BRYANT ASSOCIATES
Improving lives through infrastructure

90 Canal Street
Suite 301
Boston, MA 02114
617.248.0300
www.bryant-engrs.com

May 13, 2024
BAI #223057

MEMORANDUM

TO: James Liebman, AIA LEED AP
Senior Associate
HMFH

FROM: Todd E. Brayton, PE
Transportation Director

REFERENCE: Franklin Elementary School
Newton, Massachusetts
Traffic Study Summary

Bryant Associates, Inc., traffic consultant to HMFH Architects, Inc., has prepared a traffic impact analysis dated February 2024, revised March 2024, for the proposed Franklin Elementary School on Derby Street in Newton, Massachusetts. The project site is located near the corner of Derby Street and Cherry Street.

The traffic study summarizes the existing school operations and anticipates traffic generation and distribution during drop-off and pickup operations for the proposed school, discusses the transportation impacts in the vicinity of the site, reviews site access and circulation, and evaluates the potential crosswalk locations and treatments.

For a full description of the Existing Conditions and Operations, Traffic Volumes, Traffic Forecast, Capacity Analysis, Safety Analysis, and Potential Crosswalk Locations and Treatments, please see the full report issued by Bryant Associates, Inc.

The proposed layout has a parking area that will be to the northwest of the proposed school and will be accessed via a driveway on Derby Street and a bus loop between the blue zone and the proposed driveway on Derby Street. The school population is anticipated to increase from 363 students to approximately 396 to 414 students.

In summary, the proposed Franklin Elementary School improvements and the anticipated increase in student population will have minimal impact on the traffic operations on the surrounding roadways and intersections.

The proposed bus loop will separate the bus traffic from the private vehicle drop-off and pickup operations in the blue zone. The school van drop-off and pick-up will also occur on-site. With the school bus and van traffic on-site, the Blue Zone and Derby Street traffic will operate more efficiently.

During the site planning process, the School Transportation Steering Group met with the design team to review the proposed plans for the new Franklin Elementary School at 125 Derby Street. At the meeting the question was raised as to whether the Blue Zone and Bus Loop should be switched so the Blue Zone is closest to the school entrance. The design team evaluated this, however, doing so would be in direct conflict with the School Committee Transportation Policy which prioritizes buses. The proposed site plan is consistent with that policy. The School Transportation Steering Group also noted that there are a few items related to traffic and circulation that will continue to be evaluated and developed during the next design phase:

- Determining the location of the crosswalk on Derby Street:
    1. Keep the crosswalk as shown at the head of the Blue Zone.
    2. Move the crosswalk to the west so that it is between the entrance and exit to the Bus Loop.
    3. Remove the crosswalk as shown and only have the raised intersection at Derby Street.
- Installing a raised intersection on Derby Street at Pershing Road.
- Installing a crosswalk on Cherry Street with a rectangular rapid flashing beacon (RRFB).
- On-site staff parking to have as many as 60 spaces.
- Off-site managed staff parking plan to accommodate an additional 30 spaces within approximately a 2-minute walk.

The full report can be found on the following pages.

HMFH Architects, Inc.

Franklin Elementary School

Derby Street
Newton, Massachusetts

Traffic Impact Analysis

Existing Franklin Elementary School

February 2024
1st Revision February 2024
2nd Revision February 2024
3rd Revision March 2024

BRYANT ASSOCIATES
Improving lives through infrastructure
90 Canal Street
Suite 301
Boston, MA 02114
617.248.0300

www.bryant-engrs.com

TABLE OF CONTENTS

1.0 Introduction

1.1 Purpose of Study

This traffic study was prepared at the request of HMFH Architects, Inc. in connection with its study of the proposed project for the Franklin Elementary School on Derby Street in Newton, Massachusetts. For the benefit of the boards and citizens of Newton, the traffic impacts of the proposed school development have been evaluated. The study analyzes traffic use attributable to the proposed school development of the site and discusses transportation impacts in the vicinity of the site.

1.2 Description of Project

The project site is located on the corner of Derby Street and Cherry Street in Newton, as shown in Figure No. 1. The proposed project includes the replacement of the existing Franklin Elementary school to accommodate the future needs of the community. The existing Franklin Elementary School has 363 elementary school (K-grade 5) students. The projected student population for the new school is anticipated to be 414 elementary school (K-grade 5) students. The existing school is accessed by a driveway on Cherry Street. There is also a gated driveway on Derby Street that is not used for vehicular traffic. Parent drop-off and pick-up occur in a blue zone on the north side of Derby Street adjacent to the school. There were two school buses observed during the field review during both the morning and afternoon operations that stopped on Derby Street in the vicinity of the blue zone to drop-off and pick-up students, see Section 2.1.1 and 2.3 for additional information. Based on information received from HMFH Architects, Inc., school vans for the school use the blue zone for access to drop-off and pick-up students, although school vans were not seen dropping-off or picking-up students during the field observations.

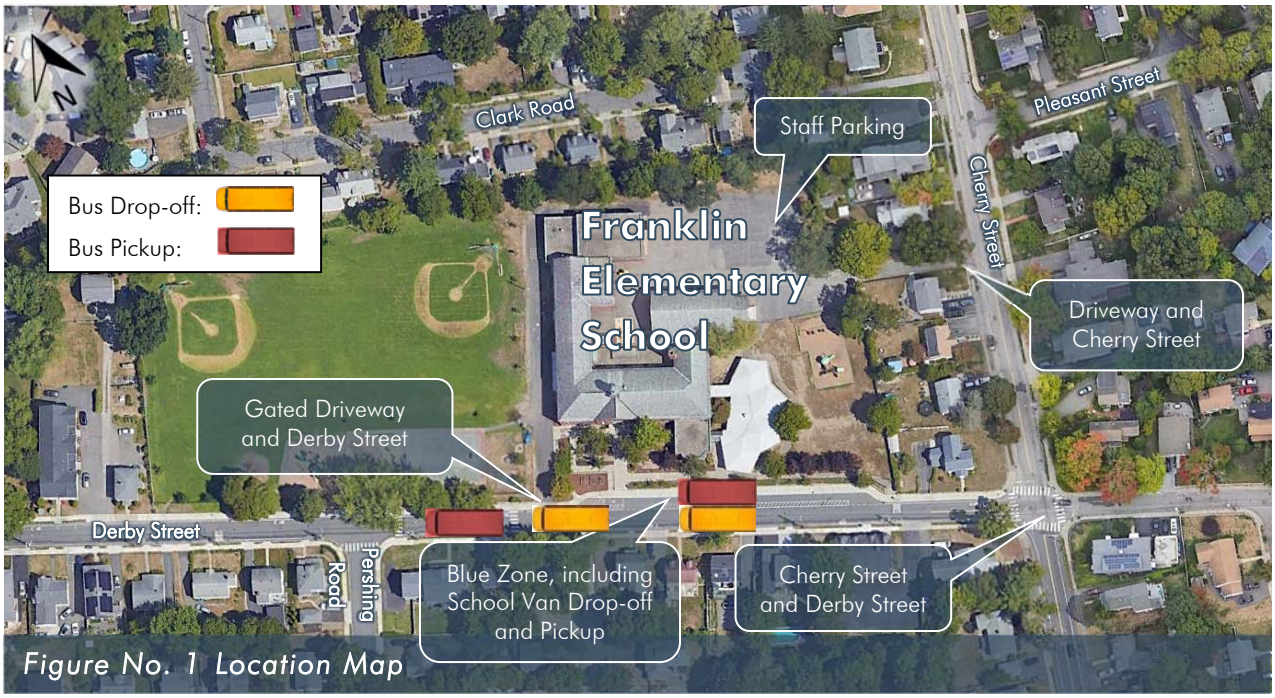


Figure No. 1 Location Map

Figure No. 2 Proposed Franklin Elementary School

The proposed layout shows that the new building will be located to the northwest of the existing school along Derby Street on the existing fields, see Figure No. 2. The existing blue zone for drop-off and pick-up will remain with minor modifications. The parking area will be to the northwest of the proposed school and will be accessed via a driveway on Derby Street. There will be a bus loop

between the blue zone and the proposed driveway on Derby Street. There will be only pedestrian access at the existing driveway location on Cherry Street.

2.0 Existing Conditions

2.1 Study Area

The new school will utilize Derby Street for access to and from the site. Traffic volumes are low on Derby Street and Cherry Street, which are classified as Urban Collectors, as presented in the online Road Inventory Interactive Map, which is based on Year-End 2020 Road Inventory File maintained by the Massachusetts Office of Transportation Planning. A collector street balances mobility for through traffic and access to local roadways and properties. Land use in the area is primarily residential.

2.1.1 Existing Driveways

Derby Street in the vicinity of the school driveway is a two-lane, two-way roadway (with shared vehicle-bicycle lanes), approximately 23.5-feet wide, without center pavement markings. Derby Street in the vicinity of the blue zone is a two-lane, two-way roadway, approximately 34.5-feet wide, with a 5-foot-wide striped area between the travel lanes and the approximately 7.5-foot wide drop-off/pick-up lane. There also is an accessible space at the western end of the blue zone. The blue zone is signed as a drop-off and pick up zone with no parking between 7:45 A.M. and 8:15 A.M. and 2:00 P.M. and 3:30 P.M. (11:30 A.M. – 1:00 P.M. on Wednesday) on school days. The blue zone ends just to the east of the gated school driveway and is approximately 270 feet in length. Parking is restricted on the south side of the road and on the north side of the road away from the blue zone between 8 A.M. and 4 P.M. on school days. There is a signed and striped crosswalk across Derby Street just to the west of the gated school driveway. There also is a signed and striped crosswalk across Derby Street at Pershing Street to the west of the school. There are School Speed Limit flashing beacons (20 MPH when flashing) in both directions of Derby Street approaching the school. There are no U-turn signs posted in each direction. There are concrete sidewalks on both sides of Derby Street. The school driveway does not have a stop sign or stop line.

