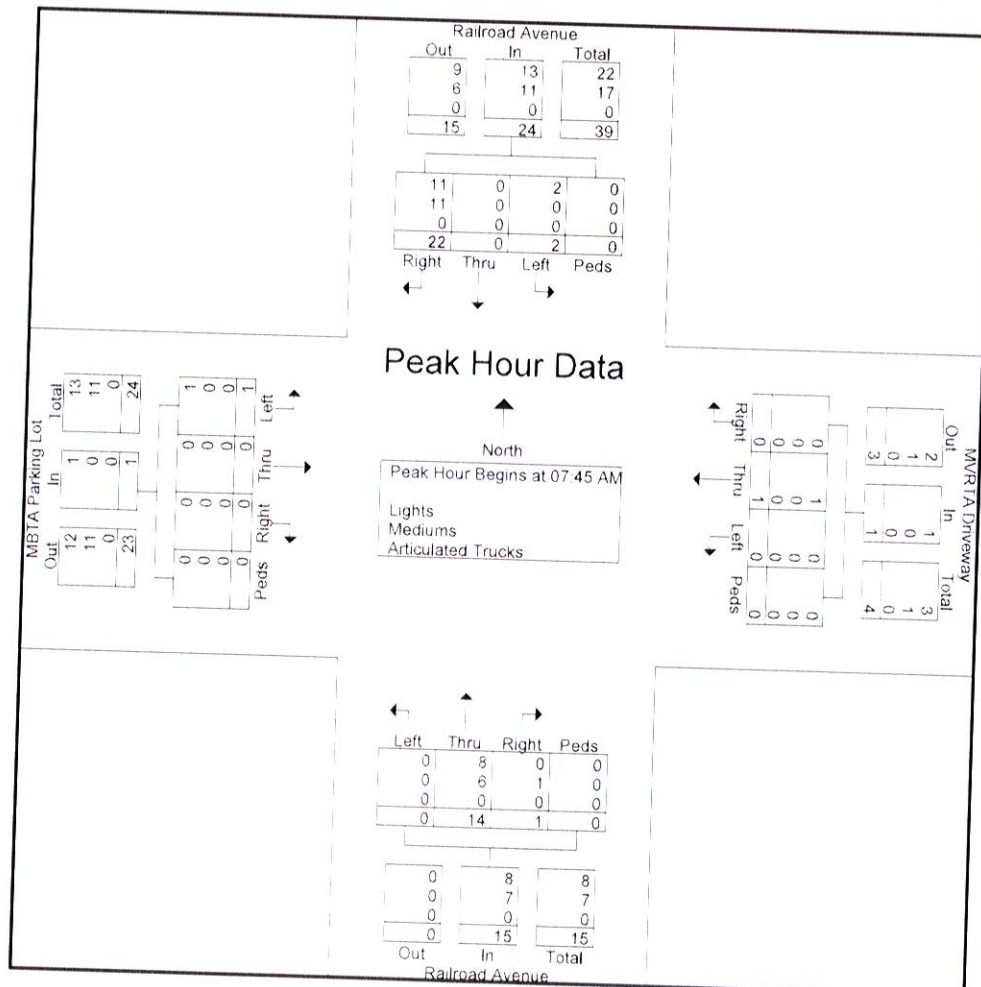
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Railroad Avenue
E/W: MBTA & MVRTA
Haverhill, MA

File Name : 1089 Railroad at MBTA & MVRTA Driveway
Site Code : 1089
Start Date : 7/8/2020
Page No : 2

Start Time	Railroad Avenue From North					MVRTA Driveway From East					Railroad Avenue From South					MBTA Parking Lot From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
	Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1 Peak Hour for Entire Intersection Begins at 07:45 AM																				
07:45 AM	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	3	0	0	0	3	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	15
08:15 AM	9	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
08:30 AM	7	0	0	0	7	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	9
Total Volume	22	0	2	0	24	0	1	0	0	1	1	14	0	0	15	0	0	1	0	1	
% App. Total	91.7	0	8.3	0		0	100	0	0		6.7	93.3	0	0		0	0	100	0		
PHF	.611	.000	.250	.000	.667	.000	.250	.000	.000	.250	.250	.389	.000	.000	.417	.000	.000	.250	.000	.250	.683
Lights	11	0	2	0	13	0	1	0	0	1	0	8	0	0	8	0	0	1	0	1	23
% Lights	50.0	0	100	0	54.2	0	100	0	0	100	0	57.1	0	0	53.3	0	0	100	0	100	56.1
Mediums	11	0	0	0	11	0	0	0	0	0	1	6	0	0	7	0	0	0	0	0	18
% Mediums	50.0	0	0	0	45.8	0	0	0	0	0	100	42.9	0	0	46.7	0	0	0	0	0	43.9
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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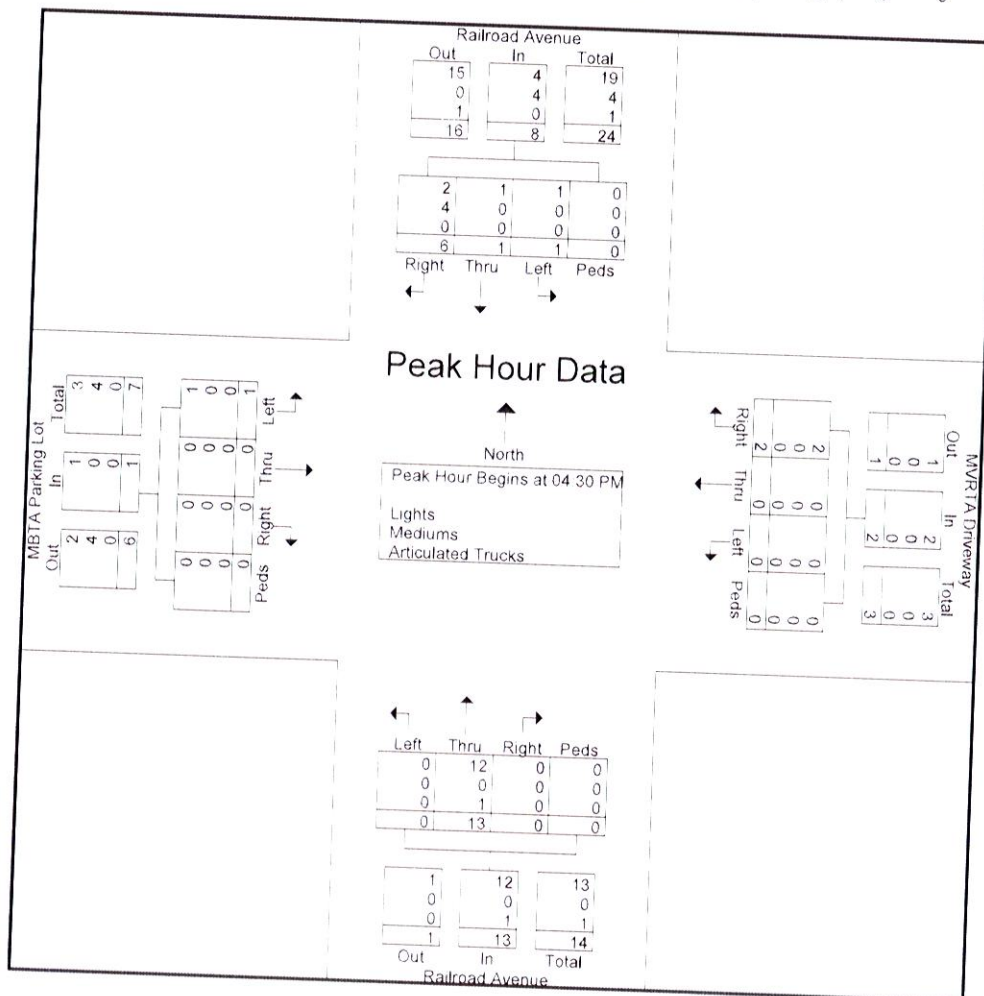
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Railroad Avenue
E/W: MBTA & MVRTA
Haverhill, MA

File Name : 1089 Railroad at MBTA & MVRTA Driveway
Site Code : 1089
Start Date : 7/8/2020
Page No : 3

Start Time	Railroad Avenue From North					MVRTA Driveway From East					Railroad Avenue From South					MBTA Parking Lot From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
	Peak Hour Analysis From 12:00 PM to 06:00 PM - Peak 1 of 1 Peak Hour for Entire Intersection Begins at 04:30 PM 04:30 PM																				
04:45 PM	2	0	0	0	2	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	4
05:00 PM	1	0	0	0	2	0	0	0	0	1	0	7	0	0	7	0	0	0	0	0	10
05:15 PM	0	0	1	0	1	1	0	0	0	1	0	7	0	0	7	0	0	1	0	1	4
Total Volume	6	1	1	0	8	2	0	0	0	2	0	13	0	0	13	0	0	1	0	1	24
% App. Total	75	12.5	12.5	0		100	0	0	0		0	100	0	0		0	0	100	0		
PHF	.500	.250	.250	.000	.667	.500	.000	.000	.000		.000	.464	.000	.000	.464	.000	.000	.250	.000		
Lights	2	1	1	0	4	2	0	0	0	2	0	12	0	0	12	0	0	1	0	1	19
% Lights	33.3	100	100	0	50.0	100	0	0	0	100	0	92.3	0	0	92.3	0	0	100	0	100	79.2
Mediums	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
% Mediums	66.7	0	0	0	50.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16.7
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.2
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	7.7	0	0	7.7	0	0	0	0	0	4.2



MDM TRANSPORTATION CONSULTANTS, INC.

Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Railroad Avenue
E/W: MBTA Parking Lot
Haverhill, MA

File Name : 1089 Railroad at MBTA Driveway
Site Code : 1089
Start Date : 7/8/2020
Page No : 1

Groups Printed- Lights - Mediums - Articulated Trucks

Start Time	Railroad Avenue From North				MBTA Parking Lot From East				Railroad Avenue From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
07:00 AM	6	1	0	7	1	0	0	1	0	0	0	0	8
07:15 AM	4	3	0	7	0	0	0	0	0	3	0	3	10
07:30 AM	4	2	0	6	0	0	0	0	0	6	0	6	12
07:45 AM	6	2	0	8	1	0	0	1	0	9	0	9	18
Total	20	8	0	28	2	0	0	2	0	18	0	18	48
08:00 AM	2	0	0	2	0	0	0	0	0	3	0	3	5
08:15 AM	9	1	0	10	1	0	0	1	0	0	0	0	11
08:30 AM	7	0	0	7	3	0	0	3	0	5	0	5	15
08:45 AM	3	0	0	3	0	0	0	0	0	9	0	9	12
Total	21	1	0	22	4	0	0	4	0	17	0	17	43
04:00 PM	0	1	0	1	0	0	0	0	0	1	0	1	2
04:15 PM	1	0	0	1	2	0	0	2	0	1	0	1	4
04:30 PM	3	1	0	4	2	0	0	2	1	2	0	3	9
04:45 PM	2	2	0	4	0	0	0	0	0	2	0	2	6
Total	6	4	0	10	4	0	0	4	1	6	0	7	21
05:00 PM	2	0	0	2	3	0	0	3	0	8	0	8	13
05:15 PM	1	0	0	1	0	0	0	0	0	3	0	3	4
05:30 PM	5	0	0	5	1	0	0	1	0	1	0	1	7
05:45 PM	3	1	0	4	2	0	0	2	0	2	0	2	8
Total	11	1	0	12	6	0	0	6	0	14	0	14	32
Grand Total	58	14	0	72	16	0	0	16	1	55	0	56	144
Apprch %	80.6	19.4	0		100	0	0		1.8	98.2	0		
Total %	40.3	9.7	0	50	11.1	0	0	11.1	0.7	38.2	0	38.9	
Lights	30	13	0	43	15	0	0	15	1	42	0	43	101
% Lights	51.7	92.9	0	59.7	93.8	0	0	93.8	100	76.4	0	76.8	70.1
Mediums	26	1	0	27	1	0	0	1	0	12	0	12	40
% Mediums	44.8	7.1	0	37.5	6.2	0	0	6.2	0	21.8	0	21.4	27.8
Articulated Trucks	2	0	0	2	0	0	0	0	0	1	0	1	3
% Articulated Trucks	3.4	0	0	2.8	0	0	0	0	0	1.8	0	1.8	2.1

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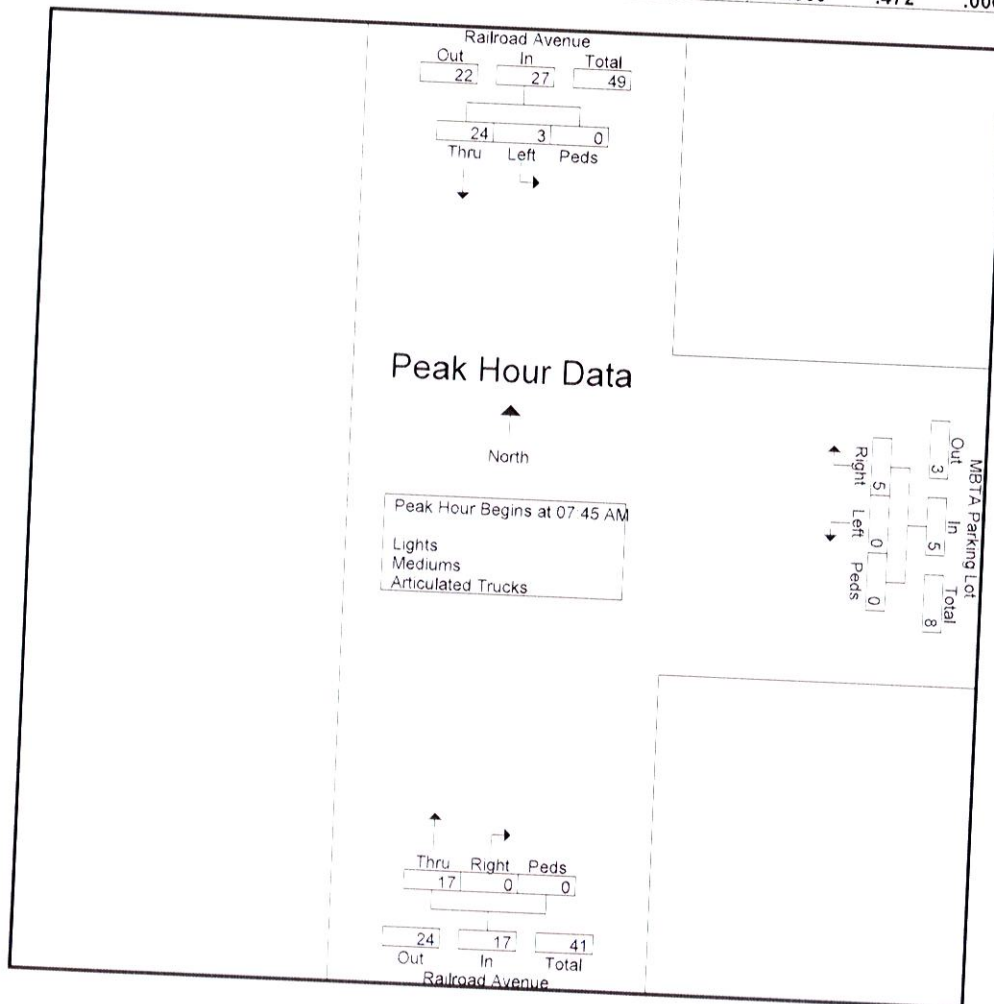
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Railroad Avenue
E/W: MBTA Parking Lot
Haverhill, MA

File Name : 1089 Railroad at MBTA Driveway
Site Code : 1089
Start Date : 7/8/2020
Page No : 2

Start Time	Railroad Avenue From North				MBTA Parking Lot From East				Railroad Avenue From South				Int. Total	
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total		
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 07:45 AM														
07:45 AM	6	2	0	8	1	0	0	1	0	9	0	9	18	
08:00 AM	2	0	0	2	0	0	0	0	0	3	0	3	5	
08:15 AM	9	1	0	10	1	0	0	1	0	0	0	0	11	
08:30 AM	7	0	0	7	3	0	0	3	0	5	0	5	15	
Total Volume	24	3	0	27	5	0	0	5	0	17	0	17	49	
% App. Total	88.9	11.1	0		100	0	0		0	100	0			
PHF	.667	.375	.000	.675	.417	.000	.000	.417	.000	.472	.000	.472	.681	



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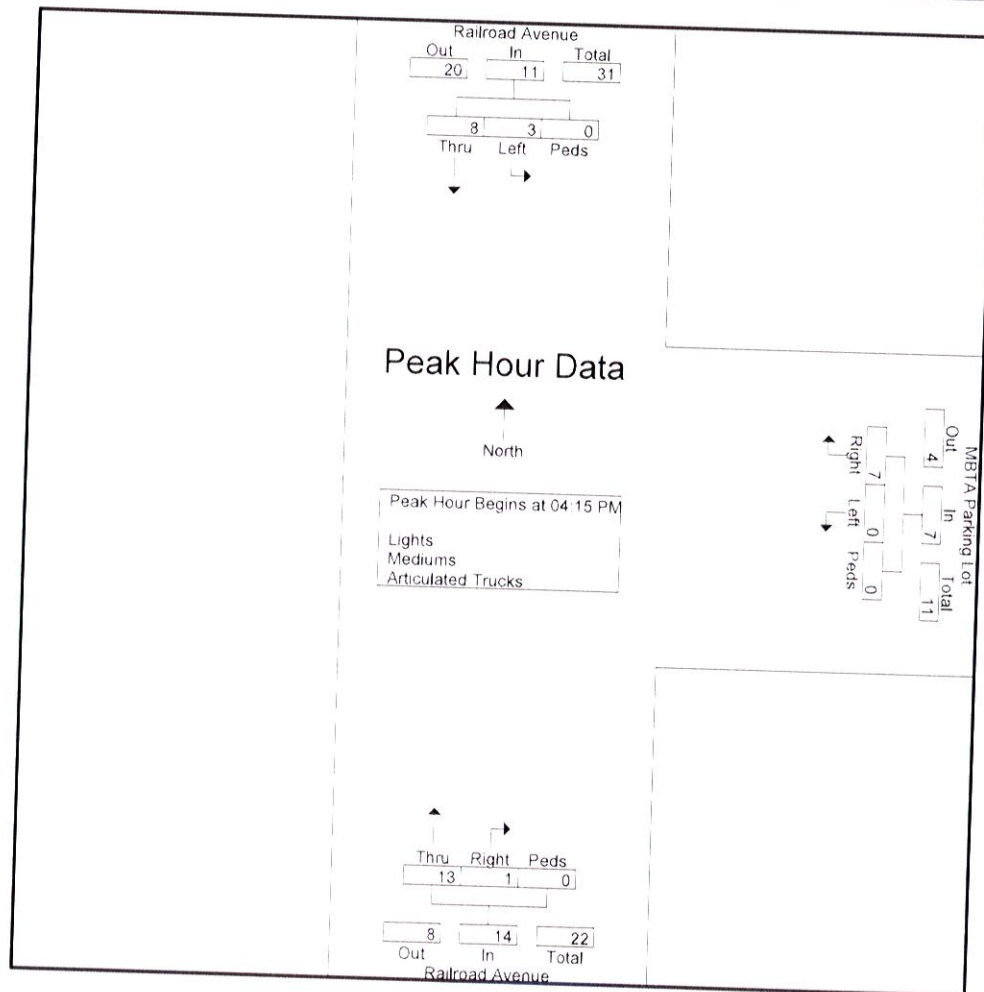
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Railroad Avenue
E/W: MBTA Parking Lot
Haverhill, MA

File Name : 1089 Railroad at MBTA Driveway
Site Code : 1089
Start Date : 7/8/2020
Page No : 3

Start Time	Railroad Avenue From North				MBTA Parking Lot From East				Railroad Avenue From South				Int. Total	
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total		
Peak Hour Analysis From 12:00 PM to 06:00 PM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 04:15 PM														
04:15 PM	1	0	0	1	2	0	0	2	0	1	0	1	4	
04:30 PM	3	1	0	4					1	2	0	3	9	
04:45 PM	2	2	0	4	0	0	0	0	0	2	0	2	6	
05:00 PM	2	0	0	2	3	0	0	3	0	8	0	8	13	
Total Volume	8	3	0	11	7	0	0	7	1	13	0	14	32	
% App. Total	72.7	27.3	0		100	0	0		7.1	92.9	0			
PHF	.667	.375	.000	.688	.583	.000	.000	.583	.250	.406	.000	.438	.615	



28 Lord Road, Suite 280
Marlborough, MA

File Name : 1089 Railroad at Steampunk Station
Site Code : 1089
Start Date : 7/8/2020
Page No : 1

Groups Printed- Lights - Mediums - Articulated Trucks																					
Railroad Avenue From North						Steampunk Cafe From East					Railroad Avenue From South					Skateland From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	8	0	0	8	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
07:15 AM	0	6	0	0	6	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	9
07:30 AM	0	6	0	0	6	1	0	0	0	1	0	6	0	0	6	0	0	0	0	0	9
07:45 AM	0	3	0	0	3	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	13
Total	0	23	0	0	23	1	0	0	0	1	0	20	0	0	20	0	0	0	0	0	18
08:00 AM	0	1	1	0	2	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	49
08:15 AM	0	10	0	0	10	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	5
08:30 AM	0	7	1	0	8	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	11
08:45 AM	0	3	1	0	4	1	0	0	0	1	0	9	0	0	9	0	0	0	0	0	16
Total	0	21	3	0	24	1	0	0	0	1	0	21	0	0	21	0	0	0	0	0	14
																					46
04:00 PM	0	2	2	0	4	0	0	0	0	0	0	2	0	0	2	0	0	1	0	1	7
04:15 PM	0	2	0	0	2	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	5
04:30 PM	0	4	1	0	5	2	0	0	0	2	0	5	0	0	5	0	0	0	0	0	12
04:45 PM	0	6	0	0	6	1	0	0	0	1	0	2	0	0	2	0	0	0	0	0	9
Total	0	14	3	0	17	3	0	0	0	3	0	13	0	0	13	0	0	1	0	1	34
05:00 PM	0	1	1	0	2	0	0	0	0	0	0	13	0	0	13	0	0	1	0	1	15
05:15 PM	0	1	1	0	2	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	5
05:30 PM	1	5	2	0	8	1	0	0	0	1	0	3	0	0	3	0	0	0	0	0	11
05:45 PM	0	4	0	0	4	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	8
Total	1	11	4	0	16	1	0	0	0	1	0	4	0	0	4	0	0	0	0	0	39
Grand Total	1	74	10	0	85	6	0	0	0	6	0	76	0	0	76	0	0	1	0	1	
Approach %	1.2	57.1	11.3	0	85	100	0	0	0	8	0	100	0	0	76	0	0	1	0	1	168
Total %	0.6	44	3	0	50.6	3.6	0	0	0	3.6	0	100	0	0	76	0	0	100	0	0	
Lights	1	45	10	0	56	6	0	0	0	3.6	0	45.2	0	0	45.2	0	0	0.6	0	0.6	
% Lights	100	60.6	100	0	65.9	100	0	0	0	100	0	62	0	0	62	0	0	100	0	100	125
Mediums	0	28	0	0	28	0	0	0	0	0	0	81.6	0	0	81.6	0	0	0	0	0	74.4
% Mediums	0	37.8	0	0	32.9	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	41
Articulated Trucks												17.1	0	0	17.1	0	0	0	0	0	24.4
% Articulated Trucks	0	1.4	0	0	1.2	0	0	0	0	0	0	1.3	0	0	1.3	0	0	0	0	0	
																					1.2

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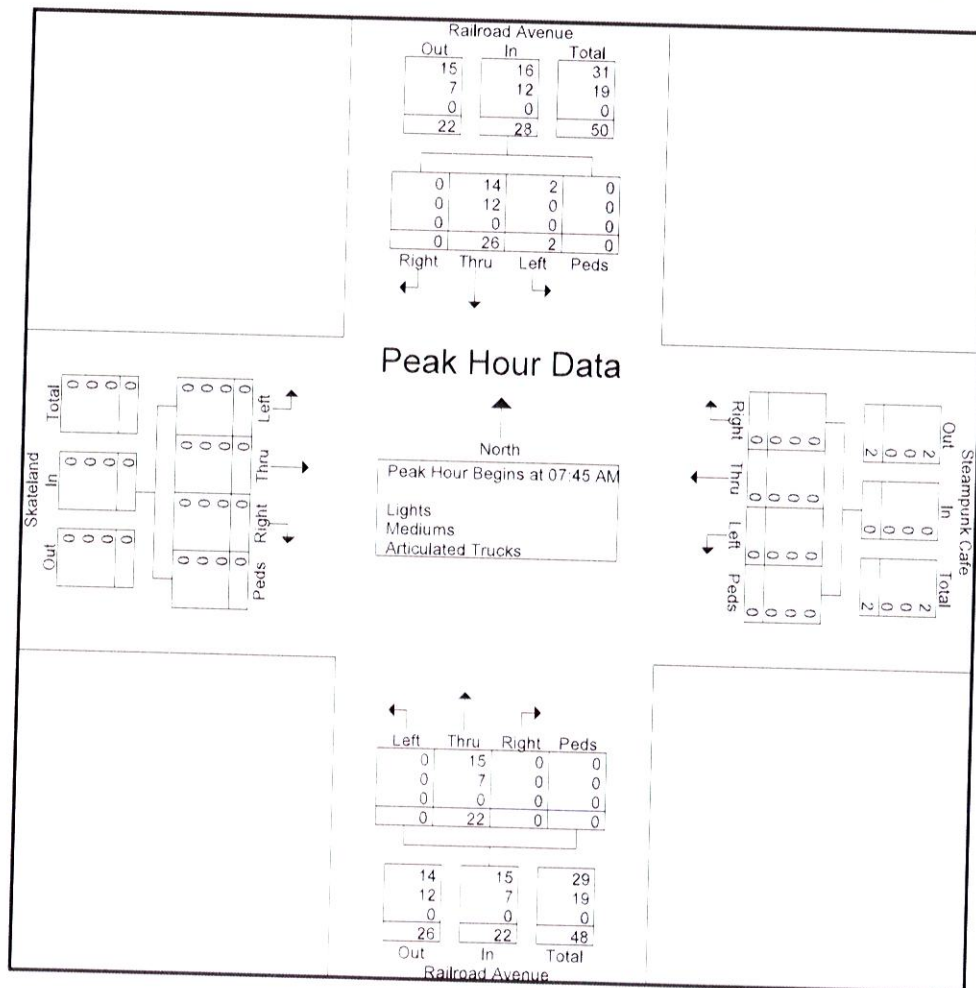
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Railroad Avenue
E/W: Steampunk Cafe & Skateland
Haverhill, MA

File Name : 1089 Railroad at Steampunk Station
Site Code : 1089
Start Date : 7/8/2020
Page No : 2

Start Time	Railroad Avenue From North					Steampunk Cafe From East					Railroad Avenue From South					Skateland From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1 Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	0	8	0	0	8	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	18
08:00 AM	0	1	1	0	2	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	3
08:15 AM	0	10	0	0	10	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	5
08:30 AM	0	7	1	0	8	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	11
Total Volume	0	26	2	0	28	0	0	0	0	0	0	22	0	0	22	0	0	0	0	0	16
% App. Total	0	92.9	7.1	0		0	0	0	0	0	0	100	0	0		0	0	0	0	0	50
PHF	.000	.650	.500	.000	.700	.000	.000	.000	.000	.000	.000	.550	.000	.000	.550	.000	.000	.000	.000	.000	.694
Lights	0	14	2	0	16	0	0	0	0	0	0	15	0	0	15	0	0	0	0	0	31
% Lights	0	53.8	100	0	57.1	0	0	0	0	0	0	68.2	0	0	68.2	0	0	0	0	0	62.0
Mediums	0	12	0	0	12	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	19
% Mediums	0	46.2	0	0	42.9	0	0	0	0	0	0	31.8	0	0	31.8	0	0	0	0	0	38.0
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



28 Lord Road, Suite 280
Marlborough, MA

File Name : 1089 Railroad at Steampunk Station
Site Code : 1089
Start Date : 7/8/2020
Page No : 3

Peak Hour Data

North

Peak Hour Begins at 04:15 PM

Lights
Mediums
Articulated Trucks

Railroad Avenue

Out	In	Total
26	10	36
0	4	4
1	1	2
27	15	42

Right	Thru	Left	Peds
0	8	2	0
0	4	0	0
0	1	0	0
0	13	2	0

Skateland

Out	In	Total
0	0	0
0	0	0
0	0	0
0	0	0

Peds	Right	Thru	Left
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

Steampunk Gate

Out	In	Total
2	3	5
0	0	0
0	0	0
2	3	5

Right	Thru	Left	Peds
3	0	0	0
0	0	0	0
0	0	0	0
3	0	0	0

Railroad Avenue

Out	In	Total
8	23	31
4	0	4
1	1	2
13	24	37

Left	Thru	Right	Peds
0	23	0	0
0	0	0	0
0	1	0	0
0	24	0	0

MDM TRANSPORTATION CONSULTANTS, INC.

Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Washington Street & Comeau Bridge
E/W: Washington Street & River Street
Haverhill, MA

File Name : 1089 Washington at Comeau Bridge Updated
Site Code : 1089
Start Date : 7/8/2020
Page No : 1

Groups Printed- Lights - Mediums - Articulated Trucks

Start Time	Washington Street From North					Washington Street From East					Comeau Bridge From South					River Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00 AM	2	17	9	0	28	7	46	26	0	79	12	7	13	0	32	26	42	0	0	67	206
07:15 AM	1	21	8	0	30	12	47	25	0	84	16	14	23	0	53	28	51	0	0	79	246
07:30 AM	1	23	9	0	33	6	50	22	0	88	9	6	16	0	31	24	56	4	0	84	236
07:45 AM	1	18	9	0	28	6	55	21	0	82	21	15	24	0	60	24	58	5	0	87	267
Total	5	79	35	0	119	31	208	94	0	333	58	42	76	0	176	101	217	9	0	327	955
08:00 AM	3	23	12	0	38	12	50	21	0	93	30	14	25	0	69	26	59	5	0	90	290
08:15 AM	1	19	14	0	34	12	53	28	0	103	15	4	20	0	39	15	71	1	0	87	263
08:30 AM	0	26	10	0	36	12	59	32	0	103	18	9	19	0	46	23	59	2	0	84	279
08:45 AM	6	22	13	0	41	15	51	29	0	135	23	13	22	0	58	23	57	1	0	81	295
Total	10	90	49	0	149	51	243	110	0	404	86	40	86	0	212	87	266	9	0	362	1127
04:00 PM	7	22	13	0	42	14	97	36	0	147	40	26	18	0	84	32	75	8	0	115	388
04:15 PM	5	27	20	0	52	27	91	43	0	161	40	24	37	0	101	36	84	3	0	123	427
04:30 PM	1	19	18	0	38	31	94	35	0	160	38	21	34	0	91	38	90	3	0	131	420
04:45 PM	10	29	19	0	58	36	78	27	0	141	23	27	35	0	85	44	56	2	0	112	396
Total	23	97	70	0	190	108	350	141	0	589	139	98	124	0	361	150	315	16	0	481	1631
05:00 PM	8	14	12	0	32	30	89	41	0	160	33	23	39	0	95	48	76	1	0	125	412
05:15 PM	6	33	27	0	66	26	96	42	0	164	34	29	28	0	91	47	80	1	0	128	419
05:30 PM	4	19	19	0	42	31	73	27	0	128	34	22	32	0	88	28	110	4	0	142	400
05:45 PM	1	19	23	0	43	22	90	21	0	133	38	19	37	0	94	31	73	0	0	104	374
Total	17	85	81	0	183	109	315	131	0	555	139	93	136	0	368	154	339	6	0	499	1605
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	2
Grand Total	55	351	235	0	641	299	1116	476	0	1891	422	273	422	0	1117	492	1138	41	0	1671	5320
Approach %	8.6	54.8	36.7	0		15.8	59	25.2	0		37.8	24.4	37.8	0		29.4	58.1	2.5	0		
Total %	1	6.6	4.4	0	12	5.6	21	8.9	0	35.5	7.9	5.1	7.9	0	21	9.2	21.4	0.8	0	31.4	
Lights	49	346	228	0	623	291	1088	462	0	1841	415	267	414	0	1096	477	1098	35	0	1610	5170
% Lights	39.1	98.6	97	0	97.2	97.3	97.5	97.1	0	97.4	88.3	97.8	98.1	0	98.1	97	96.5	85.4	0	96.3	97.2
Mediums	4	5	7	0	16	8	23	13	0	44	7	6	7	0	20	15	36	5	0	56	136
% Mediums	7.3	1.4	3	0	2.5	2.7	2.1	2.7	0	2.3	1.7	2.2	1.7	0	1.8	3	3.2	12.2	0	3.4	2.6
Articulated Trucks																					
% Articulated Trucks	3.6	0	0	0	0.3	0	0.4	0.2	0	0.3	0	0	0.2	0	0.1	0	0.4	2.4	0	0.3	0.3

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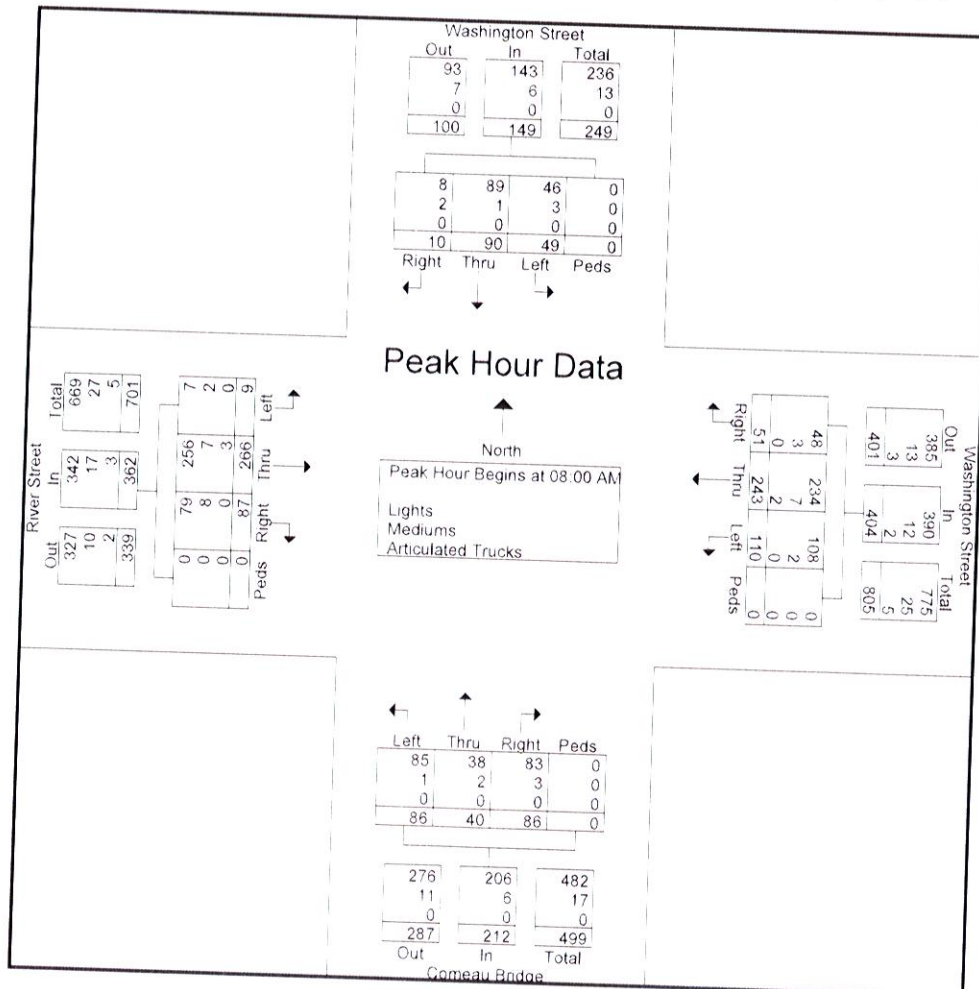
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Washington Street & Comeau Bridge
E/W: Washington Street & River Street
Haverhill, MA

File Name : 1089 Washington at Comeau Bridge Updated
Site Code : 1089
Start Date : 7/8/2020
Page No : 2

Start Time	Washington Street From North					Washington Street From East					Comeau Bridge From South					River Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:15 AM	1	19	14		38	12	59	32	0	93	18	9	19	0	58	26	59	5	0	90	290
08:30 AM	0	26	10	0	36	12	59	32	0	103	18	9	19	0	58	26	59	5	0	90	290
08:45 AM	6	22	13	0	41	15	61	29	0	105	23	13	22	0	46	23	69	2	0	94	279
Total Volume	10	90	49	0	149	51	243	110	0	404	86	40	86	0	212	87	266	9	0	362	1127
% App. Total	6.7	60.4	32.9	0		12.6	60.1	27.2	0		40.6	18.9	40.6	0		24	73.5	2.5	0		
PHF	.417	.865	.875	.000	.909	.850	.964	.859	.000		.717	.714	.860	.000	.768	.837	.937	.450	.000		
Lights	8	89	46	0	143	48	234	108	0	390	83	38	85	0	206	79	256	7	0	342	1081
% Lights	80.0	98.9	93.9	0	96.0	94.1	96.3	98.2	0	96.5	96.5	95.0	98.8	0	97.2	90.8	96.2	77.8	0	94.5	95.9
Mediums	2	1	3	0	6	3	7	2	0	12	3	2	1	0	6	8	7	2	0	17	41
% Mediums	20.0	1.1	6.1	0	4.0	5.9	2.9	1.8	0	3.0	3.5	5.0	1.2	0	2.8	9.2	2.6	22.2	0	4.7	3.6
Articulated Trucks	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	3	0	0	3	5
% Articulated Trucks	0	0	0	0	0	0	0.8	0	0	0.5	0	0	0	0	0	0	1.1	0	0	0.8	0.4



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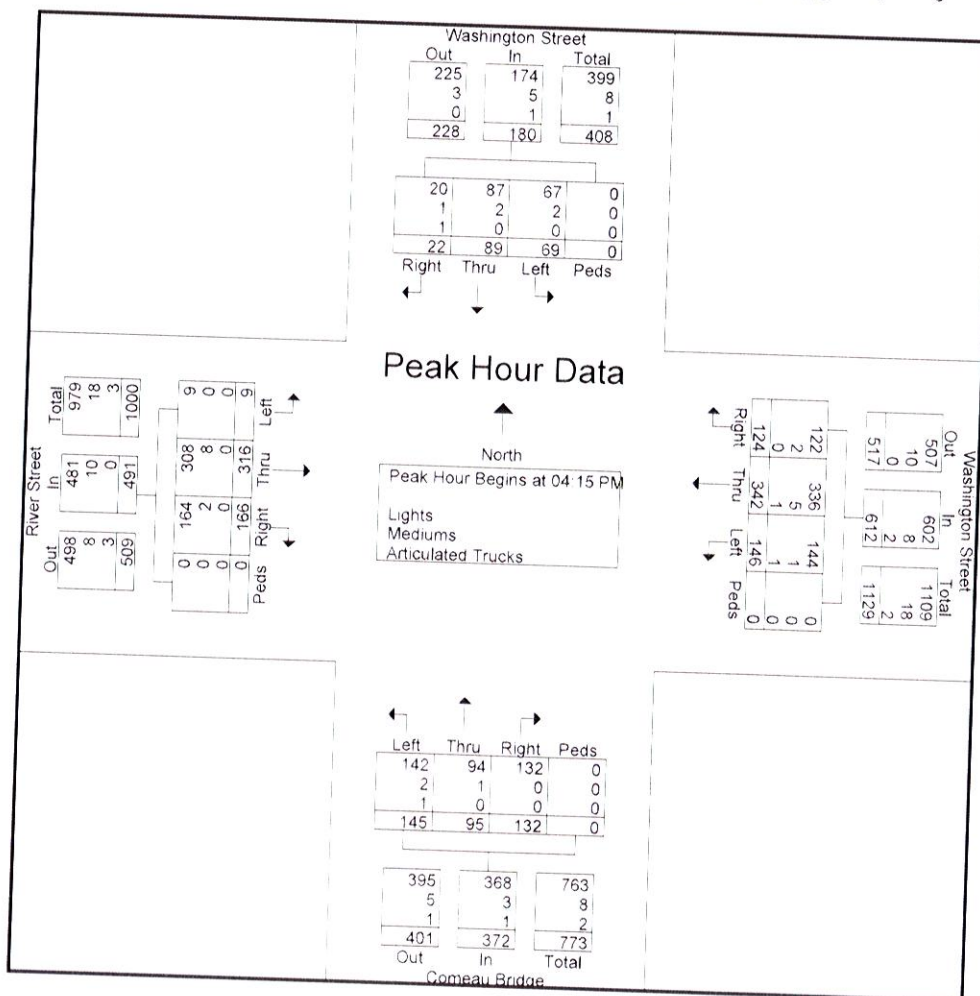
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Washington Street & Comeau Bridge
E/W: Washington Street & River Street
Haverhill, MA

File Name : 1089 Washington at Comeau Bridge Updated
Site Code : 1089
Start Date : 7/8/2020
Page No : 3

Start Time	Washington Street From North					Washington Street From East					Comeau Bridge From South					River Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
	Peak Hour Analysis From 12:00 PM to 06:00 PM - Peak 1 of 1 Peak Hour for Entire Intersection Begins at 04:15 PM																				
04:15 PM	5	27	20	9	52	27	81	43	0	151	40	24	37	0	101	36	84	3	0	123	427
04:30 PM	1	19	18	0	38	31	94	35	0	160	36	21	34	0	91	38	90	3	0	131	420
04:45 PM	10	29	19	0	58	36	78	27	0	141	23	27	35	0	85	44	66	2	0	112	396
05:00 PM	6	14	12	0	32	30	89	41	0	160	33	23	39	0	95	48	76	1	0	125	412
Total Volume	22	89	69	0	180	124	342	146	0	612	132	95	145	0	372	166	316	9	0	491	1655
% App. Total	12.2	49.4	38.3	0		20.3	55.9	23.9	0		35.5	25.5	39	0		33.8	64.4	1.8	0		
PHF	550	767	863	000	776	861	910	849	000		825	880	929	000	921	865	878	750	000		
Lights	20	87	67	0	174	122	336	144	0	602	132	94	142	0	368	164	308	9	0	481	1625
% Lights	90.9	97.8	97.1	0	96.7	98.4	98.2	98.6	0	98.4	100	98.9	97.9	0	98.9	98.8	97.5	100	0	98.0	98.2
Mediums	1	2	2	0	5	2	5	1	0	8	0	1	2	0	3	2	8	0	0	10	26
% Mediums																					
Articulated Trucks	1	0	0	0	1	0	1	1	0	2	0	0	1	0	1	0	0	0	0	0	4
% Articulated Trucks	4.5	0	0	0	0.6	0	0.3	0.7	0	0.3	0	0	0.7	0	0.3	0	0	0	0	0	0.2



□ Pedestrian and Bicycle Data

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28 Lord Road, Suite 280
Marlborough, MA

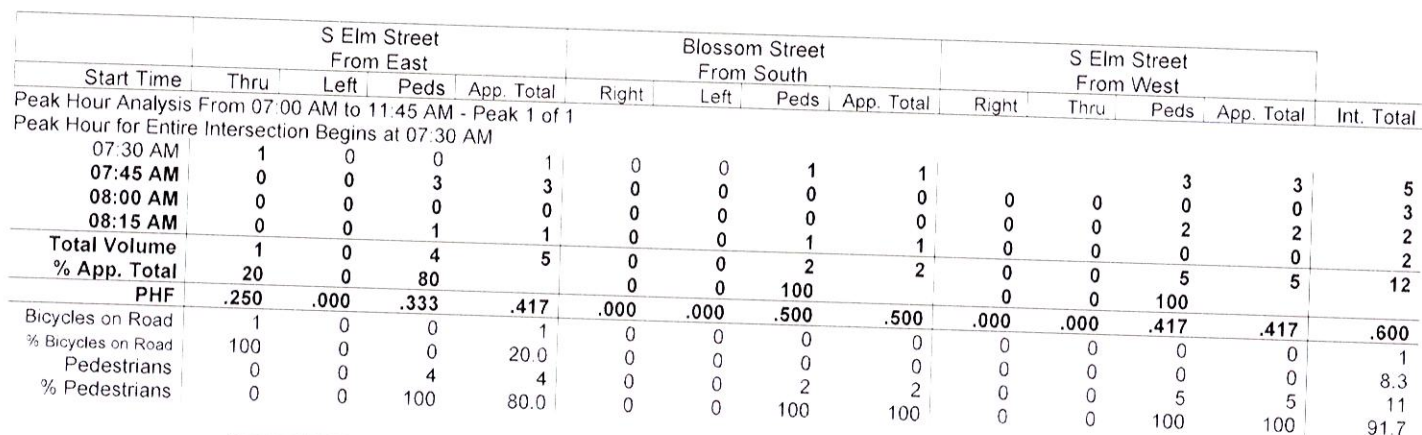
E/W: S Elm Street
NB: Blossom Street
Haverhill, MA

File Name : 1089 Elm at Blossom Rotated
Site Code : 1089
Start Date : 7/8/2020
Page No : 1

Groups Printed- Bicycles on Road - Pedestrians														
Start Time	S Elm Street From East				Blossom Street From South				S Elm Street From West				Int. Total	
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total		
07:00 AM	0	0	0	0	0	0	1	1	0	0	0	0	1	
07:30 AM	1	0	0	1	0	0	1	1	0	0	3	3	5	
07:45 AM	0	0	3	3	0	0	0	0	0	0	0	0	3	
Total	1	0	3	4	0	0	2	2	0	0	3	3	9	
08:00 AM	0	0	0	0	0	0	0	0	0	0	2	2	2	
08:15 AM	0	0	1	1	0	0	1	1	0	0	0	0	2	
08:30 AM	0	0	0	0	0	0	2	2	0	0	0	0	2	
Total	0	0	1	1	0	0	3	3	0	0	2	2	6	
04:00 PM	0	0	0	0	0	0	0	0	1	0	0	1	1	
04:15 PM	3	0	0	3	0	0	0	0	0	0	0	0	3	
04:45 PM	0	0	0	0	0	0	1	1	0	0	0	0	1	
Total	3	0	0	3	0	0	1	1	1	0	0	1	5	
05:30 PM	0	0	0	0	0	0	0	0	0	2	0	2	2	
05:45 PM	3	0	0	3	0	0	0	0	0	0	0	0	3	
Total	3	0	0	3	0	0	0	0	0	2	0	2	5	
Grand Total	7	0	4	11	0	0	6	6	1	2	5	8	25	
Apprch %	63.6	0	36.4		0	0	100		12.5	25	62.5			
Total %	28	0	16	44	0	0	24	24	4	8	20	32		
Bicycles on Road	7	0	0	7	0	0	0	0	1	2	0	3	10	
% Bicycles on Road	100	0	0	63.6	0	0	0	0	100	100	0	37.5	40	
Pedestrians	0	0	4	4	0	0	6	6	0	0	5	5	15	
% Pedestrians	0	0	100	36.4	0	0	100	100	0	0	100	62.5	60	

28 Lord Road, Suite 280
Marlborough, MA

File Name : 1089 Elm at Blossom Rotated
Site Code : 1089
Start Date : 7/8/2020
Page No : 2