During the morning drop-off operations one school bus stopped next to the blue zone hatched area and one stopped adjacent to the school driveway on Derby Street. While the buses were stopped, traffic was stopped on Derby Street including in the blue zone. In addition to the red flashing lights on the school buses, the crossing guard also stopped traffic on Derby Street while the buses were stopped. During the afternoon pick-up operations one school bus stopped to the west of the school driveway on Derby Street which restricted traffic on Derby Street to one lane of traffic. A second school bus arrived after the parent pick-up operations were completed and parked in the blue zone.

Cherry Street in the vicinity of the existing school driveway is a two-lane, two-way roadway, approximately 28.5-feet wide, without edge line pavement markings. Parking is restricted within 5 feet of the driveway on the west side of the road. There are bituminous sidewalks on the west side and

concrete sidewalk on the east side of Cherry Street. The school driveway has a stop sign, but not a stop line.

2.1.2 Proposed School Driveways

As stated in Section 1.2, the proposed layout has a bus loop between Pershing Road and the blue zone what will consist of an entrance-only driveway and an exit-only driveway on Derby Street. Separating bus traffic from traffic in the blue zone and Derby Street will improve traffic operations, see Section 5.3. There is also a two-way driveway to the northwest of the site on Derby Street to access the parking lot for faculty and staff.

2.1.3 Surrounding Intersection

The four-way, signalized intersection of Cherry Street and Derby Street is located to the southeast of the school. There are crosswalks across all the approaches. To the northeast, Cherry Street at its intersection with Derby Street is a two-lane, two-way bituminous roadway approximately 33.5 feet in width with 15 to 18.5-foot travel lanes with no shoulders. There is concrete curb, a grass strip, concrete sidewalks, and utility poles on the southeast side of the roadway. There is bituminous berm, a grass strip, and bituminous sidewalks on the northwest side of the roadway. To the southwest, Cherry Street at its intersection with Derby Street is a two-lane, two-way bituminous roadway approximately 33 feet in width with 12 to 13-foot travel lanes and 3 to 5-foot shoulders. There is concrete curb, a grass strip, and bituminous sidewalks on the northwest side of the roadway. There is concrete curb, a grass strip, concrete sidewalks, and utility poles on the southeast side of the roadway. Parking is prohibited on both sides of the roadway. To the northwest, Derby Street at its intersection with Cherry Street is a two-lane, two-way bituminous roadway approximately 28.5 feet in width with 10 to 12.5-foot travel lanes and 2 to 4-foot shoulders. There is granite curb and bituminous sidewalk on the northeast side of the roadway. There is granite curb, grass strip, concrete sidewalk, and utility poles on the southwest side of the roadway. Parking is prohibited on both sides of the roadway. To the southeast, Derby Street at its intersection with Cherry Street is a two-lane, two-way bituminous roadway approximately 24 feet in width with 12-foot travel lanes with no shoulders. There is concrete curb and concrete sidewalk on both sides of the roadway. There are utility poles on the southwest side of the roadway. Parking is prohibited on the southwest side of the roadway.

2.2 Data Collection

Traffic turning movement counts were conducted at the intersections of Derby Street and the existing school driveway, Cherry Street and the existing school driveway, and Derby Street and Cherry Street between the hours of 7:00 and 9:00 A.M. and 2:00 and 4:00 P.M. on Thursday, June 15, 2023. 48-hour traffic volume and speed data using automatic traffic recorders was also acquired on Derby Street and Cherry Street in the vicinity of the existing school driveways between 12:00 A.M. on Thursday, June 15, 2023, and 12:00 A.M. on Saturday, June 17, 2023. The traffic count data is shown in Appendix A.

The Franklin Elementary School hours are between 8:10 A.M. and 2:50 P.M. (12:20 P.M. on Wednesday). The calculated school A.M. peak hour, based on the existing school traffic volumes, is 7:15 to 8:15 and the school P.M. peak hour is 3:00 to 4:00.

Pertinent field observations including existing stopping sight distance, location of existing utilities, posted speed limits, traffic control devices, etc. were made on June 15, 2023. Crash data for the period from January 1, 2019, through January 2024 was collected from the MassDOT "Impact Crash Query and Visualization Tool". In addition, traffic speed data (shown in Appendix E) using automatic traffic recorders was acquired on Derby Street and Cherry Street in the vicinity of the existing school driveways on June 15, 2023, and June 16, 2023.

2.3 Field Observations

2.3.1 Observed Morning Arrival Operations

It was observed that the gate for the Derby Street driveway was opened at approximately 7:35 A.M. and closed at approximately 8:30 A.M., although no vehicular traffic used the driveway to access the school. Staff vehicles accessed the parking lot on site via the driveway on Cherry Street. There was a crossing guard present to assist pedestrians using the crosswalk adjacent to the school driveway. There also was a crossing guard that assisted pedestrians crossing at the signalized intersection of Derby Street and Cherry Street to the east of the school. It was observed that many students walked to school and some rode bicycles, on both Derby Street and Cherry Street, some of which used the school driveway on Cherry Street to enter the school. A school bus arrived at approximately 7:56 A.M. and dropped off students adjacent to the blue zone (bus stopped in the travel lane). Another bus arrived at approximately 8:07 A.M. and dropped off students from the travel lane adjacent to the school driveway. Private vehicles predominantly used the blue zone on Derby Street to drop-off students. There was a total of 71 private vehicles observed using the blue zone during the A.M. arrival. Some cars, however, parked on the north side of Derby Street to the west of the school driveway, on Howard Street, which is a dead-end street across from the school, and on Cherry Street and the students were escorted to the school. It was also observed that some cars parked in the blue zone. Vehicles also stopped adjacent to the blue zone, within the travel lanes of Derby Street, and on Pershing Street to drop off students. Vehicles also used the Cherry Street driveway to drop off students on site. Cars were also observed doing U-turns from the blue zone after dropping off students and into the blue zone to drop-off.

There was a short queue for a short duration on Derby Street waiting to enter the blue zone. There also were short queues on Derby Street westbound at Pershing Street due to left turning vehicles, the longest almost reaching the crosswalk adjacent to the school driveway. There were short queues in each direction of Derby Street, typically 4 – 5 cars, when the crossing guard allowed pedestrians to cross at the crosswalk. There also were short queues when the buses dropped off students. There was no significant queuing at the Derby Street and Cherry Street signalized intersection.

There was increased traffic activity at the school during the morning operations for approximately 30 to 35 minutes.

2.3.2 Observed Afternoon Dismissal Operations

It was observed that private vehicles were parked in the blue zone on Derby Street by 2:15 P.M. It was observed that the gate for the Derby Street driveway was opened at approximately 2:40 P.M. and closed at approximately 3:35 P.M., although similar to the A.M. no vehicular traffic used the driveway to access the school. Staff vehicles accessed the parking lot on site via the driveway on Cherry Street. There was a crossing guard present to assist pedestrians using the crosswalk adjacent to the school driveway. There also was a crossing guard that assisted pedestrians crossing at the signalized intersection of Derby Street and Cherry Street. It was observed that many students walked from school on both Derby Street and Cherry Street, some of which used the school driveway on Cherry Street to exit the school. A school bus arrived at approximately 2:55 P.M. and parked to the west of the school driveway to pick-up students. The bus stopped in the travel lane, which didn't leave enough room for two lanes of travel, although there was not much conflict with passing vehicles. Another bus arrived at approximately 3:20 P.M. and parked in the blue zone to pick-up students. Private vehicles predominantly used the blue zone on Derby Street to pick-up students. There was a total of 24 private vehicles observed using the blue zone during the P.M.dismissal. Some cars, however, parked within the striped area adjacent to the blue zone, on the north side of Derby Street to the west of the school driveway, on Howard Street, and on Cherry Street. Vehicles also used the Cherry Street driveway to pick-up students on site. Cars were also observed picking up students from the travel lane, after dismissal. Cars were also observed doing U-turns from the blue zone after picking-up students.

There were short queues in each direction of Derby Street when the crossing guard allowed pedestrians to cross at the crosswalk, typically 4 – 5 cars in the westbound direction and shorter in the eastbound direction. There also were short queues when the buses picked-up students. There were short queues on Derby Street at the Cherry Street signalized intersection and minimal queues on Cherry Street.

There was increased traffic activity at the school during the afternoon operations for approximately 20 to 25 minutes.

3.0 Traffic Forecasts

3.1 Existing Traffic Volumes

Existing traffic volumes for the study area were developed from traffic data obtained by the New England Traffic Counts (NETC).

The total 24-hour two-way traffic volume (from the road tube counts) on Derby Street is approximately 3,600 vehicles per day (vpd) and on Cherry Street is approximately 4,200 vpd.

The school hours for the existing elementary school are from 8:10 A.M. to 2:50 P.M. The school A.M. peak hour, as indicated previously in Section 2.2, occurred between 7:15 and 8:15. The two-way traffic volumes at the intersection of Derby Street and the school driveway were 251 vehicles and 1 vehicle, respectively, during the school A.M. peak hour. The school P.M. peak hour was measured between 3:00 and 4:00, with two-way traffic volumes on Derby Street and the school driveway of 275 and 2 vehicles, respectively. The vehicle that was counted on the school driveway belonged to the crossing guard that parks in the driveway close to Derby Street and was not used for other vehicular traffic.

The two-way traffic volumes on Cherry Street and the school driveway were 337 vehicles and 59 vehicles, respectively, during the school A.M. peak hour. The two-way traffic volumes on Cherry Street and the school driveway were 352 vehicles and 59 vehicles, respectively, during the school P.M. peak hour.

The two-way traffic volumes on Cherry Street and Derby Street at its intersection were 338 vehicles and 266 vehicles, respectively, during the school A.M. peak hour. The two-way traffic volumes on Cherry Street and Derby Street were 410 vehicles and 294 vehicles, respectively, during the school P.M. peak hour.

3.2 Vehicle Trip Generation

To evaluate the traffic impacts of the proposed project, it is necessary to determine the amount of traffic expected to be generated by the proposed improvements. The trip generation calculations are typically based on data compiled in Trip Generation (11th edition), an informational report published by the Institute of Transportation Engineers (ITE). Trip Generation is a tool for planners, transportation professionals, zoning boards, and others who are interested in estimating the number of vehicle trips generated by a proposed development or land use. This document is based on thousands of trip generation studies submitted to the Institute by public agencies, developers, consulting firms, and associations. More specific information, however, from the traffic counts for the existing Franklin Elementary School has been used for the trip generation.

As stated in Section 1.2, the existing Franklin Elementary School has 363 students. The projected K-5 student population is 414 students. To estimate the increase in the number of trips on-site anticipated to be generated by the increase in the number of students, a ratio was developed between the increase in students and the number of existing trips for the Franklin Elementary School, including staff and parents. The on-site volumes anticipated to be generated by the proposed school and the increase in student population during the school A.M. and school P.M. peak hours can be found in Table No. 1.

Table No. 1
Trip Generation Summary
Franklin Elementary School (On-Site)

Time Period	Direction	Existing Trips (Population: 363)	Proposed Trips (Population: 414)	Trip Increase
School A.M. Peak Hour	Enter	52	59	+7
	Exit	8	9	+1
School P.M. Peak Hour	Enter	28	32	+4
	Exit	33	38	+5

The distribution of the anticipated new vehicle trips by direction was based upon the existing trip patterns observed in the traffic count data and the anticipated usage of the roadways for the school. The anticipated increase in trips from the proposed school building was added to the existing volumes for analysis of the build conditions. The trip generation calculations and distribution of the traffic of the increased traffic anticipated by the school are shown in Appendix B.

4.0 Capacity Analysis

4.1 General

Capacity analyses in this report focus on the peak hours of traffic volume for the school because they represent the most critical periods for operations and have the highest capacity requirements. It is expected that there will be minimal impact from the school during the remaining hours of the day.

4.2 Intersections

The intersection capacity analysis was prepared using the Highway Capacity Manual (HCM), 6th edition, published by the Transportation Research Board. The analysis utilizes the concept of Level of Service. The term "level of service" is defined as a qualitative measure describing operational conditions within a traffic stream based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience. There are six levels of service utilized for the analysis. They are given letter designations from A to F, with Level of Service A representing the most favorable operating conditions and Level of Service F the least. Level of Service F is assigned to the movement if the volume-to-capacity ratio for the movement exceeds 1.0, regardless of the control delay. The level of service criteria for unsignalized and signalized intersections are shown in Table No. 2.

The computer software, HCS7 and Synchro11, were utilized to perform the capacity analysis for the study area.

Table No. 2
Level of Service Criteria for Unsignalized and Signalized Intersections
Source: Highway Capacity Manual, 6th Edition

Level Of Service	Average Total Delay (Second/Vehicle)	
	Unsignalized Intersection	Signalized Intersection
A	≤10	≤10
B	>10 and ≤15	>10 and ≤20
C	>15 and ≤25	>20 and ≤35
D	>25 and ≤35	>35 and ≤55
E	>35 and ≤50	>55 and ≤80
F	>50	>80

Unsignalized intersection capacity analysis was undertaken for the intersection of Cherry Street and the existing school driveway during the school A.M. and school P.M. peak hours under no-build conditions. As stated in Section 1.2 the existing school driveway on Derby Street is not used for vehicular traffic and was not analyzed. Unsignalized intersection capacity analysis was also undertaken for the intersection of Derby Street and the proposed driveway under build conditions. The capacity analysis computations are included in Appendix C. A summary of the level of service (LOS) for these intersections is shown in Table Nos. 3 and 4 for the school A.M. and school P.M. peak hours, respectively.

Table No. 3
School A.M. Peak Hour - Level of Service Summary
Unsignalized Intersections

Intersection/ Critical Movement	Level of Service (Delay-Second/Vehicle)	
	No-Build	Build
Cherry Street/Existing School Driveway		
Driveway (EB)	B (10.6)	-
Cherry Street (NB)	A (1.4)	-
Derby Street/Proposed School Driveway		
Derby Street (EB)	-	A (1.6)
Driveway (SB)	-	B (11.9)

Table No. 4
School P.M. Peak Hour - Level of Service Summary
Unsignalized Intersections

Intersection/ Critical Movement	Level of Service (Delay-Second/Vehicle)	
	No-Build	Build
Cherry Street/Existing School Driveway		
Driveway (EB)	B (10.0)	-
Cherry Street (NB)	A (0.8)	-
Derby Street/Proposed School Driveway		
Derby Street (EB)	-	A (0.9)
Driveway (SB)	-	B (10.7)

The unsignalized intersection capacity analysis shows that the proposed driveway on Derby Street will operate at excellent levels of service under build conditions during the school A.M. and school P.M. peak hours.

Signalized intersection capacity analysis for the intersection Cherry Street and Derby Street was undertaken using the school A.M. and school P.M. peak hour traffic volumes under no-build and build conditions. The capacity analysis computations are included in Appendix C. A summary of the level of service for this intersection is shown in Table Nos. 5 and 6 for the school A.M. and school P.M. peak hours, respectively.

Table No. 5
School A.M. Peak Hour - Level of Service Summary
Signalized Intersection

Intersection/ Critical Movement	Level of Service (Delay-Second/Vehicle)	
	No-Build	Build
Cherry Street/Derby Street		
Overall Intersection	C (20.1)	B (19.8)
Cherry Street (NB)	B (16.9)	B (17.8)
Cherry Street (SB)	B (12.9)	B (12.2)
Derby Street (EB)	C (27.7)	C (27.1)
Derby Street (WB)	C (26.9)	C (26.9)

Table No. 6
School P.M. Peak Hour - Level of Service Summary
Signalized Intersection

Intersection/ Critical Movement	Level of Service (Delay-Second/Vehicle)	
	No-Build	Build
Cherry Street/Derby Street		
Overall Intersection	C (20.6)	C (21.9)
Cherry Street (NB)	B (15.4)	B (15.5)
Cherry Street (SB)	B (13.7)	B (12.9)
Derby Street (EB)	C (28.6)	C (32.5)
Derby Street (WB)	C (27.8)	C (27.9)

The signalized capacity analysis shows that the intersection of Cherry Street and Derby Street will operate at acceptable levels of service and will basically remain the same during the school A.M. peak hour and P.M. peak hour under build conditions as compared to no-build conditions.

4.3 Blue Zone

There are minimal changes proposed to the blue zone, which include a bump-out at the end of the accessible parking space that will separate the accessible parking space from the main area of the blue zone. The main area of the blue zone is approximately the same length and is anticipated to operate similarly to existing conditions. It is also anticipated that the increase in trips due to the

projected student population will have minor impact to the blue zone operations, although it may extend the duration that the drop-off and pick-up operations impact Derby Street.

During the field review it was observed that private vehicles were double parked on the hatched area of the blue zone waiting for vehicles in the blue zone to leave, see Section 2.3.

Based on the existing vehicles waiting in the hatched area during the field observation and projected increase in student population, it is recommended that the proposed blue zone length be increased by approximately 80 feet. It is noted that this recommendation is based on observations that were performed during a nice day with students walking/biking to school. The blue zone may need to be longer to accommodate the increase of private vehicles during poor weather conditions.

5.0 Safety Analysis

5.1 Geometrics

The geometric configurations of the intersections affected by traffic generated by the proposed improvements were examined with regard to safe stopping sight distance using principles presented in A Policy on Geometric Design of Highways and Streets, 2018, of the American Association of State Highway and Transportation Officials (AASHTO). AASHTO provides recommendations for necessary sight distance at intersections.

The minimum safe stopping distance was determined based on the collected 85th percentile speed and AASHTO requirements. The sight distances at the proposed driveway on Derby Street are in excess of the minimum sight distances required.

5.2 Crash History

Crash data for the study area was obtained from the MassDOT "Impact Crash Query and Visualization Tool" for the period from January 1, 2019, through January 31, 2024. A summary of data received is contained in Appendix D.

There were four crashes on Derby Street between Howard Street and Cherry Street as shown in Table No. 7. These crashes included one crash involving a vehicle hitting a bicycle, two angle crashes, and one sideswipe crash. Three of these crashes involved a parked vehicle. None of these crashes resulted in injury.

There were six crashes at the intersection of Derby Street and Cherry Street. These crashes included one crash involving a vehicle hitting a bicycle, four angle crashes, and one rear-end crash. One of these crashes occurred on wet pavement and three of these crashes resulted in injuries.

There were two crashes on Cherry Street between the existing school driveway and Derby Street. These crashes included one angle crash and one sideswipe crash. Both of these crashes involved a parked

vehicle. One of these crashes occurred on pavement covered in ice and none of these crashes resulted in injury.

There were two crashes at the intersection of Cherry Street and Pleasant Street. Both of the crashes were sideswipe crashes on pavement covered in ice that occurred on the same day. Neither crash resulted in injury.

Table No. 7
Summary of Crashes
Source: MassDOT Impact Crash Query and Visualization Tool

Crash Location	January 2019 through January 2024
Derby Street between Howard Street and Cherry Street	4
Intersection of Derby Street and Cherry Street	6
Cherry Street between the school driveway and Derby Street	2
Intersection of Cherry Street and Pleasant Street	2
TOTAL	14

The number and type of crashes that occurred over this five-year plus period does not indicate the presence of unusual conditions that might be worsened by the proposed school development.

5.3 Site Circulation

The site plan was reviewed by Samiotes Consultants Inc. (Samiotes), see Appendix F, and they determined that the proposed layout will allow for the safe movement of emergency vehicles to and from the school. Samitoes also determined that there is not sufficient space for buses to take a left turn out of the bus loop onto Derby Street.

The proposed bus loop will separate the bus traffic from the private vehicle drop-off and pickup operations in the blue zone. During the field observations there was one school bus that stopped in the hatched area next to the blue zone in the morning and there was one school bus in both the morning and afternoon that stopped to the west of the blue zone which restricted traffic on Derby Street. The school van drop-off and pick-up will also occur on-site. With the school bus and van traffic on-site, the blue zone and Derby Stret traffic will operate more efficiently.