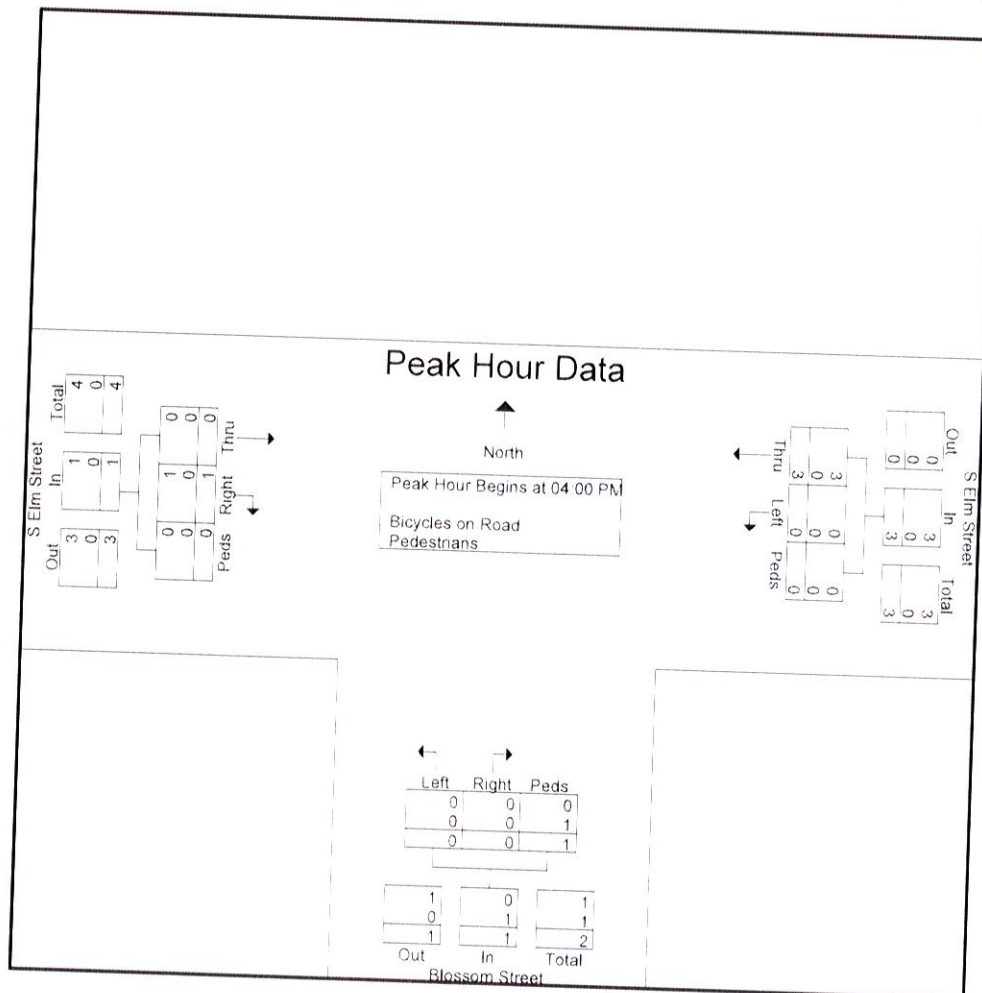
MDM TRANSPORTATION CONSULTANTS, INC. Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

E/W: S Elm Street
NB: Blossom Street
Haverhill, MA

File Name : 1089 Elm at Blossom Rotated
Site Code : 1089
Start Date : 7/8/2020
Page No : 3

Start Time	S Elm Street From East				Blossom Street From South				S Elm Street From West				Int. Total	
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total		
Peak Hour Analysis From 12:00 PM to 06:00 PM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 04:00 PM														
04:00 PM	0	0	0	0	0	0	0	0	1	0	0	1	1	
04:15 PM	3	0	0	3	0	0	0	0	0	0	0	0	3	
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Volume	3	0	0	3	0	0	1	1	0	0	0	0	1	
% App. Total	100	0	0	3	0	0	1	1	1	0	0	1	5	
PHF	.250	.000	.000	.250	.000	.000	.100	.250	.100	.000	.000	.250	.417	
Bicycles on Road	3	0	0	3	0	0	0	0	1	0	0	1	4	
% Bicycles on Road	100	0	0	100	0	0	0	0	100	0	0	100	80.0	
Pedestrians	0	0	0	0	0	0	1	1	0	0	0	0	1	
% Pedestrians	0	0	0	0	0	0	100	100	0	0	0	0	20.0	



MDM TRANSPORTATION CONSULTANTS, INC. Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

E/W: South Elm Street
NB: Laurel Avenue
Haverhill, MA

File Name : 1089 Elm at Laurel
Site Code : 1089
Start Date : 7/8/2020
Page No : 1

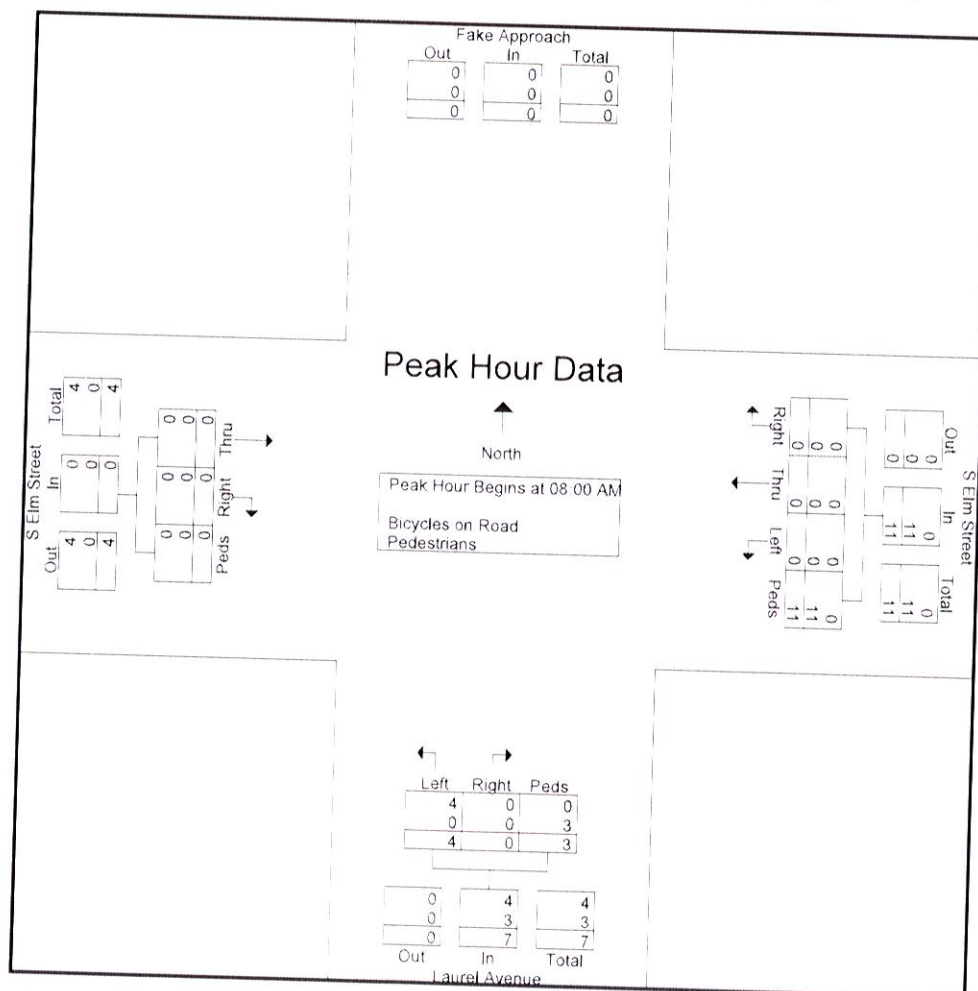
Groups Printed- Bicycles on Road - Pedestrians

Start Time	S Elm Street From East					Laurel Avenue From South				S Elm Street From West				Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	3	3	3
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	2	2	2
07:30 AM	0	1	0	0	1	0	0	0	0	0	0	3	3	4
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	2	2	2
Total	0	1	0	0	1	0	0	0	0	0	0	10	10	11
08:00 AM	0	0	0	2	2	0	1	1	2	0	0	0	0	4
08:30 AM	0	0	0	6	6	0	3	1	4	0	0	0	0	10
08:45 AM	0	0	0	3	3	0	0	1	1	0	0	0	0	4
Total	0	0	0	11	11	0	4	3	7	0	0	0	0	18
04:15 PM	0	0	3	1	4	0	0	0	0	0	0	7	7	11
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	2	2	2
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	2	2	2
Total	0	0	3	1	4	0	0	0	0	0	0	11	11	15
05:00 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	1
05:30 PM	0	0	0	0	0	2	0	0	2	0	0	0	0	2
05:45 PM	0	1	2	0	3	0	0	0	0	0	0	0	0	3
Total	0	1	2	1	4	2	0	0	2	0	0	0	0	6
Grand Total	0	2	5	13	20	2	4	3	9	0	0	21	21	50
Apprch %	0	10	25	65		22.2	44.4	33.3		0	0	100		
Total %	0	4	10	26	40	4	8	6	18	0	0	42	42	
Bicycles on Road	0	2	5	0	7	2	4	0	6	0	0	0	0	13
% Bicycles on Road	0	100	100	0	35	100	100	0	66.7	0	0	0	0	26
Pedestrians	0	0	0	13	13	0	0	3	3	0	0	21	21	37
% Pedestrians	0	0	0	100	65	0	0	100	33.3	0	0	100	100	74

28 Lord Road, Suite 280
Marlborough, MA

File Name : 1089 Elm at Laurel
Site Code : 1089
Start Date : 7/8/2020
Page No : 2

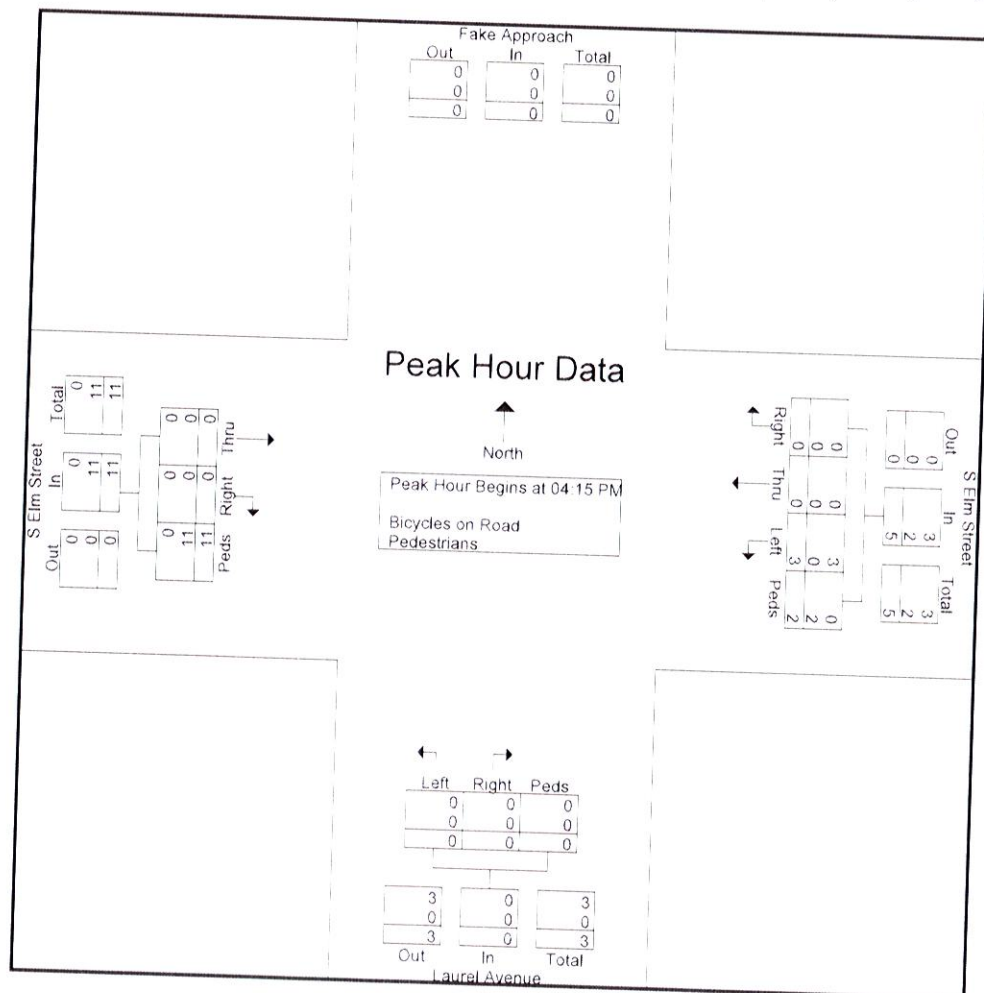
	S Elm Street From East					Laurel Avenue From South				S Elm Street From West				
Start Time	Right	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 08:00 AM														
08:00 AM	0	0	0	2	2	0	1	1	2	0	0	0	0	4
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	6	6	0	3	1	4	0	0	0	0	10
08:45 AM	0	0	0	3	3	0	0	1	1	0	0	0	0	4
Total Volume	0	0	0	11	11	0	4	3	7	0	0	0	0	18
% App. Total	0	0	0	100		0	57.1	42.9		0	0	0	0	
PHF	.000	.000	.000	.458	.458	.000	.333	.750	.438	.000	.000	.000	.000	.450
Bicycles on Road	0	0	0	0	0	0	4	0	4	0	0	0	0	4
% Bicycles on Road	0	0	0	0	0	0	100	0	57.1	0	0	0	0	22.2
Pedestrians	0	0	0	11	11	0	0	3	3	0	0	0	0	14
% Pedestrians	0	0	0	100	100	0	0	100	42.9	0	0	0	0	77.8



28 Lord Road, Suite 280
Marlborough, MA

File Name : 1089 Elm at Laurel
Site Code : 1089
Start Date : 7/8/2020
Page No : 3

Start Time	S Elm Street From East					Laurel Avenue From South				S Elm Street From West				Int. Total	
	Right	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total		
Peak Hour Analysis From 12:00 PM to 06:00 PM - Peak 1 of 1															
Peak Hour for Entire Intersection Begins at 04:15 PM															
04:15 PM	0	0	3	1	4	0	0	0	0	0	0	7	7	11	
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	2	2	2	
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	2	2	2	
05:00 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	1	
Total Volume	0	0	3	2	5	0	0	0	0	0	0	0	0	2	
% App. Total	0	0	60	40		0	0	0	0	0	0	11	11	16	
PHF	.000	.000	.250	.500	.313	.000	.000	.000	.000	.000	.000	.393	.393	.364	
Bicycles on Road	0	0	3	0	3	0	0	0	0	0	0	0	0	3	
% Bicycles on Road	0	0	100	0	60.0	0	0	0	0	0	0	0	0	18.8	
Pedestrians	0	0	0	2	2	0	0	0	0	0	0	11	11	13	
% Pedestrians	0	0	0	100	40.0	0	0	0	0	0	0	100	100	81.3	



MDM TRANSPORTATION CONSULTANTS, INC.

Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Elm Street/Comeau Bridge
EB: Railroad Avenue
Haverhill, MA

File Name : 1089 Railroad at Elm
Site Code : 1089
Start Date : 7/8/2020
Page No : 1

Groups Printed- Bicycles on Road - Pedestrians													
Start Time	Comeau Bridge From North				Elm Street From South				Railroad Avenue From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
07:45 AM	0	0	0	0	0	0	2	2	0	0	0	0	2
Total	0	0	0	0	0	0	2	2	0	0	0	0	2
08:00 AM	0	0	0	0	1	0	2	3	0	0	0	0	2
08:45 AM	0	0	1	1	0	0	0	0	0	0	0	0	3
Total	0	0	1	1	1	0	2	3	0	0	1	1	5
04:30 PM	0	0	0	0	0	0	1	1	0	0	0	0	1
Total	0	0	0	0	0	0	1	1	0	0	0	0	1
05:30 PM	0	0	1	1	0	1	0	1	0	0	0	0	2
Total	0	0	1	1	0	1	0	1	0	0	0	0	2
Grand Total	0	0	2	2	1	1	5	7	0	0	0	0	2
Apprch %	0	0	100	20	14.3	14.3	71.4	7	0	0	1	1	10
Total %	0	0	20	20	10	10	50	70	0	0	100	10	
Bicycles on Road	0	0	0	0	1	1	0	2	0	0	10	10	
% Bicycles on Road	0	0	0	0	100	100	0	28.6	0	0	0	0	2
Pedestrians	0	0	2	2	0	0	5	5	0	0	0	0	20
% Pedestrians	0	0	100	100	0	0	100	71.4	0	0	1	1	8
											100	100	80

MDM TRANSPORTATION CONSULTANTS, INC.

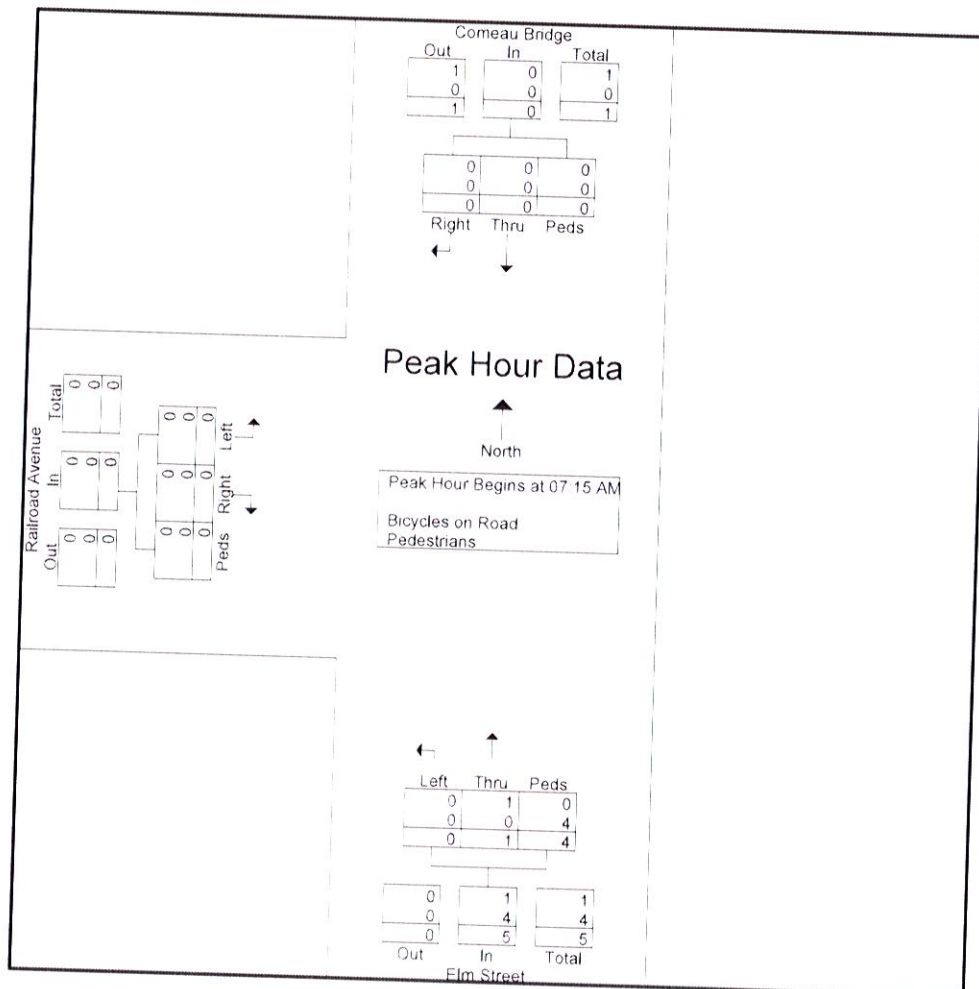
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Elm Street/Comeau Bridge
EB: Railroad Avenue
Haverhill, MA

File Name : 1089 Railroad at Elm
Site Code : 1089
Start Date : 7/8/2020
Page No : 2

	Comeau Bridge From North				Elm Street From South				Railroad Avenue From West				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	2	2	0	0	0	0	0
08:00 AM	0	0	0	0	1	0	2	3	0	0	0	0	2
Total Volume	0	0	0	0	1	0	4	5	0	0	0	0	3
% App. Total	0	0	0	0	20	0	80	5	0	0	0	0	5
PHF	.000	.000	.000	.000	.250	.000	.500	.417	.000	.000	.000	.000	.417
Bicycles on Road	0	0	0	0	1	0	0	1	0	0	0	0	1
% Bicycles on Road	0	0	0	0	100	0	0	20.0	0	0	0	0	20.0
Pedestrians	0	0	0	0	0	0	4	4	0	0	0	0	4
% Pedestrians	0	0	0	0	0	0	100	80.0	0	0	0	0	80.0



MDM TRANSPORTATION CONSULTANTS, INC.

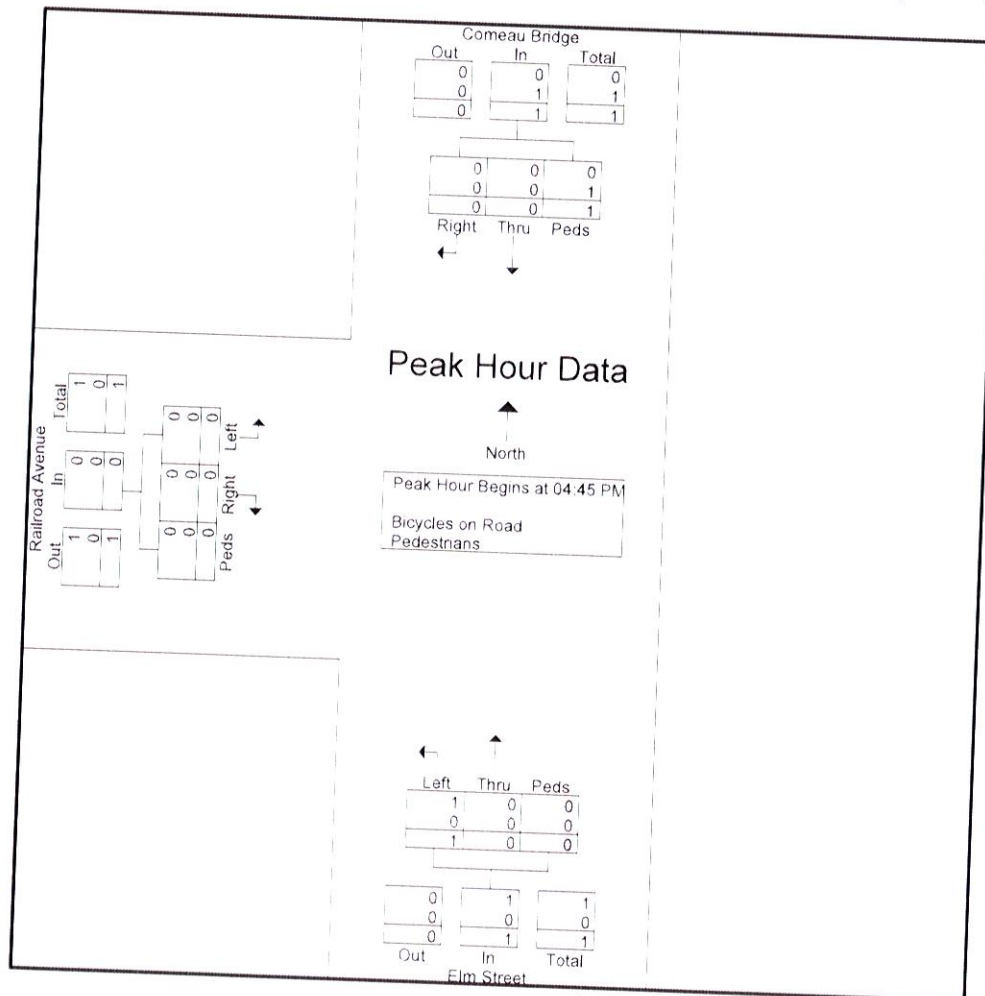
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Elm Street/Comeau Bridge
EB: Railroad Avenue
Haverhill, MA

File Name : 1089 Railroad at Elm
Site Code : 1089
Start Date : 7/8/2020
Page No : 3

Start Time	Comeau Bridge From North				Elm Street From South				Railroad Avenue From West				Int. Total	
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total		
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 04:45 PM														
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	1	1	0	1	0	1	0	0	0	0	0	0
Total Volume	0	0	1	1	0	1	0	1	0	0	0	0	0	2
% App. Total	0	0	100	1	0	100	0	1	0	0	0	0	0	2
PHF	.000	.000	.250	.250	.000	.250	.000	.250	.000	.000	.000	.000	.000	.250
Bicycles on Road	0	0	0	0	0	1	0	1	0	0	0	0	0	1
% Bicycles on Road	0	0	0	0	0	100	0	100	0	0	0	0	0	50.0
Pedestrians	0	0	1	1	0	0	0	0	0	0	0	0	0	1
% Pedestrians	0	0	100	100	0	0	0	0	0	0	0	0	0	50.0



MDM TRANSPORTATION CONSULTANTS, INC.

Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Washington Street & Comeau Bridge
E/W: Washington Street & River Street
Haverhill, MA

File Name : 1089 Washington at Comeau Bridge Updated
Site Code : 1089
Start Date : 7/8/2020
Page No : 1

Groups Printed- Bicycles on Road - Pedestrians																					
Start Time	Washington Street From North					Washington Street From East					Comeau Bridge From South					River Street From West					
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	2	0	0	1	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	0	0	4	6	3	0	0	0	3	0	0	0	0	0	0	0	0	0	2	8
04:00 PM	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	2	2	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	1	1	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	7	7	0	0	0	5	5	0	0	0	2	2	0	0	0	0	1	5
Grand Total	2	0	0	17	19	3	0	0	5	9	1	0	0	34	35	0	0	0	4	5	20
Approach %	10.5	0	0	89.5		33.3	0	0	66.7		2.9	0	0	97.1		0	1	0	4		
Total %	2.9	0	0	25	27.9	4.4	0	0	8.8	13.2	1.5	0	0	50	51.5	0	20	0	80		
Bicycles on Road																					
% Bicycles on Road	100	0	0	0	10.5	100	0	0	0	33.3	100	0	0	0	2.9	0	100	0	0	20	10.3
Pedestrians	0	0	0	17	17	0	0	0	6	6	0	0	0	34	34	0	0	0	4	4	61
% Pedestrians	0	0	0	100	89.5	0	0	0	100	66.7	0	0	0	100	97.1	0	0	0	100	80	89.7

MDM TRANSPORTATION CONSULTANTS, INC.

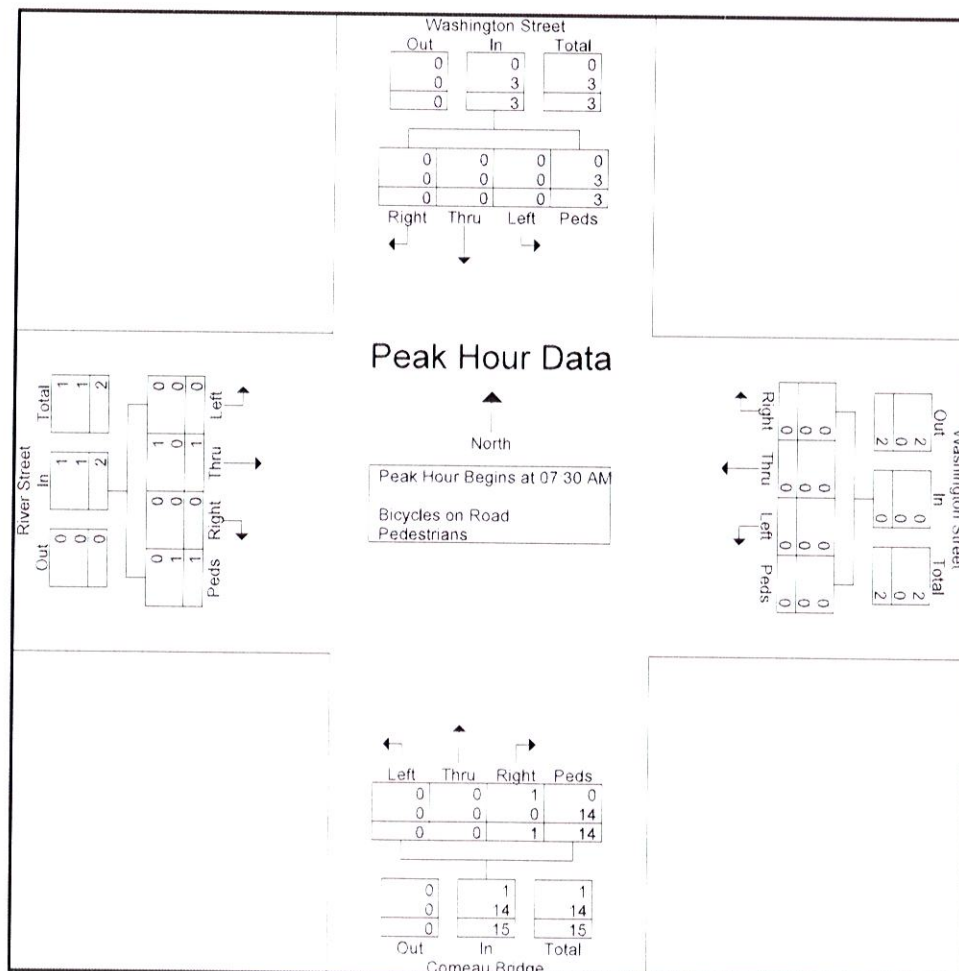
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Washington Street & Comeau Bridge
E/W: Washington Street & River Street
Haverhill, MA

File Name : 1089 Washington at Comeau Bridge Updated
Site Code : 1089
Start Date : 7/8/2020
Page No : 2

	Washington Street From North					Washington Street From East					Comeau Bridge From South					River Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	0	0	0	0	4
08:15 AM	0	0	0	3	3	0	0	0	0	0	0	0	0	2	2	0	1	0	0	1	6
Total Volume	0	0	0	3	3	0	0	0	0	0	1	0	0	14	15	0	1	0	1	2	20
% App. Total	0	0	0	100		0	0	0	0		6.7	0	0	93.3		0	50	0	50		
PHF	.000	.000	.000	.250	.250	.000	.000	.000	.000		.250	.000	.000	.583	.625	.000	.250	.000	.250		
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	1	2
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	100	0	0	0	6.7	0	100	0	0	50.0	10.0
Pedestrians %	0	0	0	3	3	0	0	0	0	0	0	0	0	14	14	0	0	0	1	1	18
Pedestrians	0	0	0	100	100	0	0	0	0	0	0	0	0	100	93.3	0	0	0	100	50.0	90.0



MDM TRANSPORTATION CONSULTANTS, INC.

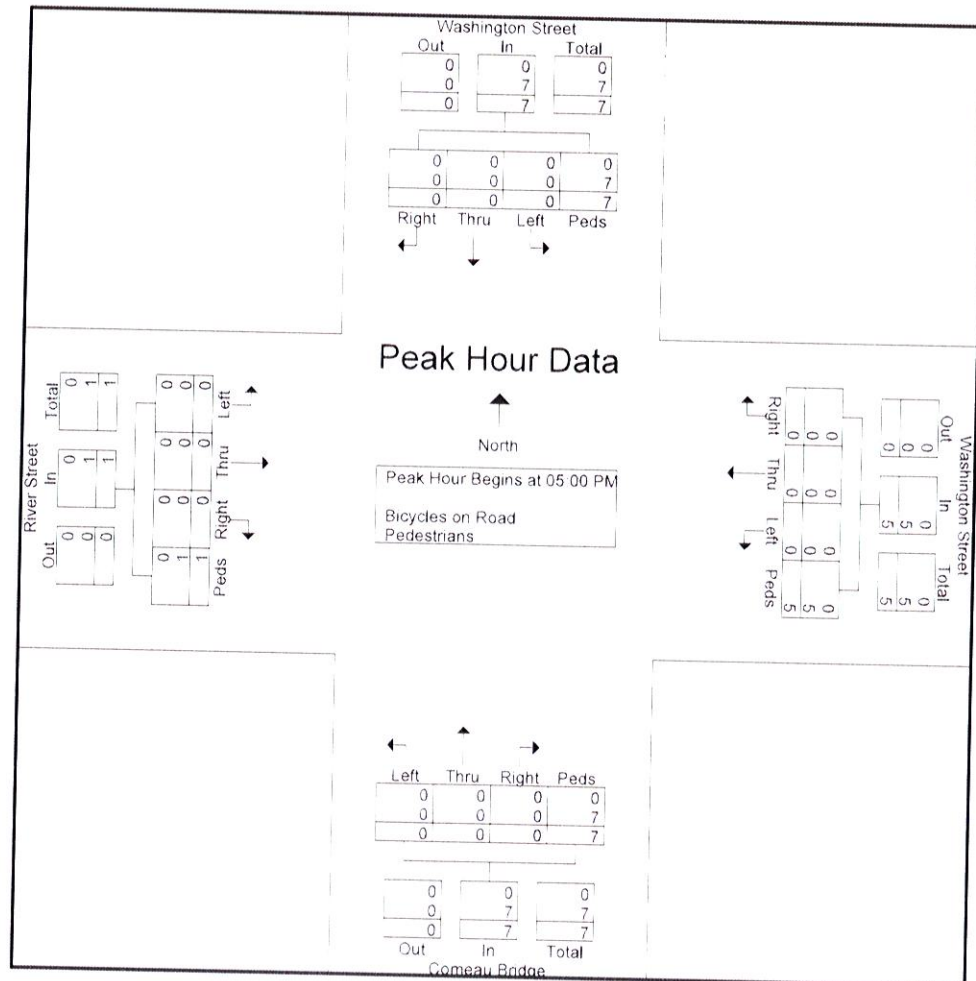
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Washington Street & Comeau Bridge
E/W: Washington Street & River Street
Haverhill, MA

File Name : 1089 Washington at Comeau Bridge Updated
Site Code : 1089
Start Date : 7/8/2020
Page No : 3

Start Time	Washington Street From North					Washington Street From East					Comeau Bridge From South					River Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 12:00 PM to 06:00 PM - Peak 1 of 1 Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	0	0	2	2	0	0	0	2	2	0	0	0	2	2	0	0	0	0	0	0
05:15 PM	0	0	0	3	3	0	0	0	2	2	0	0	0	2	2	0	0	0	0	0	4
05:30 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	7
05:45 PM	0	0	0	1	1	0	0	0	1	1	0	0	0	2	2	0	0	0	0	0	4
Total Volume	0	0	0	7	7	0	0	0	5	5	0	0	0	7	7	0	0	0	1	1	20
% App. Total	0	0	0	100		0	0	0	100		0	0	0	100		0	0	0	1	1	
PHF	.000	.000	.000	.583	.583	.000	.000	.000	.625	.625	.000	.000	.000	.583	.583	.000	.000	.000	.250	.250	.714
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	7	7	0	0	0	5	5	0	0	0	7	7	0	0	0	1	1	20
ns																					
%																					
Pedestrians	0	0	0	100	100	0	0	0	100	100	0	0	0	100	100	0	0	0	100	100	100



□ Speed Data

MDM TRANSPORTATION CONSULTANTS, INC.

Planners & Engineers

Railroad Avenue
East of MBTA Parking
Haverhill, MA

28 Lord Road, Suite 280
Marlborough, MA 01752

Eastbound																	Site Code: 1089															
Start Time	1	3	4	6	7	9	10	12	13	15	16	18	19	21	22	24	25	27	28	30	31	33	34	36	37	39	40	999	Total	Percent	85th	
07/08/20	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	4	4	1	2	0	0	0	1	0	0	0	0	0	7	7	29
01:00	0	0	0	0	0	0	0	0	0	0	1	0	1	1	2	1	1	1	2	0	0	0	0	0	0	0	0	0	7	7	28	
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	23	
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	23	
04:00	0	0	0	0	0	0	0	0	0	0	2	2	14	3	5	5	5	7	4	1	1	0	0	0	0	0	0	0	15	15	26	
05:00	0	0	0	0	0	0	0	0	1	0	0	0	3	3	2	2	2	7	4	1	1	0	0	0	0	0	0	0	32	32	26	
06:00	0	0	0	0	0	0	0	0	0	0	6	4	8	3	2	3	3	2	1	1	0	0	0	0	0	0	0	0	9	9	26	
07:00	0	0	0	0	0	0	0	0	0	0	2	2	4	8	2	2	5	2	0	0	2	1	0	0	0	0	0	1	19	19	27	
08:00	0	0	0	0	0	0	0	0	0	0	1	1	2	4	1	1	2	2	0	1	0	0	0	0	0	0	0	0	20	20	25	
09:00	0	0	0	0	0	0	0	0	0	0	4	4	4	8	4	4	0	0	3	1	0	0	0	0	0	0	0	0	8	8	26	
10:00	0	0	0	0	0	0	0	0	0	0	1	4	4	8	4	4	2	2	4	3	2	0	0	0	0	0	0	0	14	14	29	
11:00	0	0	0	0	0	0	0	0	1	1	3	2	8	3	6	6	2	2	4	1	0	0	0	0	0	0	0	0	22	22	27	
12 PM	0	0	0	0	0	0	0	0	4	4	7	7	6	3	9	11	6	6	5	1	1	2	1	1	0	0	0	1	33	33	28	
13:00	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	4	4	0	0	0	0	0	0	0	0	0	0	31	31	25	
14:00	0	0	0	0	0	0	0	0	0	0	0	0	5	5	4	4	1	1	1	1	0	0	0	0	0	1	0	0	14	14	29	
15:00	0	0	0	0	0	0	0	0	0	0	0	0	8	8	3	3	2	2	1	1	1	0	0	0	0	0	0	0	22	22	25	
16:00	0	0	0	0	0	0	0	0	0	0	0	0	6	6	11	6	6	6	0	0	0	0	0	0	0	0	0	0	31	31	25	
17:00	0	0	0	0	0	0	0	0	0	0	0	0	1	1	4	4	1	1	1	1	0	0	0	0	0	1	0	0	11	11	29	
18:00	0	0	0	0	0	0	0	0	0	0	2	4	12	4	6	6	4	4	6	1	1	1	0	0	0	0	0	0	18	18	25	
19:00	0	0	0	0	0	0	0	0	1	1	3	3	4	4	6	6	3	3	1	1	0	0	0	0	0	0	0	0	33	33	28	
20:00	0	0	0	0	0	0	0	0	0	0	1	1	1	1	4	4	2	2	2	0	0	0	0	0	0	0	0	1	19	19	25	
21:00	0	0	0	0	0	0	0	0	0	0	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	27	
22:00	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	19	
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	20	
Total	0	0	0	0	0	0	1	1	7	7	46	46	96	96	81	81	62	62	42	42	10	10	0	0	0	1	1	0	3	3	37	
																													353			

Marlborough, MA 01752																	Site Code 1089	
Eastbound	Start	1	4	7	10	13	16	19	22	25	28	31	34	37	40	Total	85th Percent	
Time	07/09/20	3	6	9	12	15	18	21	24	27	30	33	36	39	999			
01:00	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	3	28	
02:00	0	0	0	0	0	0	0	3	0	0	3	1	0	0	0	7	29	
03:00	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	3	25	
04:00	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2	29	
05:00	0	0	0	0	0	0	1	4	5	2	0	0	0	0	0	12	24	
06:00	0	0	0	0	0	0	1	6	13	3	4	2	0	0	0	29	28	
07:00	0	0	0	0	0	0	1	3	3	3	1	0	0	0	0	11	26	
08:00	0	0	0	0	0	1	3	3	3	3	1	0	0	0	0	15	26	
09:00	0	0	0	0	0	3	4	5	3	1	1	0	1	0	0	17	23	
10:00	0	0	0	0	1	0	2	1	3	1	1	0	0	0	0	9	25	
11:00	0	0	0	0	0	0	1	2	2	1	1	0	0	0	0	6	27	
12 PM	0	0	0	0	0	2	2	6	6	4	3	0	0	0	0	19	27	
13:00	0	0	0	0	0	1	1	8	7	2	3	1	1	1	0	24	29	
14:00	0	0	0	0	0	0	3	12	13	6	3	0	0	0	0	31	26	
15:00	0	0	0	0	0	0	2	2	1	1	2	1	1	0	0	22	28	
16:00	0	0	0	0	0	0	0	1	1	6	2	4	0	1	0	15	32	
17:00	0	0	0	0	0	0	3	3	4	4	2	1	0	0	0	17	27	
18:00	0	0	0	0	0	1	1	5	2	8	1	1	1	0	0	19	27	
19:00	0	0	0	0	0	0	3	9	5	6	3	1	0	0	0	28	26	
20:00	0	0	0	0	0	0	2	0	5	10	2	2	0	0	0	30	26	
21:00	0	0	0	0	0	0	0	0	1	3	4	2	0	0	0	10	30	
22:00	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2	23	
23:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	26	
Total	0	0	0	0	3	9	31	83	81	68	38	19	4	2	0	338	31	

[illegible]

MDM TRANSPORTATION CONSULTANTS, INC.

Planners & Engineers

Railroad Avenue
East of MBTA Parking
Haverhill, MA

28 Lord Road, Suite 280
Marlborough, MA 01752

Eastbound		Waverborough, MA 01752																			Site Code 1089	
Start Time	1	4	7	10	13	16	19	22	25	28	31	34	37	40	Total	85th Percent						
07/11/20	0	0	0	0	0	0	2	0	1	0	0	0	0	0	3	25						
01:00	0	0	0	0	0	0	0	1	3	1	1	0	0	0	6	30						
02:00	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	20						
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*						
04:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	26						
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*						
06:00	0	0	0	0	0	0	1	0	0	1	0	0	0	0	2	29						
07:00	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2	20						
08:00	0	0	0	0	0	4	4	5	1	1	0	1	0	0	16	25						
09:00	0	0	0	0	2	0	2	2	4	0	2	0	0	0	12	30						
10:00	0	0	0	0	0	1	2	2	0	0	1	0	0	0	6	30						
11:00	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2	26						
12 PM	0	0	0	0	0	0	1	0	0	2	0	2	0	0	5	34						
13:00	0	0	0	0	2	1	0	0	1	0	0	0	0	0	8	23						
14:00	0	0	0	0	0	1	0	4	0	0	0	0	1	0	4	20						
15:00	0	0	0	0	0	0	4	0	0	0	0	0	0	0	10	28						
16:00	0	0	0	0	0	3	4	1	0	1	0	1	0	0	8	26						
17:00	0	0	0	0	0	2	1	1	3	2	1	1	0	0	22	*						
18:00	0	0	0	0	1	1	4	6	6	0	0	0	0	0	4	22						
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	20						
20:00	0	0	0	0	0	0	3	1	0	0	0	0	0	0	2	23						
21:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	*						
22:00	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0							
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
Total	0	0	0	0	5	14	33	25	21	8	5	6	1	0	118							

28 Lord Road, Suite 280
Marlborough, MA 01752

Eastbound															Warrenborough, MA 01752										Site Code: 1089									
Start Time	1	4	7	10	13	16	19	22	25	28	31	34	37	40	Total	85th Percent																		
07/12/20	3	6	9	12	15	18	21	24	27	30	33	36	39	40	999	2	29																	
01:00	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2	29																	
02:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	29																	
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	26																	
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*																	
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*																	
06:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	20																	
07:00	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	20																	
08:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	3	28																	
09:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	20																	
10:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	17																	
11:00	0	0	0	0	0	0	2	1	1	0	0	0	0	0	2	2	17																	
12 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	4	4	25																	
13:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	14																	
14:00	0	0	0	0	1	0	0	3	1	0	0	0	0	0	2	2	26																	
15:00	0	0	0	0	0	1	2	0	1	0	0	0	0	0	5	5	24																	
16:00	0	0	0	0	0	0	1	1	0	1	0	0	0	0	5	5	27																	
17:00	0	0	0	0	1	1	2	1	1	1	0	0	0	0	3	3	28																	
18:00	0	0	0	0	2	1	1	2	0	0	0	0	0	0	6	6	24																	
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	22																	
20:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	*																	
21:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	4	4	25																	
22:00	0	0	0	0	1	0	1	4	0	0	0	0	0	0	5	5	23																	
23:00	0	0	0	0	0	1	0	2	0	0	0	0	0	0	2	2	20																	
Total	0	0	0	1	10	7	15	15	8	5	0	0	0	0	61	61	20																	

15th Percentile : 18 MPH
50th Percentile : 22 MPH
85th Percentile : 28 MPH
95th Percentile : 31 MPH

Statistics : 10 MPH Pace Speed : 19-28 MPH
Number in Pace : 845
Percent in Pace : 69.8%
Number of Vehicles > 30 MPH : 92
Percent of Vehicles > 30 MPH : 7.6%
Mean Speed(Average) : 23 MPH

28 Lord Road, Suite 280
Marlborough, MA 01752

Westbound																	Site Code: 1089																
Start Time	1	4	7	10	13	16	19	22	25	28	31	34	37	40	Total	85th Percent																	
07:00	3	6	9	12	15	18	21	24	27	30	33	36	39	40	3	25																	
01:00	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3	20																	
02:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	17																	
03:00	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	17																	
04:00	0	0	0	0	0	1	2	5	4	9	6	3	5	0	2	29																	
05:00	0	0	0	0	1	0	1	4	6	6	1	1	1	0	35	35																	
06:00	0	0	0	0	0	0	4	3	6	6	5	2	1	0	23	29																	
07:00	0	0	0	2	0	2	2	11	12	1	2	2	0	2	23	32																	
08:00	0	0	0	0	0	1	6	10	3	3	2	0	1	0	33	26																	
09:00	0	0	0	0	0	0	0	2	1	2	3	0	1	0	25	28																	
10:00	0	0	0	0	0	3	0	1	2	2	3	0	0	0	9	31																	
11:00	0	0	0	0	0	2	1	1	5	4	0	1	1	0	12	31																	
12 PM	0	0	0	0	1	2	2	9	8	6	3	3	0	0	23	28																	
13:00	0	0	0	0	0	3	5	5	7	2	2	3	0	1	35	30																	
14:00	0	0	0	0	0	2	6	7	3	3	2	4	4	0	34	35																	
15:00	0	0	0	0	0	2	2	7	3	3	2	0	0	0	19	29																	
16:00	0	0	0	0	0	0	1	2	1	2	2	0	0	0	9	32																	
17:00	0	0	0	0	0	1	1	3	2	1	1	0	1	0	10	31																	
18:00	0	0	0	0	0	8	2	2	4	0	1	0	0	0	14	23																	
19:00	0	0	0	0	1	3	15	9	4	2	1	1	0	0	36	25																	
20:00	0	0	0	0	1	2	7	2	3	1	0	0	0	0	16	25																	
21:00	0	0	0	0	0	1	0	2	2	1	0	0	0	0	6	27																	
22:00	0	0	0	0	0	0	2	1	1	1	0	1	0	0	5	33																	
23:00	0	0	0	0	1	0	0	1	1	0	0	1	0	0	4	34																	
Total	0	0	0	2	5	32	63	87	75	50	33	18	16	3	384	37																	

MDM TRANSPORTATION CONSULTANTS, INC.