6.0 Potential Crosswalk Locations and Treatments

There are two crosswalks proposed on Derby Street and a proposed crosswalk on Cherry Street.

The preferred crosswalk locations on Derby Street are one near Howard Street, which is close to the existing crosswalk that is controlled by a crossing guard, and one near Pershing Road. There are no sight distance issues on Derby Street. There also are School Speed Limit flashing beacons (20 mph when flashing) in both directions of Derby Street approaching the school.

The desired crosswalk location for Cherry Street is at Pleasant Street (south side), however, the minimum sight distance will not be met at that location. There also is a significant grade difference between the road and the sidewalk on the west side of the road, which could make installing an ADA compliant curb ramp difficult or infeasible. The minimum safe stopping distance was determined based on the collected 85th percentile speed, the 3% profile grade of the roadway, and AASHTO requirements. The sight distances at the proposed driveway on Derby Street are in excess of the minimum sight distances required. It is recommended that the crosswalk be located further south at the proposed pedestrian path (at the existing Cherry Street school driveway) further away from the vertical and horizontal curvature of the roadway north of Pleasant Street to provide increased sight distance. The sight distances at this location are in excess of the minimum sight distances required, see Appendix F. From the field review, the sidewalk grades at this location will be more manageable to accommodate ADA compliant ramps. It is also recommended to install a school zone speed limit on Cherry Street between Pleasant Street and Derby Street.

The Massachusetts Department of Transportation (MassDOT) "Municipal Resource Guide for Walkability" (May 2019) recommends using the Federal Highway Administration (FHWA) "Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE): Countermeasure Selection Tool", see Appendix F, to determine the applicable countermeasures to improve pedestrian safety. Based on the assessment the crosswalks on Derby Street and Cherry Street should be marked and have adequate lighting and illumination with parking restrictions at the crosswalks. The longitudinal bar (continental) crosswalk pavement markings (high visibility) should be implemented. In addition to pavement markings pedestrian/school crossing sign assemblies should be installed at each crosswalk. ADA compliant ramps shall be installed at the proposed crosswalks. There is currently street lighting on one side of the roadway on Derby Street and Cherry Street in the vicinity of the proposed crosswalks. Although the majority of pedestrian activity at the school will occur during daylight hours, further study to evaluate if there is sufficient lighting at the crosswalks should be considered. Parking should be restricted at least 30 feet from the crosswalk all the time.

The PEDSAFE countermeasure tool also recommends that curb extensions, crossing islands, rectangular rapid flashing beacon (RRFB), and pedestrian hybrid beacon (PHB) be considered. Due to the narrow roadways, curb extensions and crossing islands are not applicable to the crosswalks on Derby Street and Cherry Street. The crosswalks on Derby Street and Cherry Street do not meet the requirements outlined in the "Manual on Uniform Traffic Control Devices" (MUTCD) to install a PHB. The MUTCD does not have vehicular/pedestrian volume requirements to install RRFBs and states that, "A pedestrian-activated and/or bicyclist activated rectangular rapid flashing beacon (RRFB) may be used to provide supplemental emphasis to pedestrian, school, and trail warning signs at marked crosswalks across uncontrolled approaches". It is recommended that an RRFB be considered at the proposed crosswalks on Derby Street and Cherry Street. An RRFB is a pedestrian actuated flashing beacon which is installed in conjunction with the warning signs. RRFBs consist of two LED rectangular yellow indications and can be actuated by pushbutton or through passive pedestrian detection (e.g.,

video or infrared). Studies have shown that installing an RRFB can reduce pedestrian crashes and significantly increase the rate of motorists yielding to pedestrians.

Since the speed data indicates that more than half of the vehicles traveling on Derby Stret are exceeding the posted speed limit of 25 mph, it is recommended to investigate the installation of raised crosswalks on Derby Street or a raised intersection at the intersection of Derby Street and Pershing Road.

7.0 Conclusions and Recommendations

This traffic impact analysis was conducted to evaluate the impacts on surrounding roadways and intersections due to the proposed Franklin Elementary School on Derby Street in Newton.

The unsignalized intersection capacity analysis shows that the proposed driveway on Derby Street will operate at excellent levels of service under build conditions during the school A.M. and school P.M. peak hours.

The signalized capacity analysis shows that the intersection of Cherry Street and Derby Street will operate at acceptable levels of service and will basically remain the same during the school A.M. peak hour and P.M. peak hour under build conditions as compared to on-build conditions.

The number and type of crashes that occurred over this five-year plus period does not indicate the presence of unusual conditions that might be worsened by the proposed school development.

During the field review it was observed that private vehicles were double parked on the hatched area of the blue zone waiting for vehicles in the blue zone to leave. Based on the existing vehicles waiting in the hatched area during the field observation and the projected increase in student population to the higher enrollment of 414 students it is recommended that the blue zone length be increased by approximately 80 feet (4 cars). It is noted that this recommendation is based on observations that were performed on a nice day with many students walking/biking to school. The blue zone may need to be longer to accommodate the increase of private vehicles during poor weather conditions. It is noted that removing the school buses and vans from the blue zone and Derby Street by accommodating these vehicles on-site, will improve traffic operations.

The preferred crosswalk locations on Derby Street are one near Howard Street, which is close to the existing crosswalk that is controlled by a crossing guard, and one near Pershing Road. The proposed crosswalks on Derby Street have no sight distance concerns. Although there are existing school zone speed limit flashing beacons in both directions of Derby Street approaching the school, the flashing beacon facing eastbound traffic may need to be relocated to the west of the proposed driveway. The desired crosswalk location for Cherry Street is at Pleasant Street (south side), however, the minimum sight distance will not be met. It is recommended that the crosswalk be located further south at the proposed pedestrian path (at the existing Cherry Street school driveway) further away from the vertical

and horizontal curvature of the roadway north of Pleasant Street to increased sight distance. It is also recommended to install a school zone speed limit on Cherry Street between Pleasant Street and Derby Street.

According to the FHWA PEDSAFE Countermeasure Selection Tool the crosswalks on Derby Street and Cherry Street should be marked and have adequate lighting and illumination with parking restrictions on both sides of the crosswalk. In addition to crosswalk pavement markings, MUTCD compliant pedestrian/school crossing signs should be installed at each crosswalk. ADA compliant ramps shall be installed at the proposed crosswalks. Although there is street lighting on Derby Street and Cherry Street, the adequacy of the existing lighting at the proposed crosswalks should be evaluated for pedestrian safety. Parking should be restricted at least 30 feet from the crosswalk.

The PEDSAFE countermeasure tool also recommends that curb extensions, crossing islands, rectangular rapid flashing beacon (RRFB), and pedestrian hybrid beacon (PHB) be considered. Due to the narrow roadways curb extensions and crossing islands are not applicable to the crosswalks on Derby Street and Cherry Street. The crosswalks on Derby Street and Cherry Street do not meet the requirements outlined in the MUTCD to install a PHB. It is recommended that RRFBs be considered at the proposed crosswalks on Derby Street and Cherry Street.

It is recommended that raised crosswalks on Derby Street or a raised intersection at Derby Street and Pershing Road be investigated.

Based upon the analyses, traffic operations on the surrounding roadways and intersections will experience minimal change with the addition of traffic generated by the proposed improvements.

APPENDIX A

Traffic Counts

NE TRAFFIC COUNTS

City: Newton
Location 1: Derby St
Location 2: Between Pershing Rd and Howard St
Tech: EM
Latitude: 42.358095
Longitude: -71.229330

6/12/2023	6/12/2023		6/13/2023		6/14/2023		6/15/2023		6/16/2023		Weekday Average		6/17/2023		6/18/2023	
Time	East	West	East	West	East	West	East	West	East	West	East	West	East	West	East	West
12:00 AM	*	*	*	*	*	*	1	2	14	15	8	8	*	*	*	*
1:00	*	*	*	*	*	*	4	7	6	11	5	9	*	*	*	*
2:00	*	*	*	*	*	*	2	2	3	6	2	4	*	*	*	*
3:00	*	*	*	*	*	*	0	3	0	2	0	2	*	*	*	*
4:00	*	*	*	*	*	*	6	2	4	3	5	2	*	*	*	*
5:00	*	*	*	*	*	*	25	9	19	11	22	10	*	*	*	*
6:00	*	*	*	*	*	*	69	21	52	23	60	22	*	*	*	*
7:00	*	*	*	*	*	*	153	68	129	55	141	62	*	*	*	*
8:00	*	*	*	*	*	*	136	138	137	116	136	127	*	*	*	*
9:00	*	*	*	*	*	*	97	75	114	94	106	84	*	*	*	*
10:00	*	*	*	*	*	*	77	54	98	77	88	66	*	*	*	*
11:00	*	*	*	*	*	*	86	69	101	93	94	81	*	*	*	*
12:00 PM	*	*	*	*	*	*	109	77	132	99	120	88	*	*	*	*
1:00	*	*	*	*	*	*	97	101	121	122	109	112	*	*	*	*
2:00	*	*	*	*	*	*	111	124	117	126	114	125	*	*	*	*
3:00	*	*	*	*	*	*	143	135	105	178	124	156	*	*	*	*
4:00	*	*	*	*	*	*	122	151	153	152	138	152	*	*	*	*
5:00	*	*	*	*	*	*	166	161	167	152	166	156	*	*	*	*
6:00	*	*	*	*	*	*	130	146	168	142	149	144	*	*	*	*
7:00	*	*	*	*	*	*	94	100	85	100	90	100	*	*	*	*
8:00	*	*	*	*	*	*	77	85	63	87	70	86	*	*	*	*
9:00	*	*	*	*	*	*	45	60	45	39	45	50	*	*	*	*
10:00	*	*	*	*	*	*	37	37	37	44	37	40	*	*	*	*
11:00	*	*	*	*	*	*	21	27	21	35	21	31	*	*	*	*
Total	0	0	0	0	0	0	1808	1654	1891	1782	1850	1717	0	0	0	0
Day	0		0		0		3462		3673		3567		0		0	
AM Peak							7:00	8:00	8:00	8:00	7:00	8:00				
Volume							153	138	137	116	141	127				
PM Peak							5:00	5:00	6:00	3:00	5:00	3:00				
Volume							166	161	168	178	166	156				
Comb Total	0		0		0		3462		3673		3567		0		0	
ADT	ADT: 3,568		AADT: 3,568													