Planners & Engineers

Railroad Avenue
East of MBTA Parking
Haverhill, MA

28 Lord Road, Suite 280
Marlborough, MA 01752

Westbound																Site Code 1089									
Start Time	1	4	7	10	13	16	19	22	25	28	31	34	37	40	Total	85th Percent									
07/09/20	3	6	9	12	15	18	21	24	27	30	33	36	39	40	2	23									
01:00	0	0	0	0	0	1	1	0	0	1	1	0	0	0	4	31									
02:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0									
03:00	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0									
04:00	0	0	0	0	0	0	3	6	6	5	5	5	0	3	2	32									
05:00	0	0	0	0	0	0	0	2	0	6	3	4	1	2	33	33									
06:00	0	0	0	0	0	1	1	5	8	1	3	1	1	2	18	34									
07:00	0	0	0	0	1	4	0	4	6	2	4	1	0	1	21	31									
08:00	0	0	0	0	1	4	6	5	6	2	1	2	1	0	23	31									
09:00	0	0	0	0	0	0	1	3	0	2	0	1	6	0	27	28									
10:00	0	0	0	0	1	0	1	1	3	1	2	2	1	0	13	38									
11:00	0	0	0	0	0	3	3	3	5	3	1	4	1	0	12	34									
12 PM	0	0	0	0	0	2	4	4	7	6	1	1	0	0	22	33									
13:00	0	0	0	0	0	3	10	2	5	9	1	3	1	2	28	29									
14:00	0	0	0	0	0	1	2	2	4	3	3	2	0	0	33	29									
15:00	0	0	0	0	0	0	5	2	3	0	1	0	2	1	20	34									
16:00	0	0	0	0	0	1	2	3	1	2	1	0	0	0	11	26									
17:00	0	0	0	0	0	3	4	2	3	1	0	0	1	0	11	31									
18:00	0	0	0	0	1	3	7	12	4	1	0	2	1	0	16	33									
19:00	0	0	0	0	0	2	8	6	1	2	0	0	0	0	28	24									
20:00	0	0	0	0	0	0	0	1	2	2	1	3	0	0	23	29									
21:00	0	0	0	0	1	0	2	0	1	0	1	0	0	0	6	30									
22:00	0	0	0	0	0	0	3	0	1	1	1	1	0	0	5	30									
23:00	0	0	0	0	0	0	2	0	2	1	1	0	0	0	7	32									
Total	0	0	0	0	6	28	66	64	68	52	31	32	14	9	5	27									

MDM TRANSPORTATION CONSULTANTS, INC. Planners & Engineers

Railroad Avenue
East of MBTA Parking
Haverhill, MA

28 Lord Road, Suite 280
Marlborough, MA 01752

Westbound

Start Time	1	4	7	10	13	16	19	22	25	28	31	34	37	40	Total	85th Percent
07:10/20	3	6	9	12	15	18	21	24	27	30	33	36	39	40	1	26
01:00	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2	20
02:00	0	0	0	0	0	0	1	0	0	1	0	0	0	0	2	29
03:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	29
04:00	0	0	0	0	0	2	0	4	5	6	8	6	2	1	34	34
05:00	0	0	0	0	0	0	0	2	2	4	6	4	2	1	20	35
06:00	0	0	0	0	0	1	0	2	3	3	3	2	0	2	16	32
07:00	0	0	0	0	0	0	4	2	4	5	6	2	1	1	25	32
08:00	0	0	0	0	0	3	3	7	7	7	2	1	0	0	30	29
09:00	0	0	0	0	0	1	1	2	4	2	0	2	1	0	16	33
10:00	0	0	0	0	1	2	2	0	4	1	1	1	1	0	13	33
11:00	0	0	0	0	0	2	0	1	5	6	4	0	0	0	18	30
12 PM	0	0	0	0	1	1	6	6	5	3	5	3	2	1	33	33
13:00	0	0	0	0	0	0	3	6	10	7	2	2	0	0	30	29
14:00	0	0	0	0	0	0	4	4	7	3	2	0	0	0	20	28
15:00	0	0	0	0	0	1	1	2	2	3	0	0	0	0	10	29
16:00	0	0	0	0	0	0	4	4	0	1	4	1	0	1	15	32
17:00	0	0	0	0	0	4	0	5	5	2	1	1	0	0	19	28
18:00	0	0	0	0	0	2	8	13	7	1	2	0	0	0	33	26
19:00	0	0	0	0	1	1	5	6	3	2	1	0	0	0	19	27
20:00	0	0	0	0	0	0	0	2	0	1	1	0	0	0	4	31
21:00	0	0	1	8	4	1	0	2	1	0	0	1	0	0	18	22
22:00	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2	26
23:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	11
Total	0	0	1	9	9	22	43	70	79	59	48	27	9	6	382	

Site Code: 1089

MIDM

TRANSPORTATION CONSULTANTS, INC.

Planners & Engineers

Railroad Avenue
East of MBTA Parking
Haverhill, MA

28 Lord Road, Suite 280
Marlborough, MA 01752

Site Code: 1089

Westbound		1	4	7	10	13	16	19	22	25	28	31	34	37	40	Total	85th Percent
Start Time		3	6	9	12	15	18	21	24	27	30	33	36	39	999		
07/11/20		0	0	0	2	1	0	0	1	1	0	0	0	0	0	5	24
01:00		0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	23
02:00		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
03:00		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
04:00		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
05:00		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
06:00		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
07:00		0	0	0	0	0	0	1	1	2	1	0	0	0	0	5	27
08:00		0	0	0	0	0	0	0	2	3	3	4	5	3	1	21	36
09:00		0	0	0	0	1	0	0	0	0	2	2	0	0	0	5	31
10:00		0	0	0	0	0	0	1	1	0	3	2	0	0	1	8	31
11:00		0	0	0	0	0	0	0	1	0	3	2	0	0	0	1	23
12 PM		0	0	0	0	0	0	0	2	0	2	0	1	0	0	7	29
13:00		0	0	0	0	0	1	0	1	4	1	0	0	0	0	7	26
14:00		0	0	0	0	0	0	0	1	0	1	0	0	0	0	2	35
15:00		0	0	0	0	0	1	1	2	2	0	0	1	0	0	7	26
16:00		0	0	0	0	0	0	1	1	4	2	0	0	1	0	9	29
17:00		0	0	0	0	1	3	5	4	2	0	0	0	0	0	15	23
18:00		0	0	0	0	1	4	7	6	1	0	0	0	0	0	19	23
19:00		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
20:00		0	0	0	0	0	0	0	1	2	0	1	1	0	0	5	33
21:00		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
22:00		0	0	0	0	0	0	0	1	1	0	0	0	0	0	2	26
23:00		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
Total		0	0	0	2	4	9	19	26	22	14	9	9	4	2	120	

Statistics	
15th Percentile	18 MPH
50th Percentile	24 MPH
85th Percentile	31 MPH
95th Percentile	35 MPH
10 MPH Pace Speed	19-28 MPH
Number in Pace	778
Percent in Pace	58.8%
Number of Vehicles > 30 MPH	283
Percent of Vehicles > 30 MPH	21.4%
Mean Speed(Average)	25 MPH

□ Crash Data

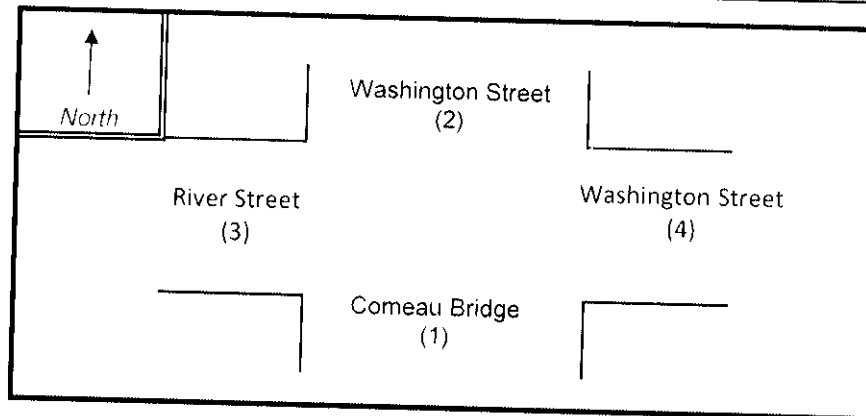
INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Haverhill, MA COUNT DATE : Jul-20
 DISTRICT : 4 UNSIGNALIZED : ☐ SIGNALIZED : ☒

~ INTERSECTION DATA ~

MAJOR STREET : Washington Street
 MINOR STREET(S) : River Street
Comeau Bridge

**INTERSECTION
 DIAGRAM**
 (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	EB	WB		
PEAK HOURLY VOLUMES (PM) :	469	232	626	778		2,105

"K" FACTOR : 0.087 INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME : 24,195

TOTAL # OF CRASHES : 56 # OF YEARS : 5 AVERAGE # OF CRASHES PER YEAR (A) : 11.20

CRASH RATE CALCULATION : 1.27 RATE = $\frac{(A * 1,000,000)}{(V * 365)}$

Comments : MassDOT District 4 Avg: Signalized = 0.73, Unsignalized = 0.57
 Project Title & Date : 1089 - Haverhill

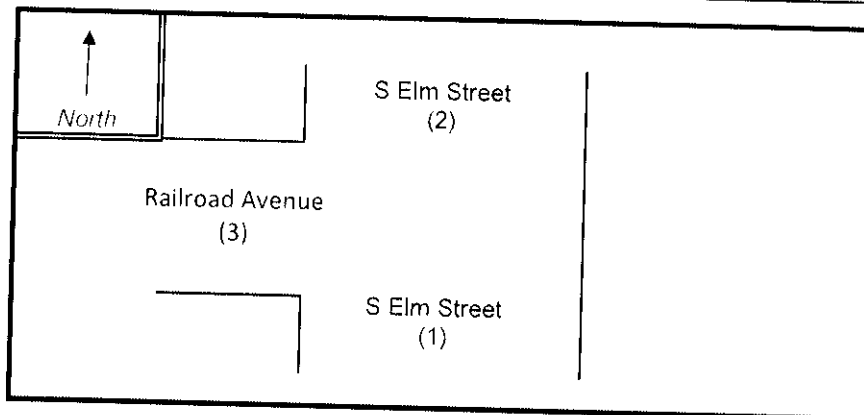
INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Haverhill, MA COUNT DATE : Jul-20
 DISTRICT : 4 UNSIGNALIZED : ☒ SIGNALIZED : ☐

~ INTERSECTION DATA ~

MAJOR STREET : South Elm Street
 MINOR STREET(S) : Railroad Avenue

**INTERSECTION
 DIAGRAM**
 (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	EB	WB		
PEAK HOURLY VOLUMES (PM) :	467	525	48			1,040

"K" FACTOR :

0.087

INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME :

11,954

TOTAL # OF CRASHES :

6

OF YEARS :

5

AVERAGE # OF CRASHES PER YEAR (A) :

1.20

CRASH RATE CALCULATION :

0.28

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : MassDOT District 4 Avg: Signalized = 0.73; Unsignalized = 0.57

Project Title & Date : 1089 - Haverhill

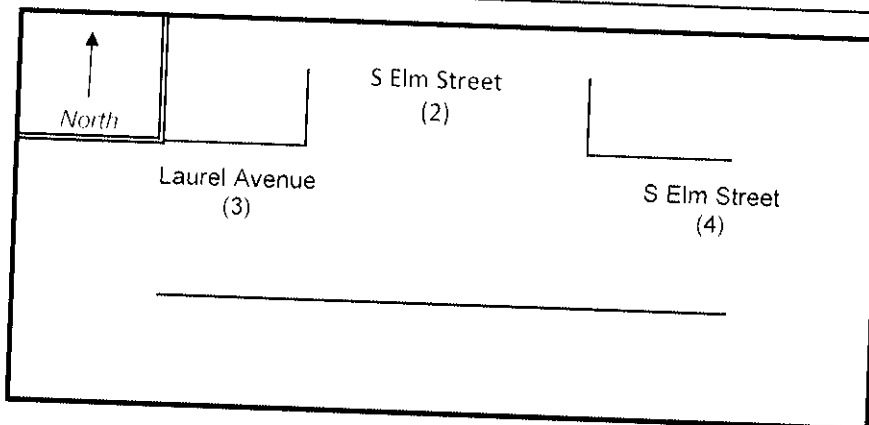
INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Haverhill, MA COUNT DATE : Jul-20
 DISTRICT : 4 UNSIGNALIZED : ☒ SIGNALIZED : ☐

~ INTERSECTION DATA ~

MAJOR STREET : South Elm Street
 MINOR STREET(S) : Laurel Avenue

**INTERSECTION
 DIAGRAM**
 (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	EB	WB		
PEAK HOURLY VOLUMES (PM) :		552	232	369		1,153

"K" FACTOR : INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME :

TOTAL # OF CRASHES : # OF YEARS : AVERAGE # OF CRASHES PER YEAR (A) :

CRASH RATE CALCULATION : RATE = $\frac{(A * 1,000,000)}{(V * 365)}$

Comments : MassDOT District 4 Avg: Signalized = 0.73; Unsignalized = 0.57
 Project Title & Date : 1089 - Haverhill

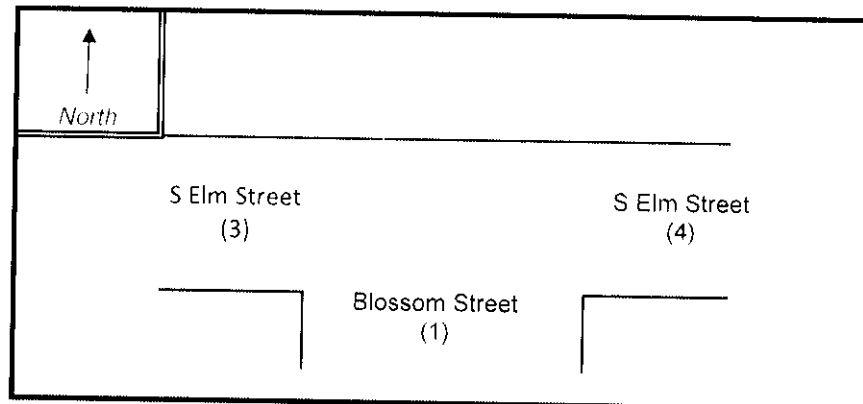
INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Haverhill, MA COUNT DATE : Jul-20
 DISTRICT : 4 UNSIGNALIZED : ☒ X SIGNALIZED : ☐

~ INTERSECTION DATA ~

MAJOR STREET : South Elm Street
 MINOR STREET(S) : Blossom Street

**INTERSECTION
 DIAGRAM**
 (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	EB	WB		
PEAK HOURLY VOLUMES (PM) :	21		395	378		794

"K" FACTOR :

0.087

INTERSECTION ADT (V) = TOTAL DAILY
 APPROACH VOLUME :

9,126

TOTAL # OF CRASHES :

3

OF
 YEARS :

5

AVERAGE # OF
 CRASHES PER YEAR (A) :

0.60

CRASH RATE CALCULATION :

0.18

RATE = $\frac{(A * 1,000,000)}{(V * 365)}$

Comments : MassDOT District 4 Avg: Signalized = 0.73; Unsignalized = 0.57

Project Title & Date: 1089 - Haverhill

WASHINGTON STREET AT RIVER STREET AND COMEAU BRIDGE

Crash Number	Crash Type Name	Crash Date	Crash Severity	Crash Time	Crash Year	Manner of Collision	Road Surface Condition	Total Fatalities	Total Non-Fatal Injuries	Weather Conditions	City	County	Roadway
4008065 - HAVERRILL		01/09/2015	Property damage only (none injured)	3:26 AM	2015	Sideswipe, same direction	Dry	0	0	Clear			WASHINGTON ST
4062032 - HAVERRILL		01/25/2015	Non-fatal injury	2:09 PM	2015	Rear-end	Dry	0	0	Clear	233804 2801	946934 3893	WASHINGTON ST
4101846 - HAVERRILL		09/20/2015	Property damage only (none injured)	8:20 PM	2015	Head-on	Dry	0	0	Clear	233804 2801	946934 3893	WASHINGTON ST
4111370 - HAVERRILL		09/26/2015	Property damage only (none injured)	7:25 PM	2015	Single vehicle crash	Dry	0	0	Clear	233813 1251	946944 0627	RIVER ST / WASHINGTON ST
4122003 - HAVERRILL		09/03/2015	Property damage only (none injured)	11:25 AM	2015	Angle	Dry	0	0	Clear	233813 1251	946944 0627	RIVER ST / WASHINGTON ST
4122541 - HAVERRILL		11/30/2015	Property damage only (none injured)	3:54 PM	2015	Angle	Dry	0	0	Clear	233813 1251	946944 0627	RIVER ST / WASHINGTON ST
4133387 - HAVERRILL		12/11/2015	Property damage only (none injured)	6:26 PM	2015	Angle	Dry	0	0	Clear	233813 1251	946944 0627	RIVER ST / WASHINGTON ST
4134077 - HAVERRILL		11/01/2015	Non-fatal injury	4:35 PM	2015	Head-on	Wet	0	0	Sleet, hail, freezing rain or drizzle	233813 1251	946944 0627	RIVER ST / WASHINGTON ST
4133985 - HAVERRILL		02/04/2015	Property damage only (none injured)	6:43 AM	2015	Head-on	Snow	0	0	Clear	233773 5936	946898 5623	COMEAU BRIDGE / RIVER STREET
4134148 - HAVERRILL		02/27/2015	Not Reported	11:09 PM	2015	Rear-end	Dry	0	0	Clear	233747 5463	946910 3559	WASHINGTON ST
4184188 - HAVERRILL		03/05/2015	Property damage only (none injured)	8:20 PM	2015	Angle	Wet	0	0	Cloudy	233813 1251	946944 0627	RIVER ST / WASHINGTON ST
4184180 - HAVERRILL		04/28/2015	Property damage only (none injured)	7:26 AM	2015	Sideswipe, same direction	Dry	0	0	Cloudy	233797 2215	946936 24 57FEET	RIVER STREET / RIVER STREET / WASHINGTON
4184639 - HAVERRILL		10/24/2015	Property damage only (none injured)	12:50 PM	2015	Sideswipe, same direction	Dry	0	0	Cloudy	233813 1251	946944 0627	RIVER ST / WASHINGTON ST
4184694 - HAVERRILL		02/05/2016	Property damage only (none injured)	10:51 AM	2016	Rear-end	Snow	0	0	Snow/Cloudy	233813 1251	946944 0627	RIVER ST / WASHINGTON ST
4150602 - HAVERRILL		02/15/2016	Property damage only (none injured)	8:51 PM	2016	Head-on	Dry	0	0	Clear	233813 1251	946944 0627	RIVER ST / WASHINGTON ST
4184757 - HAVERRILL		02/17/2016	Property damage only (none injured)	10:37 AM	2016	Angle	Unknown	0	0	Unknown	233804 2801	946934 3893	WASHINGTON ST
4184767 - HAVERRILL		02/20/2016	Property damage only (none injured)	8:51 PM	2016	Head-on	Dry	0	0	Clear	233747 5463	946910 3559	WASHINGTON ST
4184839 - HAVERRILL		03/15/2016	Property damage only (none injured)	7:40 PM	2016	Angle	Wet	0	0	Rain	233813 1251	946944 0627	WASHINGTON ST
4190916 - HAVERRILL		04/18/2016	Not Reported	4:03 AM	2016	Single vehicle crash	Dry	0	0	Clear/Cloudy	233804 2801	946934 3893	WASHINGTON ST
4126440 - HAVERRILL		05/15/2016	Property damage only (none injured)	11:50 AM	2016	Rear-end	Dry	0	0	Clear	233804 2801	946934 3893	WASHINGTON ST
4150646 - HAVERRILL		06/21/2016	Property damage only (none injured)	9:17 AM	2016	Rear-end	Dry	0	0	Clear	233813 1251	946944 0627	RIVER ST / WASHINGTON ST
4150825 - HAVERRILL		10/02/2016	Property damage only (none injured)	12:51 AM	2016	Angle	Wet	0	0	Rain	233773 5936	946898 5623	BRIDGE
4150980 - HAVERRILL		10/21/2016	Property damage only (none injured)	7:02 AM	2016	Head-on	Wet	0	0	Rain	233773 5936	946898 5623	RIVER ST / WASHINGTON ST
4126062 - HAVERRILL		01/18/2017	Not Reported	5:21 PM	2017	Not reported	Snow	0	0	Sleet, hail, freezing rain or drizzle	233797 872	946928 4954	WASHINGTON ST
4325423 - HAVERRILL		01/13/2017	Property damage only (none injured)	8:10 PM	2017	Rear-end	Dry	0	0	Clear	233773 5936	946898 5623	RIVER ST / WASHINGTON ST
4367211 - HAVERRILL		04/12/2017	Property damage only (none injured)	5:53 PM	2017	Rear-end	Dry	0	0	Clear	233773 5936	946898 5623	RIVER ST / WASHINGTON ST
4400227 - HAVERRILL		06/26/2017	Non-fatal injury	2:34 PM	2017	Rear-end	Dry	0	0	Clear	233764 0363	946886 6919	RIVER ST
4426653 - HAVERRILL		07/11/2017	Property damage only (none injured)	6:31 AM	2017	Sideswipe, opposite direction	Dry	0	0	Rain	233797 872	946928 4954	WASHINGTON ST
4418690 - HAVERRILL		08/12/2017	Property damage only (none injured)	8:10 PM	2017	Head-on	Dry	0	0	Clear/Cloudy	233773 5936	946898 5623	RIVER ST / WASHINGTON ST
4419309 - HAVERRILL		08/03/2017	Property damage only (none injured)	2:40 PM	2017	Angle	Dry	0	0	Clear	233813 1251	946944 0627	RIVER STREET / WASHINGTON STREET
4436218 - HAVERRILL		08/01/2017	Property damage only (none injured)	8:19 PM	2017	Rear-end	Dry	0	0	Clear	233773 5936	946898 5623	RIVER ST / WASHINGTON ST
4446743 - HAVERRILL		10/27/2017	Property damage only (none injured)	9:52 PM	2017	Angle	Dry	0	0	Clear	233813 1251	946944 0627	RIVER ST / WASHINGTON ST
4598642 - HAVERRILL		11/04/2017	Property damage only (none injured)	11:37 AM	2017	Angle	Dry	0	0	Clear	233773 5936	946898 5623	RIVER ST / WASHINGTON ST
4598686 - HAVERRILL		11/11/2017	Property damage only (none injured)	8:53 PM	2017	Angle	Dry	0	0	Clear	233797 872	946928 4954	WASHINGTON ST
4598693 - HAVERRILL		11/14/2017	Property damage only (none injured)	7:56 PM	2017	Sideswipe, same direction	Dry	0	0	Clear	233773 5936	946898 5623	RIVER ST / WASHINGTON ST
4598715 - HAVERRILL		11/19/2017	Property damage only (none injured)	10:49 AM	2017	Sideswipe, same direction	Wet	0	0	Rain/Cloudy	233773 5936	946898 5623	WASHINGTON STREET
4684324 - HAVERRILL		12/23/2017	Property damage only (none injured)	2:53 PM	2017	Head-on	Ice	0	0	Sleet, hail, freezing rain or drizzle	233773 5936	946898 5623	COMEAU BRIDGE / RIVER STREET
4497373 - HAVERRILL		01/18/2018	Property damage only (none injured)	10:21 PM	2018	Rear-end	Dry	0	0	Clear	233773 5936	946898 5623	COMEAU BRIDGE / WASHINGTON ST
4533926 - HAVERRILL		05/02/2018	Property damage only (none injured)	5:59 PM	2018	Rear-end	Dry	0	0	Clear	233773 5936	946898 5623	COMEAU BRIDGE / WASHINGTON ST
4546931 - HAVERRILL		05/25/2018	Property damage only (none injured)	8:16 AM	2018	Sideswipe, same direction	Dry	0	0	Clear	233813 1251	946944 0627	WASHINGTON ST
4564747 - HAVERRILL		07/10/2018	Property damage only (none injured)	11:44 AM	2018	Angle	Dry	0	0	Clear	233813 1251	946944 0627	RIVER ST
4587846 - HAVERRILL		08/29/2018	Non-fatal injury	8:20 AM	2018	Single vehicle crash	Dry	0	0	Clear	233813 1251	946944 0627	RIVER ST / WASHINGTON ST
4587855 - HAVERRILL		08/30/2018	Property damage only (none injured)	2:30 PM	2018	Sideswipe, same direction	Dry	0	0	Clear	233773 5936	946898 5623	BRIDGE
4649836 - HAVERRILL		12/17/2018	Property damage only (none injured)	6:36 PM	2018	Rear-end	Wet	0	0	Rain	233773 5936	946898 5623	RIVER ST / WASHINGTON ST
4616762 - HAVERRILL		11/01/2018	Property damage only (none injured)	6:46 PM	2018	Sideswipe, same direction	Dry	0	0	Cloudy	233773 5936	946898 5623	RIVER ST / WASHINGTON ST
4646312 - HAVERRILL		01/02/2019	Property damage only (none injured)	11:35 PM	2019	Single vehicle crash	Dry	0	0	Clear	233773 5936	946898 5623	RIVER ST / WASHINGTON ST
4665852 - HAVERRILL		02/19/2019	Property damage only (none injured)	1:24 PM	2019	Single vehicle crash	Dry	0	0	Clear	233773 5936	946898 5623	RIVER ST / WASHINGTON ST
4691490 - HAVERRILL		04/22/2019	Property damage only (none injured)	1:33 PM	2019	Single vehicle crash	Wet	0	0	Rain	233773 5936	946898 5623	COMEAU BRIDGE / RIVER ST
4691455 - HAVERRILL		05/02/2019	Property damage only (none injured)	5:46 PM	2019	Angle	Dry	0	0	Cloudy/Rain	233773 5936	946898 5623	RIVER ST / WASHINGTON ST
4702418 - HAVERRILL		05/14/2019	Non-fatal injury	9:07 PM	2019	Single vehicle crash	Wet	0	0	Rain	233773 5936	946898 5623	WASHINGTON STREET / RIVER STREET
4708922 - HAVERRILL		06/03/2019	Property damage only (none injured)	10:39 PM	2019	Angle	Dry	0	0	Clear	233773 5936	946898 5623	COMEAU BRIDGE
4711125 - HAVERRILL		06/10/2019	Property damage only (none injured)	7:52 AM	2019	Angle	Dry	0	0	Clear	233773 5936	946898 5623	COMEAU BRIDGE
4714358 - HAVERRILL		06/13/2019	Property damage only (none injured)	7:47 AM	2019	Angle	Wet	0	0	Clear/Cloudy	233813 1251	946944 0627	WASHINGTON ST
4760141 - HAVERRILL		10/08/2019	Property damage only (none injured)	11:55 PM	2019	Head-on	Dry	0	0	Clear	233773 5936	946898 5623	COMEAU BRIDGE
4783032 - HAVERRILL		11/27/2019	Property damage only (none injured)	10:23 AM	2019	Angle	Dry	0	0	Cloudy	233773 5936	946898 5623	COMEAU BRIDGE
4785364 - HAVERRILL		12/06/2019	Non-fatal injury	6:08 PM	2019	Rear-end	Wet	0	0	Clear	233773 5936	946898 5623	COMEAU BRIDGE

SOUTH ELM STREET AT LAUREL AVENUE

Crash Number	City/Town Name	Crash Date	Crash Severity	Crash Time	Crash Year	Weather at Collision	Road Surface Condition	Total Fatalities	Total Non-Fatal Injuries	Weather Conditions	X	Y	Roadway
4308185	HAVERHILL	01/29/2015	Property damage only (none injured)	6:30 PM	2015	Angle	Slush	0	0	Clear	233875.6	946562.8	LAUREL AVE / SOUTH ELM ST
4308185	HAVERHILL	01/29/2015	Property damage only (none injured)	6:34 PM	2015	Rear-end	Ice	0	0	Clear	233860.5	946567	SOUTH ELM ST
4397085	HAVERHILL	08/08/2015	Property damage only (none injured)	10:34 AM	2015	Angle	Dry	0	0	Clear	233875.6	946562.8	LAUREL AVE / SOUTH ELM ST
4101979	HAVERHILL	09/17/2015	Property damage only (none injured)	1:01 PM	2015	Rear-end	Dry	0	0	Clear	233860.5	946567	SOUTH ELM ST
4143422	HAVERHILL	12/21/2015	Property damage only (none injured)	7:19 AM	2015	Rear-end	Dry	0	0	Clear	233860.5	946567	SOUTH ELM ST
4267169	HAVERHILL	07/05/2016	Property damage only (none injured)	3:17 PM	2016	Rear-end	Dry	0	0	Clear	233860.5	946567	SOUTH ELM ST
4314774	HAVERHILL	09/21/2016	Property damage only (none injured)	3:38 PM	2016	Rear-end	Dry	0	0	Clear	233860.5	946567	SOUTH ELM ST
4313026	HAVERHILL	12/04/2016	Property damage only (none injured)	2:24 AM	2016	Rear-end	Dry	0	0	Clear, Clear	233875.6	946562.8	LAUREL AVE / SOUTH ELM ST
4418511	HAVERHILL	08/03/2017	Property damage only (none injured)	12:17 PM	2017	Single vehicle crash	Dry	0	0	Clear	233875.6	946562.8	LAUREL AVE / SOUTH ELM ST
4497312	HAVERHILL	01/10/2018	Property damage only (none injured)	5:10 PM	2018	Rear-end	Dry	0	0	Clear	233875.6	946562.8	LAUREL AVE
4315978	HAVERHILL	03/17/2018	Property damage only (none injured)	1:42 AM	2018	Single vehicle crash	Dry	0	0	Clear	233860.5	946567	SOUTH ELM ST
4638899	HAVERHILL	12/18/2018	Property damage only (none injured)	7:01 AM	2018	Angle	Dry	0	0	Clear, Clear	233875.6	946562.8	LAUREL AVE / SOUTH ELM ST
4706889	HAVERHILL	06/10/2019	Non-fatal injury	4:08 PM	2019	Single vehicle crash	Dry	0	0	Clear	233875.6	946562.8	LAUREL AVE / SOUTH ELM ST

RAILROAD AVENUE AT SOUTH ELM STREET AND COMEAU BRIDGE

Crash Number	City/Town Name	Crash Date	Crash Severity	Crash Time	Crash Year	Manner of Collision	Road Surface Condition	Total Fatalities	Total Non-Fatal Injuries	Weather Conditions	x	y	Roadway
4060993	HAVERHILL	06/13/2015	Property damage only [none injured]	12:18 AM	2015	Single vehicle crash	Wet	0	0	Rain	233846.1	946577.7	RAILROAD AVE / SOUTH ELM ST
4092023	HAVERHILL	07/22/2015	Non-fatal injury Property damage only	1:13 PM	2015	Rear end	Dry	0	1	Clear	233846.1	946577.7	SOUTH ELM ST / RAILROAD AVE
4133469	HAVERHILL	12/31/2015	[none injured] Property damage only	10:49 PM	2015	Head-on	Dry	0	0	Clear	233846.1	946577.7	COMEAU BRIDGE
4194680	HAVERHILL	12/02/2016	[none injured] Property damage only	8:12 PM	2016	Rear end	Unknown	0	0	Clear	233846.1	946577.7	COMEAU BRIDGE / RAILROAD AVE
4245687	HAVERHILL	09/02/2019	Non-fatal injury Property damage only	3:24 PM	2019	Single vehicle crash	Wet	0	0	Cloudy/Rain	233846.1	946577.7	COMEAU BRIDGE / SOUTH ELM STREET
4779351	HAVERHILL	11/18/2019	[none injured] Property damage only	7:32 AM	2019	Angle	Dry	0	0	Clear	233846.1	946577.7	COMEAU BRIDGE / SOUTH ELM ST / LAUREL AVENUE

SOUTH ELM STREET AT BLOSSOM STREET

Crash Number	City/Town Name	Crash Date	Crash Severity	Crash Time	Crash Year	Manner of Collision	Road Surface Condition	Total Fatalities	Total Non-Fatal Injuries	Weather Conditions	Lat	Long	Roadway
4184478	MA, FR-HILL	05/22/2015	Property damage only (none injured)	1:37 PM	2015	Angle	Dry	0	0	0 Cloudy	233908.2	946575.2	BLOSSOM STREET SOUTH ELM STREET
4606032	MA, FR-HILL	10/05/2018	Non-fatal injury Property damage only (none injured)	1:23 PM	2018	Sideswipe, same direction	Dry	0	1	1 Clear	233908.5	946575.2	SOUTH ELM STREET BLOSSOM STREET
4772284	MA, FR-HILL	11/01/2019	injured	9:38 AM	2019	Sideswipe, opposite direction	Wet	0	0	0 Cloudy	233908.2	946575	SOUTH ELM STREET

□ Sight Distance Calculations

Stopping Sight Distance - Regulatory

Railroad Avenue approaches to Site Driveway

		SPEED (MPH)	BRAKE REACTION DISTANCE (FT)	BRAKING DISTANCE (FT)	CALCULATED STOPPING SIGHT DISTANCE (FT)
Direction 1	EB	20	73.5	38.3	111.8
Direction 2	WB	20	73.5	38.3	111.8

INPUTS

	Direction 1	Direction 2
Travel Direction	EB	WB
Speed	20	20
Grade	0	0
t	2.5	2.5
a	11.2	11.2

Stopping Sight Distance (SSD) - Source: AASHTO

SSD = Reaction Distance + Brake Distance

Reaction Distance = $1.47 \times t \times V$

Brake Distance = $V^2 / (30 \times ((a/32.2) + G))$

Where:

t = reaction time (sec)

V = travel speed (mph)

G = roadway grade

a = deceleration rate (ft/sec²)

Stopping Sight Distance - Observed 85th Percentile

Railroad Avenue approaches to Site Driveway

		SPEED (MPH)	BRAKE REACTION DISTANCE (FT)	BRAKING DISTANCE (FT)	CALCULATED STOPPING SIGHT DISTANCE (FT)
Direction 1	EB	28	102.9	75.1	178
Direction 2	WB	31	113.925	92.1	206

INPUTS

	Direction 1	Direction 2
Travel Direction	EB	WB
Speed	28	31
Grade	0	0
t	2.5	2.5
a	11.2	11.2

Stopping Sight Distance (SSD) - Source: AASHTO

SSD = Reaction Distance + Brake Distance

Reaction Distance = $1.47 \times t \times V$

Brake Distance = $V^2 / (30 \times ((a/32.2) + G))$

Where:

t = reaction time (sec)

V = travel speed (mph)

G = roadway grade

a = deceleration rate (ft/sec²)

Intersection Sight Distance Calculations

Source: *A Policy on Geometric Design of Highways and Street, 6th Edition*: AASHTO: 2011.

$$ISD = 1.47 * V * t$$

V = speed

t = time gap

t = 7.5 s for a passenger car for Left Turn from a Stop

t = 6.5 s for a passenger car for Right Turn from a Stop

Railroad Avenue

$$ISD = 1.47 * 20 * 7.5 = 221 \text{ ft } \textbf{SAY 225 ft}$$

(left-turn from a stop)

$$ISD = 1.47 * 20 * 6.5 = 191 \text{ ft } \textbf{SAY 195 ft}$$

(right-turn from a stop)

Vehicles Turning From S Elm Street

$$ISD = 1.47 * 15 * 6.5 = 143 \text{ ft } \textbf{SAY 145 ft}$$

(right-turn from a stop)

□ Adjustment Calculations

1089 - Haverhill

Pandemic Adjustment Factors

Count Date: 7/14/2020

10/4/2007

Weekday AM - 2hr Volume Comparison - Route 1 North of Site

7AM-9AM

Time Period	2020 Count	2007 Count	Percent Difference		
	2854	4357	34.4%	SAY	34%

Count Dates: 7/14/2020

10/4/2007

Weekday PM - 1hr Volume Comparison - E Wash at Orne

4PM-5PM

Time Period	2020 Count	2007 Count	Percent Difference		
	3002	4049	25.9%	SAY	26%

28 Lord Road, Suite 280
Marlborough, MA

File Name : 1089 Main Street at Basiliere Bridge
Site Code : 1089
Start Date : 7/14/2020
Page No : 1

Start Time	Main Street From North					Water Street From East					Main Street From South					Merrimack Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
04 00 PM	13	37	3	0	113	6	58	52	0	116	47	112	30	0	189	22	42	20	0	84	507
04 15 PM	18	120	3	0	144	2	38	64	0	108	43	119	26	0	188	26	38	29	0	93	533
04 30 PM	21	126	6	0	153	2	46	39	0	87	48	131	24	0	201	25	53	12	0	90	531
04 45 PM	20	103	9	0	132	3	60	50	0	113	40	109	20	0	169	24	35	24	0	83	497
Total	72	446	29	0	547	17	202	205	0	424	176	471	100	0	747	97	168	85	0	350	2068
05 00 PM	14	97	5	0	116	7	48	43	0	98	52	116	28	0	196	21	49	25	0	95	505
05 15 PM	17	82	3	0	102	1	54	41	0	96	54	88	19	0	161	17	36	17	0	70	429
05 30 PM	19	95	4	0	118	3	54	38	0	95	43	104	20	0	167	19	37	16	0	72	452
05 45 PM	28	94	6	0	128	3	36	33	0	72	47	38	25	0	170	25	35	20	0	90	450
Total	78	368	18	0	464	14	192	155	0	361	196	406	92	0	694	82	157	78	0	317	1836
06 00 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
07 00 AM	4	70	4	0	78	0	32	42	0	74	21	49	7	0	77	18	32	13	0	63	292
07 15 AM	11	53	2	0	76	2	33	25	0	51	36	51	12	0	109	14	41	5	0	60	306
07 30 AM	9	51	8	0	78	2	26	43	0	71	29	68	21	0	112	14	38	10	0	62	329
07 45 AM	16	88	3	0	112	2	30	47	0	79	38	82	21	0	141	12	39	13	0	64	396
Total	40	282	22	0	344	6	121	158	0	285	124	260	51	0	445	58	150	41	0	249	1323
08 00 AM	11	77	6	0	94	5	41	31	0	77	33	88	32	0	153	13	34	14	0	61	385
08 15 AM	17	69	5	0	91	1	32	35	0	68	40	88	21	0	149	15	32	10	0	57	365
08 30 AM	10	68	4	0	82	2	44	38	0	84	29	100	12	0	141	13	31	12	0	56	363
08 45 AM	15	83	5	0	103	2	37	32	0	71	47	98	25	0	170	15	47	12	0	74	418
Total	53	297	20	0	370	10	154	136	0	300	149	374	90	0	613	58	144	48	0	248	1631
09 00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Grand Total	243	1394	89	0	1726	47	869	654	0	1370	646	1511	343	0	2500	293	619	252	0	1164	6760
Appron %	14.1	90.8	5.2	0		3.4	48.8	47.7	0		25.8	80.4	13.7	0		25.2	53.2	21.6	0		
Total %	3.6	20.6	1.3	0	25.5	0.7	9.9	9.7	0	20.3	9.6	22.4	5.1	0	37	4.3	9.2	3.7	0	17.2	
Lights %	237	1351	86	0	1673	44	646	640	0	1330	629	1478	336	0	2443	279	595	243	0	1117	6563
% Lights	97.5	96.9	95.5	0	96.9	93.6	96.6	97.9	0	97.1	97.4	97.8	98	0	97.7	95.2	96.1	96.4	0	96	97.1
Mediums %	5	37	3	0	45	3	19	11	0	33	14	31	6	0	51	13	22	8	0	43	172
% Mediums	2.1	2.7	3.4	0	2.6	6.4	2.8	1.7	0	2.4	2.2	2.1	1.7	0	2	4.4	3.6	3.2	0	3.7	2.5
Articulated Trucks																					
% Articulated Trucks	0.4	0.4	1.1	0	0.5	0	0.6	0.5	0	0.5	0.5	0.1	0.3	0	0.2	0.3	0.3	0.4	0	0.3	0.4

Merrimack Valley Planning Commission

30 Main Street

Haverhill, Mass. 01830

City/Town: Haverhill

Weather: Sunny, mild, dry

Recorded By: JVT

Intersection: Main St @ Water St.

File Name : tmmawaam
Site Code : 000000011
Start Date : 10/04/2007
Page No : 1

Start Time	Main Street From North				Water Street From East				Bridge Street From South				Merrimack Street From West			
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total
																Int. Total
07:00 AM	1	105	7	113	62	45	0	108	25	87	33	145	6	27	41	74
07:15 AM	3	130	13	146	63	44	2	109	22	86	24	142	6	45	32	83
07:30 AM	2	144	10	156	71	38	1	110	19	86	34	149	13	36	31	80
07:45 AM	2	136	22	160	55	53	0	108	34	145	58	237	10	53	25	88
Total	8	515	52	575	251	181	3	435	100	424	149	673	35	161	129	325
08:00 AM	3	146	21	170	59	47	4	110	26	116	46	188	15	45	26	86
08:15 AM	8	133	26	167	58	44	6	108	47	146	63	255	12	33	26	71
08:30 AM	6	105	34	145	53	62	3	118	24	141	52	217	21	31	23	75
08:45 AM	8	123	40	171	64	55	4	123	39	138	63	240	22	53	23	98
Total	25	513	121	659	234	208	17	459	136	541	224	901	70	162	96	330
Grand Total	33	1028	173	1234	485	389	20	834	236	985	373	1574	105	323	227	655
Approach %	2.7	83.3	14.0	28.3	54.3	43.5	2.2	20.5	15.0	61.3	23.7	35.1	16.0	49.3	34.7	43.57
Total %	0.8	23.6	4.0		11.1	8.9	0.5		5.4	22.1	8.6		2.4	7.4	5.2	15.0

SECTION I - CONTINUOUS COUNTING STATION MONTHLY AVERAGE DAILY TRAFFIC

STATION 5070 - HAVERHILL - I-495

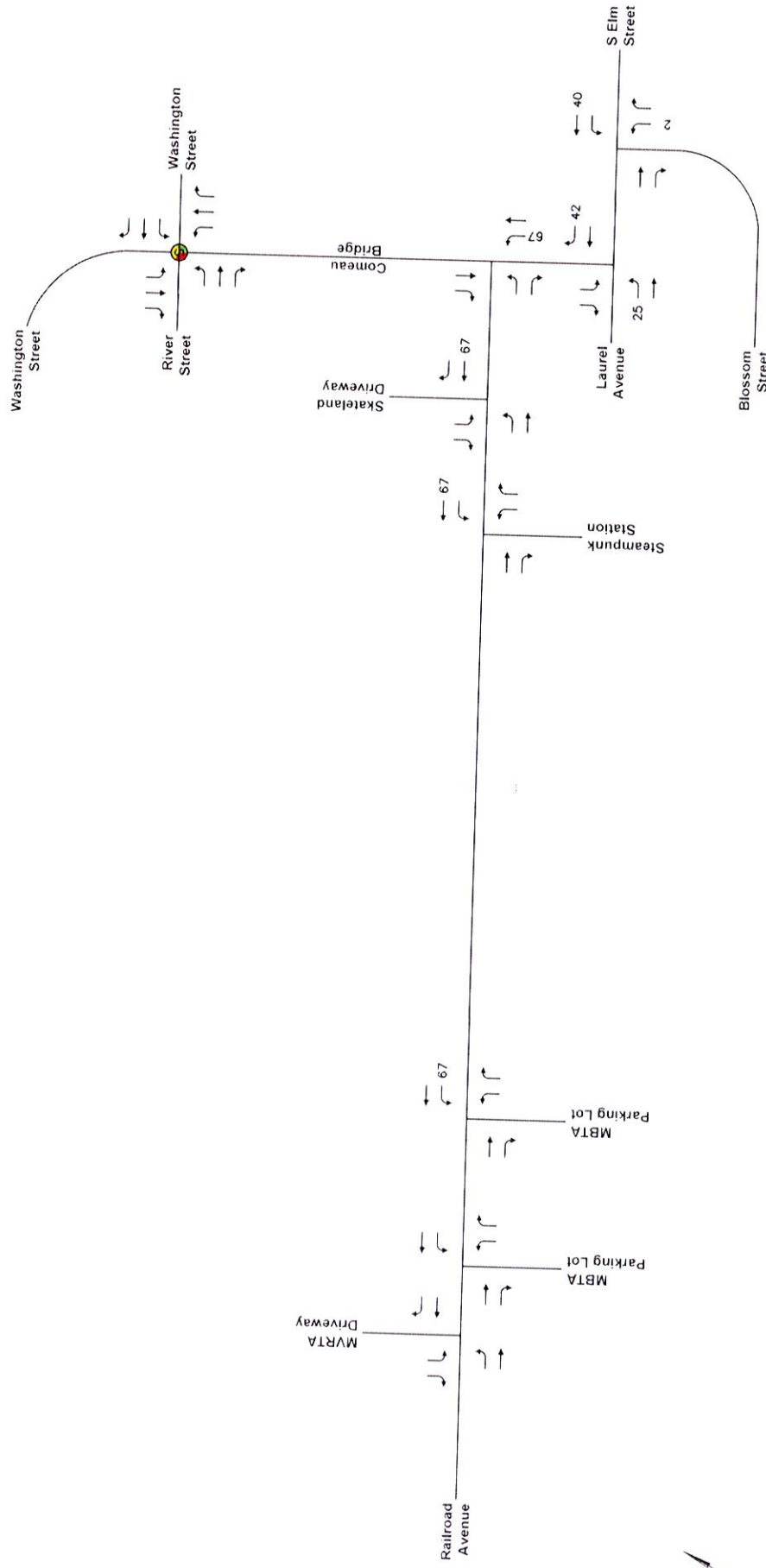
YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
15	73,631	75,016	82,869	89,633	98,645	103,265	111,718	112,662	99,024	82,667	86,816	86,932	91,907
19	80,562	82,565	87,989	93,496	101,159	108,278	114,280	110,545	101,934	99,242	81,950	72,161	94,513
	1.21	1.18	1.09	1.02	0.93	0.88	0.82	0.84	0.93	1.03	1.11	1.18	
	Seasonal Adjustment Factor												
	(to average month)												
	Growth												0.71%

STATION 5122 - HAVERHILL - I-495 - METHUEN

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
15	83,217	80,252	92,226	98,892	107,089	111,813	118,427	119,939	109,454	105,088	99,274	96,142	101,818
19	91,970	94,068	98,060	104,606	111,733	118,485	123,233	124,562	112,992	109,687	101,085	92,155	106,886
	1.19	1.20	1.10	1.03	0.95	0.91	0.86	0.85	0.94	0.97	1.04	1.11	
	Seasonal Adjustment Factor												
	(to average month)												
	Growth												1.24%

Average
Seasonal Adjustment Factor
(to average month)

Average Yearly Growth: Calculated 1.0%
Yearly Growth Factor Used 1.0%



North

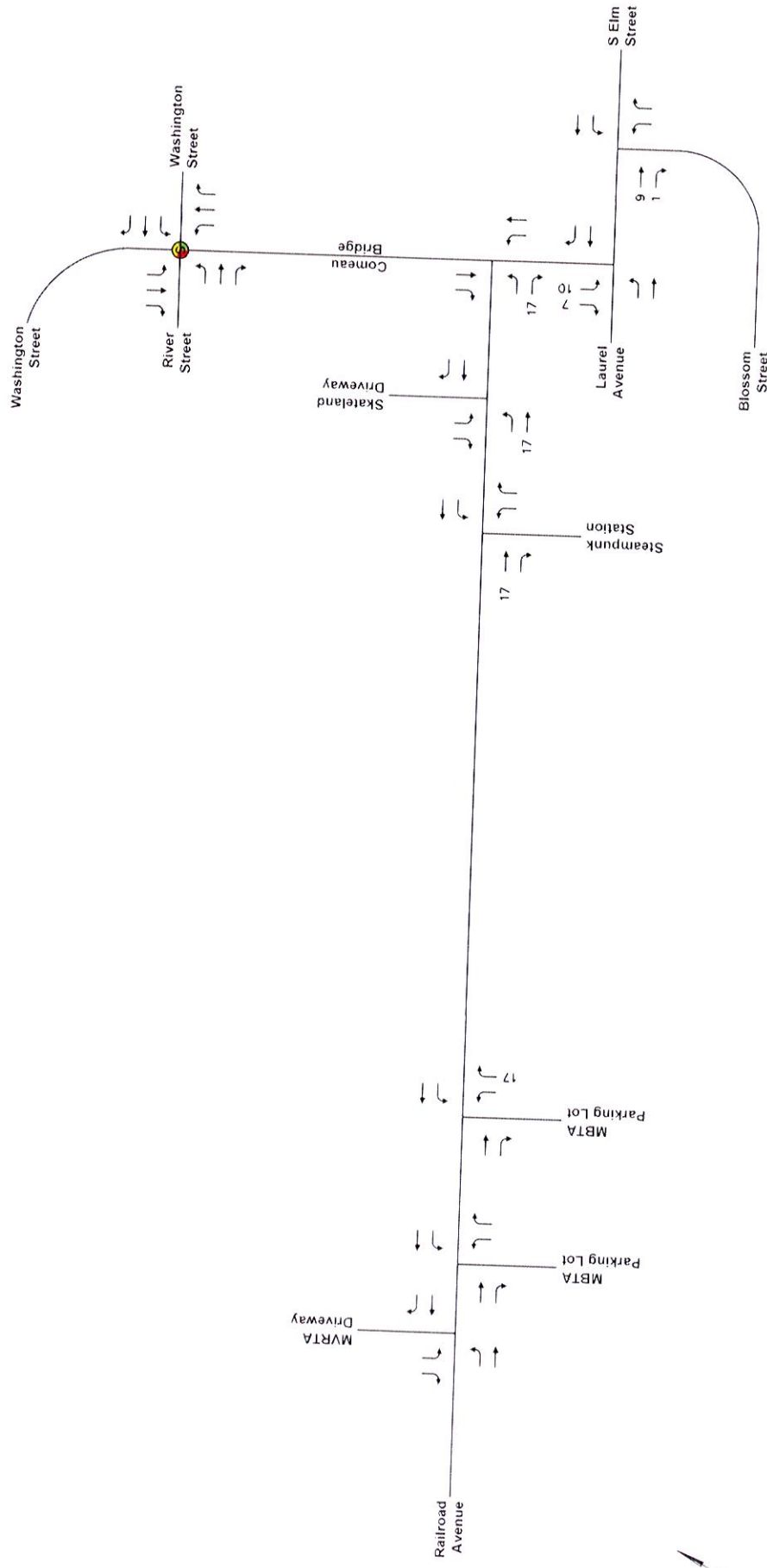
Scale: Not to Scale

MDM TRANSPORTATION CONSULTANTS, INC.
 Planners & Engineers

NOTES:
 NEGL. = Negligible
 = Signalized Intersection

Attachment

MBTA Adjustment
 Weekday Morning Peak Hour Traffic Volumes



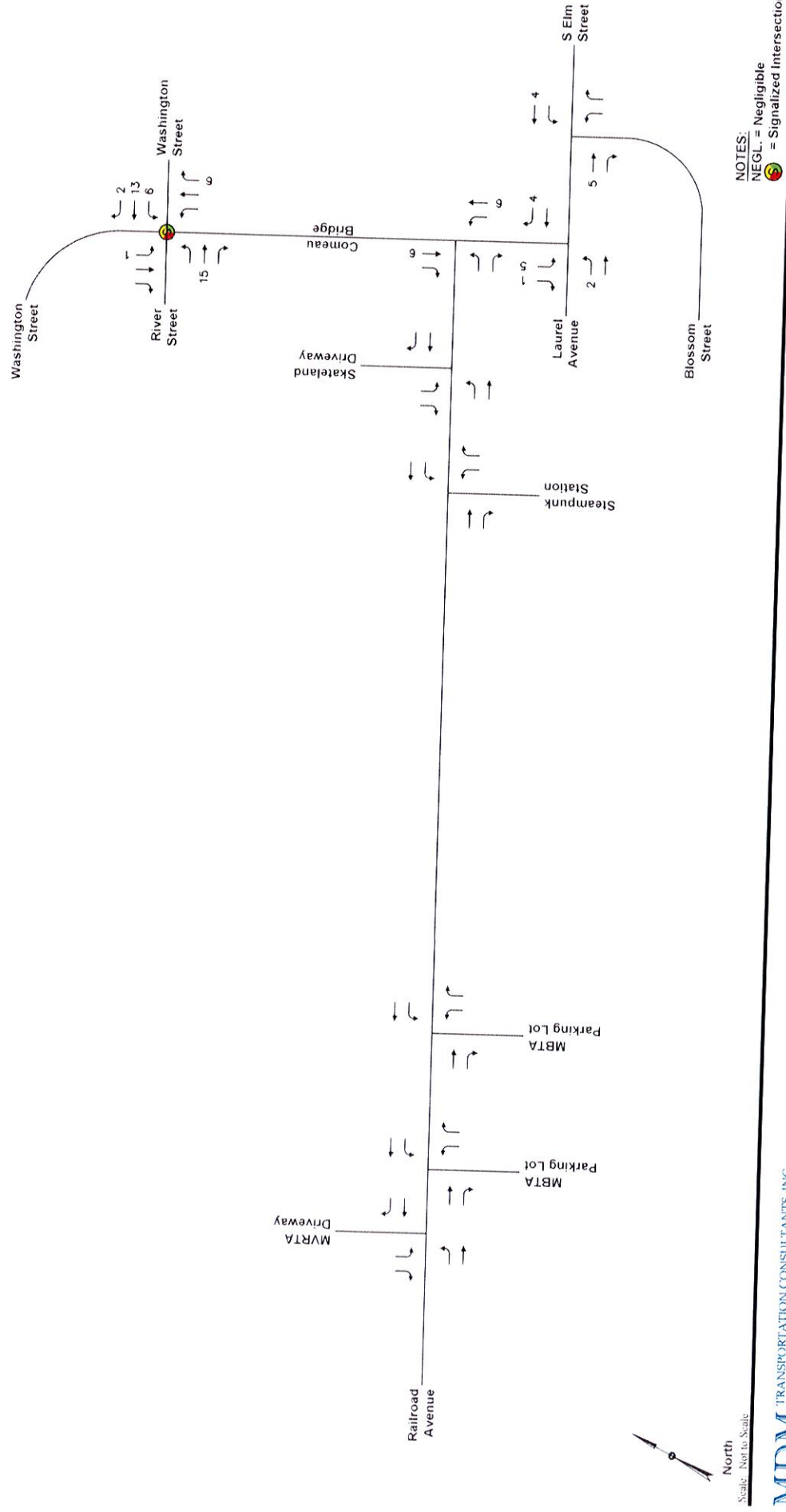
North
Scale: Not to Scale

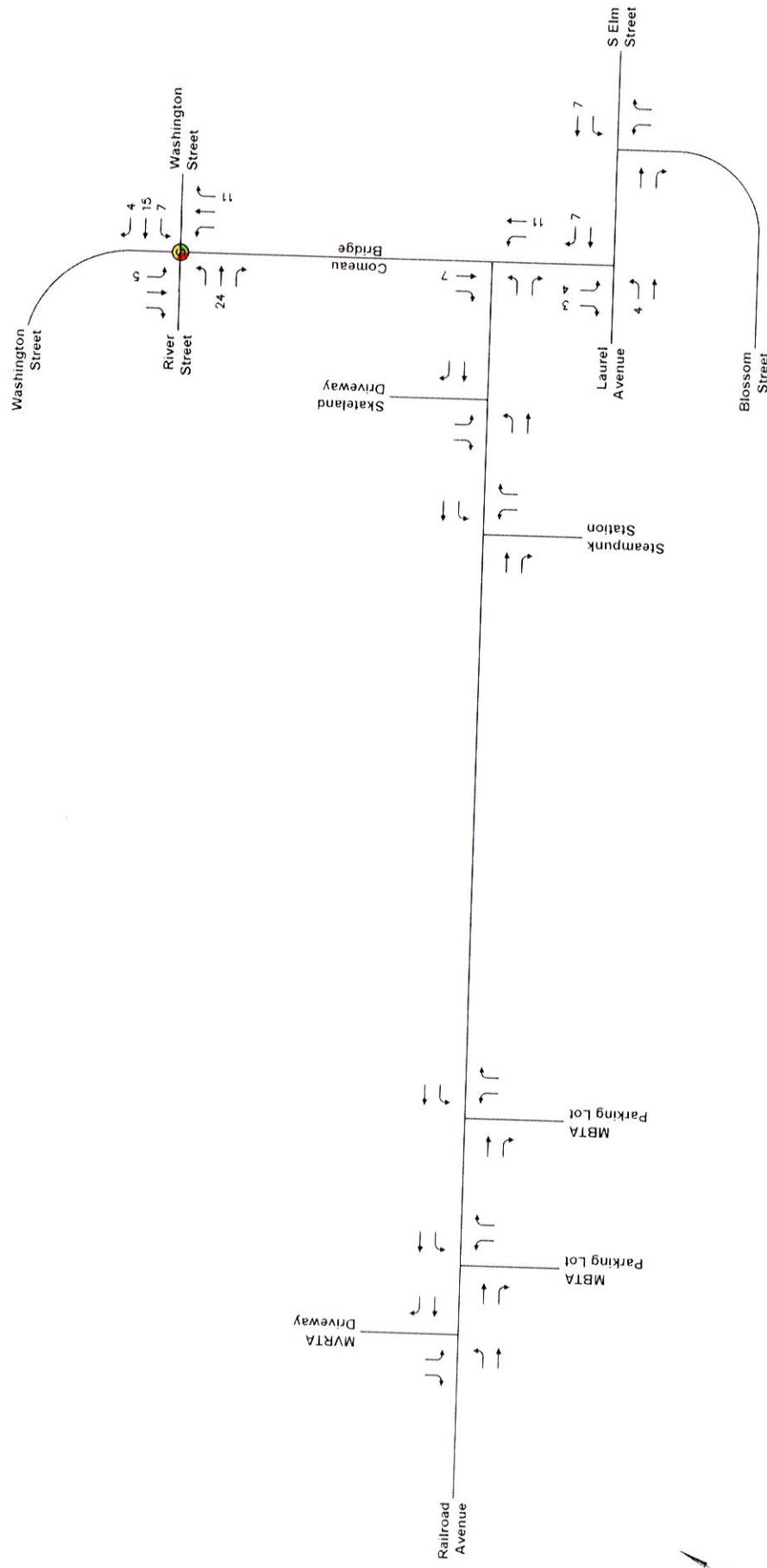
MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Attachment

MBTA Adjustment Weekday Evening Peak Hour Traffic Volumes

□ Background Projects





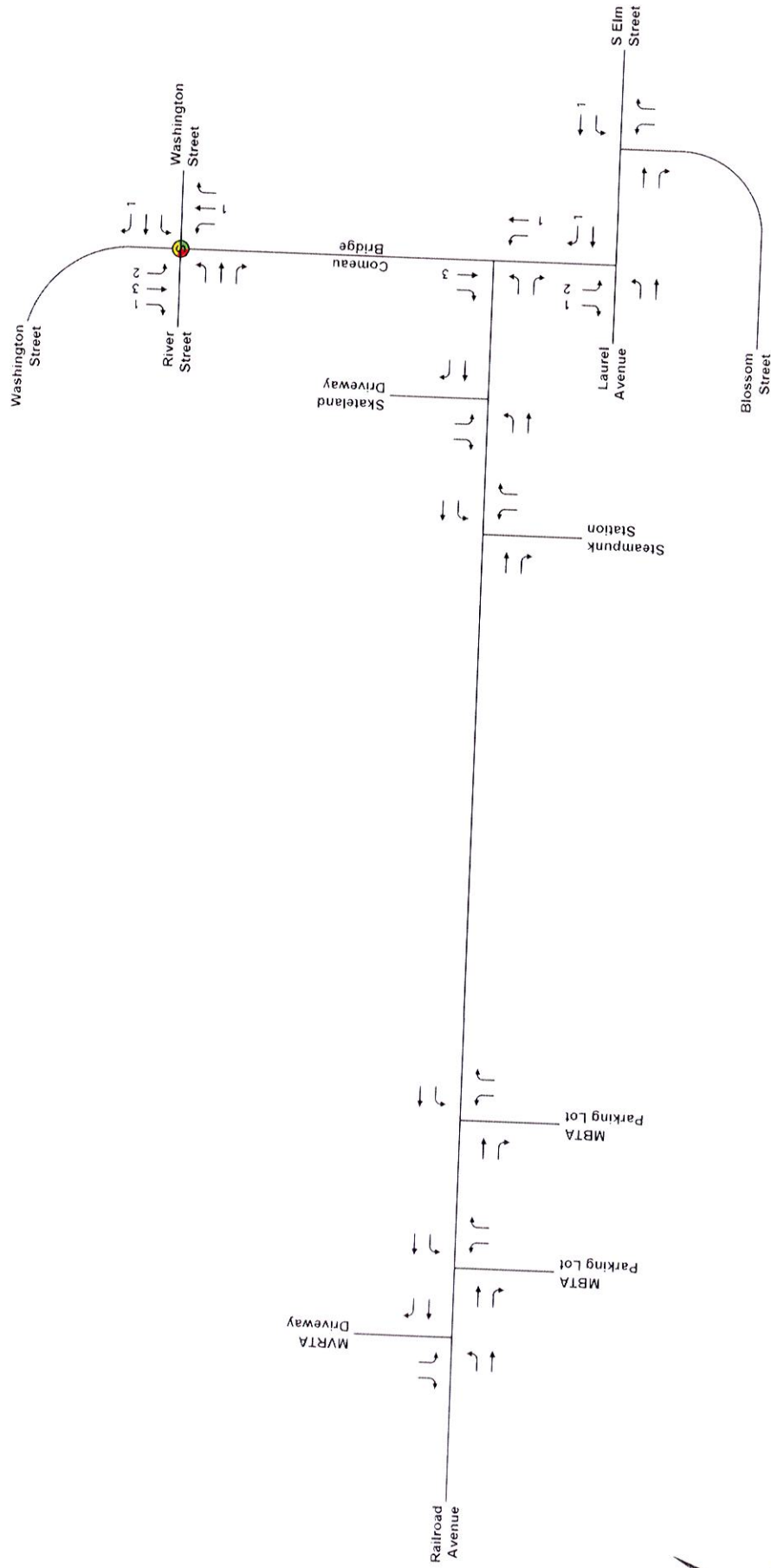
North
Scale: Not to Scale

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

NOTES:
NEGL. = Negligible
Signalized Intersection

Attachment

Heights at Haverhill Trips Weekday Evening Peak Hour Traffic Volumes



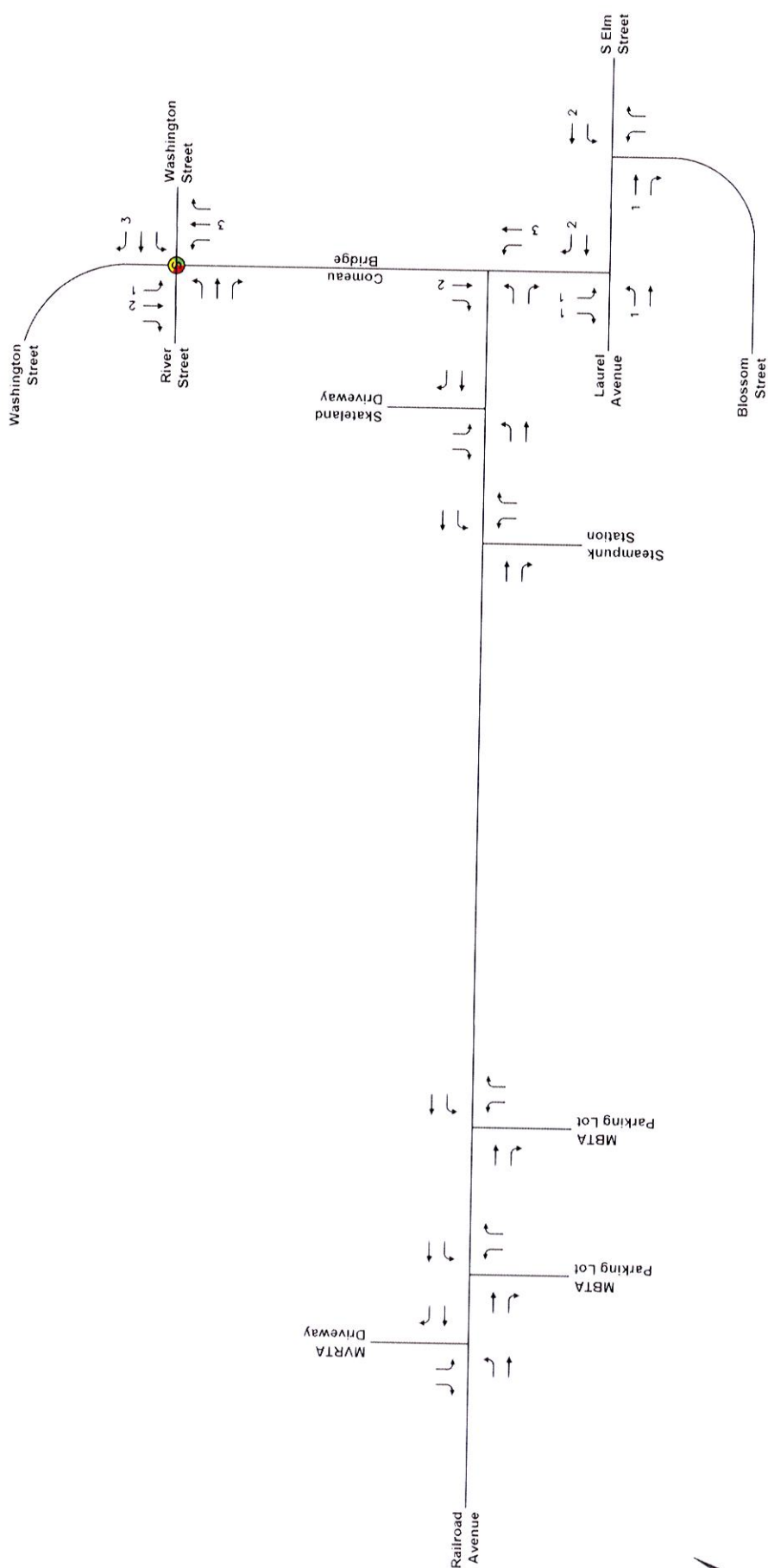
North
Scale: Not to Scale

NOTES:
NEGL. = Negligible
Signalized Intersection

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Attachment

181 Washington Street Trips
Weekday Morning Peak Hour Traffic Volumes



Scale: Not to Scale

North

NOTES:
 NEGL. = Negligible
 S = Signalized Intersection

**Institute of Transportation Engineers (ITE) 10th Edition
Land Use Code (LUC) 221 - Multifamily Housing (Mid-Rise)**

Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 44

AVERAGE WEEKDAY DAILY

$$I = 5.44 * X$$

$$I = 5.44 * 44$$

$$I = 239.36$$

$$I = 240 \text{ vehicle trips}$$

with 50% (120 vpd) entering and 50% (120 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$I = 0.36 * X$$

$$I = 0.36 * 44$$

$$I = 15.84$$

$$I = 16 \text{ vehicle trips}$$

with 26% (4 vph) entering and 74% (12 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$I = 0.44 * X$$

$$I = 0.44 * 44$$

$$I = 19.36$$

$$I = 19 \text{ vehicle trips}$$

with 61% (12 vph) entering and 39% (7 vph) exiting.

SATURDAY DAILY

$$I = 4.91 * X$$

$$I = 4.91 * 44$$

$$I = 216.04$$

$$I = 216 \text{ vehicle trips}$$

with 50% (108 vpd) entering and 50% (108 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$$I = 0.44 * X$$

$$I = 0.44 * 44$$

$$I = 19.36$$

$$I = 19 \text{ vehicle trips}$$

with 49% (9 vph) entering and 51% (10 vph) exiting.

Institute of Transportation Engineers (ITE) 10th Edition
 Land Use Code (LUC) 931 - Quality Restaurant

Average Vehicle Trips Ends vs: 1000 Sq. Feet Gross Floor Area
 Independent Variable (X): 5,8

AVERAGE WEEKDAY DAILY

$$T = 83.84 * (X)$$

$$T = 83.84 * 5.75$$

$$T = 482.08$$

$$T = 482 \text{ vehicle trips}$$

with 50% (241 vpd) entering and 50% (241 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 0.73 * (X)$$

$$T = 0.73 * 5.75$$

$$T = 4.20$$

$$T = 4 \text{ vehicle trips}$$

with 55% (2 vph) entering and 45% (2 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 7.8 * (X)$$

$$T = 7.8 * 5.75$$

$$T = 44.85$$

$$T = 45 \text{ vehicle trips}$$

with 67% (30 vph) entering and 33% (15 vph) exiting.

SATURDAY DAILY

$$T = 90.04 * (X)$$

$$T = 90.04 * 5.75$$

$$T = 517.73$$

$$T = 518 \text{ vehicle trips}$$

with 50% (259 vpd) entering and 50% (259 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$$T = 10.68 * (X)$$

$$T = 10.68 * 5.75$$

$$T = 61.41$$

$$T = 61 \text{ vehicle trips}$$

with 59% (36 vph) entering and 41% (25 vph) exiting.

Institute of Transportation Engineers (ITE) 10th Edition
 Land Use Code (LUC) 932 - High Turnover (Sit-Down) Restaurant

Average Vehicle Trips Ends vs: 1000 Sq. Feet Gross Floor Area
 Independent Variable (X): 2.5

AVERAGE WEEKDAY DAILY

$$I = 112.18 * (X)$$

$$I = 112.18 * 2.5$$

$$I = 280.45$$

$$I = 280 \text{ vehicle trips}$$

with 50% (140 vpd) entering and 50% (140 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$I = 9.94 * (X)$$

$$I = 9.94 * 2.5$$

$$I = 24.85$$

$$I = 25 \text{ vehicle trips}$$

with 55% (14 vph) entering and 45% (11 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$I = 9.77 * (X)$$

$$I = 9.77 * 2.5$$

$$I = 24.43$$

$$I = 24 \text{ vehicle trips}$$

with 62% (15 vph) entering and 38% (9 vph) exiting.

SATURDAY DAILY

$$I = 122.40 * (X)$$

$$I = 122.40 * 2.5$$

$$I = 306.00$$

$$I = 306 \text{ vehicle trips}$$

with 50% (153 vpd) entering and 50% (153 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$$I = 11.19 * (X)$$

$$I = 11.19 * 2.5$$

$$I = 27.98$$

$$I = 28 \text{ vehicle trips}$$

with 51% (14 vph) entering and 49% (14 vph) exiting.

□ Trip Generation

Institute of Transportation Engineers (ITE) 10th Edition
Land Use Code (LUC) 221 - Multifamily Housing (Mid-Rise)

Average Vehicle Trips Ends vs: Dwelling Units
 Independent Variable (X): 290

AVERAGE WEEKDAY DAILY

$$T = 5.44 * X$$

$$T = 5.44 * 290$$

$$T = 1577.60$$

$$T = 1578 \text{ vehicle trips}$$

with 50% (789 vpd) entering and 50% (789 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 0.36 * X$$

$$T = 0.36 * 290$$

$$T = 104.40$$

$$T = 104 \text{ vehicle trips}$$

with 26% (27 vph) entering and 74% (77 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 0.44 * X$$

$$T = 0.44 * 290$$

$$T = 127.60$$

$$T = 128 \text{ vehicle trips}$$

with 61% (78 vph) entering and 39% (50 vph) exiting.

SATURDAY DAILY

$$T = 4.91 * X$$

$$T = 4.91 * 290$$

$$T = 1423.90$$

$$T = 1424 \text{ vehicle trips}$$

with 50% (712 vpd) entering and 50% (712 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$$T = 0.44 * X$$

$$T = 0.44 * 290$$

$$T = 127.60$$

$$T = 128 \text{ vehicle trips}$$

with 49% (63 vph) entering and 51% (65 vph) exiting.

Institute of Transportation Engineers (ITE) 10th Edition
Land Use Code (LUC) 820 - Shopping Center

Average Vehicle Trips Ends vs: 1000 Sq. Feet Gross Leasable Area
 Independent Variable (X): 10,000

AVERAGE WEEKDAY DAILY

$$T = 37.75 * (X)$$

$$T = 37.75 * 10,000$$

$$T = 377,500$$

$$T = 378 \text{ vehicle trips}$$

with 50% (189 vph) entering and 50% (189 vph) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 0.94 * (X)$$

$$T = 0.94 * 10,000$$

$$T = 9,400$$

$$T = 9 \text{ vehicle trips}$$

with 62% (6 vph) entering and 38% (3 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 3.81 * (X)$$

$$T = 3.81 * 10,000$$

$$T = 38,100$$

$$T = 38 \text{ vehicle trips}$$

with 48% (18 vph) entering and 52% (20 vph) exiting.

SATURDAY DAILY

$$T = 46.12 * (X)$$

$$T = 46.12 * 10,000$$

$$T = 461,200$$

$$T = 462 \text{ vehicle trips}$$

with 50% (231 vph) entering and 50% (231 vph) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$$T = 4.50 * (X)$$

$$T = 4.50 * 10,000$$

$$T = 45,000$$

$$T = 45 \text{ vehicle trips}$$

with 52% (23 vph) entering and 48% (22 vph) exiting.

- Trip Distribution

Residence-to-Work Distribution

US Census Journey-to-Work Data

Residence Town	Workplace Town	Workplace State	All Workers	% of Total Rounded	To/From Routes					
					River Street East North	Laurel Street From East	S Elm Street From South	Washington Street From West	Washington Street From East	Total
Haverhill city	Haverhill city	Massachusetts	9,431	31.9%	10%	3.2%	10%	3.2%	50.0%	31.9%
Haverhill city	Andover town	Massachusetts	2,015	6.8%	50%	3.4%	50%	3.4%	0.0%	6.8%
Haverhill city	Lawrence city	Massachusetts	1,649	5.6%	50%	2.8%	50%	2.8%	0.0%	5.6%
Haverhill city	Boston city	Massachusetts	1,571	5.3%	50%	0.0%	50%	2.7%	0.0%	5.3%
Haverhill city	North Andover town	Massachusetts	1,335	4.5%	50%	2.3%	50%	0.0%	0.0%	4.5%
Haverhill city	Methuen Town city	Massachusetts	1,324	4.5%	50%	2.2%	50%	0.0%	0.0%	4.5%
Haverhill city	Newburyport city	Massachusetts	683	2.3%	50%	0.0%	50%	0.0%	0.0%	2.3%
Haverhill city	Salem town	New Hampshire	593	2.0%	50%	1.0%	50%	100.0%	0.0%	2.3%
Haverhill city	Tewksbury town	Massachusetts	549	1.9%	50%	0.9%	50%	0.0%	0.0%	2.0%
Haverhill city	Plaistow town	New Hampshire	474	1.6%	50%	0.0%	50%	0.0%	0.0%	1.9%
Haverhill city	Woburn city	Massachusetts	459	1.6%	50%	0.8%	50%	100.0%	0.0%	1.6%
Haverhill city	Peabody city	Massachusetts	432	1.5%	50%	0.0%	50%	0.0%	0.0%	1.5%
Haverhill city	Danvers town	Massachusetts	422	1.4%	50%	0.0%	50%	0.0%	0.0%	1.4%
Haverhill city	Beverly city	Massachusetts	406	1.4%	50%	0.0%	50%	0.0%	0.0%	1.4%
Haverhill city	Lowell city	Massachusetts	395	1.3%	50%	0.7%	50%	0.0%	0.0%	1.3%
Haverhill city	Wilmington town	Massachusetts	380	1.3%	50%	0.6%	50%	0.0%	0.0%	1.3%
Haverhill city	Cambridge city	Massachusetts	334	1.1%	50%	0.6%	50%	0.0%	0.0%	1.1%
Haverhill city	Georgetown town	Massachusetts	317	1.1%	50%	0.0%	100%	0.0%	0.0%	1.1%
Haverhill city	Burlington town	Massachusetts	316	1.1%	50%	0.5%	50%	0.0%	0.0%	1.1%
Haverhill city	Amesbury Town city	Massachusetts	281	1.0%	50%	0.5%	50%	0.0%	0.0%	1.1%
Haverhill city	Walham city	Massachusetts	275	0.9%	50%	0.5%	50%	50.0%	0.0%	1.1%
Haverhill city	Chelmsford town	Massachusetts	263	0.9%	50%	0.4%	50%	0.0%	0.0%	1.0%
Haverhill city	Salem city	Massachusetts	260	0.9%	50%	0.0%	50%	0.0%	0.0%	0.9%
Haverhill city	Lynn city	Massachusetts	243	0.8%	50%	0.0%	50%	0.4%	0.0%	0.9%
Haverhill city	Manchester city	New Hampshire	215	0.7%	50%	0.4%	50%	0.0%	0.0%	0.8%
Haverhill city	Billerica town	Massachusetts	207	0.7%	50%	0.4%	50%	0.0%	0.0%	0.8%
Haverhill city	Groveland town	Massachusetts	169	0.6%	50%	0.0%	50%	0.0%	0.0%	0.7%
Haverhill city	North Reading town	Massachusetts	169	0.6%	50%	0.0%	50%	50.0%	0.0%	0.6%
Haverhill city	Nashua city	New Hampshire	163	0.6%	50%	0.3%	50%	0.0%	0.0%	0.6%
Sub-Total			25,330	85.7%	21.4%	31.4%	12.3%	4.7%	16.0%	85.7%
Other			4,224	14.3%	3.6%	5.2%	2.0%	4.1%	2.7%	14.3%
Total			29,554	100%	25%	35%	15%	5%	20%	100%

□ Capacity Analysis

2020 Baseline Condition

Lanes, Volumes, Timings

1: Comeau Bridge & River Street & Washington Street

2020 Baseline Condition

Weekday Morning Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔	↔		↔		↔	↔	
Traffic Volume (vph)	13	356	118	149	326	68	121	58	121	64	122	13
Future Volume (vph)	13	356	118	149	326	68	121	58	121	64	122	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	16	16	16	11	14	14
Storage Length (ft)	0		125	100		150	0		0	200		0
Storage Lanes	0		1	1		1	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.945			0.985	
Flt Protected		0.998		0.950				0.980		0.950		
Satd. Flow (prot)	0	1812	1482	1770	1827	1524	0	1936	0	1745	1996	0
Flt Permitted		0.983		0.252				0.980		0.950		
Satd. Flow (perm)	0	1785	1482	469	1827	1524	0	1936	0	1745	1996	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			132			132						
Link Speed (mph)		30			30			24			4	
Link Distance (ft)		410			486			30			30	
Travel Time (s)		9.3			11.0			1100			300	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	22%	4%	9%	2%	4%	6%	1%	5%	4%	0%	0%	0%
Adj. Flow (vph)	14	371	123	155	340	71	126	60	126	67	127	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	385	123	155	340	71	0	312	0	67	141	0
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)		12			12			11			11	
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	0.85	0.85	0.85	1.04	0.92	0.92
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94		94		
Detector 2 Size(ft)		6			6			6		6		
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex		CI+Ex		
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0		0.0		
Turn Type	Perm	NA	Free	pm+pt	NA	Free	Split	NA		Split	0.0	NA

Lanes, Volumes, Timings

1: Comeau Bridge & River Street & Washington Street

2020 Baseline Condition

Weekday Morning Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases	2		Free	6		Free						
Detector Phase	2	2		1	6		3	6		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Total Split (s)	45.0	45.0		15.0	60.0		40.0	40.0		40.0	40.0	
Total Split (%)	32.1%	32.1%		10.7%	42.9%		28.6%	28.6%		28.6%	28.6%	
Maximum Green (s)	40.0	40.0		10.0	55.0		35.0	35.0		35.0	35.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		-2.0		-2.0	-2.0							
Total Lost Time (s)		3.0		3.0	3.0							
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		None	Min		3.0	3.0		3.0	3.0	
Act Effct Green (s)		27.6	38.0	42.2	42.2	88.0	None	None		None	None	
Actuated G/C Ratio		0.31	1.00	0.48	0.48	1.00		21.9		14.4	14.4	
Y/C Ratio		0.69	0.08	0.39	0.39	0.05		0.25		0.16	0.16	
Control Delay		34.8	0.1	17.6	17.4	0.1		0.63		0.23	0.43	
Queue Delay		0.0	0.0	0.0	0.0	0.0		35.0		38.9	40.1	
Total Delay		34.8	0.1	17.6	17.4	0.1		0.0		0.0	0.0	
LOS		C	A	B	B	A		35.0		38.9	40.1	
Approach Delay		26.4						C		D	D	
Approach LOS		C						35.0			39.7	
90th %ile Green (s)	40.0	40.0		10.0	55.0		29.7	29.7		18.3	18.3	
90th %ile Term Code	Max	Max		Max	Hold		Gap	Gap		Gap	Gap	
70th %ile Green (s)	30.2	30.2		10.0	45.2		23.8	23.8		14.7	14.7	
70th %ile Term Code	Gap	Gap		Max	Hold		Gap	Gap		Gap	Gap	
50th %ile Green (s)	24.8	24.8		10.0	39.8		19.6	19.6		12.1	12.1	
50th %ile Term Code	Gap	Gap		Max	Hold		Gap	Gap		Gap	Gap	
30th %ile Green (s)	20.4	20.4		8.8	34.2		16.0	16.0		10.0	10.0	
30th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap		Gap	Gap	
10th %ile Green (s)	15.0	15.0		7.1	27.1		11.7	11.7		7.6	7.6	
10th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap		Gap	Gap	
Queue Length 50th (ft)		183	0	46	113	0		140		32	68	
Queue Length 95th (ft)		344	0	107	233	0		285		37	158	
Internal Link Dist (ft)		330			406			1020			220	
Turn Bay Length (ft)			125	100		150						
Base Capacity (vph)		895	1482	411	1244	1524		369		200		
Starvation Cap Reductn		0	0	0	0	0		0		771	884	
Spillback Cap Reductn		0	0	0	0	0		0		0	0	
Storage Cap Reductn		0	0	0	0	0		0		0	0	
Reduced Y/C Ratio		0.43	0.08	0.38	0.27	0.05		0.36		0.09	0.16	
Intersection Summary												
Area Type	Other											
Cycle Length	140											

Lanes, Volumes, Timings

1: Comeau Bridge & River Street & Washington Street

2020 Baseline Condition

Weekday Morning Peak Hour

Actuated Cycle Length: 88

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 25.9

Intersection Capacity Utilization: 74.3%

Analysis Period (min): 15

90th %ile Actuated Cycle: 118

70th %ile Actuated Cycle: 98.7

50th %ile Actuated Cycle: 86.5

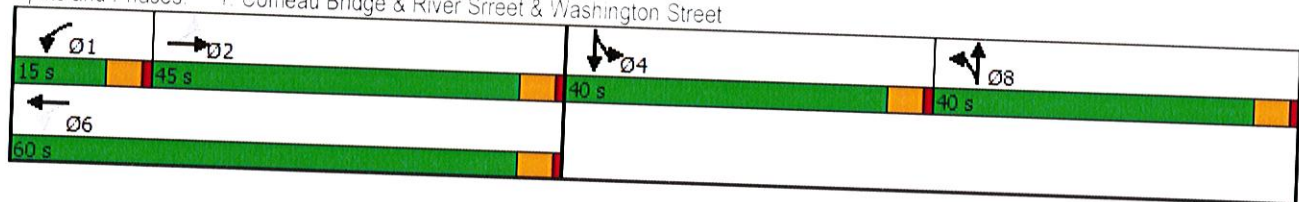
30th %ile Actuated Cycle: 75.2

10th %ile Actuated Cycle: 61.4

Intersection LOS: C

ICU Level of Service: D

Splits and Phases: 1: Comeau Bridge & River Street & Washington Street



HCM 6th TWSC

2: S Elm Street/Comeau Bridge & Railroad Avenue

2020 Baseline Condition
Weekday Morning Peak Hour

Intersection

Int Delay, s/veh 1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			4	4	
Traffic Vol, veh/h	14	14	86	286	370	19
Future Vol, veh/h	14	14	86	286	370	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	27	27	69	2	3	8
Mvmt Flow	15	15	91	301	389	20

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	882	399	409
Stage 1	399	-	-
Stage 2	483	-	-
Critical Hdwy	6.67	6.47	4.79
Critical Hdwy Stg 1	5.67	-	-
Critical Hdwy Stg 2	5.67	-	-
Follow-up Hdwy	3.743	3.543	2.821
Pot Cap-1 Maneuver	287	600	866
Stage 1	627	-	-
Stage 2	572	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	251	600	866
Mov Cap-2 Maneuver	251	-	-
Stage 1	548	-	-
Stage 2	572	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.1	2.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	866	-	354	-	-
HCM Lane V/C Ratio	0.105	-	0.083	-	-
HCM Control Delay (s)	9.6	0	16.1	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.3	-	0.3	-	-

HCM 6th AWSC
3: Laurel Avenue & S Elm Street

2020 Baseline Condition
Weekday Morning Peak Hour

Intersection

Intersection Delay s/veh 12.7
Intersection LOS B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol. veh/h	139	34	32	233	214	170
Future Vol. veh/h	139	34	32	233	214	170
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	5	2	4	3	13	4
Mvmt Flow	145	35	33	243	223	177
Number of Lanes	0	1	1	0	1	0
Approach	EB		WB		SB	
Opposing Approach	WB		EB			
Opposing Lanes	1		1		0	
Conflicting Approach Left	SB				WB	
Conflicting Lanes Left	1		0		1	
Conflicting Approach Right			SB		EB	
Conflicting Lanes Right	0		1		1	
HCM Control Delay	10.9		10.7		14.9	
HCM LOS	B		B		B	

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	80%	0%	56%
Vol Thru, %	20%	12%	0%
Vol Right, %	0%	88%	44%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	173	265	384
LT Vol	139	0	214
Through Vol	34	32	0
RT Vol	0	233	170
Lane Flow Rate	180	276	400
Geometry Grp	1	1	1
Degree of Util (X)	0.283	0.371	0.573
Departure Headway (Hd)	5.646	4.844	5.161
Convergence Y/N	Yes	Yes	Yes
Cap	636	743	700
Service Time	3.879	2.869	3.173
HCM Lane V/C Ratio	0.283	0.371	0.571
HCM Control Delay	10.9	10.7	14.9
HCM Lane LOS	B	B	B
HCM 95th-ile Q	1.2	1.7	3.7

HCM 6th TWSC

4: Blossom Street & S Elm Street

2020 Baseline Condition

Weekday Morning Peak Hour

Intersection

Int Delay, s/veh 0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	EB	EB	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	245	3	5	254	9	12
Future Vol, veh/h	245	3	5	254	9	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage #	0	-	-	0	0	-
Grade %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles %	6	0	0	4	0	0
Mvmt Flow	263	3	5	273	10	13

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	265
Stage 1	-	-	265
Stage 2	-	-	283
Critical Hdwy	-	4.1	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	-	2.2	3.5
Pot Cap-1 Maneuver	-	1310	501
Stage 1	-	-	784
Stage 2	-	-	770
Platoon blocked %	-	-	-
Mov Cap-1 Maneuver	-	1310	499
Mov Cap-2 Maneuver	-	-	499
Stage 1	-	-	784
Stage 2	-	-	767

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	10.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	628	-	-	1310	-
HCM Lane V/C Ratio	0.036	-	-	0.004	-
HCM Control Delay (s)	10.9	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

HCM 6th TWSC

5: Steampunk Cafe Driveway & Railroad Avenue

2020 Baseline Condition

Weekday Morning Peak Hour

Intersection

Int Delay: s/veh 0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol. veh/h	28	0	3	102	0	0
Future Vol. veh/h	28	0	3	102	0	0
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage. #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	32	0	0	46	0	0
Mvmt Flow	30	0	3	111	0	0

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	30
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	4.1	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	2.2	-
Pot Cap-1 Maneuver	-	1596	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	1596	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1596	-
HCM Lane V/C Ratio	-	-	-	0.002	-
HCM Control Delay (s)	0	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th Pctile Q (veh)	-	-	-	0	-

HCM 6th TWSC

6: MBTA East Driveway & Railroad Avenue

2020 Baseline Condition

Weekday Morning Peak Hour

Intersection

Int Delay, s/veh 4.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	23	0	70	32	0	5
Future Vol, veh/h	23	0	70	32	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	0	0	2	0	0
Mvmt Flow	25	0	76	35	0	5

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	25
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	4	1
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	2	2
Pot Cap-1 Maneuver	-	1603	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	1603	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1057	-	-	1603	-
HCM Lane V/C Ratio	0.005	-	-	0.047	-
HCM Control Delay (s)	8.4	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0.1	-

HCM 6th TWSC

7: MBTA West Driveway & Railroad Avenue

2020 Baseline Condition

Weekday Morning Peak Hour

Intersection

Int Delay s/veh 0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol. veh/h	23	1	3	29	1	0
Future Vol. veh/h	23	1	3	29	1	0
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage #	0	-	-	0	0	-
Grade %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles %	43	0	0	50	0	0
Mvmt Flow	25	1	3	32	1	0

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	26
Stage 1	-	-	26
Stage 2	-	-	38
Critical Hdwy	-	4.1	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	-	2.2	3.5
Pot Cap-1 Maneuver	-	1601	947
Stage 1	-	-	1002
Stage 2	-	-	990
Platoon blocked %	-	-	-
Mov Cap-1 Maneuver	-	1601	945
Mov Cap-2 Maneuver	-	-	945
Stage 1	-	-	1002
Stage 2	-	-	988

Approach	EB	WB	NB
HCM Control Delay s	0	0.7	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	945	-	-	1601	-
HCM Lane V/C Ratio	0.001	-	-	0.002	-
HCM Control Delay (s)	8.8	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 6th TWSC

8: Railroad Avenue & MVRTA Driveway

2020 Baseline Condition
Weekday Morning Peak Hour

Intersection

Int Delay s/veh 0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol. veh/h	0	23	0	30	1	0
Future Vol. veh/h	0	23	0	30	1	0
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage #	-	0	0	-	0	-
Grade %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles %	0	43	0	50	0	0
Mvmt Flow	0	25	0	33	1	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	33	0	42
Stage 1	-	-	17
Stage 2	-	-	25
Critical Hdwy	4.1	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.5
Pot Cap-1 Maneuver	1592	-	974
Stage 1	-	-	1011
Stage 2	-	-	1003
Platoon blocked %	-	-	-
Mov Cap-1 Maneuver	1592	-	974
Mov Cap-2 Maneuver	-	-	974
Stage 1	-	-	1011
Stage 2	-	-	1003

Approach	EB	WB	SB
HCM Control Delay s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1592	-	-	-	974
HCM Lane V/C Ratio	-	-	-	-	0.001
HCM Control Delay (s)	0	-	-	-	8.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Lanes, Volumes, Timings

1: Comeau Bridge & River Street & Washington Street

2020 Baseline Condition

Weekday Evening Peak Hour

												
Lane Group	EBL	EST	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	398	217	191	431	156	183	120	166	87	117	28
Future Volume (vph)	11	398	217	191	431	156	183	120	166	87	117	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	16	16	16	11	14	14
Storage Length (ft)	0		125	100		150	0		0	200		0
Storage Lanes	0		1	1		1	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.952			0.971	
Flt Protected		0.999		0.950				0.981		0.950		
Satd. Flow (prot)	0	1862	1599	1787	1863	1583	0	1990	0	1694	1904	0
Flt Permitted		0.986		0.187				0.981		0.950		
Satd. Flow (perm)	0	1838	1599	352	1863	1583	0	1990	0	1694	1904	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			132			132		19			8	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		410			486			1100			300	
Travel Time (s)		9.3			11.0			25.0			6.8	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	2%	1%	1%	2%	2%	2%	1%	0%	3%	2%	9%
Adj. Flow (vph)	11	410	224	197	444	161	189	124	171	90	121	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	421	224	197	444	161	0	484	0	90	150	0
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)		12			12			11			11	
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	0.85	0.85	0.85	1.04	0.92	0.92
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Free	pm+pt	NA	Free	Split	NA		Split	NA	

Lanes, Volumes, Timings

1: Comeau Bridge & River Street & Washington Street

2020 Baseline Condition

Weekday Evening Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases	2		Free	6		Free	8		8			
Detector Phase	2	2		1	6		8	8		4		
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Total Split (s)	45.0	45.0		15.0	60.0		40.0	40.0		40.0	40.0	
Total Split (%)	32.1%	32.1%		10.7%	42.9%		28.6%	28.6%		28.6%	28.6%	
Maximum Green (s)	40.0	40.0		10.0	55.0		35.0	35.0		35.0	35.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		-2.0		-2.0	-2.0					-2.0	-2.0	
Total Lost Time (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		None	Min		None	None		3.0	3.0	
Act Effct Green (s)		31.6	104.5	46.8	46.8	104.5		32.7		15.7	15.7	
Actuated g/c Ratio		0.30	1.00	0.45	0.45	1.00		0.31		0.15	0.15	
v/c Ratio		0.76	0.14	0.61	0.53	0.10		0.76		0.35	0.51	
Control Delay		43.7	0.2	27.9	24.8	0.1		41.7		47.3	47.7	
Queue Delay		0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay		43.7	0.2	27.9	24.8	0.1		41.7		47.3	47.7	
LOS		D	A	C	C	A		D		D	D	
Approach Delay		28.6			20.6			41.7			47.5	
Approach LOS		C			C			D			D	
90th %ile Green (s)	40.0	40.0		10.0	55.0		35.0	35.0		19.7	19.7	
90th %ile Term Code	Max	Max		Max	Hold		Max	Max		Gap	Gap	
70th %ile Green (s)	35.9	35.9		10.0	50.9		35.0	35.0		16.4	16.4	
70th %ile Term Code	Gap	Gap		Max	Hold		Max	Max		Gap	Gap	
50th %ile Green (s)	29.9	29.9		10.0	44.9		34.8	34.8		13.8	13.8	
50th %ile Term Code	Gap	Gap		Max	Hold		Gap	Gap		Gap	Gap	
30th %ile Green (s)	25.3	25.3		10.0	40.3		27.8	27.8		11.5	11.5	
30th %ile Term Code	Gap	Gap		Max	Hold		Gap	Gap		Gap	Gap	
10th %ile Green (s)	18.7	18.7		9.3	33.0		21.0	21.0		8.4	8.4	
10th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap		Gap	Gap	
Queue Length 50th (ft)		268	0	86	225	0		279		57	93	
Queue Length 95th (ft)		409	0	148	350	0		#490		117	171	
Internal Link Dist (ft)		330			406			1020			220	
Turn Bay Length (ft)			125	100		150						
Base Capacity (vph)		760	1599	327	1045	1583		737		200	617	699
Starvation Cap Reductn		0	0	0	0	0		0		0	0	
Spillback Cap Reductn		0	0	0	0	0		0		0	0	
Storage Cap Reductn		0	0	0	0	0		0		0	0	
Reduced v/c Ratio		0.55	0.14	0.60	0.42	0.10		0.66		0.15	0.21	
Intersection Summary												
Area Type	Other											
Cycle Length	140											

Lanes, Volumes, Timings

1: Comeau Bridge & River Street & Washington Street

2020 Baseline Condition

Weekday Evening Peak Hour

Actuated Cycle Length: 104.5

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 30.6

Intersection Capacity Utilization: 92.0%

Analysis Period (min): 15

Intersection LOS: C

ICU Level of Service: F

90th %ile Actuated Cycle: 124.7

70th %ile Actuated Cycle: 117.3

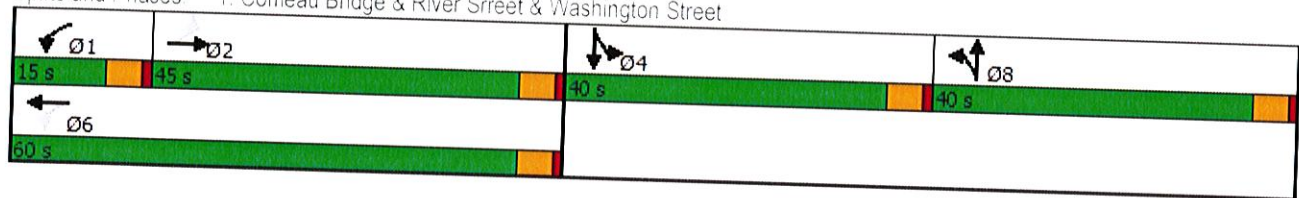
50th %ile Actuated Cycle: 108.5

30th %ile Actuated Cycle: 94.6

10th %ile Actuated Cycle: 77.4

95th percentile volume exceeds capacity; queue may be longer
Queue shown is maximum after two cycles.