NE TRAFFIC COUNTS

City: Newton
Location 1: Derby St
Location 2: Between Pershing Rd and Howard St
Tech: EM
Latitude: 42.358095
Longitude: -71.229330

Direction: East

6/15/2023 Time	Motor Cycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
12:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1
1:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4
2:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00	1	4	1	0	0	0	0	0	0	0	0	0	0	6
5:00	1	18	6	0	0	0	0	0	0	0	0	0	0	25
6:00	0	53	12	0	4	0	0	0	0	0	0	0	0	69
7:00	0	128	21	0	3	0	0	1	0	0	0	0	0	153
8:00	7	106	15	3	4	1	0	0	0	0	0	0	0	136
9:00	1	78	16	0	2	0	0	0	0	0	0	0	0	97
10:00	2	63	9	0	2	1	0	0	0	0	0	0	0	77
11:00	1	64	20	1	0	0	0	0	0	0	0	0	0	86
12:00 PM	1	92	14	0	2	0	0	0	0	0	0	0	0	109
1:00	0	85	9	0	2	1	0	0	0	0	0	0	0	97
2:00	2	92	13	0	3	0	0	1	0	0	0	0	0	111
3:00	3	111	23	1	3	2	0	0	0	0	0	0	0	143
4:00	3	99	17	0	3	0	0	0	0	0	0	0	0	122
5:00	2	151	11	0	2	0	0	0	0	0	0	0	0	166
6:00	1	116	11	0	1	0	0	1	0	0	0	0	0	130
7:00	4	82	8	0	0	0	0	0	0	0	0	0	0	94
8:00	4	65	5	0	3	0	0	0	0	0	0	0	0	77
9:00	1	43	1	0	0	0	0	0	0	0	0	0	0	45
10:00	1	36	0	0	0	0	0	0	0	0	0	0	0	37
11:00	0	18	3	0	0	0	0	0	0	0	0	0	0	21
Total	35	1511	215	5	34	5	0	3	0	0	0	0	0	1808
Percent	1.9%	83.6%	11.9%	0.3%	1.9%	0.3%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	8:00	7:00	7:00	8:00	6:00	8:00		7:00						7:00
	7	128	21	3	4	1	*	1	*	*	*	*	*	153
PM Peak	7:00	5:00	3:00	3:00	2:00	3:00		2:00						5:00
	4	151	23	1	3	2	*	1	*	*	*	*	*	166

NE TRAFFIC COUNTS

City: Newton
Location 1: Derby St
Location 2: Between Pershing Rd and Howard St
Tech: EM
Latitude: 42.358095
Longitude: -71.229330

Direction: East

6/16/2023 Time	Motor Cycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
12:00 AM	0	13	1	0	0	0	0	0	0	0	0	0	0	14
1:00	0	6	0	0	0	0	0	0	0	0	0	0	0	6
2:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00	0	3	1	0	0	0	0	0	0	0	0	0	0	4
5:00	1	14	4	0	0	0	0	0	0	0	0	0	0	19
6:00	0	42	10	0	0	0	0	0	0	0	0	0	0	52
7:00	2	109	14	0	1	0	0	3	0	0	0	0	0	129
8:00	6	108	19	0	4	0	0	0	0	0	0	0	0	137
9:00	1	91	14	2	4	1	0	1	0	0	0	0	0	114
10:00	4	73	15	1	4	0	0	1	0	0	0	0	0	98
11:00	0	84	15	0	2	0	0	0	0	0	0	0	0	101
12:00 PM	0	109	18	1	3	1	0	0	0	0	0	0	0	132
1:00	3	95	13	1	9	0	0	0	0	0	0	0	0	121
2:00	2	107	6	1	1	0	0	0	0	0	0	0	0	117
3:00	2	83	12	2	4	1	0	1	0	0	0	0	0	105
4:00	1	135	13	0	2	1	0	0	0	1	0	0	0	153
5:00	3	151	13	0	0	0	0	0	0	0	0	0	0	167
6:00	3	149	12	0	4	0	0	0	0	0	0	0	0	168
7:00	2	79	4	0	0	0	0	0	0	0	0	0	0	85
8:00	2	55	6	0	0	0	0	0	0	0	0	0	0	63
9:00	0	43	2	0	0	0	0	0	0	0	0	0	0	45
10:00	0	35	2	0	0	0	0	0	0	0	0	0	0	37
11:00	0	21	0	0	0	0	0	0	0	0	0	0	0	21
Total	32	1608	194	8	38	4	0	6	0	1	0	0	0	1891
Percent	1.7%	85.0%	10.3%	0.4%	2.0%	0.2%	0.0%	0.3%	0.0%	0.1%	0.0%	0.0%	0.0%	
AM Peak	8:00	7:00	8:00	9:00	8:00	9:00		7:00						8:00
	6	109	19	2	4	1	*	3	*	*	*	*	*	137
PM Peak	1:00	5:00	12:00 PM	3:00	1:00	12:00 PM		3:00		4:00				6:00
	3	151	18	2	9	1	*	1	*	1	*	*	*	168
Grand Total	67	3119	409	13	72	9	0	9	0	1	0	0	0	3699
Percent	1.8%	84.3%	11.1%	0.4%	1.9%	0.2%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	

NE TRAFFIC COUNTS

City: Newton
Location 1: Derby St
Location 2: Between Pershing Rd and Howard St
Tech: EM
Latitude: 42.358095
Longitude: -71.229330

Direction: West

6/15/2023 Time	Motor Cycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
12:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	2
1:00	0	7	0	0	0	0	0	0	0	0	0	0	0	7
2:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
3:00	0	1	2	0	0	0	0	0	0	0	0	0	0	3
4:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
5:00	1	7	0	0	1	0	0	0	0	0	0	0	0	9
6:00	0	15	3	0	3	0	0	0	0	0	0	0	0	21
7:00	1	47	15	0	4	1	0	0	0	0	0	0	0	68
8:00	2	98	28	3	6	0	0	1	0	0	0	0	0	138
9:00	0	55	15	0	5	0	0	0	0	0	0	0	0	75
10:00	1	45	6	0	2	0	0	0	0	0	0	0	0	54
11:00	1	52	11	0	5	0	0	0	0	0	0	0	0	69
12:00 PM	2	55	14	0	6	0	0	0	0	0	0	0	0	77
1:00	3	84	10	0	4	0	0	0	0	0	0	0	0	101
2:00	1	104	10	0	8	0	0	1	0	0	0	0	0	124
3:00	0	106	19	0	7	0	0	3	0	0	0	0	0	135
4:00	2	106	27	2	11	0	0	3	0	0	0	0	0	151
5:00	0	138	21	0	2	0	0	0	0	0	0	0	0	161
6:00	1	133	9	1	2	0	0	0	0	0	0	0	0	146
7:00	0	93	5	0	2	0	0	0	0	0	0	0	0	100
8:00	0	73	9	0	3	0	0	0	0	0	0	0	0	85
9:00	0	53	7	0	0	0	0	0	0	0	0	0	0	60
10:00	0	32	4	0	1	0	0	0	0	0	0	0	0	37
11:00	3	21	3	0	0	0	0	0	0	0	0	0	0	27
Total	18	1330	218	6	73	1	0	8	0	0	0	0	0	1654
Percent	1.1%	80.4%	13.2%	0.4%	4.4%	0.1%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	8:00	8:00	8:00	8:00	8:00	7:00		8:00						8:00
	2	98	28	3	6	1	*	1	*	*	*	*	*	138
PM Peak	1:00	5:00	4:00	4:00	4:00			3:00						5:00
	3	138	27	2	11	*	*	3	*	*	*	*	*	161

NE TRAFFIC COUNTS

City: Newton
Location 1: Derby St
Location 2: Between Pershing Rd and Howard St
Tech: EM
Latitude: 42.358095
Longitude: -71.229330

Direction: West

6/16/2023 Time	Motor Cycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
12:00 AM	0	14	1	0	0	0	0	0	0	0	0	0	0	15
1:00	0	11	0	0	0	0	0	0	0	0	0	0	0	11
2:00	0	6	0	0	0	0	0	0	0	0	0	0	0	6
3:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
4:00	0	2	1	0	0	0	0	0	0	0	0	0	0	3
5:00	0	9	1	0	1	0	0	0	0	0	0	0	0	11
6:00	0	19	3	0	1	0	0	0	0	0	0	0	0	23
7:00	2	28	17	0	8	0	0	0	0	0	0	0	0	55
8:00	0	90	19	2	3	0	0	2	0	0	0	0	0	116
9:00	0	72	17	2	3	0	0	0	0	0	0	0	0	94
10:00	0	60	12	0	5	0	0	0	0	0	0	0	0	77
11:00	0	71	16	1	5	0	0	0	0	0	0	0	0	93
12:00 PM	2	77	12	1	7	0	0	0	0	0	0	0	0	99
1:00	2	96	17	0	7	0	0	0	0	0	0	0	0	122
2:00	4	98	15	1	5	2	0	1	0	0	0	0	0	126
3:00	0	148	17	1	10	1	0	1	0	0	0	0	0	178
4:00	1	126	19	0	5	0	0	1	0	0	0	0	0	152
5:00	2	125	21	0	3	0	0	1	0	0	0	0	0	152
6:00	2	120	16	0	4	0	0	0	0	0	0	0	0	142
7:00	5	75	16	0	4	0	0	0	0	0	0	0	0	100
8:00	1	70	13	0	3	0	0	0	0	0	0	0	0	87
9:00	1	32	5	0	1	0	0	0	0	0	0	0	0	39
10:00	1	42	1	0	0	0	0	0	0	0	0	0	0	44
11:00	0	33	2	0	0	0	0	0	0	0	0	0	0	35
Total	23	1426	241	8	75	3	0	6	0	0	0	0	0	1782
Percent	1.3%	80.0%	13.5%	0.4%	4.2%	0.2%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	7:00	8:00	8:00	8:00	7:00			8:00						8:00
	2	90	19	2	8	*	*	2	*	*	*	*	*	116
PM Peak	7:00	3:00	5:00	12:00 PM	3:00	2:00		2:00						3:00
	5	148	21	1	10	2	*	1	*	*	*	*	*	178
Grand Total	41	2756	459	14	148	4	0	14	0	0	0	0	0	3436
Percent	1.2%	80.2%	13.4%	0.4%	4.3%	0.1%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	