Splits and Phases: 1: Comeau Bridge & River Street & Washington Street



HCM 6th TWSC

2: S Elm Street/Comeau Bridge & Railroad Avenue

2020 Baseline Condition

Weekday Evening Peak Hour

Intersection

Int Delay: s/veh 0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			4	4	
Traffic Vol: veh/h	15	16	13	454	519	6
Future Vol: veh/h	15	16	13	454	519	6
Conflicting Peds: #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage: #	0	-	-	0	0	-
Grade: %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles: %	27	27	69	2	3	8
Mvmt Flow	16	17	14	478	546	6

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1055	549	552
Stage 1	549	-	-
Stage 2	506	-	-
Critical Hdwy	6.67	6.47	4.79
Critical Hdwy Stg 1	5.67	-	-
Critical Hdwy Stg 2	5.67	-	-
Follow-up Hdwy	3.743	3.543	2.821
Pot Cap-1 Maneuver	224	490	754
Stage 1	532	-	-
Stage 2	557	-	-
Platoon blocked: %	-	-	-
Mov Cap-1 Maneuver	218	490	754
Mov Cap-2 Maneuver	218	-	-
Stage 1	519	-	-
Stage 2	557	-	-

Approach	EB	NB	SB
HCM Control Delay: s	18.2	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	754	-	306	-	-
HCM Lane V/C Ratio	0.018	-	0.107	-	-
HCM Control Delay (s)	9.9	0	18.2	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

HCM 6th AWSC
3: Laurel Avenue & S Elm Street

2020 Baseline Condition
Weekday Evening Peak Hour

Intersection

Intersection Delay s/veh 26.4
Intersection LOS D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol. veh/h	164	68	66	303	317	218
Future Vol. veh/h	164	68	66	303	317	218
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles %	4	2	1	1	2	0
Mvmt Flow	174	72	70	322	337	232
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	15	17.7	37.4
HCM LOS	B	C	E

Lane	EBLn1	WBLn1	SBLn1
Vol Left %	71%	0%	59%
Vol Thru %	29%	18%	0%
Vol Right %	0%	82%	41%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	232	369	535
LT Vol	164	0	317
Through Vol	68	66	0
RT Vol	0	303	218
Lane Flow Rate	247	393	569
Geometry Grp	1	1	1
Degree of Util (X)	0.453	0.623	0.887
Departure Headway (Hd)	6.605	5.711	5.715
Convergence Y/N	Yes	Yes	Yes
Cap	548	636	637
Service Time	4.619	3.711	3.715
HCM Lane V/C Ratio	0.451	0.618	0.893
HCM Control Delay	15	17.7	37.4
HCM Lane LOS	B	C	E
HCM 95th-ile Q	2.3	4.3	10.7

HCM 6th TWSC

4: Blossom Street & S Elm Street

2020 Baseline Condition

Weekday Evening Peak Hour

Intersection

Int Delay: s/veh 0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol. veh/h	360	25	24	354	15	6
Future Vol. veh/h	360	25	24	354	15	6
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	5	0	0	8	0
Mvmt Flow	379	26	25	373	16	6

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	405
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.1
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.2
Pot Cap-1 Maneuver	-	-	1165
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1165
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay: s	0	0.5	14.9
HCM LOS			B

Minor Lane:Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	385	-	-	1165	-
HCM Lane V/C Ratio	0.057	-	-	0.022	-
HCM Control Delay (s)	14.9	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

HCM 6th TWSC
5: Steampunk Cafe Driveway & Railroad Avenue

2020 Baseline Condition
Weekday Evening Peak Hour

Intersection

Int Delay s/veh 0.9

Movement EBT EBR WBL WBT NBL NBR

Lane Configurations	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol. veh/h	28	0	3	16	0	3
Future Vol. veh/h	28	0	3	16	0	3
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage. #	0	-	-	0	0	-
Grade. %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles. %	4	0	0	39	0	0
Mvmt Flow	30	0	3	17	0	3

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	30
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.1
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.2
Pot Cap-1 Maneuver	-	-	1596
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked. %	-	-	-
Mov Cap-1 Maneuver	-	-	1596
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay s	0	1.1	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1050	-	-	1596	-
HCM Lane V/C Ratio	0.003	-	-	0.002	-
HCM Control Delay (s)	8.4	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 6th TWSC
6: MBTA East Driveway & Railroad Avenue

2020 Baseline Condition
Weekday Evening Peak Hour

Intersection

Int Delay s/veh 1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
----------	-----	-----	-----	-----	-----	-----

Lane Configurations						
Traffic Vol. veh/h	23	1	4	12	0	5
Future Vol. veh/h	23	1	4	12	0	5
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage #	0	-	-	0	0	-
Grade. %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles. %	2	2	2	2	2	2
Mvmt Flow	25	1	4	13	0	5

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	26
Stage 1	-	-	26
Stage 2	-	-	21
Critical Hdwy	-	4.12	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	2.218	3.518
Pot Cap-1 Maneuver	-	1588	963
Stage 1	-	-	997
Stage 2	-	-	1002
Platoon blocked. %	-	-	-
Mov Cap-1 Maneuver	-	1588	960
Mov Cap-2 Maneuver	-	-	960
Stage 1	-	-	997
Stage 2	-	-	999

Approach	EB	WB	NB
HCM Control Delay s	0	1.8	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1050	-	-	1588	-
HCM Lane V/C Ratio	0.005	-	-	0.003	-
HCM Control Delay (s)	8.4	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %ile Q(veh)	0	-	-	0	-

HCM 6th TWSC
7: MBTA West Driveway & Railroad Avenue

2020 Baseline Condition
Weekday Evening Peak Hour

Intersection						
Int Delay s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol. veh/h	22	0	1	11	0	2
Future Vol. veh/h	22	0	1	11	0	2
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage #	0	-	-	0	0	-
Grade %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles %	2	2	2	2	2	2
Mvmt Flow	24	0	1	12	0	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	24	0	38	24
Stage 1	-	-	-	-	24	-
Stage 2	-	-	-	-	14	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1591	-	974	1052
Stage 1	-	-	-	-	999	-
Stage 2	-	-	-	-	1009	-
Platoon blocked %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1591	-	973	1052
Mov Cap-2 Maneuver	-	-	-	-	973	-
Stage 1	-	-	-	-	999	-
Stage 2	-	-	-	-	1008	-

Approach	EB		WB		NB
HCM Control Delay s	0		0.6		8.4
HCM LOS					A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1052	-	-	1591	-
HCM Lane V/C Ratio	0.002	-	-	0.001	-
HCM Control Delay (s)	8.4	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 6th TWSC
8: Railroad Avenue & MVRTA Driveway

2020 Baseline Condition
Weekday Evening Peak Hour

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	21	1	10	1	0
Future Vol, veh/h	0	21	1	10	1	0
Conflicting Peds #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage #	-	0	0	-	0	-
Grade %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles %	2	2	2	2	2	2
Mvmt Flow	0	23	1	11	1	0

Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	12	0	-	0	30	7
Stage 1	-	-	-	-	7	-
Stage 2	-	-	-	-	23	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1607	-	-	-	984	1075
Stage 1	-	-	-	-	1016	-
Stage 2	-	-	-	-	1000	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1607	-	-	-	984	1075
Mov Cap-2 Maneuver	-	-	-	-	984	-
Stage 1	-	-	-	-	1016	-
Stage 2	-	-	-	-	1000	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1607	-	-	-	984
HCM Lane V/C Ratio	-	-	-	-	0.001
HCM Control Delay (s)	0	-	-	-	8.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %ile Q(veh)	0	-	-	-	0

2027 Build Condition

Lanes, Volumes, Timings

1: Comeau Bridge & River Street & Washington Street

2027 Build Condition

Weekday Morning Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	397	134	171	363	76	142	66	151	72	136	15
Future Volume (vph)	13	397	134	171	363	76	142	66	151	72	136	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	16	16	16	11	14	14
Storage Length (ft)	0		125	100		150	0		0	200		0
Storage Lanes	0		1	1		1	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.943			0.985	
Flt Protected		0.998		0.950				0.981		0.950		
Satd. Flow (prot)	0	1813	1482	1770	1827	1524	0	1934	0	1745	1996	0
Flt Permitted		0.983		0.212				0.981		0.950		
Satd. Flow (perm)	0	1786	1482	395	1827	1524	0	1934	0	1745	1996	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			132			132		25			4	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		410			486			1100			300	
Travel Time (s)		9.3			11.0			25.0			6.8	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	22%	4%	9%	2%	4%	6%	1%	5%	4%	0%	0%	0%
Adj. Flow (vph)	14	414	140	178	378	79	148	69	157	75	142	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	428	140	178	378	79	0	374	0	75	158	0
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)		12			12			11			11	
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	0.85	0.85	0.85	1.04	0.92	0.92
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Free	pm+pt	NA	Free	Split	NA		Split	NA	

Lanes, Volumes, Timings

1: Comeau Bridge & River Street & Washington Street

2027 Build Condition
Weekday Morning Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases	2		Free	6		Free	8	8		4	4	
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Total Split (s)	45.0	45.0		15.0	60.0		40.0	40.0		40.0	40.0	
Total Split (%)	32.1%	32.1%		10.7%	42.9%		28.6%	28.6%		28.6%	28.6%	
Maximum Green (s)	40.0	40.0		10.0	55.0		35.0	35.0		35.0	35.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		-2.0		-2.0	-2.0					-2.0	-2.0	
Total Lost Time (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		None	Min		None	None		3.0	3.0	
Act Effct Green (s)		31.9	98.5	47.0	47.0	98.5		26.3		15.8	15.8	
Actuated g/C Ratio		0.32	1.00	0.48	0.48	1.00		0.27		0.16	0.16	
v/c Ratio		0.74	0.09	0.50	0.43	0.05		0.70		0.27	0.49	
Control Delay		39.8	0.1	21.9	20.4	0.1		39.6		43.4	45.4	
Queue Delay		0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay		39.8	0.1	21.9	20.4	0.1		39.6		43.4	45.4	
LOS		D	A	C	C	A		D		D	D	
Approach Delay		30.0			18.3			39.6			44.8	
Approach LOS		C			B			D			D	
90th %ile Green (s)	40.0	40.0		10.0	55.0		35.0	35.0		19.9	19.9	
90th %ile Term Code	Max	Max		Max	Hold		Max	Max		Gap	Gap	
70th %ile Green (s)	38.0	38.0		10.0	53.0		29.1	29.1		16.5	16.5	
70th %ile Term Code	Gap	Gap		Max	Hold		Gap	Gap		Gap	Gap	
50th %ile Green (s)	30.3	30.3		10.0	45.3		24.6	24.6		13.9	13.9	
50th %ile Term Code	Gap	Gap		Max	Hold		Gap	Gap		Gap	Gap	
30th %ile Green (s)	24.7	24.7		10.0	39.7		19.9	19.9		11.3	11.3	
30th %ile Term Code	Gap	Gap		Max	Hold		Gap	Gap		Gap	Gap	
10th %ile Green (s)	18.3	18.3		8.0	31.3		14.5	14.5		8.4	8.4	
10th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap		Gap	Gap	
Queue Length 50th (ft)		237	0	63	151	0		198		42	89	
Queue Length 95th (ft)		424	0	135	292	0		354		99	182	
Internal Link Dist (ft)		330			406			1020			220	
Turn Bay Length (ft)			125	100		150				200		
Base Capacity (vph)		795	1482	363	1104	1524		773		684	785	
Starvation Cap Reductn		0	0	0	0	0		0		0	0	
Spillback Cap Reductn		0	0	0	0	0		0		0	0	
Storage Cap Reductn		0	0	0	0	0		0		0	0	
Reduced v/c Ratio		0.54	0.09	0.49	0.34	0.05		0.48		0.11	0.20	

Intersection Summary

Area Type: Other

Cycle Length: 140

Lanes, Volumes, Timings

1: Comeau Bridge & River Street & Washington Street

2027 Build Condition
Weekday Morning Peak Hour

Actuated Cycle Length: 98.5

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 29.8

Intersection Capacity Utilization 82.7%

Intersection LOS: C

ICU Level of Service E

Analysis Period (min) 15

90th %ile Actuated Cycle: 124.9

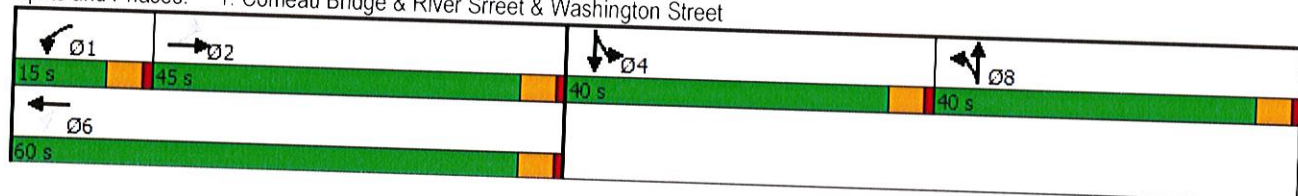
70th %ile Actuated Cycle: 113.6

50th %ile Actuated Cycle: 98.8

30th %ile Actuated Cycle: 85.9

10th %ile Actuated Cycle: 69.2

Splits and Phases: 1: Comeau Bridge & River Street & Washington Street



HCM 6th TWSC
2: S Elm Street/Comeau Bridge & Railroad Avenue

2027 Build Condition
Weekday Morning Peak Hour

Intersection

Int Delay, s/veh 3.5

Movement EBL EBR NBL NBT SBT SBR

Lane Configurations	W			W	W	
Traffic Vol. veh/h	48	47	107	315	406	34
Future Vol. veh/h	48	47	107	315	406	34
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage. #	0	-	-	0	0	-
Grade. %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles. %	27	27	69	2	3	8
Mvmt Flow	51	49	113	332	427	36

Major/Minor Minor2 Major1 Major2

Conflicting Flow All	1003	445	463	0	-	0
Stage 1	445	-	-	-	-	-
Stage 2	558	-	-	-	-	-
Critical Hdwy	6.67	6.47	4.79	-	-	-
Critical Hdwy Stg 1	5.67	-	-	-	-	-
Critical Hdwy Stg 2	5.67	-	-	-	-	-
Follow-up Hdwy	3.743	3.543	2.821	-	-	-
Pot Cap-1 Maneuver	242	564	822	-	-	-
Stage 1	596	-	-	-	-	-
Stage 2	526	-	-	-	-	-
Platoon blocked. %				-	-	-
Mov Cap-1 Maneuver	201	564	822	-	-	-
Mov Cap-2 Maneuver	201	-	-	-	-	-
Stage 1	495	-	-	-	-	-
Stage 2	526	-	-	-	-	-

Approach EB NB SB

HCM Control Delay, s	23.3	2.6	0
HCM LOS	C		

Minor Lane/Major Mvmt NBL NBT EBLn1 SBT SBR

Capacity (veh/h)	822	-	295	-	-
HCM Lane V/C Ratio	0.137	-	0.339	-	-
HCM Control Delay (s)	10.1	0	23.3	-	-
HCM Lane LOS	B	A	C	-	-
HCM 95th %tile Q(veh)	0.5	-	1.5	-	-

HCM 6th AWSC
3: Laurel Avenue & S Elm Street

2027 Build Condition
Weekday Morning Peak Hour

Intersection

Intersection Delay, s/veh 15.9
Intersection LOS C

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol. veh/h	162	36	34	260	245	207
Future Vol. veh/h	162	36	34	260	245	207
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	5	2	4	3	13	4
Mvmt Flow	169	38	35	271	255	216
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	12.1	12.2	19.9
HCM LOS	B	B	C

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	82%	0%	54%
Vol Thru, %	18%	12%	0%
Vol Right, %	0%	88%	46%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	198	294	452
LT Vol	162	0	245
Through Vol	36	34	0
RT Vol	0	260	207
Lane Flow Rate	206	306	471
Geometry Grp	1	1	1
Degree of Util (X)	0.342	0.438	0.699
Departure Headway (Hd)	5.975	5.147	5.341
Convergence, Y/N	Yes	Yes	Yes
Cap	600	698	678
Service Time	4.027	3.195	3.376
HCM Lane V/C Ratio	0.343	0.438	0.695
HCM Control Delay	12.1	12.2	19.9
HCM Lane LOS	B	B	C
HCM 95th-tile Q	1.5	2.2	5.7

HCM 6th TWSC

4: Blossom Street & S Elm Street

2027 Build Condition
Weekday Morning Peak Hour

Intersection

Int Delay. s/veh 0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol. veh/h	278	3	5	282	12	13
Future Vol. veh/h	278	3	5	282	12	13
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage. #	0	-	-	0	0	-
Grade. %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles. %	6	0	0	4	0	0
Mvmt Flow	299	3	5	303	13	14

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	302
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	4.1	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	2.2	-
Pot Cap-1 Maneuver	-	1270	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked. %	-	-	-
Mov Cap-1 Maneuver	-	1270	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay. s	0	0.1	11.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	571	-	-	1270	-
HCM Lane V/C Ratio	0.047	-	-	0.004	-
HCM Control Delay (s)	11.6	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

HCM 6th TWSC
5: Steampunk Cafe Driveway & Railroad Avenue

2027 Build Condition
Weekday Morning Peak Hour

Intersection

Int Delay, s/veh 0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol. veh/h	92	0	3	132	0	0
Future Vol. veh/h	92	0	3	132	0	0
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	32	0	0	46	0	0
Mvmt Flow	100	0	3	143	0	0

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	100
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	4.1	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	2.2	-
Pot Cap-1 Maneuver	-	1505	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	1505	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1505	-
HCM Lane V/C Ratio	-	-	-	0.002	-
HCM Control Delay (s)	0	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0	-

HCM 6th TWSC

6: MBTA East Driveway & Railroad Avenue

2027 Build Condition

Weekday Morning Peak Hour

Intersection

Int Delay, s/veh 3.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol. veh/h	43	0	75	41	0	5
Future Vol. veh/h	43	0	75	41	0	5
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage. #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	0	0	2	0	0
Mvmt Flow	47	0	82	45	0	5

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	47
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	4.1	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	2.2	-
Pot Cap-1 Maneuver	-	1573	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	1573	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.8	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1028	-	-	1573	-
HCM Lane V/C Ratio	0.005	-	-	0.052	-
HCM Control Delay (s)	8.5	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0.2	-

HCM 6th TWSC

7: MBTA West Driveway & Railroad Avenue

2027 Build Condition
Weekday Morning Peak Hour

Intersection

Int Delay. s/veh 0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol. veh/h	25	1	3	32	1	0
Future Vol. veh/h	25	1	3	32	1	0
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage. #	0	-	-	0	0	-
Grade. %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles. %	43	0	0	50	0	0
Mvmt Flow	27	1	3	35	1	0

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	28
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	4.1	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	2.2	-
Pot Cap-1 Maneuver	-	1599	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked. %	-	-	-
Mov Cap-1 Maneuver	-	1599	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay. s	0	0.6	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	939	-	-	1599	-
HCM Lane V/C Ratio	0.001	-	-	0.002	-
HCM Control Delay (s)	8.8	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 6th TWSC

8: Railroad Avenue & MVRTA Driveway

2027 Build Condition
Weekday Morning Peak Hour

Intersection

Int Delay. s/veh 0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol. veh/h	0	25	0	33	1	0
Future Vol. veh/h	0	25	0	33	1	0
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage. #	-	0	0	-	0	-
Grade. %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles. %	0	43	0	50	0	0
Mvmt Flow	0	27	0	36	1	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	36	0	0 45 18
Stage 1	-	-	- 18 -
Stage 2	-	-	- 27 -
Critical Hdwy	4.1	-	- 6.4 6.2
Critical Hdwy Stg 1	-	-	- 5.4 -
Critical Hdwy Stg 2	-	-	- 5.4 -
Follow-up Hdwy	2.2	-	- 3.5 3.3
Pot Cap-1 Maneuver	1588	-	- 970 1066
Stage 1	-	-	- 1010 -
Stage 2	-	-	- 1001 -
Platoon blocked. %	-	-	-
Mov Cap-1 Maneuver	1588	-	- 970 1066
Mov Cap-2 Maneuver	-	-	- 970 -
Stage 1	-	-	- 1010 -
Stage 2	-	-	- 1001 -

Approach	EB	WB	SB
HCM Control Delay. s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1588	-	-	-	970
HCM Lane V/C Ratio	-	-	-	-	0.001
HCM Control Delay (s)	0	-	-	-	8.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

HCM 6th TWSC

9: Railroad Avenue & Eastern Driveway

2027 Build Condition
Weekday Morning Peak Hour

Intersection

Int Delay. s/veh 0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol. veh/h	0	92	135	6	3	0
Future Vol. veh/h	0	92	135	6	3	0
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage. #	-	0	0	-	0	-
Grade. %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles. %	2	2	2	2	2	2
Mvmt Flow	0	100	147	7	3	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	154	0	0 251 151
Stage 1	-	-	- 151 -
Stage 2	-	-	- 100 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1426	-	- 738 895
Stage 1	-	-	- 877 -
Stage 2	-	-	- 924 -
Platoon blocked. %	-	-	-
Mov Cap-1 Maneuver	1426	-	- 738 895
Mov Cap-2 Maneuver	-	-	- 738 -
Stage 1	-	-	- 877 -
Stage 2	-	-	- 924 -

Approach	EB	WB	SB
HCM Control Delay. s	0	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1426	-	-	-	738
HCM Lane V/C Ratio	-	-	-	-	0.004
HCM Control Delay (s)	0	-	-	-	9.9
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

HCM 6th TWSC
10: Railroad Avenue & Central Driveway

2027 Build Condition
Weekday Morning Peak Hour

Intersection

Int Delay, s/veh 1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	70	124	8	22	0
Future Vol, veh/h	0	70	124	8	22	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	76	135	9	24	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	144	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1438	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1438	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1438	-	-	-	772
HCM Lane V/C Ratio	-	-	-	-	0.031
HCM Control Delay (s)	0	-	-	-	9.8
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 6th TWSC
11: Railroad Avenue & Central Driveway (2)

2027 Build Condition
Weekday Morning Peak Hour

Intersection

Int Delay, s/veh 1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol. veh/h	0	48	116	8	22	0
Future Vol. veh/h	0	48	116	8	22	0
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage. #	-	0	0	-	0	-
Grade. %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles. %	2	2	2	2	2	2
Mvmt Flow	0	52	126	9	24	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	135	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1449	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked. %	-	-	-
Mov Cap-1 Maneuver	1449	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1449	-	-	-	806
HCM Lane V/C Ratio	-	-	-	-	0.03
HCM Control Delay (s)	0	-	-	-	9.6
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 6th TWSC

12: Railroad Avenue & Western Driveway

2027 Build Condition
Weekday Morning Peak Hour

Intersection

Int Delay, s/veh 1.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol. veh/h	0	25	35	6	18	0
Future Vol. veh/h	0	25	35	6	18	0
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage. #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	27	38	7	20	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	45	0	0 69 42
Stage 1	-	-	- 42 -
Stage 2	-	-	- 27 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1563	-	- 936 1029
Stage 1	-	-	- 980 -
Stage 2	-	-	- 996 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1563	-	- 936 1029
Mov Cap-2 Maneuver	-	-	- 936 -
Stage 1	-	-	- 980 -
Stage 2	-	-	- 996 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1563	-	-	-	936
HCM Lane V/C Ratio	-	-	-	-	0.021
HCM Control Delay (s)	0	-	-	-	8.9
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lanes, Volumes, Timings

1: Comeau Bridge & River Street & Washington Street

2027 Build Condition

Weekday Evening Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	451	251	229	477	174	212	136	201	99	132	30
Future Volume (vph)	12	451	251	229	477	174	212	136	201	99	132	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	16	16	16	11	14	14
Storage Length (ft)	0		125	100		150	0		0	200		0
Storage Lanes	0		1	1		1	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.951			0.972	
Flt Protected		0.999		0.950				0.981		0.950		
Satd. Flow (prot)	0	1862	1599	1787	1863	1583	0	1989	0	1694	1907	0
Flt Permitted		0.985		0.137				0.981		0.950		
Satd. Flow (perm)	0	1836	1599	258	1863	1583	0	1989	0	1694	1907	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			132			132		20			8	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		410			486			1100			300	
Travel Time (s)		9.3			11.0			25.0			6.8	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	2%	1%	1%	2%	2%	2%	1%	0%	3%	2%	9%
Adj. Flow (vph)	12	465	259	236	492	179	219	140	207	102	136	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	477	259	236	492	179	0	566	0	102	167	0
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)		12			12			11			11	
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	0.85	0.85	0.85	1.04	0.92	0.92
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Free	pm+pt	NA	Free	Split	NA		Split	NA	

Lanes, Volumes, Timings

1: Comeau Bridge & River Street & Washington Street

2027 Build Condition

Weekday Evening Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases	2		Free	6		Free						
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Total Split (s)	45.0	45.0		15.0	60.0		40.0	40.0		40.0	40.0	
Total Split (%)	32.1%	32.1%		10.7%	42.9%		28.6%	28.6%		28.6%	28.6%	
Maximum Green (s)	40.0	40.0		10.0	55.0		35.0	35.0		35.0	35.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		-2.0		-2.0	-2.0			-2.0		-2.0	-2.0	
Total Lost Time (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effct Green (s)		36.3	114.9	51.4	51.4	114.9		37.3		17.1	17.1	
Actuated g/C Ratio		0.32	1.00	0.45	0.45	1.00		0.32		0.15	0.15	
v/c Ratio		0.82	0.16	0.86	0.59	0.11		0.86		0.41	0.58	
Control Delay		49.5	0.2	50.9	27.6	0.1		51.0		50.4	52.4	
Queue Delay		0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay		49.5	0.2	50.9	27.6	0.1		51.0		50.4	52.4	
LOS		D	A	D	C	A		D		D	D	
Approach Delay		32.1			28.2			51.0			51.6	
Approach LOS		C			C			D			D	
90th %ile Green (s)	40.0	40.0		10.0	55.0		35.0	35.0		21.2	21.2	
90th %ile Term Code	Max	Max		Max	Hold		Max	Max		Gap	Gap	
70th %ile Green (s)	40.0	40.0		10.0	55.0		35.0	35.0		17.6	17.6	
70th %ile Term Code	Max	Max		Max	Hold		Max	Max		Gap	Gap	
50th %ile Green (s)	37.4	37.4		10.0	52.4		35.0	35.0		15.3	15.3	
50th %ile Term Code	Gap	Gap		Max	Hold		Max	Max		Gap	Gap	
30th %ile Green (s)	31.1	31.1		10.0	46.1		35.0	35.0		12.9	12.9	
30th %ile Term Code	Gap	Gap		Max	Hold		Max	Max		Gap	Gap	
10th %ile Green (s)	24.4	24.4		10.0	39.4		35.0	35.0		9.5	9.5	
10th %ile Term Code	Gap	Gap		Max	Hold		Max	Max		Gap	Gap	
Queue Length 50th (ft)		324	0	108	266	0		395		71	114	
Queue Length 95th (ft)		486	0	#266	406	0		#668		129	190	
Internal Link Dist (ft)		330			406			1020			220	
Turn Bay Length (ft)			125	100		150				200		
Base Capacity (vph)		676	1599	276	931	1583		659		549	624	
Starvation Cap Reductn		0	0	0	0	0		0		0	0	
Spillback Cap Reductn		0	0	0	0	0		0		0	0	
Storage Cap Reductn		0	0	0	0	0		0		0	0	
Reduced v/c Ratio		0.71	0.16	0.86	0.53	0.11		0.86		0.19	0.27	

Intersection Summary

Area Type: Other

Cycle Length: 140

Lanes, Volumes, Timings

1: Comeau Bridge & River Street & Washington Street

2027 Build Condition
Weekday Evening Peak Hour

Actuated Cycle Length: 114.9

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 37.1

Intersection Capacity Utilization 102.8%

Analysis Period (min) 15

Intersection LOS: D

ICU Level of Service G

90th %ile Actuated Cycle: 126.2

70th %ile Actuated Cycle: 122.6

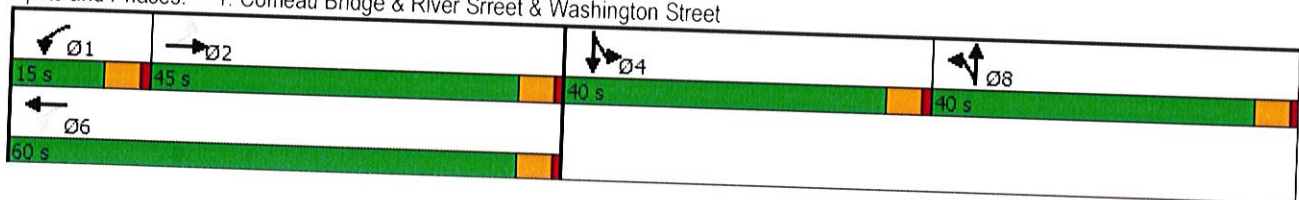
50th %ile Actuated Cycle: 117.7

30th %ile Actuated Cycle: 109

10th %ile Actuated Cycle: 98.9

95th percentile volume exceeds capacity. queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Comeau Bridge & River Street & Washington Street



HCM 6th TWSC

2: S Elm Street/Comeau Bridge & Railroad Avenue

2027 Build Condition
Weekday Evening Peak Hour

Intersection

Int Delay. s/veh 3.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↑	
Traffic Vol. veh/h	48	69	54	501	565	47
Future Vol. veh/h	48	69	54	501	565	47
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage. #	0	-	-	0	0	-
Grade. %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles. %	8	0	40	0	1	0
Mvmt Flow	51	73	57	533	601	50

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1273	626	651
Stage 1	626	-	-
Stage 2	647	-	-
Critical Hdwy	6.48	6.2	4.5
Critical Hdwy Stg 1	5.48	-	-
Critical Hdwy Stg 2	5.48	-	-
Follow-up Hdwy	3.572	3.3	2.56
Pot Cap-1 Maneuver	179	488	779
Stage 1	522	-	-
Stage 2	510	-	-
Platoon blocked. %	-	-	-
Mov Cap-1 Maneuver	160	488	779
Mov Cap-2 Maneuver	160	-	-
Stage 1	468	-	-
Stage 2	510	-	-

Approach	EB	NB	SB
HCM Control Delay. s	30.1	1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	779	-	265	-
HCM Lane V/C Ratio	0.074	-	0.47	-
HCM Control Delay (s)	10	0	30.1	-
HCM Lane LOS	A	A	D	-
HCM 95th %tile Q(veh)	0.2	-	2.3	-

HCM 6th AWSC
3: Laurel Avenue & S Elm Street

2027 Build Condition
Weekday Evening Peak Hour

Intersection

Intersection Delay, s/veh 60.2
Intersection LOS F

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol. veh/h	207	73	71	348	368	267
Future Vol. veh/h	207	73	71	348	368	267
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	4	2	1	1	2	0
Mvmt Flow	220	78	76	370	391	284
Number of Lanes	0	1	1	0	1	0
Approach	EB		WB		SB	
Opposing Approach	WB		EB			
Opposing Lanes	1		1		0	
Conflicting Approach Left	SB				WB	
Conflicting Lanes Left	1		0		1	
Conflicting Approach Right			SB		EB	
Conflicting Lanes Right	0		1		1	
HCM Control Delay	19.6		25.4		101.1	
HCM LOS	C		D		F	

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	74%	0%	58%
Vol Thru, %	26%	17%	0%
Vol Right, %	0%	83%	42%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	280	419	635
LT Vol	207	0	368
Through Vol	73	71	0
RT Vol	0	348	267
Lane Flow Rate	298	446	676
Geometry Grp	1	1	1
Degree of Util (X)	0.569	0.741	1.13
Departure Headway (Hd)	7.326	6.381	6.02
Convergence, Y/N	Yes	Yes	Yes
Cap	494	571	601
Service Time	5.326	4.381	4.066
HCM Lane V/C Ratio	0.603	0.781	1.125
HCM Control Delay	19.6	25.4	101.1
HCM Lane LOS	C	D	F
HCM 95th-tile Q	3.5	6.4	21.4

HCM 6th TWSC

4: Blossom Street & S Elm Street

2027 Build Condition
Weekday Evening Peak Hour

Intersection

Int Delay, s/veh 0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰			↱	↰	↱
Traffic Vol. veh/h	413	28	26	403	16	6
Future Vol. veh/h	413	28	26	403	16	6
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage. #	0	-	-	0	0	-
Grade. %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles. %	0	5	0	0	8	0
Mvmt Flow	435	29	27	424	17	6

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	464
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	4.1	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	2.2	-
Pot Cap-1 Maneuver	-	1108	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked. %	-	-	-
Mov Cap-1 Maneuver	-	1108	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	16.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	330	-	-	1108	-
HCM Lane V/C Ratio	0.07	-	-	0.025	-
HCM Control Delay (s)	16.7	-	-	8.3	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

HCM 6th TWSC

5: Steampunk Cafe Driveway & Railroad Avenue

2027 Build Condition

Weekday Evening Peak Hour

Intersection

Int Delay. s/veh 0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol. veh/h	94	0	3	80	0	3
Future Vol. veh/h	94	0	3	80	0	3
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage. #	0	-	-	0	0	-
Grade. %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles. %	2	2	2	2	2	2
Mvmt Flow	102	0	3	87	0	3

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	102
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	4.12	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	2.218	-
Pot Cap-1 Maneuver	-	1490	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked. %	-	-	-
Mov Cap-1 Maneuver	-	1490	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay. s	0	0.3	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	953	-	-	1490	-
HCM Lane V/C Ratio	0.003	-	-	0.002	-
HCM Control Delay (s)	8.8	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 6th TWSC
6: MBTA East Driveway & Railroad Avenue

2027 Build Condition
Weekday Evening Peak Hour

Intersection

Int Delay. s/veh 2.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol. veh/h	36	1	4	32	0	28
Future Vol. veh/h	36	1	4	32	0	28
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage. #	0	-	-	0	0	-
Grade. %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles. %	2	2	2	2	2	2
Mvmt Flow	39	1	4	35	0	30

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	40
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	4.12	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	2.218	-
Pot Cap-1 Maneuver	-	1570	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked. %	-	-	-
Mov Cap-1 Maneuver	-	1570	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay. s	0	0.8	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1031	-	-	1570	-
HCM Lane V/C Ratio	0.03	-	-	0.003	-
HCM Control Delay (s)	8.6	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

HCM 6th TWSC

7: MBTA West Driveway & Railroad Avenue

2027 Build Condition
Weekday Evening Peak Hour

Intersection

Int Delay, s/veh 0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	24	0	1	12	0	2
Future Vol, veh/h	24	0	1	12	0	2
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	0	1	13	0	2

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	26
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	4.12	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	2.218	-
Pot Cap-1 Maneuver	-	1588	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	1588	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1050	-	-	1588	-
HCM Lane V/C Ratio	0.002	-	-	0.001	-
HCM Control Delay (s)	8.4	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 6th TWSC

8: Railroad Avenue & MVRTA Driveway

2027 Build Condition
Weekday Evening Peak Hour

Intersection

Int Delay. s/veh 0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol. veh/h	0	23	1	11	1	0
Future Vol. veh/h	0	23	1	11	1	0
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage. #	-	0	0	-	0	-
Grade. %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles. %	2	2	2	2	2	2
Mvmt Flow	0	25	1	12	1	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	13	0	0 32 7
Stage 1	-	-	- 7 -
Stage 2	-	-	- 25 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1606	-	- 982 1075
Stage 1	-	-	- 1016 -
Stage 2	-	-	- 998 -
Platoon blocked. %	-	-	-
Mov Cap-1 Maneuver	1606	-	- 982 1075
Mov Cap-2 Maneuver	-	-	- 982 -
Stage 1	-	-	- 1016 -
Stage 2	-	-	- 998 -

Approach	EB	WB	SB
HCM Control Delay. s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1606	-	-	-	982
HCM Lane V/C Ratio	-	-	-	-	0.001
HCM Control Delay (s)	0	-	-	-	8.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

HCM 6th TWSC

9: Railroad Avenue & Eastern Driveway

2027 Build Condition

Weekday Evening Peak Hour

Intersection

Int Delay. s/veh 0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol. veh/h	0	97	83	18	20	0
Future Vol. veh/h	0	97	83	18	20	0
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage. #	-	0	0	-	0	-
Grade. %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles. %	2	2	2	2	2	2
Mvmt Flow	0	105	90	20	22	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	110	0	0 205 100
Stage 1	-	-	- 100 -
Stage 2	-	-	- 105 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1480	-	- 783 956
Stage 1	-	-	- 924 -
Stage 2	-	-	- 919 -
Platoon blocked. %	-	-	- -
Mov Cap-1 Maneuver	1480	-	- 783 956
Mov Cap-2 Maneuver	-	-	- 783 -
Stage 1	-	-	- 924 -
Stage 2	-	-	- 919 -

Approach	EB	WB	SB
HCM Control Delay. s	0	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1480	-	-	-	783
HCM Lane V/C Ratio	-	-	-	-	0.028
HCM Control Delay (s)	0	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 6th TWSC

10: Railroad Avenue & Central Driveway

2027 Build Condition

Weekday Evening Peak Hour

Intersection

Int Delay. s/veh 0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol. veh/h	0	79	58	22	15	0
Future Vol. veh/h	0	79	58	22	15	0
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage. #	-	0	0	-	0	-
Grade. %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles. %	2	2	2	2	2	2
Mvmt Flow	0	86	63	24	16	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	87	0	0 161 75
Stage 1	-	-	- 75 -
Stage 2	-	-	- 86 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1509	-	- 830 986
Stage 1	-	-	- 948 -
Stage 2	-	-	- 937 -
Platoon blocked. %	-	-	-
Mov Cap-1 Maneuver	1509	-	- 830 986
Mov Cap-2 Maneuver	-	-	- 830 -
Stage 1	-	-	- 948 -
Stage 2	-	-	- 937 -

Approach	EB	WB	SB
HCM Control Delay. s	0	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1509	-	-	-	830
HCM Lane V/C Ratio	-	-	-	-	0.02
HCM Control Delay (s)	0	-	-	-	9.4
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 6th TWSC

11: Railroad Avenue & Central Driveway (2)

2027 Build Condition
Weekday Evening Peak Hour

Intersection

Int Delay. s/veh

1

Movement

EBL EBT WBT WBR SBL SBR

Lane Configurations						
Traffic Vol. veh/h	0	64	36	22	15	0
Future Vol. veh/h	0	64	36	22	15	0
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage. #	-	0	0	-	0	-
Grade. %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles. %	2	2	2	2	2	2
Mvmt Flow	0	70	39	24	16	0

Major/Minor

Major1

Major2

Minor2

Conflicting Flow All	63	0	-	0	121	51
Stage 1	-	-	-	-	51	-
Stage 2	-	-	-	-	70	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1540	-	-	-	874	1017
Stage 1	-	-	-	-	971	-
Stage 2	-	-	-	-	953	-
Platoon blocked. %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1540	-	-	-	874	1017
Mov Cap-2 Maneuver	-	-	-	-	874	-
Stage 1	-	-	-	-	971	-
Stage 2	-	-	-	-	953	-

Approach

EB

WB

SB

HCM Control Delay. s

0

0

9.2

HCM LOS

A

Minor Lane/Major Mvmt

EBL EBT WBT WBR SBLn1

Capacity (veh/h)	1540	-	-	-	874
HCM Lane V/C Ratio	-	-	-	-	0.019
HCM Control Delay (s)	0	-	-	-	9.2
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 6th TWSC
12: Railroad Avenue & Western Driveway

2027 Build Condition
Weekday Evening Peak Hour

Intersection

Int Delay, s/veh 1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	26	13	19	11	0
Future Vol, veh/h	0	26	13	19	11	0
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	28	14	21	12	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	35	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1576	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1576	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1576	-	-	-	955
HCM Lane V/C Ratio	-	-	-	-	0.013
HCM Control Delay (s)	0	-	-	-	8.8
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

2027 Build (Mitigated)

Lanes, Volumes, Timings

2027 Build Condition - Signalized Alternative

1: S Elm Street/Comeau Bridge & Railroad Avenue

Weekday Morning Peak Hour

							
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Lane Configurations							
Traffic Volume (vph)	48	47	107	315	406	34	
Future Volume (vph)	48	47	107	315	406	34	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	15	15	15	15	15	15	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.934				0.990		
Flt Protected	0.975			0.987			
Satd. Flow (prot)	1499	0	0	1733	2001	0	
Flt Permitted	0.975			0.796			
Satd. Flow (perm)	1499	0	0	1398	2001	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	46				5		
Link Speed (mph)	30			30	30		
Link Distance (ft)	200			170	1100		
Travel Time (s)	4.5			3.9	25.0		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	
Heavy Vehicles (%)	27%	27%	69%	2%	3%	8%	
Adj. Flow (vph)	51	49	113	332	427	36	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	100	0	0	445	463	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	15			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	0.88	0.88	0.88	0.88	0.88	0.88	
Turning Speed (mph)	15	9	15			9	
Number of Detectors	1		1	2	2		
Detector Template	Left		Left	Thru	Thru		
Leading Detector (ft)	20		20	100	100		
Trailing Detector (ft)	0		0	0	0		
Detector 1 Position(ft)	0		0	0	0		
Detector 1 Size(ft)	20		20	6	6		
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0		0.0	0.0	0.0		
Detector 1 Queue (s)	0.0		0.0	0.0	0.0		
Detector 1 Delay (s)	0.0		0.0	0.0	0.0		
Detector 2 Position(ft)				94	94		
Detector 2 Size(ft)				6	6		
Detector 2 Type				CI+Ex	CI+Ex		
Detector 2 Channel							
Detector 2 Extend (s)				0.0	0.0		
Turn Type	Prot		D.P+P	NA	NA		
Protected Phases	5		3	13	1		9
Permitted Phases			1				
Detector Phase	5		3	1	1		

Lanes, Volumes, Timings

1: S Elm Street/Comeau Bridge & Railroad Avenue

2027 Build Condition - Signalized Alternative

Weekday Morning Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Switch Phase							
Minimum Initial (s)	6.0		6.0		8.0		5.0
Minimum Split (s)	11.0		11.0		13.0		20.0
Total Split (s)	15.0		20.0		30.0		20.0
Total Split (%)	17.6%		23.5%		35.3%		24%
Maximum Green (s)	10.0		15.0		25.0		16.0
Yellow Time (s)	3.0		3.0		3.0		2.0
All-Red Time (s)	2.0		2.0		2.0		2.0
Lost Time Adjust (s)	0.0				0.0		
Total Lost Time (s)	5.0				5.0		
Lead/Lag			Lead				Lag
Lead-Lag Optimize?			Yes				Yes
Vehicle Extension (s)	3.0		3.0		3.0		3.0
Recall Mode	None		None		Min		None
Walk Time (s)							7.0
Flash Dont Walk (s)							9.0
Pedestrian Calls (#/hr)							0
Act Effct Green (s)	7.7			37.8	26.6		
Actuated g/C Ratio	0.13			0.65	0.46		
v/c Ratio	0.42			0.46	0.50		
Control Delay	20.8			5.8	15.6		
Queue Delay	0.0			0.4	0.0		
Total Delay	20.8			6.2	15.6		
LOS	C			A	B		
Approach Delay	20.8			6.2	15.6		
Approach LOS	C			A	B		
90th %ile Green (s)	10.0		15.0		25.0		0.0
90th %ile Term Code	Max		Max		Max		Skip
70th %ile Green (s)	9.2		13.4		25.0		0.0
70th %ile Term Code	Gap		Gap		Max		Skip
50th %ile Green (s)	7.6		11.4		25.0		0.0
50th %ile Term Code	Gap		Gap		Max		Skip
30th %ile Green (s)	6.2		9.6		25.0		0.0
30th %ile Term Code	Gap		Gap		Max		Skip
10th %ile Green (s)	0.0		7.5		30.4		0.0
10th %ile Term Code	Skip		Gap		Dwell		Skip
Queue Length 50th (ft)	18			60	116		
Queue Length 95th (ft)	58			115	227		
Internal Link Dist (ft)	120			90	1020		
Turn Bay Length (ft)							
Base Capacity (vph)	299			975	919		
Starvation Cap Reductn	0			187	0		
Spillback Cap Reductn	0			0	0		
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.33			0.56	0.50		

Intersection Summary

Area Type: Other

Cycle Length: 85

Lanes, Volumes, Timings

1: S Elm Street/Comeau Bridge & Railroad Avenue

2027 Build Condition - Signalized Alternative

Weekday Morning Peak Hour

Actuated Cycle Length: 58.1

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 12.0

Intersection Capacity Utilization 64.0%

Analysis Period (min) 15

90th %ile Actuated Cycle: 65

70th %ile Actuated Cycle: 62.6

50th %ile Actuated Cycle: 59

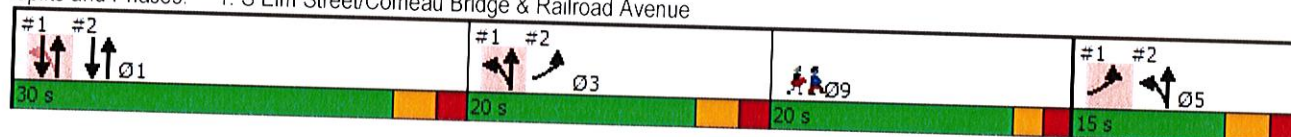
30th %ile Actuated Cycle: 55.8

10th %ile Actuated Cycle: 47.9

Intersection LOS: B

ICU Level of Service B

Splits and Phases: 1: S Elm Street/Comeau Bridge & Railroad Avenue



Lanes, Volumes, Timings
2: S Elm Street & Laurel Avenue

2027 Build Condition - Signalized Alternative
Weekday Morning Peak Hour

							
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Lane Configurations							
Traffic Volume (vph)	162	36	34	260	245	207	
Future Volume (vph)	162	36	34	260	245	207	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	15	15	11	15	15	15	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.975				0.938		
Flt Protected	0.961		0.950				
Satd. Flow (prot)	1875	0	1678	2029	1801	0	
Flt Permitted	0.961		0.950				
Satd. Flow (perm)	1875	0	1678	2029	1801	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	12				51		
Link Speed (mph)	30			30	30		
Link Distance (ft)	200			150	170		
Travel Time (s)	4.5			3.4	3.9		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	
Heavy Vehicles (%)	5%	2%	4%	3%	13%	4%	
Adj. Flow (vph)	169	38	35	271	255	216	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	207	0	35	271	471	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	15			11	11		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	0.88	0.88	1.04	0.88	0.88	0.88	
Turning Speed (mph)	15	9	15			9	
Number of Detectors	1		1	2	2		
Detector Template	Left		Left	Thru	Thru		
Leading Detector (ft)	20		20	100	100		
Trailing Detector (ft)	0		0	0	0		
Detector 1 Position(ft)	0		0	0	0		
Detector 1 Size(ft)	20		20	6	6		
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0		0.0	0.0	0.0		
Detector 1 Queue (s)	0.0		0.0	0.0	0.0		
Detector 1 Delay (s)	0.0		0.0	0.0	0.0		
Detector 2 Position(ft)				94	94		
Detector 2 Size(ft)				6	6		
Detector 2 Type				CI+Ex	CI+Ex		
Detector 2 Channel							
Detector 2 Extend (s)				0.0	0.0		
Turn Type	Prot		Prot	NA	NA		
Protected Phases	3		5	1 5	1		9
Permitted Phases							
Detector Phase	3		5	1	1		

Lanes, Volumes, Timings
2: S Elm Street & Laurel Avenue

2027 Build Condition - Signalized Alternative
Weekday Morning Peak Hour

							
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Switch Phase							
Minimum Initial (s)	6.0		6.0		8.0		5.0
Minimum Split (s)	11.0		11.0		13.0		20.0
Total Split (s)	20.0		15.0		30.0		20.0
Total Split (%)	23.5%		17.6%		35.3%		24%
Maximum Green (s)	15.0		10.0		25.0		16.0
Yellow Time (s)	3.0		3.0		3.0		2.0
All-Red Time (s)	2.0		2.0		2.0		2.0
Lost Time Adjust (s)	0.0		0.0		0.0		
Total Lost Time (s)	5.0		5.0		5.0		
Lead/Lag	Lead						Lag
Lead-Lag Optimize?	Yes						Yes
Vehicle Extension (s)	3.0		3.0		3.0		3.0
Recall Mode	None		None		Min		None
Walk Time (s)							7.0
Flash Dont Walk (s)							9.0
Pedestrian Calls (#/hr)							0
Act Effct Green (s)	11.2		7.7	36.7	26.6		
Actuated g/C Ratio	0.19		0.13	0.63	0.46		
v/c Ratio	0.56		0.16	0.21	0.55		
Control Delay	26.7		25.3	5.4	4.3		
Queue Delay	0.0		0.0	0.0	0.0		
Total Delay	26.7		25.3	5.4	4.3		
LOS	C		C	A	A		
Approach Delay	26.7			7.7	4.3		
Approach LOS	C			A	A		
90th %ile Green (s)	15.0		10.0		25.0		0.0
90th %ile Term Code	Max		Max		Max		Skip
70th %ile Green (s)	13.4		9.2		25.0		0.0
70th %ile Term Code	Gap		Gap		Max		Skip
50th %ile Green (s)	11.4		7.6		25.0		0.0
50th %ile Term Code	Gap		Gap		Max		Skip
30th %ile Green (s)	9.6		6.2		25.0		0.0
30th %ile Term Code	Gap		Gap		Max		Skip
10th %ile Green (s)	7.5		0.0		30.4		0.0
10th %ile Term Code	Gap		Skip		Dwell		Skip
Queue Length 50th (ft)	63		11	33	17		
Queue Length 95th (ft)	124		35	71	31		
Internal Link Dist (ft)	120			70	90		
Turn Bay Length (ft)							
Base Capacity (vph)	498		292	1283	852		
Starvation Cap Reductn	0		0	0	11		
Spillback Cap Reductn	0		0	126	0		
Storage Cap Reductn	0		0	0	0		
Reduced v/c Ratio	0.42		0.12	0.23	0.56		
Intersection Summary							
Area Type:	Other						
Cycle Length: 85							