NE TRAFFIC COUNTS

City: Newton
Location 1: Derby St
Location 2: Between Pershing Rd and Howard St
Tech: EM
Latitude: 42.358095
Longitude: -71.229330

Direction: Combined

6/15/2023 Time	Motor Cycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
12:00 AM	0	2	0	0	1	0	0	0	0	0	0	0	0	3
1:00	0	11	0	0	0	0	0	0	0	0	0	0	0	11
2:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4
3:00	0	1	2	0	0	0	0	0	0	0	0	0	0	3
4:00	1	6	1	0	0	0	0	0	0	0	0	0	0	8
5:00	2	25	6	0	1	0	0	0	0	0	0	0	0	34
6:00	0	68	15	0	7	0	0	0	0	0	0	0	0	90
7:00	1	175	36	0	7	1	0	1	0	0	0	0	0	221
8:00	9	204	43	6	10	1	0	1	0	0	0	0	0	274
9:00	1	133	31	0	7	0	0	0	0	0	0	0	0	172
10:00	3	108	15	0	4	1	0	0	0	0	0	0	0	131
11:00	2	116	31	1	5	0	0	0	0	0	0	0	0	155
12:00 PM	3	147	28	0	8	0	0	0	0	0	0	0	0	186
1:00	3	169	19	0	6	1	0	0	0	0	0	0	0	198
2:00	3	196	23	0	11	0	0	2	0	0	0	0	0	235
3:00	3	217	42	1	10	2	0	3	0	0	0	0	0	278
4:00	5	205	44	2	14	0	0	3	0	0	0	0	0	273
5:00	2	289	32	0	4	0	0	0	0	0	0	0	0	327
6:00	2	249	20	1	3	0	0	1	0	0	0	0	0	276
7:00	4	175	13	0	2	0	0	0	0	0	0	0	0	194
8:00	4	138	14	0	6	0	0	0	0	0	0	0	0	162
9:00	1	96	8	0	0	0	0	0	0	0	0	0	0	105
10:00	1	68	4	0	1	0	0	0	0	0	0	0	0	74
11:00	3	39	6	0	0	0	0	0	0	0	0	0	0	48
Total	53	2841	433	11	107	6	0	11	0	0	0	0	0	3462
Percent	1.5%	82.1%	12.5%	0.3%	3.1%	0.2%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	8:00	8:00	8:00	8:00	8:00	7:00		7:00						8:00
	9	204	43	6	10	1	*	1	*	*	*	*	*	274
PM Peak	4:00	5:00	4:00	4:00	4:00	3:00		3:00						5:00
	5	289	44	2	14	2	*	3	*	*	*	*	*	327

NE TRAFFIC COUNTS

City: Newton
Location 1: Derby St
Location 2: Between Pershing Rd and Howard St
Tech: EM
Latitude: 42.358095
Longitude: -71.229330

Direction: Combined

6/16/2023 Time	Motor Cycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
12:00 AM	0	27	2	0	0	0	0	0	0	0	0	0	0	29
1:00	0	17	0	0	0	0	0	0	0	0	0	0	0	17
2:00	0	9	0	0	0	0	0	0	0	0	0	0	0	9
3:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
4:00	0	5	2	0	0	0	0	0	0	0	0	0	0	7
5:00	1	23	5	0	1	0	0	0	0	0	0	0	0	30
6:00	0	61	13	0	1	0	0	0	0	0	0	0	0	75
7:00	4	137	31	0	9	0	0	3	0	0	0	0	0	184
8:00	6	198	38	2	7	0	0	2	0	0	0	0	0	253
9:00	1	163	31	4	7	1	0	1	0	0	0	0	0	208
10:00	4	133	27	1	9	0	0	1	0	0	0	0	0	175
11:00	0	155	31	1	7	0	0	0	0	0	0	0	0	194
12:00 PM	2	186	30	2	10	1	0	0	0	0	0	0	0	231
1:00	5	191	30	1	16	0	0	0	0	0	0	0	0	243
2:00	6	205	21	2	6	2	0	1	0	0	0	0	0	243
3:00	2	231	29	3	14	2	0	2	0	0	0	0	0	283
4:00	2	261	32	0	7	1	0	1	0	1	0	0	0	305
5:00	5	276	34	0	3	0	0	1	0	0	0	0	0	319
6:00	5	269	28	0	8	0	0	0	0	0	0	0	0	310
7:00	7	154	20	0	4	0	0	0	0	0	0	0	0	185
8:00	3	125	19	0	3	0	0	0	0	0	0	0	0	150
9:00	1	75	7	0	1	0	0	0	0	0	0	0	0	84
10:00	1	77	3	0	0	0	0	0	0	0	0	0	0	81
11:00	0	54	2	0	0	0	0	0	0	0	0	0	0	56
Total	55	3034	435	16	113	7	0	12	0	1	0	0	0	3673
Percent	1.5%	82.6%	11.8%	0.4%	3.1%	0.2%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	8:00	8:00	8:00	9:00	7:00	9:00		7:00						8:00
	6	198	38	4	9	1	*	3	*	*	*	*	*	253
PM Peak	7:00	5:00	5:00	3:00	1:00	2:00		3:00		4:00				5:00
	7	276	34	3	16	2	*	2	*	1	*	*	*	319
Grand Total	108	5875	868	27	220	13	0	23	0	1	0	0	0	7135
Percent	1.5%	82.3%	12.2%	0.4%	3.1%	0.2%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	

NE TRAFFIC COUNTS

City: Newton
Location 1: Cherry St
Location 1: S/O Pleasant St
Tech: EM
Latitude: 42.358374
Longitude: -71.227045

6/12/2023	6/12/2023		6/13/2023		6/14/2023		6/15/2023		6/16/2023		Weekday Average		6/17/2023		6/18/2023	
Time	North	South	North	South	North	South	North	South	North	South	North	South	North	South	North	South
12:00 AM	*	*	*	*	*	*	6	6	12	6	9	6	*	*	*	*
1:00	*	*	*	*	*	*	9	9	7	7	8	8	*	*	*	*
2:00	*	*	*	*	*	*	4	3	3	2	4	2	*	*	*	*
3:00	*	*	*	*	*	*	3	3	5	3	4	3	*	*	*	*
4:00	*	*	*	*	*	*	6	8	2	7	4	8	*	*	*	*
5:00	*	*	*	*	*	*	30	38	28	38	29	38	*	*	*	*
6:00	*	*	*	*	*	*	91	75	67	73	79	74	*	*	*	*
7:00	*	*	*	*	*	*	141	166	107	156	124	161	*	*	*	*
8:00	*	*	*	*	*	*	133	155	149	152	141	154	*	*	*	*
9:00	*	*	*	*	*	*	103	117	130	116	116	116	*	*	*	*
10:00	*	*	*	*	*	*	101	87	89	108	95	98	*	*	*	*
11:00	*	*	*	*	*	*	98	103	153	118	126	110	*	*	*	*
12:00 PM	*	*	*	*	*	*	135	107	149	128	142	118	*	*	*	*
1:00	*	*	*	*	*	*	139	120	140	122	140	121	*	*	*	*
2:00	*	*	*	*	*	*	127	133	164	170	146	152	*	*	*	*
3:00	*	*	*	*	*	*	158	168	163	129	160	148	*	*	*	*
4:00	*	*	*	*	*	*	166	174	155	144	160	159	*	*	*	*
5:00	*	*	*	*	*	*	199	153	172	156	186	154	*	*	*	*
6:00	*	*	*	*	*	*	167	124	147	127	157	126	*	*	*	*
7:00	*	*	*	*	*	*	96	76	104	92	100	84	*	*	*	*
8:00	*	*	*	*	*	*	105	70	76	43	90	56	*	*	*	*
9:00	*	*	*	*	*	*	72	52	55	54	64	53	*	*	*	*
10:00	*	*	*	*	*	*	39	39	47	39	43	39	*	*	*	*
11:00	*	*	*	*	*	*	26	17	29	23	28	20	*	*	*	*
Total	0	0	0	0	0	0	2154	2003	2153	2013	2155	2008	0	0	0	0
Day	0		0		0		4157		4166		4163		0		0	
AM Peak							7:00	7:00	11:00	7:00	8:00	7:00				
Volume							141	166	153	156	141	161				
PM Peak							5:00	4:00	5:00	2:00	5:00	4:00				
Volume							199	174	172	170	186	159				
Comb Total	0		0		0		4157		4166		4163		0		0	
ADT	ADT: 4,162		AADT: 4,162													

NE TRAFFIC COUNTS

City: Newton
Location 1: Cherry St
Location 1: S/O Pleasant St
Tech: EM
Latitude: 42.358374
Longitude: -71.227045

Direction: North

6/15/2023 Time	Motor Cycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	No Class	Total
12:00 AM	0	4	0	0	0	0	0	0	0	0	0	0	0	2	6
1:00	0	7	1	1	0	0	0	0	0	0	0	0	0	0	9
2:00	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4
3:00	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
4:00	0	2	1	1	2	0	0	0	0	0	0	0	0	0	6
5:00	1	23	4	0	1	0	0	0	0	0	0	0	0	1	30
6:00	3	63	14	1	6	1	0	3	0	0	0	0	0	0	91
7:00	2	114	15	1	4	2	0	2	1	0	0	0	0	0	141
8:00	0	103	20	0	6	1	0	1	0	0	0	0	0	2	133
9:00	0	76	16	1	7	1	0	1	0	0	0	0	0	1	103
10:00	2	76	15	2	3	1	0	1	0	0	0	0	0	1	101
11:00	0	80	11	0	6	1	0	0	0	0	0	0	0	0	98
12:00 PM	0	118	12	0	5	0	0	0	0	0	0	0	0	0	135
1:00	0	117	17	0	5	0	0	0	0	0	0	0	0	0	139
2:00	0	115	4	0	7	1	0	0	0	0	0	0	0	0	127
3:00	0	140	12	0	6	0	0	0	0	0	0	0	0	0	158
4:00	0	155	5	0	6	0	0	0	0	0	0	0	0	0	166
5:00	0	180	11	0	8	0	0	0	0	0	0	0	0	0	199
6:00	0	136	13	1	17	0	0	0	0	0	0	0	0	0	167
7:00	8	69	10	0	3	0	0	0	0	0	0	0	0	2	92
8:00	2	86	11	0	2	0	0	1	0	0	0	0	0	0	102
9:00	1	57	13	0	1	0	0	0	0	0	0	0	0	0	72
10:00	0	36	3	0	0	0	0	0	0	0	0	0	0	0	39
11:00	0	17	9	0	0	0	0	0	0	0	0	0	0	0	26
Total	19	1781	217	8	95	8	0	9	1	0	0	0	0	9	2147
Percent	0.9%	83.0%	10.1%	0.4%	4.4%	0.4%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	
AM Peak	6:00	7:00	8:00	10:00	9:00	7:00		6:00	7:00					12:00 AM	7:00
	3	114	20	2	7	2	*	3	1	*	*	*	*	2	141
PM Peak	7:00	5:00	1:00	6:00	6:00	2:00		8:00						7:00	5:00
	8	180	17	1	17	1	*	1	*	*	*	*	*	2	199

NE TRAFFIC COUNTS

City: Newton
Location 1: Cherry St
Location 1: S/O Pleasant St
Tech: EM
Latitude: 42.358374
Longitude: -71.227045

Direction: North

6/16/2023 Time	Motor Cycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	No Class	Total
12:00 AM	0	10	2	0	0	0	0	0	0	0	0	0	0	0	12
1:00	2	2	1	1	0	1	0	0	0	0	0	0	0	0	7
2:00	0	2	0	0	1	0	0	0	0	0	0	0	0	0	3
3:00	0	5	0	0	0	0	0	0	0	0	0	0	0	0	5
4:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1	2
5:00	1	21	3	0	3	0	0	0	0	0	0	0	0	0	28
6:00	2	40	10	0	13	1	0	1	0	0	0	0	0	0	67
7:00	0	79	18	0	7	0	0	3	0	0	0	0	0	0	107
8:00	2	94	32	0	17	0	0	4	0	0	0	0	0	0	149
9:00	3	82	27	2	13	0	0	2	0	0	0	0	0	1	130
10:00	0	53	22	1	10	0	0	2	0	0	0	0	0	1	89
11:00	0	101	33	0	17	0	0	1	0	0	0	0	0	1	153
12:00 PM	1	96	34	1	13	0	0	3	0	0	0	0	0	1	149
1:00	3	89	33	1	11	0	0	2	0	0	0	0	0	1	140
2:00	1	116	26	1	15	2	0	3	0	0	0	0	0	0	164
3:00	2	106	36	0	13	1	0	2	0	0	1	0	0	2	163
4:00	1	107	29	0	10	1	0	6	0	0	0	0	0	1	155
5:00	1	132	27	0	9	0	0	3	0	0	0	0	0	0	172
6:00	0	110	26	0	9	0	0	1	0	0	0	0	0	1	147
7:00	0	81	16	1	4	1	0	0	0	0	0	0	0	1	104
8:00	2	52	17	0	5	0	0	0	0	0	0	0	0	0	76
9:00	1	47	6	0	1	0	0	0	0	0	0	0	0	0	55
10:00	0	40	5	0	2	0	0	0	0	0	0	0	0	0	47
11:00	0	23	4	0	2	0	0	0	0	0	0	0	0	0	29
Total	22	1488	407	8	176	7	0	33	0	0	1	0	0	11	2153
Percent	1.0%	69.1%	18.9%	0.4%	8.2%	0.3%	0.0%	1.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	
AM Peak	9:00	11:00	11:00	9:00	8:00	1:00		8:00						4:00	11:00
	3	101	33	2	17	1	*	4	*	*	*	*	*	1	153
PM Peak	1:00	5:00	3:00	12:00 PM	2:00	2:00		4:00			3:00			3:00	5:00
	3	132	36	1	15	2	*	6	*	*	1	*	*	2	172
Grand Total	41	3269	624	16	271	15	0	42	1	0	1	0	0	20	4300
Percent	1.0%	76.0%	14.5%	0.4%	6.3%	0.3%	0.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	

NE TRAFFIC COUNTS

City: Newton
Location 1: Cherry St
Location 1: S/O Pleasant St
Tech: EM
Latitude: 42.358374
Longitude: -71.227045

Direction: South

6/15/2023 Time	Motor Cycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	No Class	Total
12:00 AM	1	3	0	1	0	0	0	0	0	0	0	0	0	1	6
1:00	0	8	1	0	0	0	0	0	0	0	0	0	0	0	9
2:00	0	1	2	0	0	0	0	0	0	0	0	0	0	0	3
3:00	0	2	1	0	0	0	0	0	0	0	0	0	0	0	3
4:00	0	5	3	0	0	0	0	0	0	0	0	0	0	0	8
5:00	1	23	9	1	4	0	0	0	0	0	0	0	0	0	38
6:00	0	54	14	0	5	1	0	0	0	0	0	0	0	1	75
7:00	0	123	29	0	10	0	0	2	0	0	0	0	0	2	166
8:00	1	124	20	0	9	0	0	1	0	0	0	0	0	0	155
9:00	1	95	12	0	6	0	0	1	0	0	0	0	0	2	117
10:00	1	70	9	1	4	0	0	1	0	0	0	0	0	1	87
11:00	0	81	17	0	5	0	0	0	0	0	0	0	0	0	103
12:00 PM	0	93	8	0	6	0	0	0	0	0	0	0	0	0	107
1:00	0	99	11	0	8	2	0	0	0	0	0	0	0	0	120
2:00	0	120	9	0	4	0	0	0	0	0	0	0	0	0	133
3:00	0	149	14	0	5	0	0	0	0	0	0	0	0	0	168
4:00	0	155	9	0	10	0	0	0	0	0	0	0	0	0	174
5:00	0	135	10	0	8	0	0	0	0	0	0	0	0	0	153
6:00	0	114	4	0	6	0	0	0	0	0	0	0	0	0	124
7:00	2	61	11	1	0	1	0	0	0	0	0	0	0	0	76
8:00	1	64	4	0	0	0	0	0	0	0	0	0	0	1	70
9:00	0	47	3	0	1	0	0	1	0	0	0	0	0	0	52
10:00	3	36	0	0	0	0	0	0	0	0	0	0	0	0	39
11:00	1	13	2	0	1	0	0	0	0	0	0	0	0	0	17
Total	12	1675	202	4	92	4	0	6	0	0	0	0	0	8	2003
Percent	0.6%	83.6%	10.1%	0.2%	4.6%	0.2%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	
AM Peak	12:00 AM	8:00	7:00	12:00 AM	7:00	6:00		7:00						7:00	7:00
	1	124	29	1	10	1	*	2	*	*	*	*	*	2	166
PM Peak	10:00	4:00	3:00	7:00	4:00	1:00		9:00						8:00	4:00
	3	155	14	1	10	2	*	1	*	*	*	*	*	1	174

NE TRAFFIC COUNTS

City: Newton
Location 1: Cherry St
Location 1: S/O Pleasant St
Tech: EM
Latitude: 42.358374
Longitude: -71.227045

Direction: South

6/16/2023 Time	Motor Cycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	No Class	Total
12:00 AM	0	5	1	0	0	0	0	0	0	0	0	0	0	0	6
1:00	1	6	0	0	0	0	0	0	0	0	0	0	0	0	7
2:00	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
3:00	0	1	2	0	0	0	0	0	0	0	0	0	0	0	3
4:00	1	5	1	0	0	0	0	0	0	0	0	0	0	0	7
5:00	0	33	3	0	2	0	0	0	0	0	0	0	0	0	38
6:00	0	57	15	0	0	0	0	0	0	0	0	0	0	1	73
7:00	4	116	28	3	3	1	0	1	0	0	0	0	0	0	156
8:00	3	122	20	1	5	0	0	0	0	0	0	0	0	1	152
9:00	2	90	20	0	3	0	0	0	0	0	0	0	0	1	116
10:00	2	94	9	0	2	0	0	1	0	0	0	0	0	0	108
11:00	0	97	17	0	3	0	0	1	0	0	0	0	0	0	118
12:00 PM	3	93	25	0	4	0	0	2	0	0	0	0	0	1	128
1:00	1	107	12	0	2	0	0	0	0	0	0	0	0	0	122
2:00	0	138	23	2	5	0	0	0	0	0	0	0	0	2	170
3:00	2	102	19	2	2	0	0	0	0	0	0	0	0	2	129
4:00	2	118	18	0	4	0	0	0	0	0	0	0	0	2	144
5:00	0	136	16	0	3	0	0	0	0	0	0	0	0	1	156
6:00	1	112	9	1	3	0	0	0	0	0	0	0	0	1	127
7:00	0	80	9	0	2	1	0	0	0	0	0	0	0	0	92
8:00	2	39	2	0	0	0	0	0	0	0	0	0	0	0	43
9:00	1	45	7	0	0	0	0	0	0	0	0	0	0	1	54
10:00	0	38	1	0	0	0	0	0	0	0	0	0	0	0	39
11:00	0	21	2	0	0	0	0	0	0	0	0	0	0	0	23
Total	25	1657	259	9	43	2	0	5	0	0	0	0	0	13	2013
Percent	1.2%	82.3%	12.9%	0.4%	2.1%	0.1%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	
AM Peak	7:00	8:00	7:00	7:00	8:00	7:00		7:00						6:00	7:00
	4	122	28	3	5	1	*	1	*	*	*	*	*	1	156
PM Peak	12:00 PM	2:00	12:00 PM	2:00	2:00	7:00		12:00 PM						2:00	2:00
	3	138	25	2	5	1	*	2	*	*	*	*	*	2	170
Grand Total	37	3332	461	13	135	6	0	11	0	0	0	0	0	21	4016
Percent	0.9%	83.0%	11.5%	0.3%	3.4%	0.1%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	