Lanes, Volumes, Timings
2: S Elm Street & Laurel Avenue

2027 Build Condition - Signalized Alternative
Weekday Morning Peak Hour

Actuated Cycle Length: 58.1

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 10.1

Intersection Capacity Utilization 47.8%

Analysis Period (min) 15

90th %ile Actuated Cycle: 65

70th %ile Actuated Cycle: 62.6

50th %ile Actuated Cycle: 59

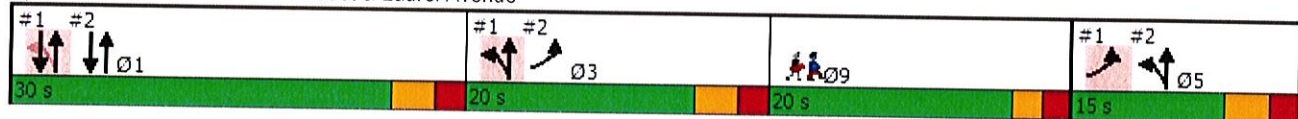
30th %ile Actuated Cycle: 55.8

10th %ile Actuated Cycle: 47.9

Intersection LOS: B

ICU Level of Service A

Splits and Phases: 2: S Elm Street & Laurel Avenue



Lanes, Volumes, Timings

2027 Build Condition - Signalized Alternative

1: S Elm Street/Comeau Bridge & Railroad Avenue

Weekday Evening Peak Hour

							
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Lane Configurations							
Traffic Volume (vph)	48	69	54	501	565	47	
Future Volume (vph)	48	69	54	501	565	47	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	15	15	15	15	15	15	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.921				0.990		
Flt Protected	0.980			0.995			
Satd. Flow (prot)	1826	0	0	2002	2050	0	
Flt Permitted	0.980			0.852			
Satd. Flow (perm)	1826	0	0	1714	2050	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	57				5		
Link Speed (mph)	30			30	30		
Link Distance (ft)	200			170	1100		
Travel Time (s)	4.5			3.9	25.0		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	
Heavy Vehicles (%)	8%	0%	40%	0%	1%	0%	
Adj. Flow (vph)	51	73	57	533	601	50	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	124	0	0	590	651	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	15			0	0		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	0.88	0.88	0.88	0.88	0.88	0.88	
Turning Speed (mph)	15	9	15			9	
Number of Detectors	1		1	2	2		
Detector Template	Left		Left	Thru	Thru		
Leading Detector (ft)	20		20	100	100		
Trailing Detector (ft)	0		0	0	0		
Detector 1 Position(ft)	0		0	0	0		
Detector 1 Size(ft)	20		20	6	6		
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0		0.0	0.0	0.0		
Detector 1 Queue (s)	0.0		0.0	0.0	0.0		
Detector 1 Delay (s)	0.0		0.0	0.0	0.0		
Detector 2 Position(ft)				94	94		
Detector 2 Size(ft)				6	6		
Detector 2 Type				CI+Ex	CI+Ex		
Detector 2 Channel							
Detector 2 Extend (s)				0.0	0.0		
Turn Type	Prot		D.P+P	NA	NA		
Protected Phases	5		3	13	1		9
Permitted Phases			1				
Detector Phase	5		3	1	1		

Lanes, Volumes, Timings

2027 Build Condition - Signalized Alternative

1: S Elm Street/Comeau Bridge & Railroad Avenue

Weekday Evening Peak Hour

							
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Switch Phase							
Minimum Initial (s)	6.0		6.0		8.0		5.0
Minimum Split (s)	11.0		11.0		13.0		20.0
Total Split (s)	15.0		25.0		40.0		20.0
Total Split (%)	15.0%		25.0%		40.0%		20%
Maximum Green (s)	10.0		20.0		35.0		16.0
Yellow Time (s)	3.0		3.0		3.0		2.0
All-Red Time (s)	2.0		2.0		2.0		2.0
Lost Time Adjust (s)	0.0				0.0		
Total Lost Time (s)	5.0				5.0		
Lead/Lag			Lag		Lead		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	3.0		3.0		3.0		3.0
Recall Mode	None		None		Min		None
Walk Time (s)							7.0
Flash Dont Walk (s)							9.0
Pedestrian Calls (#/hr)							0
Act Effct Green (s)	8.4			51.6	35.1		
Actuated g/C Ratio	0.11			0.69	0.47		
v/c Ratio	0.49			0.48	0.68		
Control Delay	25.8			6.0	20.8		
Queue Delay	0.0			0.6	0.0		
Total Delay	25.8			6.6	20.9		
LOS	C			A	C		
Approach Delay	25.8			6.6	20.9		
Approach LOS	C			A	C		
90th %ile Green (s)	10.0		20.0		35.0		0.0
90th %ile Term Code	Max		Max		Max		Skip
70th %ile Green (s)	10.0		19.9		35.0		0.0
70th %ile Term Code	Max		Gap		Max		Skip
50th %ile Green (s)	8.8		17.2		35.0		0.0
50th %ile Term Code	Gap		Gap		Max		Skip
30th %ile Green (s)	7.5		14.6		35.0		0.0
30th %ile Term Code	Gap		Gap		Max		Skip
10th %ile Green (s)	6.0		11.2		35.0		0.0
10th %ile Term Code	Min		Gap		Max		Skip
Queue Length 50th (ft)	30			107	230		
Queue Length 95th (ft)	81			185	383		
Internal Link Dist (ft)	120			90	1020		
Turn Bay Length (ft)							
Base Capacity (vph)	293			1241	962		
Starvation Cap Reductn	0			318	0		
Spillback Cap Reductn	0			0	3		
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.42			0.64	0.68		

Intersection Summary

Area Type: Other

Cycle Length: 100

Lanes, Volumes, Timings

2027 Build Condition - Signalized Alternative

1: S Elm Street/Comeau Bridge & Railroad Avenue

Weekday Evening Peak Hour

Actuated Cycle Length: 75

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 15.1

Intersection LOS: B

Intersection Capacity Utilization 81.3%

ICU Level of Service D

Analysis Period (min) 15

90th %ile Actuated Cycle: 80

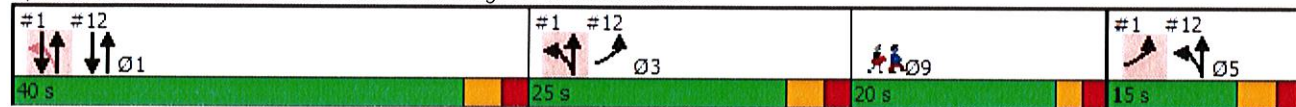
70th %ile Actuated Cycle: 79.9

50th %ile Actuated Cycle: 76

30th %ile Actuated Cycle: 72.1

10th %ile Actuated Cycle: 67.2

Splits and Phases: 1: S Elm Street/Comeau Bridge & Railroad Avenue



Lanes, Volumes, Timings
12: S Elm Street & Laurel Avenue

2027 Build Condition - Signalized Alternative
Weekday Evening Peak Hour

							
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Lane Configurations							
Traffic Volume (vph)	207	73	71	348	368	267	
Future Volume (vph)	207	73	71	348	368	267	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	15	15	11	15	15	15	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.965				0.943		
Flt Protected	0.964		0.950				
Satd. Flow (prot)	1879	0	1728	2069	1948	0	
Flt Permitted	0.964		0.950				
Satd. Flow (perm)	1879	0	1728	2069	1948	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	16				40		
Link Speed (mph)	30			30	30		
Link Distance (ft)	200			150	170		
Travel Time (s)	4.5			3.4	3.9		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	
Heavy Vehicles (%)	4%	2%	1%	1%	2%	0%	
Adj. Flow (vph)	220	78	76	370	391	284	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	298	0	76	370	675	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	15			11	11		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	0.88	0.88	1.04	0.88	0.88	0.88	
Turning Speed (mph)	15	9	15			9	
Number of Detectors	1		1	2	2		
Detector Template	Left		Left	Thru	Thru		
Leading Detector (ft)	20		20	100	100		
Trailing Detector (ft)	0		0	0	0		
Detector 1 Position(ft)	0		0	0	0		
Detector 1 Size(ft)	20		20	6	6		
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0		0.0	0.0	0.0		
Detector 1 Queue (s)	0.0		0.0	0.0	0.0		
Detector 1 Delay (s)	0.0		0.0	0.0	0.0		
Detector 2 Position(ft)				94	94		
Detector 2 Size(ft)				6	6		
Detector 2 Type				CI+Ex	CI+Ex		
Detector 2 Channel							
Detector 2 Extend (s)				0.0	0.0		
Turn Type	Prot		Prot	NA	NA		
Protected Phases	3		5	1 5	1		9
Permitted Phases							
Detector Phase	3		5	1	1		

Lanes, Volumes, Timings
12: S Elm Street & Laurel Avenue

2027 Build Condition - Signalized Alternative
Weekday Evening Peak Hour

							
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø9
Switch Phase							
Minimum Initial (s)	6.0		6.0		8.0		5.0
Minimum Split (s)	11.0		11.0		13.0		20.0
Total Split (s)	25.0		15.0		40.0		20.0
Total Split (%)	25.0%		15.0%		40.0%		20%
Maximum Green (s)	20.0		10.0		35.0		16.0
Yellow Time (s)	3.0		3.0		3.0		2.0
All-Red Time (s)	2.0		2.0		2.0		2.0
Lost Time Adjust (s)	0.0		0.0		0.0		
Total Lost Time (s)	5.0		5.0		5.0		
Lead/Lag	Lag				Lead		
Lead-Lag Optimize?	Yes				Yes		
Vehicle Extension (s)	3.0		3.0		3.0		3.0
Recall Mode	None		None		Min		None
Walk Time (s)							7.0
Flash Dont Walk (s)							9.0
Pedestrian Calls (#/hr)							0
Act Effct Green (s)	16.4		8.4	48.5	35.1		
Actuated g/C Ratio	0.22		0.11	0.65	0.47		
v/c Ratio	0.70		0.39	0.28	0.72		
Control Delay	35.4		38.3	6.8	7.0		
Queue Delay	0.0		0.0	0.1	0.1		
Total Delay	35.4		38.3	6.9	7.1		
LOS	D		D	A	A		
Approach Delay	35.4			12.3	7.1		
Approach LOS	D			B	A		
90th %ile Green (s)	20.0		10.0		35.0		0.0
90th %ile Term Code	Max		Max		Max		Skip
70th %ile Green (s)	19.9		10.0		35.0		0.0
70th %ile Term Code	Gap		Max		Max		Skip
50th %ile Green (s)	17.2		8.8		35.0		0.0
50th %ile Term Code	Gap		Gap		Max		Skip
30th %ile Green (s)	14.6		7.5		35.0		0.0
30th %ile Term Code	Gap		Gap		Max		Skip
10th %ile Green (s)	11.2		6.0		35.0		0.0
10th %ile Term Code	Gap		Min		Max		Skip
Queue Length 50th (ft)	122		34	66	36		
Queue Length 95th (ft)	206		76	117	69		
Internal Link Dist (ft)	120			70	90		
Turn Bay Length (ft)							
Base Capacity (vph)	514		231	1339	933		
Starvation Cap Reductn	0		0	0	12		
Spillback Cap Reductn	2		0	299	0		
Storage Cap Reductn	0		0	0	0		
Reduced v/c Ratio	0.58		0.33	0.36	0.73		

Intersection Summary

Area Type: Other

Cycle Length: 100

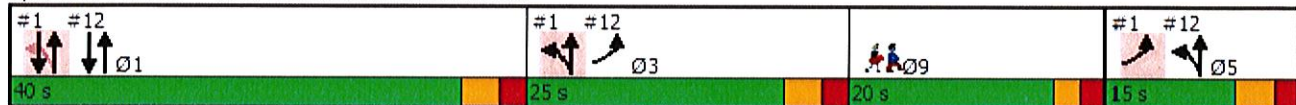
Lanes, Volumes, Timings
12: S Elm Street & Laurel Avenue

2027 Build Condition - Signalized Alternative
Weekday Evening Peak Hour

Actuated Cycle Length: 75
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 14.7
Intersection Capacity Utilization 69.1%
Analysis Period (min) 15
90th %ile Actuated Cycle: 80
70th %ile Actuated Cycle: 79.9
50th %ile Actuated Cycle: 76
30th %ile Actuated Cycle: 72.1
10th %ile Actuated Cycle: 67.2

Intersection LOS: B
ICU Level of Service C

Splits and Phases: 12: S Elm Street & Laurel Avenue



□ Signal Warrant Analysis

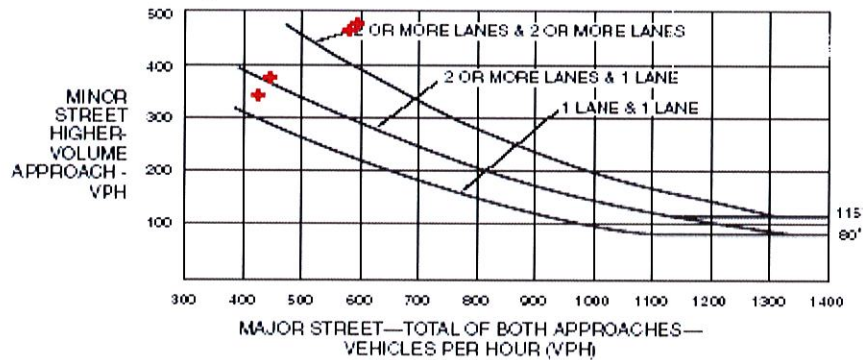
MUTCD Traffic Signal Warrant #2 Analysis

Project Name 1089 - Haverhill, MA
 Date Existing
 100% Right Turns From EB

	Street Name	Direction
Major 1	S Elm Street	NB
Major 2	S Elm Street	SB
Minor 1	Laurel Avenue	EB
Minor 2		WB

Node	Time Period	Major St. 1 Approach Volume	Major St. 2 Approach Volume	Total Major St. Volume	Minor St. 1 Approach Volume	Minor St. 2 Approach Volume	Higher Minor St. Volume	Warrant 2 Threshold Met
1	6:00-7:00 AM	0	0	0	0	0	0	NO
2	7:00-8:00 AM	296	115	411	342	0	342	YES
3	8:00-9:00 AM	265	173	438	385	0	385	YES
4	9:00-10:00 AM	0	0	0	0	0	0	NO
5	10:00-11:00 AM	0	0	0	0	0	0	NO
6	11:00 AM-12:00 PM	0	0	0	0	0	0	NO
7	12:00-1:00 PM	0	0	0	0	0	0	NO
8	1:00 PM - 2:00 PM	0	0	0	0	0	0	NO
9	2:00 PM - 3:00 PM	0	0	0	0	0	0	NO
10	3:00 PM - 4:00 PM	0	0	0	0	0	0	NO
11	4:00 PM - 5:00 PM	359	239	598	487	0	487	YES
12	5:00 PM - 6:00 PM	382	209	591	481	0	481	YES
Hours Met								4

Figure 4C-1. Warrant 2. Four-Hour Vehicular Volume



*Note: 115 vph applies as the lower threshold volume for a minor-street

MUTCD Traffic Signal Warrant #3 Analysis

Project Name 1089 - Haverhill, MA

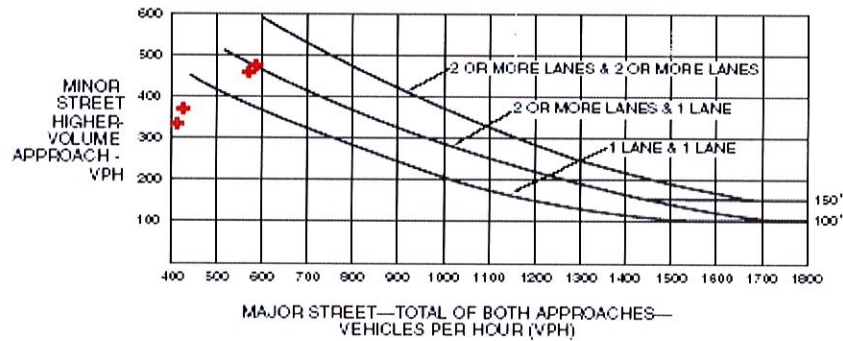
Date Existing

100% Right Turns From EB

	Street Name	Direction
Major 1	S Elm Street	NB
Major 2	S Elm Street	SB
Minor 1	Laurel Avenue	EB
Minor 2		WB

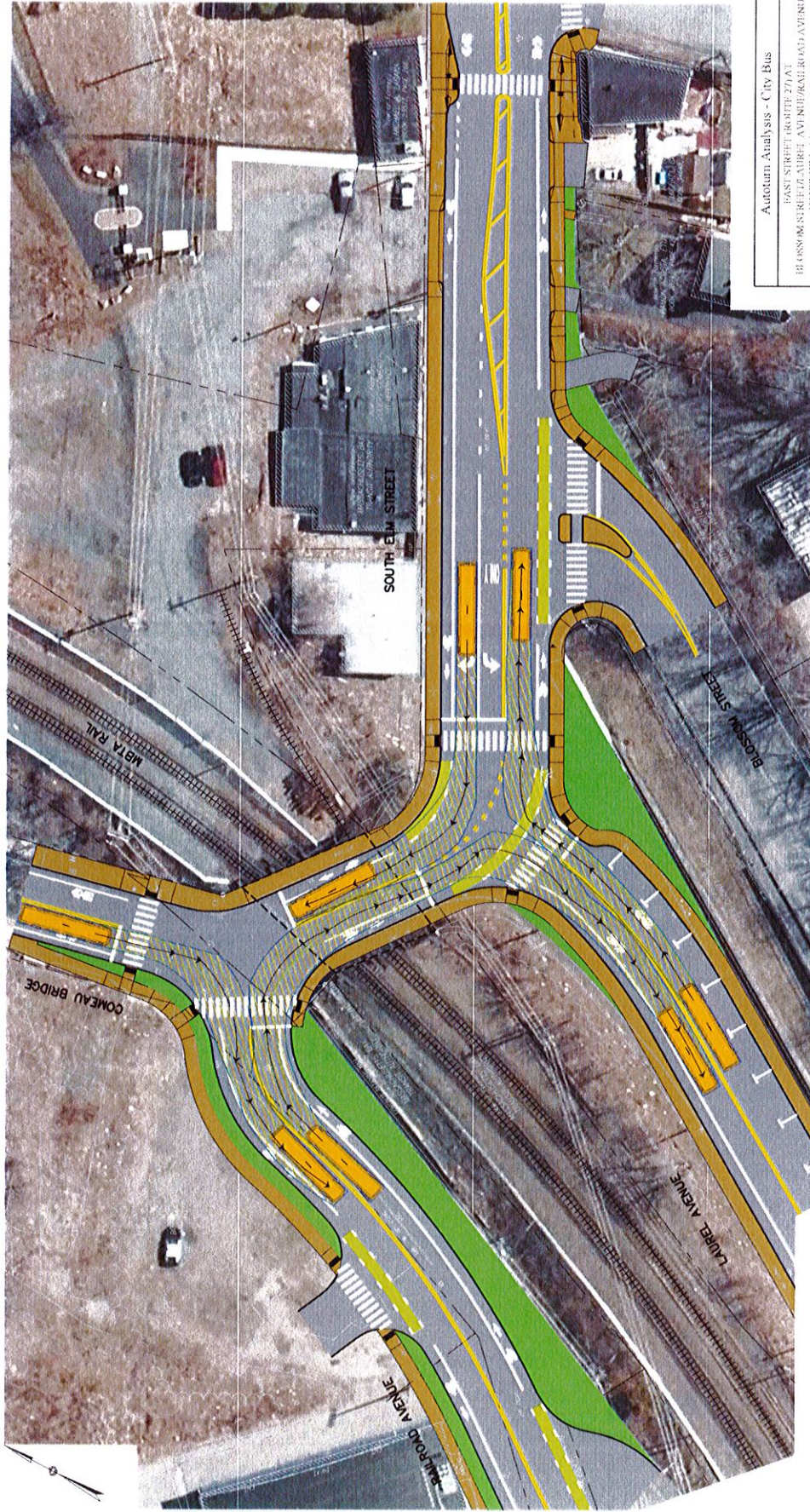
Node	Time Period	Major St. 1 Approach Volume	Major St. 2 Approach Volume	Total Major St. Volume	Minor St. 1 Approach Volume	Minor St. 2 Approach Volume	Higher Minor St. Volume	Warrant 3 Threshold Met
1	6:00-7:00 AM	0	0	0	0	0	0	NO
2	7:00-8:00 AM	296	115	411	342	0	342	NO
3	8:00-9:00 AM	265	173	438	385	0	385	NO
4	9:00-10:00 AM	0	0	0	0	0	0	NO
5	10:00-11:00 AM	0	0	0	0	0	0	NO
6	11:00 AM-12:00 PM	0	0	0	0	0	0	NO
7	12:00-1:00 PM	0	0	0	0	0	0	NO
8	1:00 PM - 2:00 PM	0	0	0	0	0	0	NO
9	2:00 PM - 3:00 PM	0	0	0	0	0	0	NO
10	3:00 PM - 4:00 PM	0	0	0	0	0	0	NO
11	4:00 PM - 5:00 PM	359	239	598	487	0	487	YES
12	5:00 PM - 6:00 PM	382	209	591	481	0	481	YES
Hours Met								2

Figure 4C-3. Warrant 3, Peak Hour

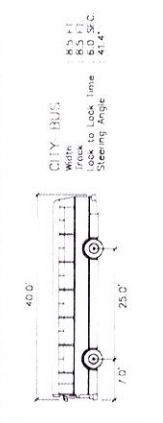


*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

□ AutoTURN® Analysis



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NOTES

1. THIS PLAN INTENDED FOR DISCUSSION PURPOSES ONLY. IT IS NOT FOR CONSTRUCTION.
2. FINAL DESIGN IS SUBJECT TO FIELD SURVEY BY OTHERS.
3. PROPERTY LINES AND ACCESS LINE LOCATIONS ARE APPROXIMATE ONLY AND ARE SUBJECT TO DEED AND TITLE RECORDS.
4. BASE PLAN SOURCE: FELDMAN LAND SURVEYORS.

Autoturn Analysis - City Bus

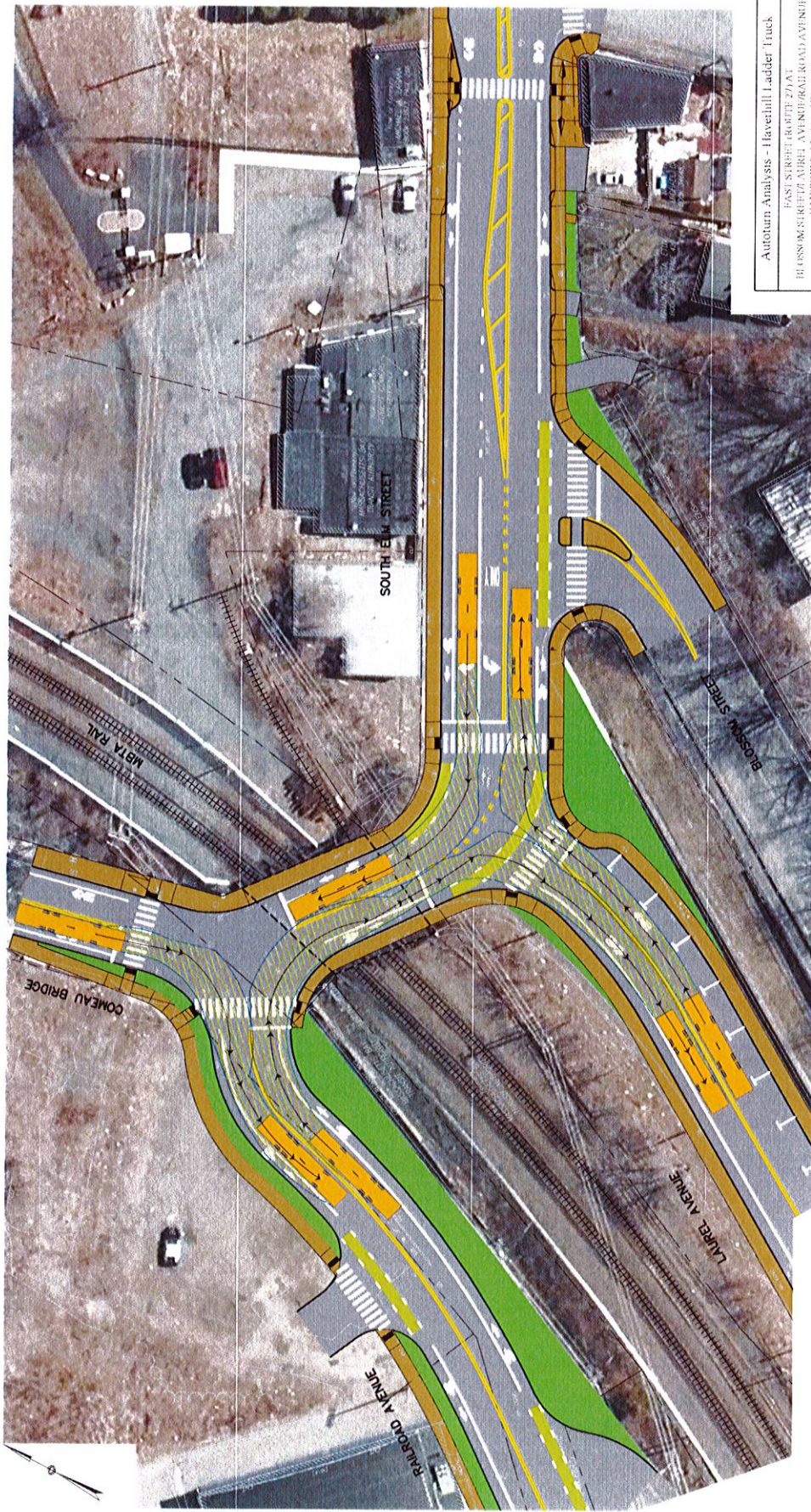
EAST STREET (ROUTE 27A)
 18.000 MONTGOMERY AVENUE/RAILROAD AVENUE
 HAVENHILL, MASSACHUSETTS

PREPARED FOR
 PROCTER ENTERPRISES, INC.
 220 BROADWAY, UNIT 102
 LYNNFIELD, MASSACHUSETTS 01904

MDM
 TRANSPORTATION CONSULTANTS, INC.
 PLANNERS & ENGINEERS
 100 LINDEN AVENUE, SUITE 200
 LYNN, MASSACHUSETTS 01901
 TEL: 781/580-0000
 FAX: 781/580-0000

DATE: August 11, 2020 SCALE: As Shown

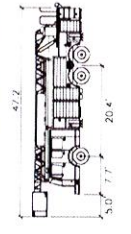
PROJECT No. 304 File: 1805 Concept Plan (2020.08.11).dwg Sheet 1 of 1



DRAFT



Haverhill | Order 1 KM: 102' RMA
 5.5' 1' 1'
 Look to Look time 0.0' 59"
 Steering Angle 45.0°



- NOTES**
1. THIS PLAN INTENDED FOR DISCUSSION PURPOSES ONLY. IT IS NOT FOR CONSTRUCTION.
 2. FINAL DESIGN IS SUBJECT TO FIELD SURVEY BY OTHERS.
 3. PROPERTY LINES AND ACCESS LINES FOR ADJACENT AREAS ARE SHOWN FOR INFORMATION ONLY AND ARE SUBJECT TO FIELD AND TITLE RECORDS.
 4. BASE PLAN SOURCE: FELLMAN LAND SURVEYORS.

Autoturn Analysis - Haverhill Ladder Truck

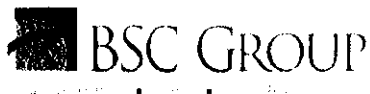
EAST STREET (ROUTE 270A)
 BRUNSWICK STREET (ROUTE 1A) / RAILROAD AVENUE
 HAVERRILL, MASSACHUSETTS

PREPARED FOR:
 PROCOPIO ENTERPRISES, INC.
 220 BRADWAY UNIT 802
 LYNNFIELD, MASSACHUSETTS 01904

MDM
 TRANSPORTATION CONSULTANTS, INC.
 PLANNERS & ENGINEERS
 25 LINDEN STREET, SUITE 200
 LYNN, MASSACHUSETTS 01901
 TEL: 781.586.4400
 FAX: 781.586.4401

DATE: August 11, 2004 SCALE: As Noted

PROJECT NO: 904 File: 100 Concept Plan 00000411.dwg Sheet 1 of 1



803 Summer Street
Boston, MA 02127

Tel: 617-896-4300

www.bscgroup.com

January 26, 2021

John H. Pettis, PE
City Engineer
City of Haverhill
4 Summer Street
Haverhill, MA 01830

RE: 19 Railroad Avenue
Transportation Peer Review

Dear Mr. Pettis:

As requested, BSC Group, Inc. (BSC) conducted a peer review of the Traffic Impact and Access Study (TIAS) prepared by MDM Transportation Consultants, Inc. (MDM) dated December 14, 2020 for a proposed residential and commercial development at 19 Railroad Avenue in Haverhill, Massachusetts.

The purpose of this review is to ensure that the traffic analysis conforms to industry standards, to confirm that the traffic study methods are appropriate for the setting, and to ensure that the recommendations and proposed mitigation adequately address potential project impacts and are consistent with the City of Haverhill's recommended guidelines for transportation improvements. Access to the site will be provided by four driveways on the north side of Railroad Avenue. Each driveway will operate as full access (allowing left and right-turns into and out of the site). The site is mostly vacant, with an existing commercial business at the east end of the site that will be removed as part of the Project.)

The key findings of our review of the TIAS are presented in the following sections. **BSC's comments and recommendations are presented in bold.**

Scope of Review

The following topics were reviewed in the Traffic Review Letter as part of the peer review:

- Study methodology
- Existing traffic volumes
- Motor vehicle crash analysis
- No-Build traffic volumes
- Build traffic volumes

Engineers

Environmental
Scientists

Custom Software
Developers

Landscape
Architects

Planners

Surveyors



- Traffic operations analysis
- Proposed mitigation/recommendations

Study Methodology

The traffic analysis provided in the TIAS presented an evaluation of baseline conditions (year 2020 with adjustments) and future conditions projected seven years (year 2027) with and without the Project. The study area consists of one signalized intersection and eight unsignalized intersections. Five of the unsignalized intersections are existing driveways along Railroad Avenue, with the remaining three located east of the site. The signalized intersection of Washington Street/River Street/Comeau Bridge, north of the Merrimack River, is included in the study area. The proposed driveways were also evaluated as part of the future conditions.

Traffic data was collected in July 2020 at each study area location by conducting turning movement counts (TMCs) during the peak commuter periods (7-9 AM and 4-6 PM). Automatic traffic recorders (ATRs) were also used to collect vehicular volumes and speeds along Railroad Avenue. The evaluation included an operations analysis of the baseline conditions, an evaluation of future conditions (year 2027) that incorporates expected traffic growth without the Project, and an evaluation of future conditions that includes expected Project-generated traffic. An evaluation of motor vehicle crashes was also conducted to identify any existing safety deficiencies within the study area. Specific recommendations were presented in the TIAS to address off-site impacts.

- 1. The study methodology is consistent with the requirements of the City of Haverhill and the Massachusetts Department of Transportation (MassDOT) guidelines for traffic impact assessment.**
- 2. The primary impacts of the Project will occur along Railroad Avenue and at the nearest intersections to the east. The selected study area is consistent with expected Project impacts.**

Existing Traffic Volumes

The Applicant collected TMCs at the study area intersections between 7-9 AM and 4-6 PM on a weekday in July 2020. Due to the historically low traffic volumes and reduced commuter rail usage, specific adjustment factors were applied to the TMCs to create a baseline condition representative of pre-2020 conditions. The Applicant compared traffic volumes collected in July 2020 with available traffic data from October 2007 to determine an appropriate adjustment factor to account for the historically low traffic volumes in 2020. The Applicant also accounted for the reduced usage at the Commuter Rail station by adding in expected trips to/from Bradford Station during peak commuting times prior to 2020.

- 3. The data was collected during the summer of 2020 during typical weekday commuter peak periods. Due to the reduction of typical commuter traffic and commuter rail ridership during 2020, the Applicant applied adjustment factors and additional volumes related to the Bradford Commuter Rail station into the baseline traffic conditions. The weekday morning volumes were adjusted upward by 34 percent and the weekday evening volumes were adjusted upward by 26 percent. BSC agrees with the methodology to increase the 2020 traffic**



volumes upward. However, we request that the Applicant provide additional technical data or clarification to support the specific adjustments related to the percent increases. The data provided in the Attachments appears to be incomplete.

4. The Applicant added a total of 67 entering trips during the weekday morning peak hour and 17 exiting trips during the weekday evening peak hour to account for trips to/from the Bradford Commuter Rail parking lots. Similar to the above comment, BSC requests that the Applicant provide further clarification on how these volumes were estimated. We also request that the Applicant describe any changes in traffic volumes related to possible reductions at the Merrimack Valley Regional Transit Authority facility located on Railroad Avenue.

Safety Evaluation

The Applicant provided an evaluation of sight distances at the proposed driveway intersections and a crash analysis of the study area roadways and intersections. Based on the evaluation, there is sufficient sight distance, and the Applicant has committed to maintaining vegetation that may impact sight lines along the site frontage.

The motor vehicle crash analysis reviewed collisions throughout the study area over the past five years for which data was available at the time of the study (2015-2019). The analysis indicates that a total of 78 crashes occurred during this time period within the study area, with the majority (56 crashes) occurring at the intersection of Washington Street at River Street & Comeau Bridge. The TIAS also indicated that this intersection is located within an HSIP eligible pedestrian cluster, which means that the cluster experienced a high rate of crashes involving pedestrians when compared to other similar intersections in the region.

5. The sight distance at the driveways is sufficient and should be properly maintained at all times, including during snow events. The Applicant should commit to the continued maintenance of any vegetation that may impact sight lines at both driveways.
6. BSC recommends that the Applicant coordinate with the City of Haverhill to conduct a Road Safety Audit (RSA) for the high crash cluster in which the intersection of Washington Street at River Street & Comeau Bridge is located. Based on MassDOT's RSA guidelines, an RSA is required when projects are anticipated to impact the operations of a High Crash Cluster.

No-Build Traffic Volumes

To develop future traffic conditions, the Applicant applied a 1.0 percent annual growth rate to the existing traffic volumes and added traffic expected to be generated by two proposed projects in the vicinity of the Project site (The Heights at Haverhill and 181-215 Washington Street).

7. The 2027 No-Build traffic volumes were developed in accordance with standard traffic engineering practice.



Build Traffic Volumes

Trip Generation

The TIAS estimated the trips generated by the Project based on data provided in the *Institute of Transportation Engineers (ITE)'s Trip Generation, 10th Edition*, using Land Use Code (LUC) 221 – Mid-Rise Residential and LUC 820 – Shopping Center. The Applicant acknowledged that some trips may occur between the residential and commercial uses on the site and that some commercial trips may occur in the form of “pass-by” trips made by people traveling along Railroad Avenue, but did not take credit for these trip reductions. The Applicant also applied a 19 percent transit credit to reflect the proximity to the Bradford Commuter Rail station. The Project is expected to generate 1,656 trips on an average weekday, 93 trips during the weekday morning peak hour, and 142 trips during the weekday evening peak hour.

- 8. The ITE LUCs that were used are appropriate for the proposed land uses. BSC agrees with the trip generation methodology used in the TIAS and the application of the transit usage reduction.**

Trip Distribution and Assignment

The estimated peak hour Project-generated trips related to the residential portion of the Project were assigned to the study area intersections based on existing journey-to-work data for residents living in the City of Haverhill and the commercial-based trips were based on existing traffic patterns throughout the study area. Based on this evaluation, the trips were distributed along Washington Street, River Street, Laurel Avenue, and South Elm Street. Approximately 50 percent of the trips will travel to/from the south on Laurel Avenue and South Elm Street and 50 percent will cross Comeau Bridge to travel to/from the site. The Applicant added the expected Project-generated trips to the No-Build traffic volumes to develop the Build condition traffic volumes.

- 9. BSC agrees with the usage of journey-to-work data and existing traffic patterns to develop trip distribution patterns for the Project.**

Traffic Operations Analysis

The Applicant conducted a traffic operations analysis for the baseline conditions, the 2027 No-Build conditions, and the 2027 Build conditions. The operations analysis presented an evaluation of vehicular delays, queues, volume-to-capacity ratios, and level-of-service (LOS).

The operations analysis indicates that the intersections operate at LOS D or better and that the queues will be contained within the available storage. These operations will continue in the future with and without the Project. The unsignalized intersections operate with minor to moderate delays and minimal queuing.

- 10. The traffic operations analysis was conducted in accordance with traffic engineering standards. The Project is not expected to significantly contribute to the queues or delays at the study intersections during normal operations. BSC requests that the Applicant provide further discussion of intersection operations during the evening periods when the Commuter Rail arrives at**



Bradford Station and passengers depart the area.

Proposed Mitigation/Recommendations

The Applicant provided specific recommendations related to access/egress, pedestrian/bicycle facilities, transportation demand management (TDM), and off-site improvements. The TIAS recommends that pedestrian connections be provided between various points of interest (the Project, commuter rail station, proposed park, and the Bradford Rail Trail system). The Applicant indicated that they are working with the City of Haverhill to design bicycle facilities along Railroad Avenue and South Elm Street, although specific plans were not provided. The Applicant provided conceptual improvement plans for Railroad Avenue, South Elm Street, and Laurel Avenue (including the intersections of Railroad Avenue/Comeau Bridge and South Elm Street/Laurel Avenue). The City has indicated to BSC that they have received funding through the MassWorks grant program to fund these improvements. BSC offers the following comments related to the recommendations:

- 11. The site driveways should be designed to accommodate emergency vehicles. Signage and pavement markings should be compliant with standards in the Manual on Uniform Traffic Control Devices (MUTCD). Adequate sight distance should be maintained at each driveway. BSC requests that the Applicant provide vehicle turning maneuvers on a site plan to show that each driveway and parking area can accommodate the City's fire and emergency vehicles.**
- 12. BSC requests that the Applicant describe or show on the site plans how the delivery and loading for each of the buildings will operate. Each driveway and parking area should be able to accommodate the largest single-unit box truck (SU-40) for moving operations.**
- 13. The site plan should show pedestrian connections to the Bradford Commuter Rail station. Crosswalks should be proposed at key points and desired pedestrian paths along Railroad Avenue.**
- 14. BSC reviewed the conceptual improvement plan for off-site improvements and the supporting analyses. The concept plans show two new traffic signals at the intersections of Railroad Avenue/Comeau Bridge and South Elm Street/Laurel Avenue along with additional upgrades along Railroad Avenue, Laurel Avenue, and South Elm Street.**

The TIAS indicated that the intersections both intersections meet the peak-hour and four-hour traffic signal warrants, as directed by the MUTCD. BSC requests that the signal warrant analyses be provided for our review.

The traffic signal timing and phasing at the intersection of Washington Street/River Street/Comeau Bridge should also be reviewed and adjusted to provide optimal operations in relation to the proposed signals south of the bridge. The City has indicated to BSC that traffic volumes on the Comeau Bridge have significantly fluctuated over the past couple of years and the traffic signal timings should reflect current traffic demands.



15. BSC recommends that the installation of an additional rectangular rapid flashing beacon (RRFB) be explored at the crosswalk location along Laurel Avenue. Warning signage should also be provided in advance of the crosswalks along Laurel Avenue and South Elm Street.
16. The TIAS did not indicate how many parking spaces will be provided for the Project. BSC requests that the Applicant provide a summary of the on-site parking by building to ensure that the expected demand can be satisfied by the proposed supply.
17. BSC recommends that the Applicant commit to the preliminary TDM measures listed in the TIAS. The transit subsidy program will allow the Applicant to further market the Project as transit-oriented and will provide a good incentive to residents to use the commuter rail to travel to/from employment opportunities.

BSC reviewed the TIAS submitted for the proposed residential and commercial development at 19 Railroad Avenue in Haverhill, Massachusetts. We recommend that the City of Haverhill require the Applicant to respond to and address all BSC's numbered comments in this letter and submit a response letter for our review.

Please do not hesitate to contact our office with any inquiries you may have.

Very truly yours,

BSC Group, Inc.

Michael A. Santos, PE, PTOE
Project Manager

cc: Sam Offei-Addo, PE, PTOE

MEMORANDUM

DATE: March 3, 2021

TO: John H. Pettis, PE, City Engineer
City of Haverhill
4 Summer Street
Haverhill, MA 01830

FROM: Robert J. Michaud, P.E. – Managing Principal 
Daniel A. Dumais, P.E. – Senior Project Manager

RE: **Response to Comments**
Proposed Mixed-Use Development
19 Railroad Avenue – Haverhill, MA

MDM Transportation Consultants, Inc. (MDM) has prepared the following responses to transportation-related comments as issued in a letter by BSC Group, Inc. dated January 26, 2021. To facilitate review, specific comments are paraphrased with corresponding responses.

Study Methodology

Comment 1: *"The study methodology is consistent with the requirements of the City of Haverhill and the Massachusetts Department of Transportation (MassDOT) guidelines for traffic impact assessment."*

Response: MDM concurs, no further action is required.

Comment 2: *"The primary impacts of the Project will occur along Railroad Avenue and at the nearest intersections to the east. The selected study area is consistent with expected Project impacts."*

Response: MDM concurs, no further action is required.

Existing Traffic Volumes

Comment 3: *"The data was collected during the summer of 2020 during typical weekday commuter peak periods. Due to the reduction of typical commuter traffic and commuter rail ridership during 2020, the Proponent applied adjustment factors and additional volumes related to the Bradford Commuter Rail station into the baseline traffic conditions. The weekday morning volumes were adjusted upward by 34*

percent and the weekday evening volumes were adjusted upward by 26 percent. BSC agrees with the methodology to increase the 2020 traffic volumes upward. However, we request that the Proponent provide additional technical data or clarification to support the specific adjustments related to the percent increases. The data provided in the Attachments appears to be incomplete.”

Response: Traffic volume data was collected at the nearby intersection of Main Street/Basilier Bridge at Merrimack Street/Water Street and compared to historical data collected at the same intersection in 2007. The weekday morning and evening peak hours were adjusted by 34% and 26% respectfully based on these comparisons. The existing traffic volumes were then further adjusted (increased) based on MBTA ridership data for the Bradford MBTA Station during the peak hours based on MBTA records. To present a conservative (worst-case) analysis scenario, adjustments for MBTA ridership assumes that one vehicular trip is added for each MBTA rider boarding or alighting at the Bradford Station during the peak hours (i.e., every MBTA rider is a “drive alone” trip to/from Bradford Station). Specific adjustment calculations are provided in the **Attachments** for reference.

Comment 4: “The Proponent added a total of 67 entering trips during the weekday morning peak hour and 17 exiting trips during the weekday evening peak hour to account for trips to/from the Bradford Commuter Rail parking lots. Similar to the above comment, BSC requests that the Proponent provide further clarification on how these volumes were estimated. We also request that the Proponent describe any changes in traffic volumes related to possible reductions at the Merrimack Valley Regional Transit Authority facility located on Railroad Avenue.”

Response: Historical MBTA ridership data for 2018 provide the basis for trip adjustments. The vehicle trips through the study were increased to account for average use of the Bradford MBTA station based on pre-Covid ridership numbers. To present a conservative (worst-case) analysis scenario, adjustments for MBTA ridership assumes that one vehicular trip is added for each MBTA rider boarding or alighting at the Bradford Station during the peak hours (i.e., every MBTA rider is a “drive alone” trip to/from Bradford Station). MBTA ridership numbers are provided in the **Attachments**. No additional adjustment was made for the MVRTA operations at its Railroad Avenue driveway beyond the pandemic adjustments stated above (34% am and 26% pm) for the peak hours which would account for any lower-than-normal bus and/or employee levels at the time of the counts.

Safety Evaluation

Comment 5: “The sight distance at the driveways is sufficient and should be properly maintained at all times, including during snow events. The Proponent should commit to the continued maintenance of any vegetation that may impact sight lines at both driveways.”

Response: The Proponent commits to the continued maintenance of any vegetation within the sight line triangles from the proposed site driveways onto Railroad Avenue.

Comment 6: *"BSC recommends that the Proponent coordinate with the City of Haverhill to conduct a Road Safety Audit (RSA) for the high crash cluster in which the intersection of Washington Street at River Street & Comeau Bridge is located. Based on MassDOT's RSA guidelines, an RSA is required when projects are anticipated to impact the operations or a High Crash Cluster."*

Response: A review of the MassDOT HSIP crash cluster map indicates that the Washington Street at River Street and Comeau bridge intersection is not a vehicular crash cluster but rather is part of a larger pedestrian cluster that extends down Washington Street to its intersection with Essex Street. This is one of 5 pedestrian HSIP clusters within the downtown area. While the project has been shown to have a limited impact to the signalized Washington Street intersection, the Proponent has committed to funding traffic signal improvements at the intersection of Washington Street at River Street and Comeau bridge intersection which will include improved pedestrian accommodations. The Proponent will further commit to providing a fair share financial contribution so that the City can conduct a larger RSA for the 5 pedestrian HSIP clusters within the downtown area.

No-Build Traffic Volumes

Comment 7: *"The 2027 No-Build traffic volumes were developed in accordance with standard traffic engineering practice. "*

Response: MDM concurs, no further action is required.

Trip Generation

Comment 8: *"The ITE LUCs that were used are appropriate for the proposed land uses. BSC agrees with the trip generation methodology used in the TIAS and the application of the transit usage reduction."*

Response: MDM concurs, no further action is required.

Trip Distribution and Assignment

Comment 9: *"BSC agrees with the usage of journey-to-work data and existing traffic patterns to develop trip distribution patterns for the Project."*

Response: MDM concurs, no further action is required.

Traffic Operations Analysis

Comment 10: "The traffic operations analysis was conducted in accordance with traffic engineering standards. The Project is not expected to significantly contribute to the queues or delays at the study intersections during normal operations. BSC requests that the Proponent provide further discussion of intersection operations during the evening periods when the Commuter Rail arrives at Bradford Station and passengers depart the area."

Response: We note that the proposed signal timing at the South Elm Street at Railroad Avenue intersection will be fully actuated to accommodate surges in volume along Railroad Avenue during Commuter Rail peak arrival/departure periods to optimally accommodate traffic during MBTA commuter rail peak arrival/departure periods.

Review of MBTA historical ridership data indicates that the evening peak hour of the Bradford MBTA Station (5:30-6:30 pm) occurs later than the volume peak of the study area roadways (4:30-5:30 pm). Peak hour volumes used in the analysis versus those that occur during MBTA arrival/departure periods are summarized in **Table R1**.

TABLE R1
PEAK HOUR VOLUME SUMMARY

Time Period	South Elm Street Total Volume ¹	Average MBTA Commuter Volume ²	Total Volume
Peak of Roadway (4:30-5:30)	986	16	1,102
Peak of MBTA (5:30-6:30)	818	91	909

¹ATR Volumes on S Elm Street adjusted by 26% pandemic adjustment.

²Based on MBTA Ridership Data from 2018. Ridership data indicate one (1) outbound commuter rail averaging 16 passengers alighting between 4:30 and 5:30 PM - the peak hour of the study area intersections. Ridership data indicate two outbound and one inbound commuter rail arrival occurs from 5:30 to 6:30 PM, with an average of 1 passenger boarding and 90 passengers alighting during this later period.

As summarized in **Table R1**, the peak of the roadway occurs between 4:30 and 5:30 PM during which time projected MBTA commuter rail trip activity is fewer than 20 trips. Subsequent arrival/departure peak for the MBTA train (5:30 to 6:30 PM) results in a projected rail trip activity of just under 100 vehicles, which when combined with adjacent street volumes is nearly 200 trips less along South Elm Street when compared to volumes used in the TIAS analysis. The traffic signal design at South Elm Street and Railroad Avenue will be fully actuated to account for the fluctuations in traffic along the roadways.

Proposed Mitigation/Recommendations

Comment 11: "The site driveways should be designed to accommodate emergency vehicles. Signage and pavement markings should be compliant with standards in the Manual on Uniform Traffic Control Devices (MUTCD). Adequate sight distance should be maintained at each driveway. BSC requests that the Proponent provide vehicle turning maneuvers on a site plan to show that each driveway and parking area can accommodate the City's fire and emergency vehicles."

Response: All proposed roadway improvements including re-alignment of the Railroad Avenue at South Elm Street are designed to accommodate the City's largest responding vehicle (ladder truck) as well as transit buses (City bus). Likewise, fire apparatus access to the property is feasible but must conduct backing maneuvers to exit the property. AutoTurn analyses indicating movements for the ladder truck at the improved intersections are presented in **Exhibit 1** and within the property are presented in **Exhibit 2**. These operating conditions will be reviewed with the Fire Department. AutoTurn analyses indicating movements for a City bus at these improved intersections are presented in **Exhibit 3**.

The signage and pavement markings will all be MUTCD compliant and the sight line triangles for the proposed site driveway approaches to Railroad Avenue will be cleared and maintained to ensure adequate visibility to/from the driveways is provided at all times.

Comment 12: "BSC requests that the Proponent describe or show on the site plans how the delivery and loading for each of the buildings will operate. Each driveway and parking area should be able to accommodate the largest single-unit box truck (SU-40) for moving operations."

Response: Service vehicle maneuvers are modeled for the site for refuse removal vehicles as presented in **Exhibit 4**.

Move-ins will be scheduled through the management office and generally assigned to use one or several of the designated curbside parking areas along Railroad Avenue that are located closest to building elevators. In some limited cases during peak move-in periods areas within the surface parking lots that flank the building may be required as an alternative and will be reserved through the management office. Typical move-in vehicles are assumed to be SU-30 box trucks and are modeled and presented in **Exhibit 5**, **Exhibit 6**, and **Exhibit 7**. Larger vehicles such as SU-40 box trucks will be required to use the curbside parking areas and will again be reserved through the management office and are presented in **Exhibit 8**. Smaller delivery vans will be allowed to use the commercial parking area and are shown in **Exhibit 9**.

Comment 13: "The site plan should show pedestrian connections to the Bradford Commuter Rail station. Crosswalks should be proposed at key points and desired pedestrian paths along Railroad Avenue."

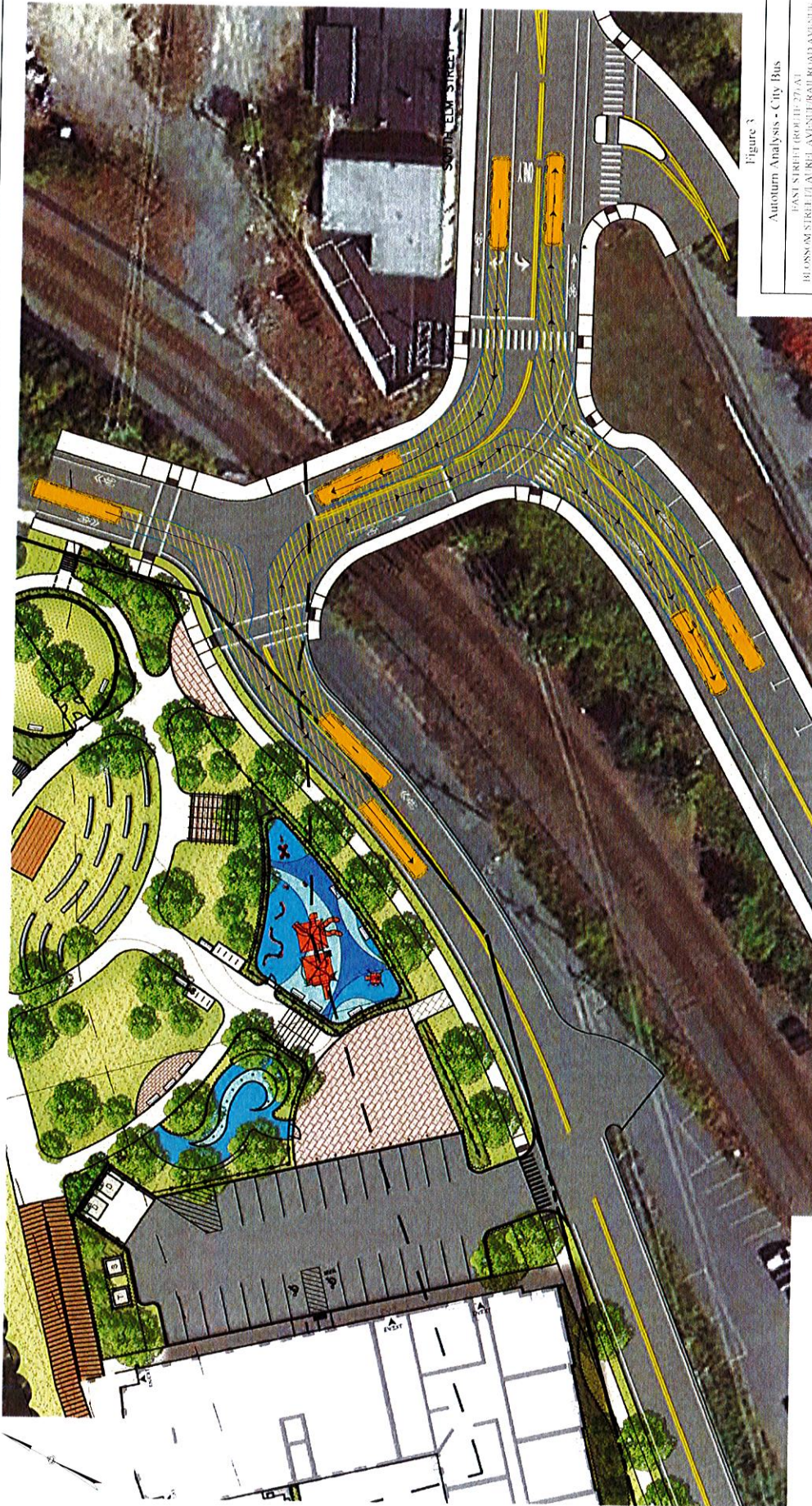


Figure 3

Autoturn Analysis - City Bus

PART STREET (ROUTE 27) AT
 BLOSSOM STREET (ROUTE 1A) RAILROAD AVENUE
 HAVERTHILL, MASSACHUSETTS
 PREPARED FOR
 PROLOG ENTERPRISES, INC.
 220 BROADWAY, UNIT 302
 LYNNFIELD, MASSACHUSETTS 01940

MDM
 TRANSPORTATION CONSULTANTS, INC.
 PLANNERS & ENGINEERS
 200 West Street, Suite 200
 Woburn, MA 01801
 Tel: 781.938.1100
 Fax: 781.938.1101

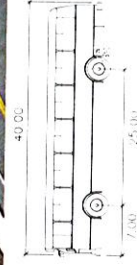
DATE: February 25, 2021

SCALE: As Noted

PROJECT No. 1089 | Rev. 1089-02-25-2021.dwg | Sheet 1 of 1

CITY BUS

Width: 6' 5" (feet)
 Track-to-track: 6' 5" (feet)
 Steering Angle: 41.4°



NOTES

1. THIS ANALYSIS IS BASED ON THE ASSUMPTIONS LISTED BELOW.
2. THE CITY BUS IS ASSUMED TO BE A SINGLE-UNIT VEHICLE.
3. THE CITY BUS IS ASSUMED TO BE A SINGLE-UNIT VEHICLE.
4. THE CITY BUS IS ASSUMED TO BE A SINGLE-UNIT VEHICLE.
5. THE CITY BUS IS ASSUMED TO BE A SINGLE-UNIT VEHICLE.

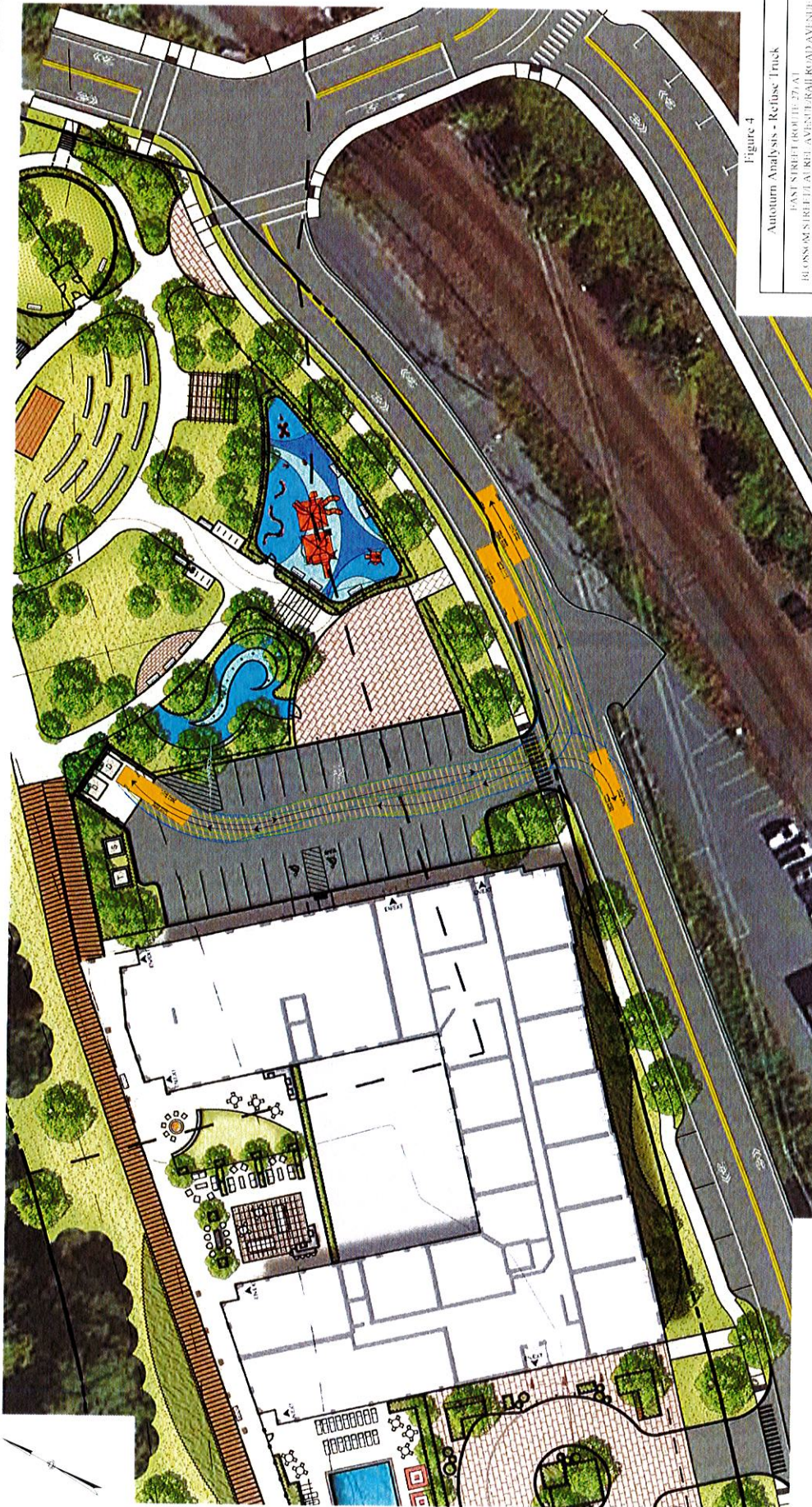


Figure 4

Autoturn Analysis - Refuse Truck

PANT STREET ROUTE 27A1
 BLOSSOM STREET RAILROAD AVENUE
 HAVERTHILL MASSACHUSETTS
 PREPARED FOR
 PROLOGO ENTERPRISES, INC.
 220 BROADWAY UNIT 802
 LYNNFIELD MASSACHUSETTS 01940

MDM
 TRANSPORTATION CONSULTANTS, INC.
 PLANNERS & ENGINEERS
 25 West Street, Suite 200
 Lynn, MA 01901
 Tel: 781.580.1234
 Fax: 781.580.1235

DATE: February 25, 2021 SCALE: As Noted
 PROJECT No: 1089 File: 1089Autoturn 02-25-2021.dwg Sheet 1 of 1



- NOTES**
1. THIS ANALYSIS WAS PREPARED FOR THE PROJECT SHOWN ON SHEET 1 OF 1.
 2. THIS ANALYSIS WAS PREPARED FOR THE PROJECT SHOWN ON SHEET 1 OF 1.
 3. THIS ANALYSIS WAS PREPARED FOR THE PROJECT SHOWN ON SHEET 1 OF 1.
 4. THIS ANALYSIS WAS PREPARED FOR THE PROJECT SHOWN ON SHEET 1 OF 1.

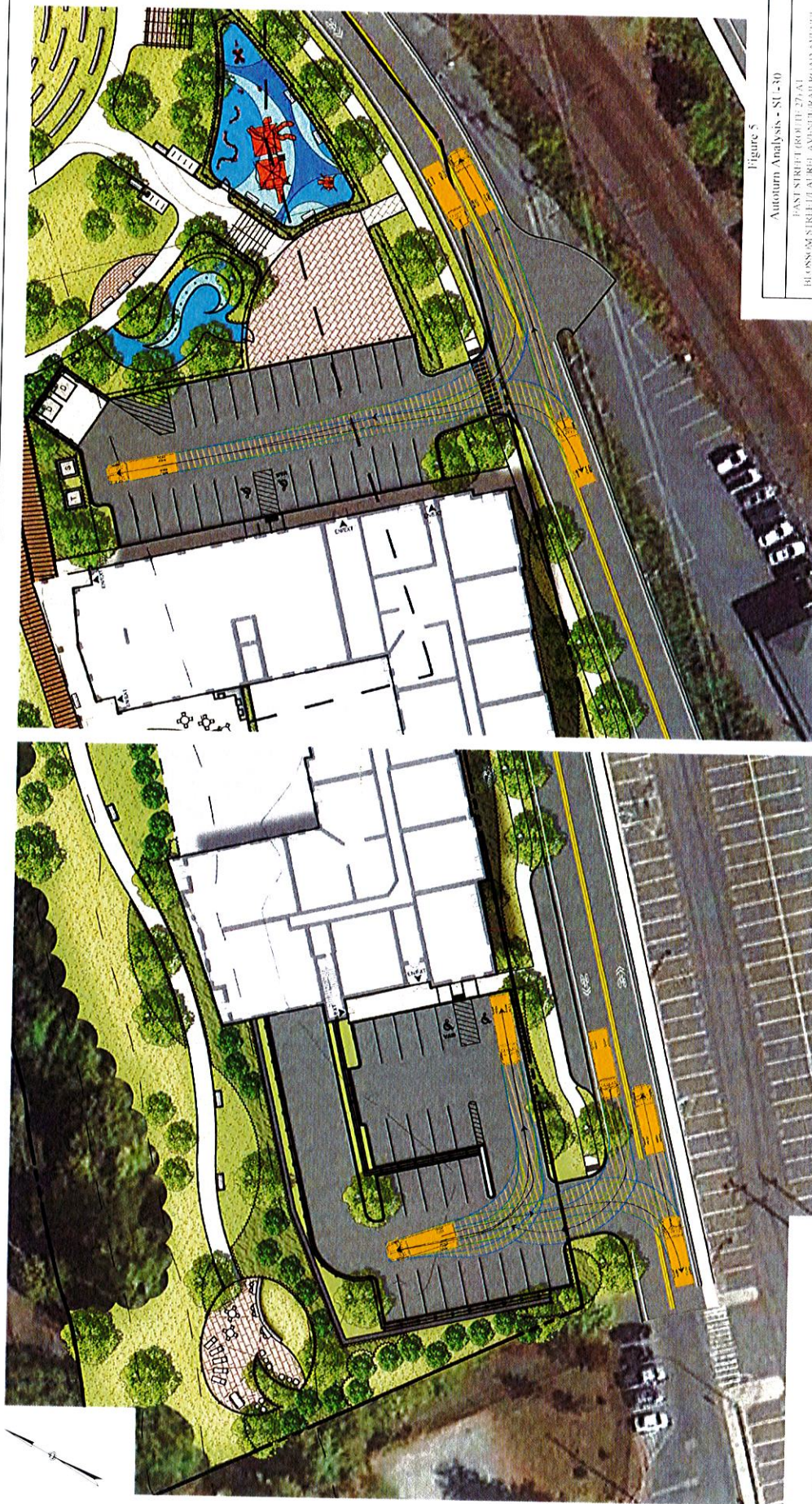
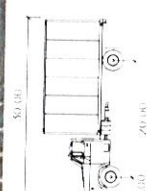


Figure 5
Autoturn Analysis - SU-30
EAST STREET (ROUTE 27) AT
BLOSSOM STREET AT RAIL AVENUE / RAIL ROAD AVENUE
HAVERHILL, MASSACHUSETTS
PREPARED FOR
PROCOPIOT ENTERPRISES, INC.
229 BROADWAY, UNIT 802
LYNNFIELD, MASSACHUSETTS 01940
MDM TRANSPORTATION CONSULTANTS, INC.
PLANNERS & ENGINEERS
25 West Street, Suite 200
Woburn, MA 01801
Tel: 781.938.1100
Fax: 781.938.1101
DATE: February 28, 2021
PROJECT No: 0089
SCALE: As Noted
Sheet 1 of 3



NOTES
1. THIS ANALYSIS WAS PREPARED FOR THE PROJECT AND IS NOT TO BE USED FOR ANY OTHER PROJECT.
2. THE ANALYSIS WAS PREPARED USING THE DATA PROVIDED BY THE CLIENT.
3. THE ANALYSIS WAS PREPARED USING THE DATA PROVIDED BY THE CLIENT.
4. THE ANALYSIS WAS PREPARED USING THE DATA PROVIDED BY THE CLIENT.
5. THE ANALYSIS WAS PREPARED USING THE DATA PROVIDED BY THE CLIENT.

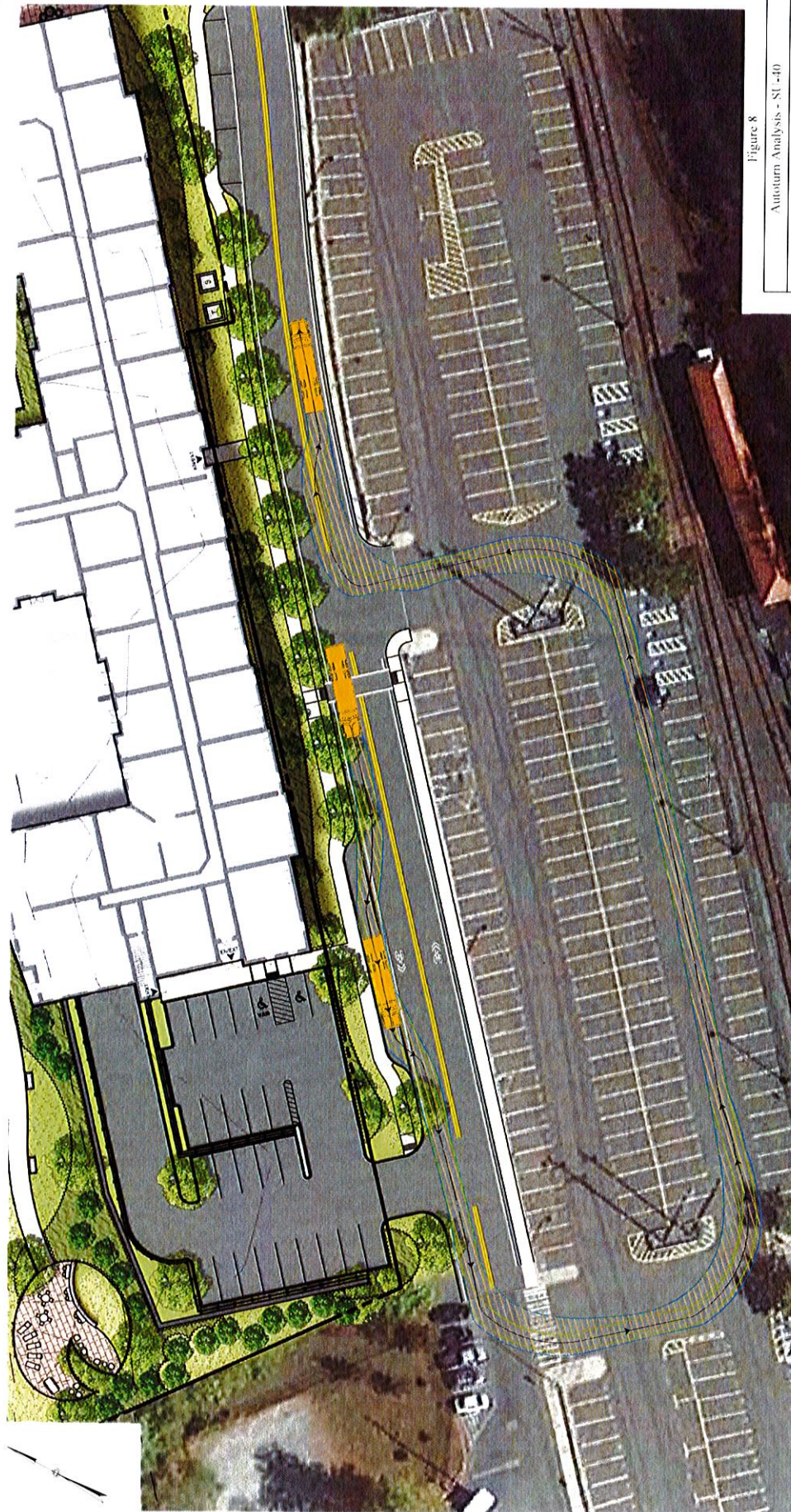


Figure 8

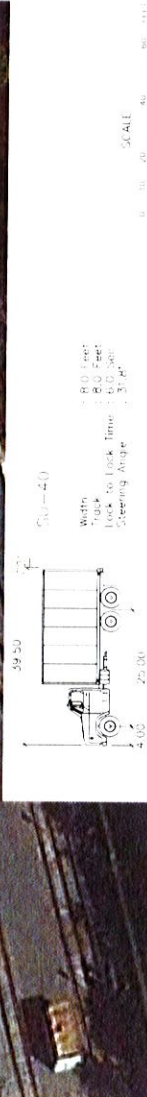
Autoturn Analysis - St. 40

DART STREET (ROUTE 27A)
 BOSTON STREET (RAIL AVENUE) RAILROAD AVENUE
 HAVERHILL, MASSACHUSETTS
 PREPARED BY
 PROLOGO ENTERPRISES, INC.
 220 BROADWAY UNIT 602
 LYNNFIELD, MASSACHUSETTS 01940

MDM
 TRANSPORTATION CONSULTANTS, INC.
 PLANNERS & ENGINEERS
 45 West Street, Suite 200
 Haverhill, MA 01830
 Tel: 978.376.1111

DATE: February 25, 2021 SCALE: As Noted
 PROJECT No. 1069 File: Haverhill/27A/2021/069

Sheet 1 of 1



NOTES
 1. 40' WIDE TURNING LANE (SEE PLAN VIEW)
 2. 40' WIDE TURNING LANE (SEE PLAN VIEW)
 3. 40' WIDE TURNING LANE (SEE PLAN VIEW)
 4. 40' WIDE TURNING LANE (SEE PLAN VIEW)



Figure 9

Autoturn Analysis - Delivery Van

1501 STREET, BOSTON, MA 02111
 HUNTINGTON AVENUE, BOSTON, MA 02111
 PREPARED FOR
 PROLOGIC ENTERPRISES, INC.
 120 BROADWAY, UNIT 102
 BOSTON, MA 02109

MDM
 TRANSPORTATION CONSULTANTS, INC.
 PLANNERS & ENGINEERS
 100 STATE STREET, SUITE 200
 BOSTON, MA 02109
 TEL: 617.552.1234
 FAX: 617.552.1235

DATE: February 22, 2021
 PROJECT No. 1089
 SCALE: As Shown
 SHEET 3 OF 4



NOTES

1. THIS ANALYSIS IS BASED ON THE ASSUMPTIONS LISTED BELOW.
2. THE ANALYSIS IS BASED ON THE ASSUMPTIONS LISTED BELOW.
3. THE ANALYSIS IS BASED ON THE ASSUMPTIONS LISTED BELOW.
4. THE ANALYSIS IS BASED ON THE ASSUMPTIONS LISTED BELOW.
5. THE ANALYSIS IS BASED ON THE ASSUMPTIONS LISTED BELOW.
6. THE ANALYSIS IS BASED ON THE ASSUMPTIONS LISTED BELOW.
7. THE ANALYSIS IS BASED ON THE ASSUMPTIONS LISTED BELOW.
8. THE ANALYSIS IS BASED ON THE ASSUMPTIONS LISTED BELOW.

Response: A pedestrian crossing to the Bradford Commuter Rail Station will be provided along the primary “desire line” from the development to the primary MBTA driveway location as presented in the updated Site Plan (provided under separate cover by Bohler Engineering).

Comment 14: “BSC reviewed the conceptual improvement plan for off-site improvements and the supporting analyses. The concept plans show two new traffic signals at the intersections of Railroad Avenue/Comeau Bridge and South Elm Street/Laurel Avenue along with additional upgrades along Railroad Avenue, Laurel Avenue, and South Elm Street.

The TIAS indicated that the intersections both intersections meet the peak- hour and four-hour traffic signal warrants, as directed by the MUTCD. BSC requests that the signal warrant analyses be provided for our review.

The traffic signal timing and phasing at the intersection of Washington Street/ River Street/Comeau Bridge should also be reviewed and adjusted to provide optimal operations in relation to the proposed signals south of the bridge. The City has indicated to BSC that traffic volumes on the Comeau Bridge have significantly fluctuated over the past couple of years and the traffic signal timings should reflect current traffic demands.”

Response: The intersection of Laurel Street with South Elm Street currently meets the four-hour and peak hour signal warrants. Signal warrant analysis is provided in the **Attachments**.

An optimized traffic signal timing plan for the signalized intersection of Washington Street/River Street/ Comeau Bridge will be developed and implemented by the Proponent. Specific signal settings will be fine-tuned following construction of the signal improvements to reflect then-current traffic conditions. The Proponent has committed to funding traffic signal improvements at the intersection of Washington Street at River Street and Comeau bridge intersection which will include improved pedestrian accommodations and allow for more efficient traffic operations.

Comment 15: “BSC recommends that the installation of an additional rectangular rapid flashing beacon (RRFB) be explored at the crosswalk location along Laurel Avenue. Warning signage should also be provided in advance of the crosswalks along Laurel Avenue and South Elm Street.”

Response: The installation of an additional rectangular rapid flashing beacon (RRFB) will be implemented at the existing midblock crossing on Laurel Avenue. Advance crosswalk warning signs will also be provided as appropriate in advance of the crosswalks along Laurel Avenue and South Elm Street as part of the engineering design plans to be submitted to the City for approval.

Comment 16: "The TIAS did not indicate how many parking spaces will be provided for the Project. BSC requests that the Proponent provide a summary of the on-site parking by building to ensure that the expected demand can be satisfied by the proposed supply."

Response: The updated site plans (provided by Bohler Engineering under separate cover) indicate a total of 311 parking spaces below the building podium, 26 surface parking spaces on the west side of the building and 28 surface parking spaces at the east side of the building. Spaces that will directly support the residential units include the 310 podium spaces and 26 surface spaces (336 total) representing a parking ratio of 1.16 spaces per unit. The 28 surface spaces on the east side of the building will support the park and limited retail programming at the property.

The proposed on-site parking supply will be augmented by short-term courtyard parking (approximately three vehicle capacity within the courtyard) and six curbside parking spaces along Railroad Avenue that will support rental office parking needs. Curbside spaces flanking the courtyard driveway, along with the additional curbside parking area to be located at the west end of the building, will also support move-in (truck) parking activity and will be managed by the rental office for scheduled move-in activity.

Parking requirements for either the property tenants, visitors or retail/park uses that may be required from time to time based on season or park programming are easily augmented by the surface spaces at the Bradford MBTA Station across the street from the site.

Comment 17: "BSC recommends that the Proponent commit to the preliminary TDM measures listed in the TIAS. The transit subsidy program will allow the Proponent to further market the Project as transit-oriented and will provide a good incentive to residents to use the commuter rail to travel to/from employment opportunities."

Response: The Proponent will commit to the preliminary TDM measures outlined in the TIAS. MDM concurs the transit subsidy will provide a good incentive for residents to use the commuter rail to travel to/from employment opportunities.

ATTACHMENTS

- Pandemic Adjustments
- Signal Warrant Analysis

- Pandemic Adjustments
 - Roadway Adjustment

1089 - Haverhill

Pandemic Adjustment Factors

Count Date:

7/14/2020

10/4/2007

Weekday AM - 2hr Volume Comparison - Main Street at Water Street/Merrimack Street, Haverhill, MA
Time Period 2020 Count 2007 Count Percent Difference SAY 7AM-9AM

34%

Count Dates:

7/14/2020

10/4/2007

Weekday PM - 1.5 hr Volume Comparison - Main Street at Water Street/Merrimack Street, Haverhill, MA
Time Period 2020 Count 2007 Count Percent Difference SAY 4PM-5:30PM

26%

MDM TRANSPORTATION CONSULTANTS, INC.

Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Main Street
E/W: Water Street/Merrimack Street
Haverhill, MA

File Name : 1089 Main Street at Basiliere Bridge
Site Code : 1089
Start Date : 7/14/2020
Page No : 1

Groups Printed- Lights - Mediums - Articulated Trucks

	Main Street From North					Water Street From East					Main Street From South					Merrimack Street From West						
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total	
04:00 PM	13	97	8	0	118	6	58	52	0	116	47	112	30	0	189	22	42	20	0	84	507	
04:15 PM	18	120	6	0	144	5	38	64	0	108	43	119	26	0	188	26	38	29	0	93	533	
04:30 PM	21	126	6	0	153	2	46	39	0	87	46	131	24	0	201	25	53	12	0	90	531	
04:45 PM	20	103	9	0	132	3	60	50	0	113	40	109	20	0	169	24	35	24	0	83	497	
Total	72	446	29	0	547	17	202	205	0	424	176	471	100	0	747	97	168	85	0	350	2068	
05:00 PM	14	97	5	0	116	7	48	43	0	98	52	116	28	0	196	21	49	25	0	95	505	
05:15 PM	17	82	3	0	102	1	54	41	0	96	54	88	19	0	161	17	36	17	0	70	429	
05:30 PM	19	95	4	0	118	3	54	38	0	95	43	104	20	0	167	19	37	16	0	72	452	
05:45 PM	26	94	6	0	128	3	36	33	0	72	47	88	25	0	170	25	35	20	0	80	450	
Total	78	368	18	0	464	14	192	155	0	361	196	406	92	0	694	82	157	78	0	317	1836	
06:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	
Total	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	
07:00 AM	4	70	4	0	78	0	32	42	0	74	21	49	7	0	77	18	32	13	0	63	292	
07:15 AM	11	63	2	0	76	2	33	26	0	61	36	51	12	0	109	14	41	5	0	60	306	
07:30 AM	9	61	8	0	78	2	26	43	0	71	29	68	21	0	118	14	36	10	0	62	329	
07:45 AM	16	98	8	0	112	2	30	47	0	79	38	82	21	0	141	12	39	13	0	64	396	
Total	40	282	22	0	344	6	121	158	0	285	124	260	61	0	445	58	150	41	0	249	1323	
08:00 AM	11	77	6	0	94	5	41	31	0	77	33	88	32	0	153	13	34	14	0	61	385	
08:15 AM	17	69	5	0	91	1	32	35	0	68	40	88	21	0	149	15	32	10	0	57	365	
08:30 AM	10	68	4	0	82	2	44	38	0	84	29	100	12	0	141	13	31	12	0	56	363	
08:45 AM	15	83	5	0	103	2	37	32	0	71	47	88	25	0	170	15	47	12	0	74	418	
Total	53	297	20	0	370	10	154	136	0	300	149	374	90	0	613	56	144	48	0	248	1531	
09:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Grand Total	243	1394	89	0	1726	47	669	654	0	1370	646	1511	343	0	2500	293	619	252	0	1164	6760	
Approach %	14.1	80.8	5.2	0		3.4	48.8	47.7	0		25.8	60.4	13.7	0		25.2	53.2	21.6	0			
Total %	3.6	20.6	1.3	0	25.5	0.7	9.9	9.7	0	20.3	9.6	22.4	5.1	0	37	4.3	9.2	3.7	0	17.2		
Lights	237	1351	85	0	1673	44	646	640	0	1330	629	1478	336	0	2443	279	595	243	0	1117	6563	
% Lights	97.5	96.9	95.5	0	96.9	93.6	96.6	97.9	0	97.1	97.4	97.8	98	0	97.7	95.2	96.1	96.4	0	96	97.1	
Mediums	5	37	3	0	45	3	19	11	0	33	14	31	6	0	51	13	22	8	0	43	172	
% Mediums	2.1	2.7	3.4	0	2.6	6.4	2.8	1.7	0	2.4	2.2	2.1	1.7	0	2	4.4	3.6	3.2	0	3.7	2.5	
Articulated Trucks																						
% Articulated Trucks	0.4	0.4	1.1	0	0.5	0	0.6	0.5	0	0.5	0.5	0.1	0.3	0	0.2	0.3	0.3	0.4	0	0.3	0.4	

Merrimack Valley Planning Commission
30 Main Street
Haverhill, Mass. 01830

City/Town: Haverhill
 Weather: Sunny, mild, dry
 Recorded By: JVT
 Intersection: Main St @ Water St.

File Name : tmmawaam
 Site Code : 00000011
 Start Date : 10/04/2007
 Page No : 1

Start Time	Main Street From North				Water Street From East				Bridge Street From South				Merrimack Street From West			
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total
07:00 AM	1	105	7	113	62	45	0	108	25	87	33	145	6	27	41	74
07:15 AM	3	130	13	146	63	44	2	109	22	86	24	142	6	45	32	83
07:30 AM	2	144	10	156	71	38	1	110	19	56	34	149	13	36	31	80
07:45 AM	2	136	22	160	55	53	0	108	34	145	58	237	10	53	25	88
Total	8	515	52	575	251	181	3	435	100	424	149	673	35	161	129	325
08:00 AM	3	146	21	170	58	47	4	110	26	116	46	188	15	45	26	86
08:15 AM	6	133	26	165	58	44	6	108	47	146	63	256	12	33	26	71
08:30 AM	6	105	34	145	53	62	3	118	24	141	52	217	21	31	23	75
08:45 AM	8	129	40	177	64	55	4	123	39	138	63	240	22	53	23	98
Total	25	513	121	659	234	208	17	459	136	541	224	901	70	162	98	330
Grand Total	33	1028	173	1234	485	389	20	894	236	965	373	1574	105	323	227	655
Approach %	2.7	83.3	14.0		54.3	43.5	2.2		15.0	61.3	23.7		16.0	49.3	34.7	
Total %	0.8	23.6	4.0	28.3	11.1	8.9	0.5	20.5	5.4	22.1	8.6	36.1	2.4	7.4	6.2	15.0

Merrimack Valley Planning Commission

30 Main Street

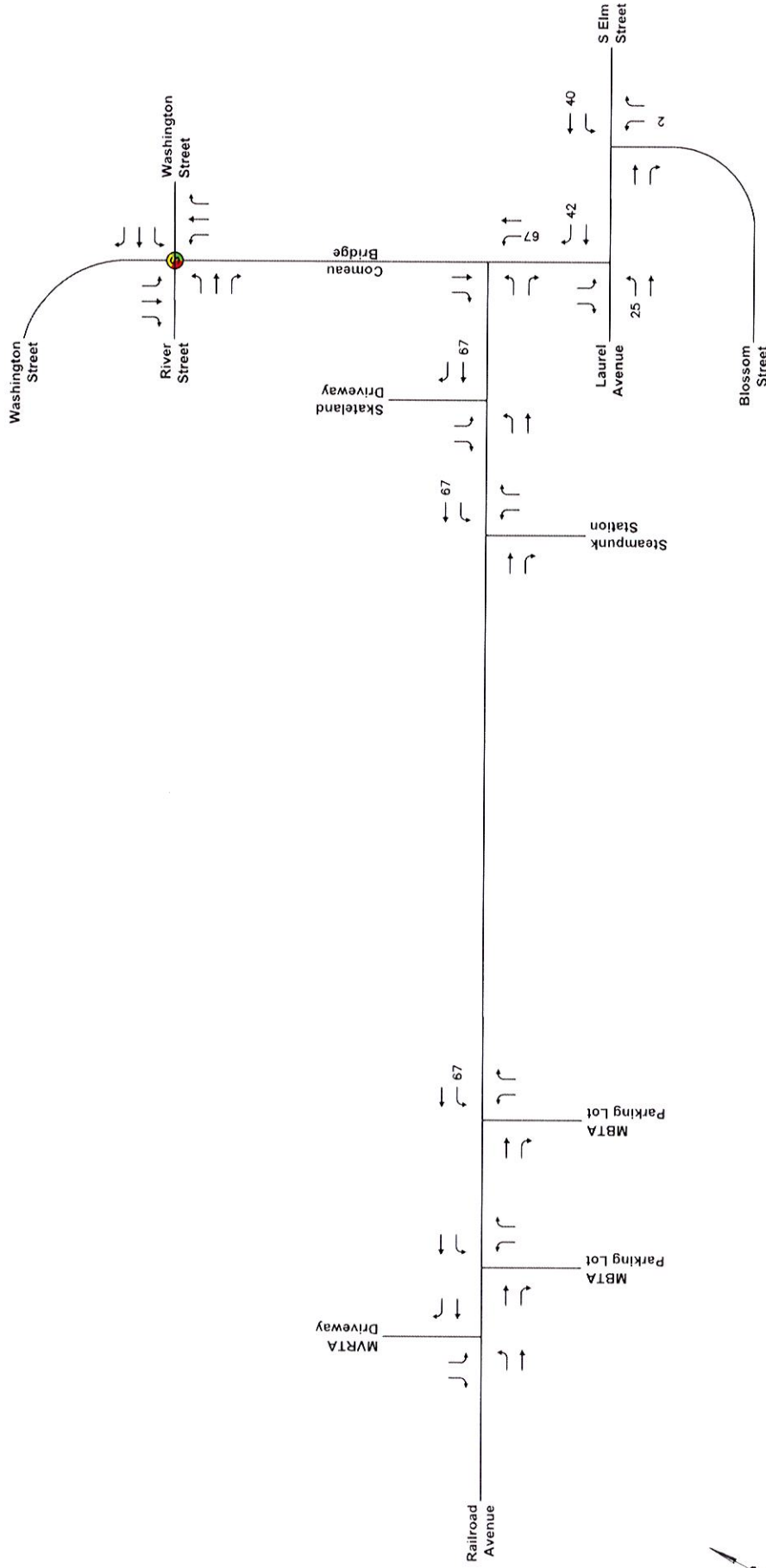
Haverhill, Mass. 01830

File Name : Immawapm
Site Code : 00000012
Start Date : 10/10/2007
Page No : 1

City/Town: Haverhill
Weather: Partly cloudy, cool, dry
Recorded By: JVT,DAO
Intersection: Main St. @ Water St.

Start Time	Main Street From North										Bridge Street From South										Merrimack Street From West									
	Thru					Right					Thru					Right					Thru					Right				
	Left	Thru	Right	Ped	App. Total	Left	Thru	Right	Ped	App. Total	Left	Thru	Right	Ped	App. Total	Left	Thru	Right	Ped	App. Total	Left	Thru	Right	Ped	App. Total	Left	Thru	Right	Ped	App. Total
03:00 PM	8	133	34	3	178	60	50	5	5	120	30	150	70	5	255	24	46	20	1	91	24	46	20	1	91	24	46	20	1	91
03:15 PM	12	135	34	5	186	58	52	3	6	119	34	158	78	1	271	32	46	28	5	114	32	46	28	5	114	32	46	28	5	114
03:30 PM	5	145	23	6	179	74	55	5	0	134	44	168	61	4	275	26	48	33	1	110	26	48	33	1	110	26	48	33	1	110
03:45 PM	11	141	28	8	188	69	49	5	6	129	33	177	78	6	284	30	31	30	0	91	30	31	30	0	91	30	31	30	0	91
Total	36	554	119	22	731	261	206	18	17	502	141	651	287	16	1095	114	173	112	7	406	114	173	112	7	406	114	173	112	7	406
04:00 PM	11	114	10	0	135	52	40	4	4	100	33	148	86	6	273	26	59	27	3	115	26	59	27	3	115	26	59	27	3	115
04:15 PM	6	120	28	2	157	56	52	3	3	114	26	150	69	2	247	33	47	19	5	104	33	47	19	5	104	33	47	19	5	104
04:30 PM	4	128	35	8	175	85	66	2	3	136	33	148	78	5	265	15	53	31	1	100	15	53	31	1	100	15	53	31	1	100
04:45 PM	3	141	25	2	171	69	60	7	0	136	26	182	63	1	272	24	51	38	0	113	24	51	38	0	113	24	51	38	0	113
Total	24	504	98	12	638	242	218	16	10	486	118	628	287	14	1057	98	210	115	9	432	98	210	115	9	432	98	210	115	9	432
05:00 PM	6	134	25	2	167	59	52	6	7	134	42	196	78	4	310	18	47	27	3	95	18	47	27	3	95	18	47	27	3	95
05:15 PM	6	148	22	0	177	54	35	2	3	94	33	236	91	3	363	17	47	27	4	95	17	47	27	4	95	17	47	27	4	95
Grand Total	72	134	265	36	1714	616	521	42	37	1216	334	170	753	37	2825	247	477	281	23	1028	247	477	281	23	1028	247	477	281	23	1028
Approach %	4.2	76	15	2.1		50	42	3.5	3.0		11	60	26	1.3		24	46	27	2.2		24	46	27	2.2		24	46	27	2.2	
Total %	1.1	19	3.9	0.5	25.3	9.1	7.7	0.6	0.5	17.9	4.9	25	11	0.5	41.6	3.6	7.0	4.1	0.3	15.2	3.6	7.0	4.1	0.3	15.2	3.6	7.0	4.1	0.3	15.2

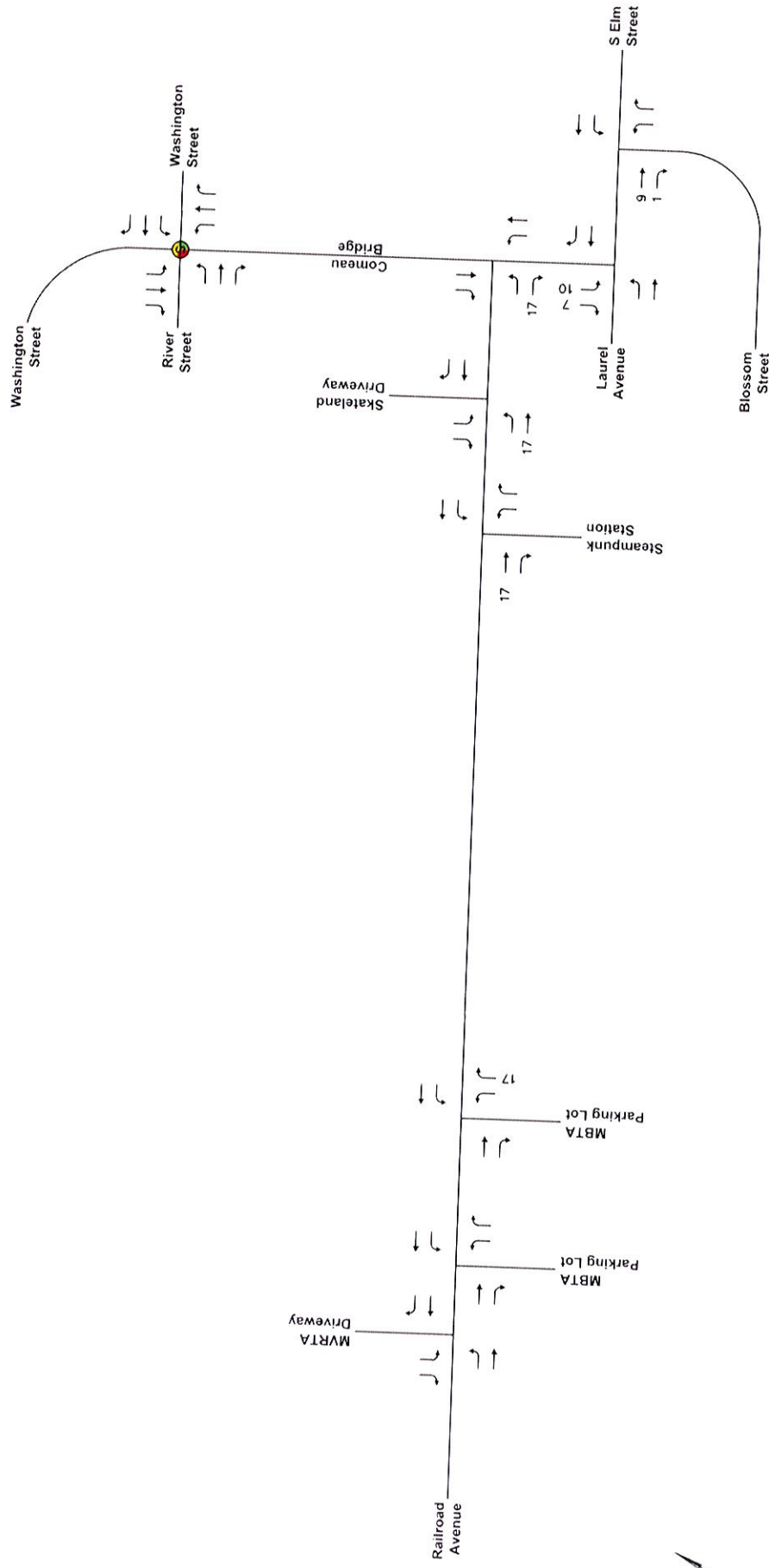
- Pandemic Adjustments
 - MBTA Adjustment



NOTES:
NEGL. = Negligible
S = Signalized Intersection

Attachment

MBTA Adjustment Weekday Morning Peak Hour Traffic Volumes



North
Scale: Not to Scale

NOTES:
NEGL. = Negligible
S = Signalized Intersection

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Attachment

MBTA Adjustment Weekday Evening Peak Hour Traffic Volumes

MBTA HAVERHILL LINE – INBOUND
WEEKDAY BOARDINGS, ALIGHTINGS, AND LOADS BY TRAIN AND STATION
Spring/Fall 2018 CTPS Commuter Rail Passenger Counts

Station	Train 286				Train 288				Train 208				Train 290				Train 210			
	Scheduled Time (AM)	Ons	Offs	Load	Scheduled Time (AM)	Ons	Offs	Load	Scheduled Time (AM)	Ons	Offs	Load	Scheduled Time (AM)	Ons	Offs	Load	Scheduled Time (AM)	Ons	Offs	Load
Haverhill	—	—	—	—	—	—	—	—	7:35	25	—	25	—	—	—	—	9:05	20	—	20
Bradford	—	—	—	—	—	—	—	—	7:37	67	0	92	—	—	—	—	9:07	8	0	28
Lawrence	—	—	—	—	—	—	—	—	7:46	108	3	197	—	—	—	—	9:15	22	1	49
Andover	—	—	—	—	—	—	—	—	7:53	104	1	300	—	—	—	—	9:22	16	2	63
Ballardvale	—	—	—	—	—	—	—	—	7:59	63	1	362	—	—	—	—	9:27	3	0	66
North Wilmington	—	—	—	—	—	—	—	—	Train 208 is routed via the Lowell Line south of Ballardvale. Ons and offs at stations on that line are shown only in the Lowell Line tables.				—	—	—	—	9:34	5	0	71
Reading	7:30	261	—	261	8:00	177	—	177	—	—	—	—	8:30	105	—	105	9:41	16	1	86
Wakefield	7:36	94	0	355	8:06	110	0	287	—	—	—	—	8:36	63	0	168	9:45	12	0	98
Greenwood	7:39	30	0	385	8:09	0	0	287	—	—	—	—	8:39	0	0	168	9:49	6	0	104
Melrose Highlands	7:41	77	0	462	8:11	72	0	359	—	—	—	—	8:41	29	0	197	9:51	3	0	107
Melrose/Cedar Park	7:43	49	0	511	8:13	11	0	370	—	—	—	—	8:43	9	2	204	9:53	2	1	108
Wyoming Hill	7:45	31	0	542	8:15	29	0	399	—	—	—	—	8:45	20	0	224	9:55	1	1	108
Malden Center	7:51	10	18	534	8:19	7	10	396	—	—	—	—	8:49	9	5	228	9:58	0	4	104
North Station	8:02	—	534	—	8:30	—	396	—	8:38	—	362	—	9:00	—	228	—	10:10	—	104	—
Total Riders		552	552			406	406			367	367			235	235			114	114	

MBTA HAVERHILL LINE – INBOUND
WEEKDAY BOARDINGS, ALIGHTINGS, AND LOADS BY TRAIN AND STATION
Spring/Fall 2018 CTPS Commuter Rail Passenger Counts

Station	Train 220					Train 294					Train 296					Train 222				
	Scheduled Time (PM)	Ons	Offs	Load	Scheduled Time (PM)	Ons	Offs	Load	Scheduled Time (PM)	Ons	Offs	Load	Scheduled Time (PM)	Ons	Offs	Load	Scheduled Time (PM)	Ons	Offs	Load
Haverhill	4:47	16	—	16	—	—	—	—	—	—	—	—	—	—	—	—	6:09	14	—	14
Bradford	f 4:49	0	0	16	—	—	—	—	—	—	—	—	—	—	—	—	6:19	1	0	15
Lawrence	4:57	19	2	33	—	—	—	—	—	—	—	—	—	—	—	—	6:39	20	0	35
Andover	f 5:04	7	0	40	—	—	—	—	—	—	—	—	—	—	—	—	f 6:46	6	3	38
Ballardvale	f 5:09	9	0	49	—	—	—	—	—	—	—	—	—	—	—	—	f 6:51	1	1	38
North Wilmington	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Reading	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Wakefield	—	—	—	—	—	5:38	6	6	6	6:55	15	—	15	—	—	—	—	—	—	—
Greenwood	—	—	—	—	f 5:43	10	0	16	f 7:00	4	0	19	—	—	—	—	—	—	—	—
Metrose Highlands	—	—	—	—	f 5:46	1	2	15	f 7:03	1	0	20	—	—	—	—	—	—	—	—
Metrose/Cedar Park	—	—	—	—	f 5:48	0	0	15	f 7:05	1	0	21	—	—	—	—	—	—	—	—
Wyoming Hill	—	—	—	—	f 5:49	0	0	15	f 7:06	1	0	22	—	—	—	—	—	—	—	—
Malden Center	—	—	—	—	f 5:51	0	0	15	f 7:08	2	0	24	—	—	—	—	—	—	—	—
North Station	5:45	—	49	—	5:54	0	0	15	7:11	0	0	24	—	—	—	—	—	—	—	—
Total Riders		51	51		6:05	17	17		7:22	24	24		7:25	42	42					

MBTA HAVERHILL LINE - OUTBOUND
WEEKDAY BOARDINGS, ALIGHTINGS, AND LOADS BY TRAIN AND STATION
Spring/Fall 2018 CTPS Commuter Rail Passenger Counts

Station	Train 285				Train 287				Train 201			
	Scheduled Time (AM)	Ons	Offs	Load	Scheduled Time (AM)	Ons	Offs	Load	Scheduled Time (AM)	Ons	Offs	Load
North Station	6:43	10	—	10	7:10	9	—	9	7:35	45	—	45
Malden Center	f 6:54	0	0	10	f 7:21	0	0	9	f 7:45	4	0	49
Wyoming Hill	f 6:57	0	0	10	f 7:24	0	0	9	f 7:48	1	0	50
Melrose Cedar Park	f 6:59	0	7	3	f 7:26	0	6	3	f 7:50	1	0	51
Melrose Highlands	f 7:02	0	0	3	f 7:29	0	1	2	f 7:53	0	1	50
Greenwood	f 7:05	0	0	3	f 7:32	0	0	2	f 7:56	0	1	49
Wakefield	f 7:09	0	0	3	f 7:36	0	1	1	f 8:00	1	4	46
Reading	7:15	—	3	—	7:42	—	1	—	8:06	1	5	42
North Wilmington	—	—	—	—	—	—	—	—	8:12	0	0	42
Ballardvale	—	—	—	—	—	—	—	—	8:19	0	7	35
Andover	—	—	—	—	—	—	—	—	8:24	1	12	24
Lawrence	—	—	—	—	—	—	—	—	8:31	1	15	10
Bradford	—	—	—	—	—	—	—	—	8:40	0	1	9
Haverhill	—	—	—	—	—	—	—	—	8:42	—	9	—
Total Riders		10	10			9	9			55	55	

MBTA HAVERHILL LINE - OUTBOUND
WEEKDAY BOARDINGS, ALIGHTINGS, AND LOADS BY TRAIN AND STATION
Spring/Fall 2018 CTPS Commuter Rail Passenger Counts

Station	Train 211				Train 291				Train 213				Train 293				Train 215			
	Scheduled Time (PM)	Ons	Offs	Load	Scheduled Time (PM)	Ons	Offs	Load	Scheduled Time (PM)	Ons	Offs	Load	Scheduled Time (PM)	Ons	Offs	Load	Scheduled Time (PM)	Ons	Offs	Load
North Station	3:15	180	—	180	3:50	147	—	147	4:30	522	—	522	4:48	226	—	226	5:15	517	—	517
Malden Center	3:26	10	4	186	4:01	6	3	150	4:41	14	2	534	4:59	3	8	221	5:26	14	15	516
Wyoming Hill	3:30	3	12	177	4:05	0	10	140	4:45	2	0	536	5:03	1	10	212	—	—	—	516
Meirose Cedar Park	3:32	0	6	171	4:07	0	16	124	4:47	0	11	525	5:05	0	11	201	—	—	—	516
Meirose Highlands	3:36	1	14	158	4:11	0	24	100	4:51	0	29	496	5:09	0	44	157	—	—	—	516
Greenwood	3:39	10	10	158	4:14	0	8	92	4:54	0	16	480	5:12	0	22	135	—	—	—	516
Wakefield	3:43	4	9	153	4:18	0	41	51	4:58	4	55	429	5:16	1	39	97	5:36	0	77	439
Reading	3:49	3	20	136	4:24	—	51	—	5:04	1	88	342	5:22	—	97	—	5:42	1	112	328
North Wilmington	3:56	0	7	129	—	—	—	—	5:11	1	25	318	—	—	—	—	5:49	0	18	310
Ballardvale	4:03	0	16	113	—	—	—	—	5:18	1	50	269	—	—	—	—	5:56	0	53	257
Andover	4:09	1	27	87	—	—	—	—	5:24	3	51	221	—	—	—	—	6:02	0	76	181
Lawrence	4:15	2	32	57	—	—	—	—	5:30	3	126	98	—	—	—	—	6:08	1	86	96
Bradford	4:24	0	16	41	—	—	—	—	5:50	0	45	53	—	—	—	—	6:18	0	45	51
Haverhill	4:27	—	41	—	—	—	—	—	6:00	—	53	—	—	—	—	—	6:21	—	51	—
Total Riders		214	214			153	153			551	551			231	231			533	533	

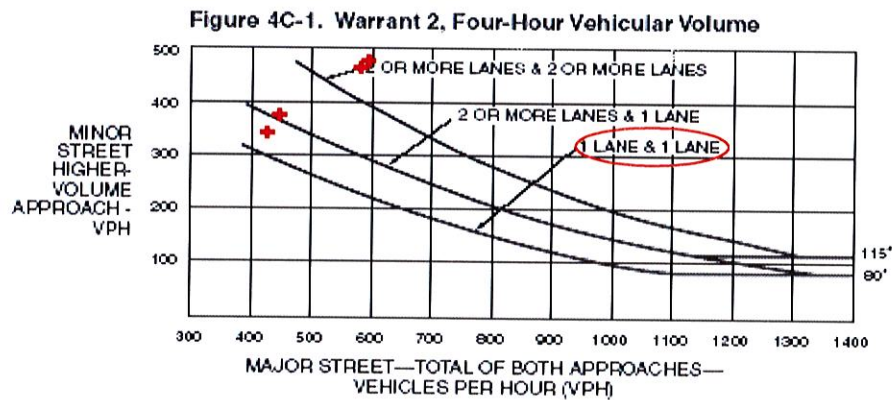
- Signal Warrant Analysis

MUTCD Traffic Signal Warrant #2 Analysis

Project Name 1089 - Haverhill, MA

Date 2020 Existing w/ Pandemic and MBTA adjustment

		Street Name	Direction						
Major 1		S Elm Street	WB						
Major 2		Laurel Avenue	EB						
Minor 1		S Elm Street	SB						
Minor 2			WB						
		</							



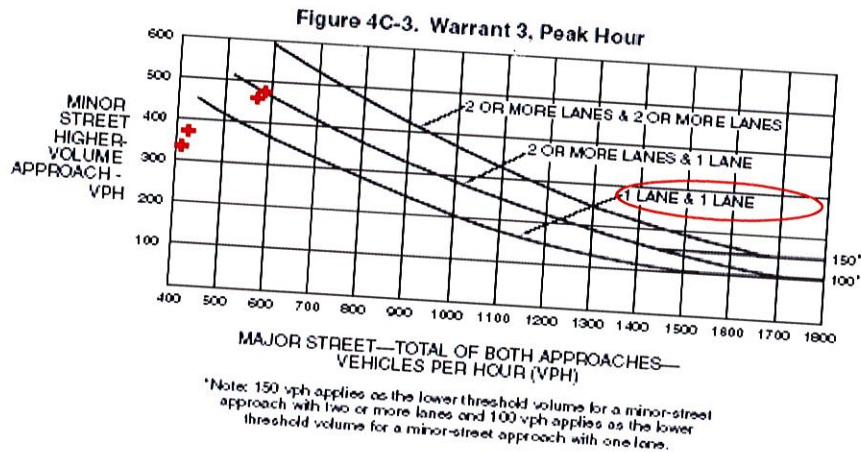
*Note: 115 vph applies as the lower threshold volume for a minor-street

MUTCD Traffic Signal Warrant #3 Analysis

Project Name 1089 - Haverhill, MA
Date 2020 Existing w/ Pandemic and MBTA adjustment

Major 1	Street Name	Direction
Major 2	S Elm Street	WB
Minor 1	Laurel Avenue	EB
Minor 2	S Elm Street	SB

Node	Time Period	S Elm St Major St. 1 Approach Volume	Laurel St Major St. 2 Approach Volume	Total Major St. Volume	S Elm St (Bridge) Minor St. 1 Approach Volume	Minor St. 2 Approach Volume	Higher Minor St. Volume	Warrant 3 Threshold Met
1	6:00-7:00 AM	0	0	0	0	0	0	
2	7:00-8:00 AM	296	115	411	342	0	0	NO
3	8:00-9:00 AM	265	173	438	385	0	342	NO
4	9:00-10:00 AM	0	0	0	0	0	385	NO
5	10:00-11:00 AM	0	0	0	0	0	0	NO
6	11:00 AM-12:00 PM	0	0	0	0	0	0	NO
7	12:00-1:00 PM	0	0	0	0	0	0	NO
8	1:00 PM - 2:00 PM	0	0	0	0	0	0	NO
9	2:00 PM - 3:00 PM	0	0	0	0	0	0	NO
10	3:00 PM - 4:00 PM	0	0	0	0	0	0	NO
11	4:00 PM - 5:00 PM	359	239	598	487	0	0	NO
12	5:00 PM - 6:00 PM	382	209	591	481	0	487	NO
						0	481	YES
							Hours Met	2



28 Lord Road, Suite 280
Marlborough, MA

E/W: South Elm Street
NB: Laurel Avenue
Haverhill, MA

File Name : 1089 Elm at Laurel
Site Code : 1089
Start Date : 7/8/2020
Page No : 1

[illegible]

MDM TRANSPORTATION CONSULTANTS, INC.

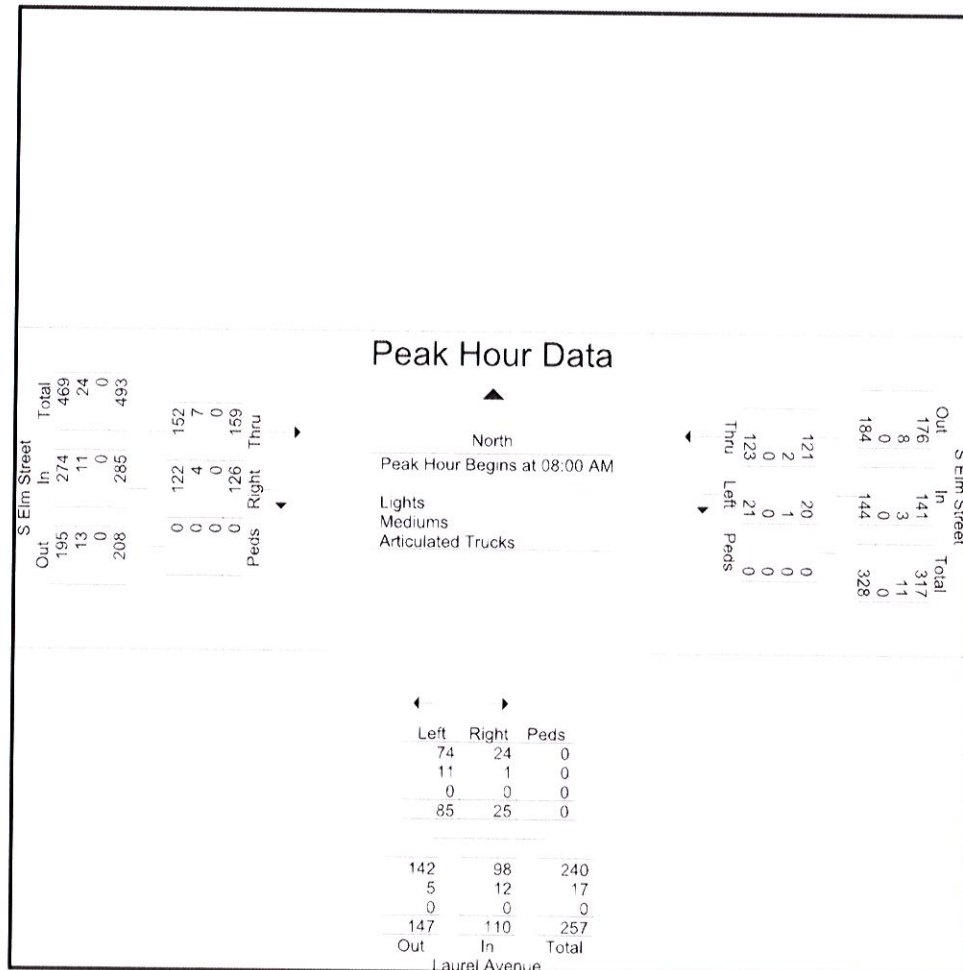
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

E/W: South Elm Street
NB: Laurel Avenue
Haverhill, MA

File Name : 1089 Elm at Laurel
Site Code : 1089
Start Date : 7/8/2020
Page No : 2

S Elm Street From East						Laurel Avenue From South				S Elm Street From West				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total	
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 08:00 AM														
08:00 AM	32	10	0	42		26	0	29	21	48	0	69	140	
08:15 AM	24	4	0	28	11	23	0	34						
08:30 AM	32	3	0	35	5	18	0	23	40	43	0	83	141	
08:45 AM	35	4	0	39	6	18	0	24	35	40	0	75	138	
Total Volume	123	21	0	144	25	85	0	110	126	159	0	285	539	
% App. Total	85.4	14.6	0		22.7	77.3	0		44.2	55.8	0			
PHF	.879	.525	.000	.857	.568	.817	.000	.809	.788	.828	.000	.858	.956	
Lights	121	20	0	141	24	74	0	98	122	152	0	274	513	
% Lights	98.4	95.2	0	97.9	96.0	87.1	0	89.1	96.8	95.6	0	96.1	95.2	
Mediums	2	1	0	3	1	11	0	12	4	7	0	11	26	
% Mediums	1.6	4.8	0	2.1	4.0	12.9	0	10.9	3.2	4.4	0	3.9	4.8	
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	



MDM TRANSPORTATION CONSULTANTS, INC.

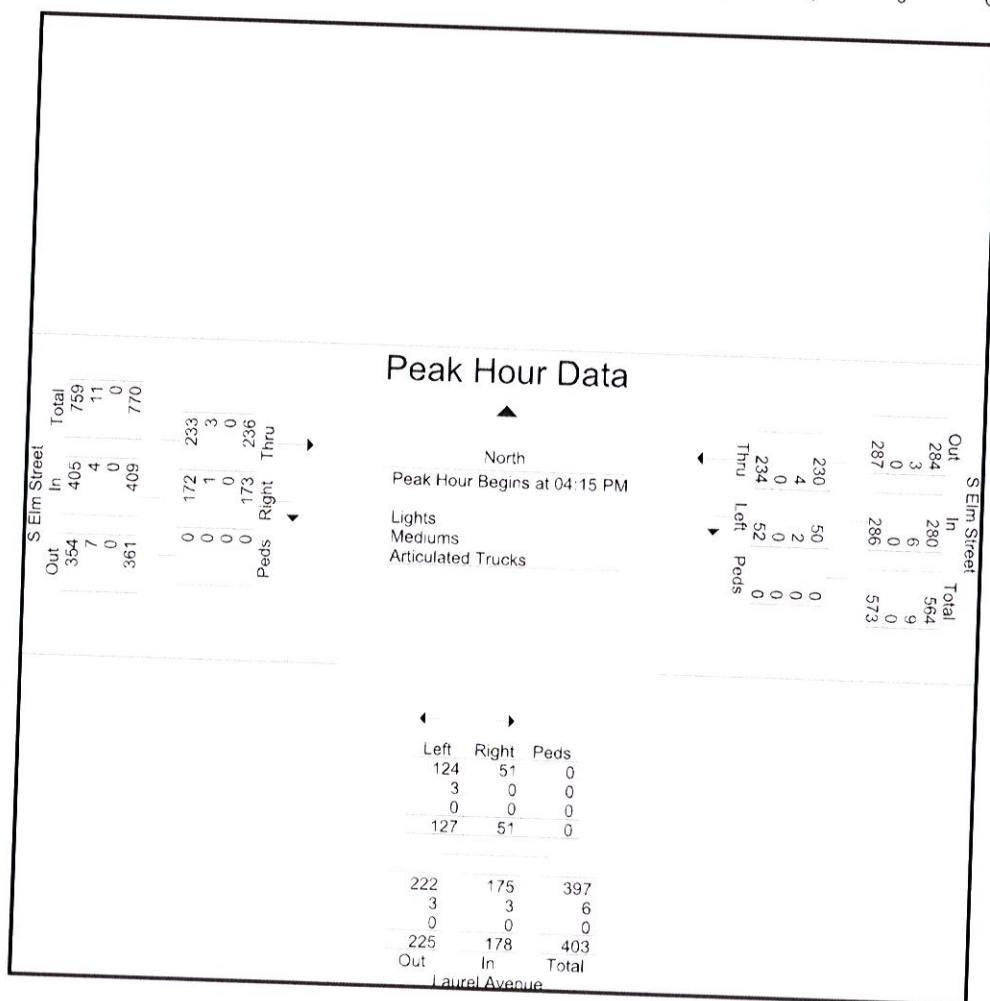
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

E/W: South Elm Street
NB: Laurel Avenue
Haverhill, MA

File Name : 1089 Elm at Laurel
Site Code : 1089
Start Date : 7/8/2020
Page No : 3

Start Time	S Elm Street From East				Right	Laurel Avenue From South				Right	S Elm Street From West				Int. Total
	Thru	Left	Peds	App. Total		Left	Peds	App. Total	Thru		Peds	App. Total			
Peak Hour Analysis From 12:00 PM to 06:00 PM - Peak 1 of 1															
Peak Hour for Entire Intersection Begins at 04:15 PM															
04:15 PM	58	16	0	74	14	32	0	46	47	58	0	105	225		
04:30 PM	55	13	0	68	7	35	0	42	37	54	0	91	201		
04:45 PM	60	9	0	69	15	27	0	42	43	60	0	103	214		
05:00 PM	61	14	0	75				48		64	0	110	233		
Total Volume	234	52	0	286	51	127	0	178	173	236	0	409	873		
% App. Total	81.8	18.2	0		28.7	71.3	0		42.3	57.7	0				
PHF	.959	.813	.000	.953	.850	.907	.000	.927	.920	.922	.000	.930	.937		
Lights	230	50	0	280	51	124	0	175	172	233	0	405	860		
% Lights	98.3	96.2	0	97.9	100	97.6	0	98.3	99.4	98.7	0	99.0	98.5		
Mediums	4	2	0	6	0	3	0	3	1	3	0	4	13		
% Mediums	1.7	3.8	0	2.1	0	2.4	0	1.7	0.6	1.3	0	1.0	1.5		
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0		
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0		



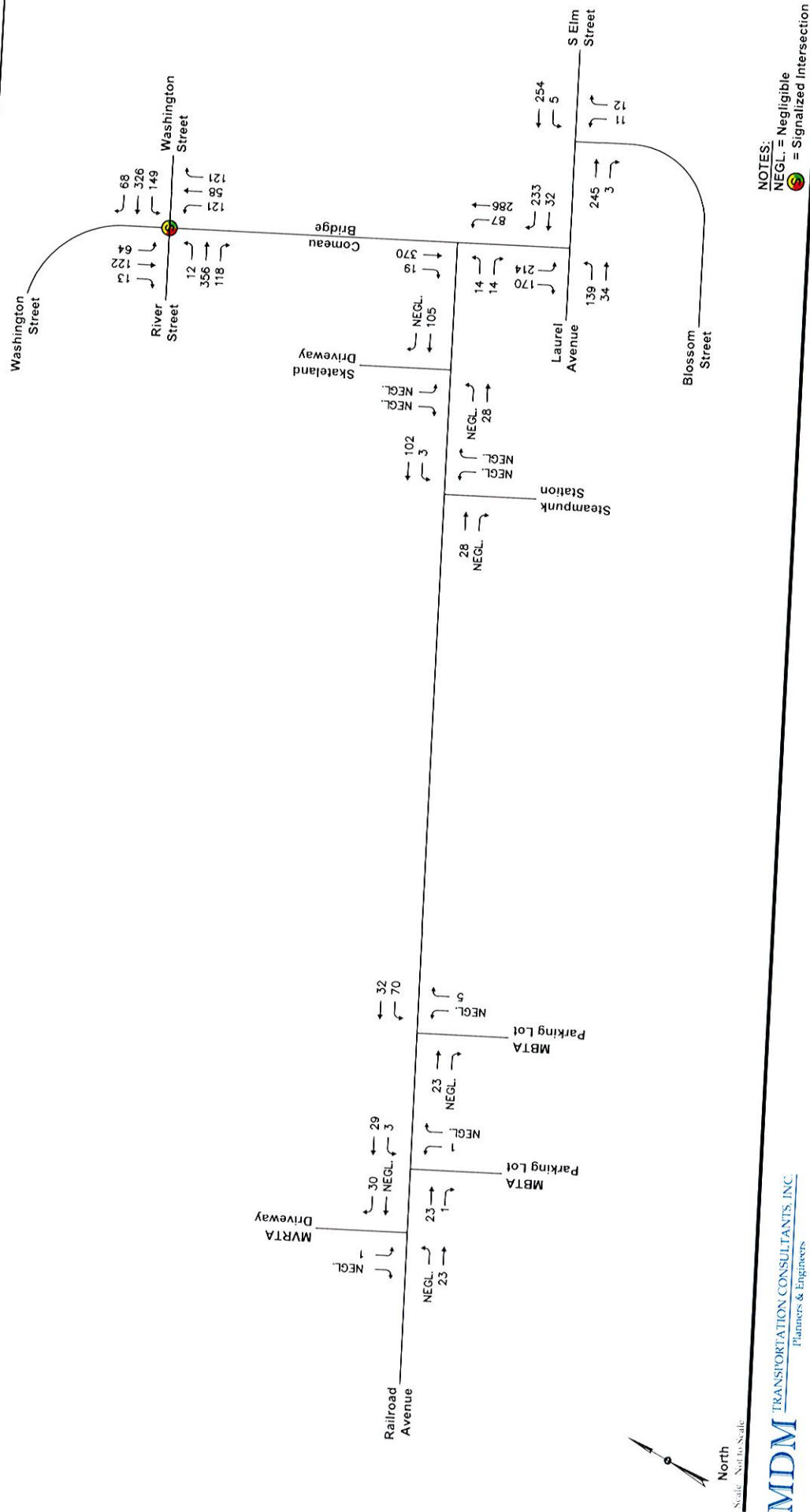


Figure 3

Baseline Conditions Weekday Morning Peak Hour Traffic Volumes



Figure 4

**Baseline Conditions
Weekday Evening Peak Hour Traffic Volumes**



Haverhill

1231

City Clerk's Office, Room 118
Phone: 978-374-2312 Fax: 978-373-8490
cityclerk@cityofhaverhill.com

Date: 5/14/21

Honorable President and Members of the Municipal Council:

The undersigned respectfully asks to receive a license for **TAG DAYS**
pursuant to Chapter 227 of Haverhill City Code

Organization: Haverhill High Wrestling ^{CotD} Applicant's Name: Kelly Nicolosi
Applicant's Residence (must be Haverhill resident): 6 Parsonage Hill Rd
Applicant's Signature: Kelly Nicolosi

(3 CONSECUTIVE DAYS ONLY)

Date of Tag Day Request(s): June 12-13
Canister: _____ Tag: ✓ Fee: \$ 20.00 ^(M/C)

ON STREET LOCATIONS ARE NO LONGER PERMITTED - SEE DOC. 47 OF 2017

OFF STREET LOCATIONS - PLEASE SPECIFY

Heavenly Donuts Charlie's
Market Basket

***A LETTER FROM THE PRIVATE PROPERTY OWNER GRANTING PERMISSION FOR
USE OF THE LISTED LOCATIONS IS REQUIRED AT THE TIME OF THE APPLICATION**

*A sample of the badge being used by those tagging and a sample of the tag being issued by the
Organization must be filed with the City Clerk's Office at the time of the application*

Office Use Only
Recommendation by Police Chief: ✓ Approved Alan R. DePaulis
_____ Denied
Police Chief

In Municipal Council, _____

Attest: _____
City Clerk

CITY COUNCIL

MELINDA E. BARRETT

PRESIDENT

COLIN F. LePAGE

VICE PRESIDENT

JOSEPH J. BEVILACQUA

JOHN A. MICHITSON

THOMAS J. SULLIVAN

TIMOTHY J. JORDAN

MICHAEL S. MCGONAGLE

MARY ELLEN DALY O'BRIEN

WILLIAM J. MACEK



CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS 01830-5843

15.1

CITY HALL, ROOM 204
4 SUMMER STREET
HAVERHILL, MA 01830
TELEPHONE: 978 374-2328

www.cityofhaverhill.com
citycncl@cityofhaverhill.com

May 21, 2021

TO: Members of the City Council:

Council President Barrett and Councillor Michitson wish to address making remote, virtual participation in public hearing and meetings a permanent fixture of city government.

President Melinda Barrett

Councillor John Michitson

CITY COUNCIL

MELINDA E. BARRETT
PRESIDENT
COLIN F. LEPAGE
VICE PRESIDENT
JOSEPH J. BEVILACQUA
JOHN A. MICHITSON
THOMAS J. SULLIVAN
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MICHAEL S. MCGONAGLE
MARY ELLEN DALY O'BRIEN
WILLIAM J. MACEK



CITY OF HAVERHILL
HAVERHILL, MASSACHUSETTS 01830-5843

1512
CITY HALL, ROOM 204
4 SUMMER STREET
HAVERHILL, MA 01830
TELEPHONE: 978 374-2328

www.cityofhaverhill.com
citycncl@cityofhaverhill.com

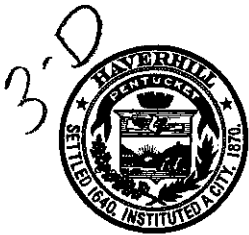
May 12, 2021

TO: President and Members of the City Council:

Councillor Michael McGonagle requests the removal of a handicap parking space at 58 Webster Street, as it is no longer needed.



City Councillor Michael McGonagle



DOCUMENT 3-D

BACKUP

CITY OF HAVERHILL

In Municipal Council January 26 2021

2021 JAN 22 AM 10:53 PM CITY

ORDERED:

MUNICIPAL ORDINANCE

CHAPTER 240

AN ORDINANCE RELATING TO PARKING

BE IT ORDAINED by the City Council of the City of Haverhill that the Code of the City of Haverhill, Chapter 240, as amended, be further amended by ADDING the following in § 240-85 Schedule B: Parking Restrictions and Prohibitions:

LOCATION	REGULATION	HOURS/DAYS
Webster Street In front of No. 58 except For 1-24 hour handicap Parking space at No. 58 Webster Street	No Parking	24 hours

APPROVED AS TO LEGALITY:

City Solicitor

PLACED ON FILE for at least 10 days

Attest:

Acting

City Clerk

IN CITY COUNCIL: February 2 2021

PASSED

Attest:

Acting

City Clerk

APPROVED:

[Signature]

Mayor

26



Document 62

CITY OF HAVERHILL

In Municipal Council May 18 2021

1611

Ordered:

That as part of the fiscal year 2022 annual budget the sum of **\$208,510,412** be and is hereby raised and appropriated within the categories as designated as appropriated on the attached and further that said appropriation be funded in the following manner:

\$210,581	Water Receipts
\$624,236	Wastewater Receipts
\$4,900,000	Free Cash
\$760,000	Transfer from Special Revenue (ARPA)
\$202,015,595	Taxation and Other Receipts

POSTPONED TO MAY 25 2021

Attest:

City Clerk

2021 MAY 17 PM 03:07 FAX 978-374-2742

Introduced by Mayor James J. Fiorentini

an Order Concerning Appropriations for the Fiscal Year Beginning July 1, 2021

Ordered that the following sums, designated as appropriations, are hereby appropriated in the General Fund of the City of Haverhill.

City Council
City of Haverhill
Submitted May 17, 2021

	Salaries Appropriation	Expenses Appropriation	Capital Appropriation	Department Totals	State and Other Assessments	Grand Totals
General Government						
City Council	189,866	8,400	0	198,266		198,266
Mayor's Office	363,801	39,600	0	403,401		403,401
Auditor's Office	282,585	106,995	0	389,580		389,580
Treasurer/Collector	436,840	208,000	0	644,840		644,840
Constituent Services	128,779	29,400	500	158,679		158,679
Assessing	280,571	158,995	0	419,566		419,566
Purchasing	114,275	12,100	0	126,375		126,375
Law Department	85,027	238,578	0	323,605		323,605
Human Resources	212,786	83,710	0	296,496		296,496
Municipal Information Systems	25,000	602,834	15,000	642,834		642,834
City Clerk	396,723	130,250	0	526,973		526,973
	2,496,053	1,618,862	15,500	4,130,415	0	4,130,415
Community & Economic Development						
Building & Zoning	301,420	0	0	301,420		301,420
Inspectional & Health Services	486,695	48,750	0	535,445		535,445
Public Health	41,900	0	0	41,900		41,900
Economic Development	186,228	69,939	0	256,167		256,167
	1,016,243	118,689	0	1,134,931	0	1,134,931
Public Safety						
Police Department	11,912,426	1,568,167	171,589	13,650,183		13,650,183
Crossing Guards	95,000	0	0	95,000		95,000
Fire Department	10,701,305	847,275	1,200	11,549,780		11,549,780
	22,708,731	2,415,442	172,789	25,294,963	0	25,294,963
Education						
Whittier Regional School		8,673,859		8,673,859		8,673,859
North Shore/Essex Regional School		739,398		739,398		739,398
School Other Funding		15,000		15,000		15,000
School Medicaid		300,000		300,000		300,000
School Department		98,383,213		98,383,213		98,383,213
	0	108,111,470	0	108,111,470	0	108,111,470
Public Works						
Administration	67,500	33,415	0	100,915		100,915
Highways	1,155,793	589,250	0	1,725,043		1,725,043
Solid Waste/Recycling	171,034	5,191,930	0	5,362,964		5,362,964
Parking Area	45,743	376,659	0	422,402		422,402
Street Marking Division	0	112,483	0	112,483		112,483
Fleet Maintenance	229,445	51,100	0	280,545		280,545
Building Maintenance	176,486	182,500	0	358,986		358,986
Park Department	378,386	278,731	0	657,117		657,117
Street Lighting	0	499,000	0	499,000		499,000
Snow & Ice Removal	228,349	481,651	0	710,000		710,000
	2,452,738	7,776,719	0	10,229,457		10,229,457
Human Services						
Citizens Center	242,364	136,800	0	379,164		379,164
Veterans Service	94,752	949,800	0	1,044,552		1,044,552
Senior Services	11,000	2,700	0	13,700		13,700
Stadium Commission	0	14,443	0	14,443		14,443

Recreation	137,930	83,000	0	220,930	220,930
Public Library	1,227,386	397,267	0	1,624,653	1,624,653
	1,713,433	1,584,010	0	3,297,443	3,297,443
Debt Service		8,114,877		8,114,877	8,114,877
Employee Benefits					
Retirement Fund	19,649,956			19,649,956	19,649,956
Unemployment Compensation	209,800			209,800	209,800
Group Insurance	22,617,970			22,617,970	22,617,970
Payroll Taxes (FICA/Medicare)	1,476,800			1,476,800	1,476,800
Workers Compensation	496,743			496,743	496,743
Indemnification of Retirees	207,632			207,632	207,632
Sick Leave Bank	75,000			75,000	75,000
Long Term Disability	2,000			2,000	2,000
Vacation Accrual	50,000			50,000	50,000
Injured on Duty Clams	216,300			216,300	216,300
	45,002,201			45,002,201	45,002,201
Other					
Capital Projects			500,000	500,000	500,000
General Liability Insurance		695,905		695,905	695,905
Salary Reserve	1,348,751			1,348,751	1,348,751
Stabilization Fund				0	0
Budget Reserve		650,000		650,000	650,000
Other Deficits (Snow & Ice)				675,000	675,000
State Assessments (Cherry Sheets)				0	7,216,772
Reserve for Abatements and Exemptions (Overlay)				400,000	400,000
	1,348,751	1,345,905	500,000	3,194,656	8,291,772
					11,486,428
Total General Fund	76,738,149	131,083,974	688,289	208,510,412	8,291,772
					216,802,184

62-B



Document 62-B

162

CITY OF HAVERHILL

In Municipal Council May 18 2021

Ordered:

That as part of the fiscal year 2022 annual budget the sum of \$45,000 be raised and appropriated from the Hospital Trust Funds and transferred into General Fund as follows:

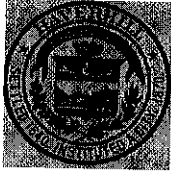
Public Health Salaries	\$40,000
Public Health Expenses	\$5,000

POSTPONED TO MAY 25 2021

Attest:

City Clerk

62-C



DOCUMENT 62-C

16.3

CITY OF HAVERHILL

In Municipal Council May 18 2021

ORDERED:

That as part of the fiscal year 2022 annual budget the sum of **\$11,261,618** be appropriated to operate the Water Department for items marked as appropriation on the attached

And that \$9,415,975 come from Water Revenue

And that \$2,056,224 come from available Retained Earnings

And that \$210,581 be appropriated in the General Fund and funded from Water Receipts

POSTPONED TO MAY 25 2021

Attest:

City Clerk

Introduced by the Mayor James J. Fiorentini
an Order Concerning Appropriations for the Fiscal Year Beginning July 1, 2021

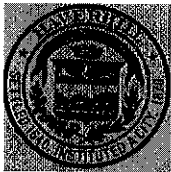
Ordered that the following sums, designated as appropriations, are hereby appropriated in the Water Fund of the City of Haverhill and that \$210,581 be appropriated in the General Fund and funded from Water revenue.

	Salaries Appropriation	Expenses Appropriation	Capital Appropriation	Total City	Other Assessments From General Fund	Grand Totals
General Operations	2,515,580	2,313,447	761,600	5,590,627		5,590,627
Engineering	428,016	99,100		527,116		527,116
Conservation	75,182	4,700		79,882		79,882
Transfers		0		0	210,581	210,581
Benefits	1,337,177			1,337,177		1,337,177
Debt		3,583,982		3,583,982		3,583,982
Reserves		0		0		0
Insurance		142,834		142,834		142,834
Total Water Fund	4,355,955	6,144,063	761,600	11,261,618	210,581	11,472,199

Be it further ordered that the City appropriations and assessments in the Water Fund are to be financed by estimated revenues drawn from the following sources.

	Charges for Services	Other Revenue	Engineering Fees	Total Revenue	Available Fund Balance	Grand Totals
Water Fund	9,058,625	205,000	152,350	9,415,975	2,056,224	11,472,199
Total Water Fund	9,058,625	205,000	152,350	9,415,975	2,056,224	11,472,199

62-D



DOCUMENT 62-D

CITY OF HAVERHILL

In Municipal Council May 18 2021

ORDERED:

That as part of the fiscal year 2022 annual budget the sum of **\$12,802,632** be appropriated to operate the Wastewater Department for items marked as appropriation on the attached

And that \$13,392,665 come from Wastewater Revenue

And that \$34,202 come from available Retained Earnings

And that \$624,235 be appropriated in the General Fund and funded from Wastewater Receipts

POSTPONED TO MAY 25 2021

ATTEST:

A

City Clerk

16.4

2021MAY17PM12:15:49V-C17AC

City Council
City of Haverhill
Submitted May 17, 2021

Introduced by the Mayor James J. Fiorentini
an Order Concerning Appropriations for the Fiscal Year Beginning July 1, 2021

Ordered that the following sums, designated as appropriations, are hereby appropriated in the Wastewater Fund of the City of Haverhill and that \$624,235 be appropriated in the General Fund and funded from Wastewater revenue.

	Salaries	Expenses	Capital	Total City	Other Assessments	Grand Totals
	Appropriation	Appropriation	Appropriation		From General Fund	
General Operations	2,664,481	4,146,277	762,900	7,573,658		7,573,658
Stormwater	93,230	427,100	0	520,330		520,330
Transfers	0	0		0	624,235	624,235
Benefits	1,214,407			1,214,407		1,214,407
Debt		3,399,668		3,399,668		3,399,668
Reserves		0		0		0
Insurance		94,569		94,569		94,569
Total Wastewater Fund	3,972,118	8,067,614	762,900	12,802,632	624,235	13,426,867

Be it further ordered that the City appropriations and assessments in the Wastewater Fund are to be financed by estimated revenues drawn from the following sources.

	Charges for	Other	Total	Available	Grand Totals
	Services	Revenue	Revenue	Fund Balance	
Wastewater Fund	13,202,665	190,000	13,392,665	34,202	13,426,867
Total Wastewater Fund	13,202,665	190,000	13,392,665	34,202	13,426,867

62-E



DOCUMENT 62-E

16.5

CITY OF HAVERHILL

In Municipal Council May 18 2021

ORDERED:

THAT the City Council, in accordance with the City Ordinance Chapter 83 set the annual budget for the following revolving funds:

Recreation and Youth Activities	\$175,000
Veterans' Memorial Skating Rink	\$456,000
Citizen Center Rental	\$ 25,000
Council on Aging Activities	\$ 50,000
Wood School Daycare	\$100,000
Municipal Open Space Management	\$100,000

POSTPONED TO MAY 25 2021

Attest:

City Clerk

2021 MAY 18 5 04 PM C

City of Haverhill Massachusetts

Fund Balances

Fiscal Year: 2020-2021

Month: May
Year: 2021
Fund Type: Chapter 44 Section
☐ Include Cash Balance
☐ FY End Report

Fund	Description	Beginning Balance	Revenue	Expense	Transfers	Fund Balance
2302662	Recreation/Parks Revolving	\$7,789.87	\$55,240.77	(\$57,661.86)	\$0.00	\$5,368.78
2302663	Skating Rink Revolving	\$36,757.69	\$179,675.00	(\$204,749.05)	\$0.00	\$11,683.64
2302666	Citizen Center Revolving	\$0.00	\$536.28	\$0.00	\$0.00	\$536.28
2302667	Council on Aging Revolving	\$21,649.54	\$3,868.07	(\$18,743.34)	\$0.00	\$6,774.27
2302670	Wood School Day Care Revolving Fund	\$71,657.96	\$39,875.00	(\$39,975.48)	\$0.00	\$71,557.48
2302671	Parking Commission Revolving	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2302672	Crowell School Day Care Revolving Fund	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2302673	Municipal Open Space Management	\$50,833.24	\$0.00	\$0.00	\$0.00	\$50,833.24
Grand Total:		\$188,688.30	\$279,195.12	(\$321,129.73)	\$0.00	\$146,753.69

End of Report

CITY COUNCIL

MELINDA E. BARRETT
PRESIDENT
COLIN F. LEPAGE
VICE PRESIDENT
JOSEPH J. BEVILACQUA
JOHN A. MICHITSON
THOMAS J. SULLIVAN
TIMOTHY J. JORDAN
MICHAEL S. MCGONAGLE
MARY ELLEN DALY O'BRIEN
WILLIAM J. MACEK



CITY HALL, ROOM 204
4 SUMMER STREET
HAVERHILL, MA 01830
TELEPHONE: 978 374-2328

www.cityofhaverhill.com
citycncl@cityofhaverhill.com

CITY OF HAVERHILL HAVERHILL, MASSACHUSETTS 01830-5843

DOCUMENTS REFERRED TO COMMITTEE STUDY

38-W	Communication from Councillor Barrett requesting to give an update on response from MBTA/Keolis & US EPA about idling trains in Bradford	Citizens Outreach	4/5/16 1/31/17
10-B	Communication from President Michitson asking to request from Mayor status of facility improvements to public buildings and parks to comply with American w/ Disabilities Act (ADA)	Citizens Outreach	1/3/17 1/31/17, 8/15/17
10-U	Communication from President Michitson requesting discussion on next steps to provide comprehensive long range plan for Haverhill	Citizens Outreach	1/31/17 8/15/17, 4/23/18
38-D	Communication from Councillors Sullivan and Barrett requesting an update on City's emergency management plan and status of working generators in all public building in City	Public Safety	3/20/18 1/23/19
79-F	Communication from Councillor Sullivan requesting to introduce Kathleen Fitts, Gale Park Assoc. to request the city replace the Gale Park Fountain in fiscal year 20	NRPP	6/25/19
79-T	Communication from Councillors Sullivan and Barrett re: discussion with VINFEN & Haverhill Police Dept. regarding incident in neighborhood of 20 Westland Ter. group home on 7/5 and steps being taken to better supervise residents and reduce police calls to residence	Public Safety	7/23/19
89-K	Communication from Councillor Macek requesting open discussion relative to the process for Establishing a Charter Commission to review the current City of Haverhill Charter	Citizens Outreach	8/6/19
89-U	Communication from Councillor LePage re: applying for Community Compact Best Practices Program grant for benefit of city and its residents	Citizens Outreach	9/17/19
89-V	Communication from Councillor McGonagle requesting a discussion about school bus safety	Public Safety	9/17/19
11	Communication from Councilor Jordan requesting to introduce Steve Costa of Citizens for Haverhill Fire to discuss Mayor's CIP and occupational cancer	Public Safety	1/7/20
34-P	Communication from Councillor Sullivan requesting a discussion regarding the disposal of cremated remains on public property	NRPP	3/17/20
58-M	Communication from Councillors LePage and Daly O'Brien re: the possible use of Hale Hospital Trust Funds for ongoing City health care programs and issues	A & F	4/21/20
55-D	Discussion about removal of the Hannah Duston Statue	NRPP	6/30/20
69-O	Communication from President Barrett and Councillor Sullivan requesting discussion on illegal fireworks in the City	Public Safety	7/28/20
55-D	Communication from Councillor Jordan requesting to introduce Ben Roy to discuss Hannah Duston Statue	NRPP	7/28/20
86-D	Communication from Councillor Michitson requesting to address economic development ideas resulting from the pandemic	Planning & Dev.	8/11/20

DOCUMENTS REFERRED TO COMMITTEE STUDY

86-F	Communication from Council President Barrett and Councillor LePage requesting discussion pertaining to utilization of UV-C disinfection fixtures in public buildings	A & F	8/25/20
89-C	Mayor Fiorentini submits final recommendations of Matrix Company	NRPP	9/15/20
91	Petition from Wady & Jewnifer Grullon requesting to purchase city property that abuts their property at 14 Silver Birch Ln; Assessor's Map 574, Block 1 Lot 7	NRPP	9/15/20
91-B	Petition from the Biggart Family requesting to purchase 2 parcels of land that abuts their property " at 30 Belvidere Rd., Assessor's Map 409, Block 114, Lot 9; and Map 409, Block 1A, Lot 1 that includes conservation land, but only the portion zone RMD (Residential Medium Density)		9/22/20
86-S	Communication from Councillors LePage, Sullivan and Macek to discuss process for approval of development projects within the Waterfront District Ch. 255, Article XVI	A & F	10/6/20
55-I	Communication from Council President Barrett and Councillor McGonagle requesting to introduce Don Jarvis, Keith Gopsill and Mike Ingham to discuss becoming a Purple Heart Community	NRPP	12/15/20
91-C	Petition of Michael DeLuca requesting to purchase surplus city land on River St., Map 538, Block 419B, Lots 20, 21, 22, 23	NRPP	12/15/20
4-I	Communication from Councillor Michitson requesting to address the rising inequities between high and low paid occupations in the United States	Citizens Outreach	1/12/21
4-Q	Communication from Councillor Macek requesting discussion on parking space requirements per zoning regulations throughout City	A & F	2/2/21
27-E	Communication from Councillor Sullivan requesting to introduce Debbie Lyons, to explain having legal permitting system as it relates to establishing permitting/licensing process to allow for "Bow Hunter Tree Stands" to be placed on trees on City properties when hunting is allowed in season	NRPP	3/2/21
27-J	Communication from Councillor Michitson requesting to re-start discussion on way ahead for residential zoning in Haverhill	Planning & Dev.	3/9/21
50	Councillor Jordan requests on behalf of Tom Riley, 195 Kingsbury Ave., to have city surplus land that abuts his property, Map 768, Block 50, Lot 85A on Lincolnshire Ave.	NRPP	4/6/21
27-X	Councillor Daly O'Brien requests discussion re: cars parking on Concord St. sidewalks and possibility of city providing off-street parking	NRPP	4/6/21
50-U	President Barrett and Vice President LePage request discussion about composting options	Citizens Outreach	5/18/21
50-W	Councillor McGonagle requests to discuss an option to reward first responders and frontline workers to receive bonus for working through pandemic	Public Safety	5/18/21

CITY COUNCIL

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LONG TERM MATTERS STUDY LIST

- 38-F Communication from Councillors Barrett and LePage requesting to discuss double poles in the City
A & F 3/15/16, 9/6/16, 11/3/16, 1/17/17, 5/11/17, 10/24/17, 3/6/19
- 26E City of Haverhill – Mayor’s Recommendations, Capital Improvement Program – 2016-2020
A & F 5/31/16, 11/3/16, 5/11/2017, 7/25/17, 2/15/18, 3/6/19, 4/17/19
- 93-L Communication from President Michitson requesting to introduce Dave Labrode to discuss street tree
plantings
NRPP 8/7/18, 2/28/19, 2/27/20
- 38-J Communication from Councillor Macek requesting a discussion about reserve parking spaces at City
Hall designated for Registry of Motor Vehicles
NRPP 3/19/19, 2/27/20
- 13-Y Communication from Councillor LePage to discuss accounting of revenue funds received from
Licensed Marijuana establishments & their allocation to mitigate costs and impacts to city
A & F 3/12/19, 8/5/19
- 89-D Communication from Councillors LePage, Michitson, Jordan requesting discussion on reducing
exposure of persons under 21 yrs. of age to outdoor advertising (billboards) of marijuana products and
zoning regulations pertaining to smoke and/or vapor stores in Haverhill
A & F 7/23/19, 8/16/19