NE TRAFFIC COUNTS

City: Newton
Location 1: Cherry St
Location 1: S/O Pleasant St
Tech: EM
Latitude: 42.358374
Longitude: -71.227045

Direction: Combined

6/15/2023 Time	Motor Cycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	No Class	Total
12:00 AM	1	7	0	1	0	0	0	0	0	0	0	0	0	3	12
1:00	0	15	2	1	0	0	0	0	0	0	0	0	0	0	18
2:00	0	5	2	0	0	0	0	0	0	0	0	0	0	0	7
3:00	0	5	1	0	0	0	0	0	0	0	0	0	0	0	6
4:00	0	7	4	1	2	0	0	0	0	0	0	0	0	0	14
5:00	2	46	13	1	5	0	0	0	0	0	0	0	0	1	68
6:00	3	117	28	1	11	2	0	3	0	0	0	0	0	1	166
7:00	2	237	44	1	14	2	0	4	1	0	0	0	0	2	307
8:00	1	227	40	0	15	1	0	2	0	0	0	0	0	2	288
9:00	1	171	28	1	13	1	0	2	0	0	0	0	0	3	220
10:00	3	146	24	3	7	1	0	2	0	0	0	0	0	2	188
11:00	0	161	28	0	11	1	0	0	0	0	0	0	0	0	201
12:00 PM	0	211	20	0	11	0	0	0	0	0	0	0	0	0	242
1:00	0	216	28	0	13	2	0	0	0	0	0	0	0	0	259
2:00	0	235	13	0	11	1	0	0	0	0	0	0	0	0	260
3:00	0	289	26	0	11	0	0	0	0	0	0	0	0	0	326
4:00	0	310	14	0	16	0	0	0	0	0	0	0	0	0	340
5:00	0	315	21	0	16	0	0	0	0	0	0	0	0	0	352
6:00	0	250	17	1	23	0	0	0	0	0	0	0	0	0	291
7:00	10	130	21	1	3	1	0	0	0	0	0	0	0	2	168
8:00	3	150	15	0	2	0	0	1	0	0	0	0	0	1	172
9:00	1	104	16	0	2	0	0	1	0	0	0	0	0	0	124
10:00	3	72	3	0	0	0	0	0	0	0	0	0	0	0	78
11:00	1	30	11	0	1	0	0	0	0	0	0	0	0	0	43
Total	31	3456	419	12	187	12	0	15	1	0	0	0	0	17	4150
Percent	0.7%	83.3%	10.1%	0.3%	4.5%	0.3%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	
AM Peak	6:00	7:00	7:00	10:00	8:00	6:00		7:00	7:00					12:00 AM	7:00
	3	237	44	3	15	2	*	4	1	*	*	*	*	3	307
PM Peak	7:00	5:00	1:00	6:00	6:00	1:00		8:00						7:00	5:00
	10	315	28	1	23	2	*	1	*	*	*	*	*	2	352

NE TRAFFIC COUNTS

City: Newton
Location 1: Cherry St
Location 1: S/O Pleasant St
Tech: EM
Latitude: 42.358374
Longitude: -71.227045

Direction: Combined

6/16/2023 Time	Motor Cycles	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	No Class	Total
12:00 AM	0	15	3	0	0	0	0	0	0	0	0	0	0	0	18
1:00	3	8	1	1	0	1	0	0	0	0	0	0	0	0	14
2:00	0	4	0	0	1	0	0	0	0	0	0	0	0	0	5
3:00	0	6	2	0	0	0	0	0	0	0	0	0	0	0	8
4:00	1	5	1	0	1	0	0	0	0	0	0	0	0	1	9
5:00	1	54	6	0	5	0	0	0	0	0	0	0	0	0	66
6:00	2	97	25	0	13	1	0	1	0	0	0	0	0	1	140
7:00	4	195	46	3	10	1	0	4	0	0	0	0	0	0	263
8:00	5	216	52	1	22	0	0	4	0	0	0	0	0	1	301
9:00	5	172	47	2	16	0	0	2	0	0	0	0	0	2	246
10:00	2	147	31	1	12	0	0	3	0	0	0	0	0	1	197
11:00	0	198	50	0	20	0	0	2	0	0	0	0	0	1	271
12:00 PM	4	189	59	1	17	0	0	5	0	0	0	0	0	2	277
1:00	4	196	45	1	13	0	0	2	0	0	0	0	0	1	262
2:00	1	254	49	3	20	2	0	3	0	0	0	0	0	2	334
3:00	4	208	55	2	15	1	0	2	0	0	1	0	0	4	292
4:00	3	225	47	0	14	1	0	6	0	0	0	0	0	3	299
5:00	1	268	43	0	12	0	0	3	0	0	0	0	0	1	328
6:00	1	222	35	1	12	0	0	1	0	0	0	0	0	2	274
7:00	0	161	25	1	6	2	0	0	0	0	0	0	0	1	196
8:00	4	91	19	0	5	0	0	0	0	0	0	0	0	0	119
9:00	2	92	13	0	1	0	0	0	0	0	0	0	0	1	109
10:00	0	78	6	0	2	0	0	0	0	0	0	0	0	0	86
11:00	0	44	6	0	2	0	0	0	0	0	0	0	0	0	52
Total	47	3145	666	17	219	9	0	38	0	0	1	0	0	24	4166
Percent	1.1%	75.5%	16.0%	0.4%	5.3%	0.2%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	
AM Peak	8:00	8:00	8:00	7:00	8:00	1:00		7:00						9:00	8:00
	5	216	52	3	22	1	*	4	*	*	*	*	*	2	301
PM Peak	12:00 PM	5:00	12:00 PM	2:00	2:00	2:00		4:00			3:00			3:00	2:00
	4	268	59	3	20	2	*	6	*	*	1	*	*	4	334
Grand Total	78	6601	1085	29	406	21	0	53	1	0	1	0	0	41	8316
Percent	0.9%	79.4%	13.0%	0.3%	4.9%	0.3%	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	

New England
TRAFFIC COUNTS

New England Traffic Counts
(413) 579-8366
emayboroda@netrafficcounts.com
www.netrafficcounts.com

CLIENT	Bryant Engineering	**STREET 1**	Derby St
CITY/TOWN	Newton, MA	**STREET 2**	Franklin Elementary School Drive
WEATHER	Sunny	**DATE**	06/15/2023
INTERSECTION #	1		

Passenger Cars & Heavy Vehicles Combined

	Franklin Elementary School Drive - Southbound			Derby St - Westbound			Derby St - Eastbound		
Start Time	**U-Turn**	**Left**	**Right**	**U-Turn**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**
7:00 AM	0	0	0	0	13	0	0	0	35
7:15 AM	0	0	0	0	16	0	0	0	32
7:30 AM	0	0	0	0	22	1	0	0	38
7:45 AM	0	0	0	0	18	0	0	0	43
8:00 AM	0	0	0	0	48	0	0	0	33
8:15 AM	0	1	0	0	49	0	0	0	42
8:30 AM	0	0	0	0	26	0	0	0	38
8:45 AM	0	0	0	0	23	0	0	0	25
2:00 PM	0	0	0	0	29	0	0	0	23
2:15 PM	0	0	0	0	24	0	0	0	27
2:30 PM	0	0	0	0	29	1	0	0	36
2:45 PM	0	0	0	0	43	0	0	0	23
3:00 PM	0	0	0	0	36	0	0	0	26
3:15 PM	0	0	0	0	35	0	0	0	43
3:30 PM	0	1	0	0	36	0	0	0	34
3:45 PM	0	1	0	0	29	0	0	0	34

AM PEAK HOURS	Franklin Elementary School Drive - Southbound			Derby St - Westbound			Derby St - Eastbound		
7:45 AM	**U-Turn**	**Left**	**Right**	**U-Turn**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**
	0	1	0	0	141	0	0	0	156
PHF		0.25			0.72			0.91	
HV%	0.0%	0.0%	0.0%	0.0%	2.8%	0.0%	0.0%	0.0%	0.6%

PM PEAK HOURS	Franklin Elementary School Drive - Southbound			Derby St - Westbound			Derby St - Eastbound		
2:45 PM	**U-Turn**	**Left**	**Right**	**U-Turn**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**
	0	1	0	0	150	0	0	0	126
PHF		0.25			0.87			0.73	
HV%	0.0%	0.0%	0.0%	0.0%	1.3%	0.0%	0.0%	0.0%	0.8%

New England
TRAFFIC COUNTS

New England Traffic Counts
(413) 579-8366
emayboroda@netrafficcounts.com
www.netrafficcounts.com

CLIENT	Bryant Engineering	**STREET 1**	Derby St
CITY/TOWN	Newton, MA	**STREET 2**	Franklin Elementary School Drive
WEATHER	Sunny	**DATE**	06/15/2023
INTERSECTION #	1		

Heavy Vehicles

	Franklin Elementary School Drive - Southbound			Derby St - Westbound			Derby St - Eastbound		
Start Time	**U-Turn**	**Left**	**Right**	**U-Turn**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	1
7:30 AM	0	0	0	0	0	0	0	0	1
7:45 AM	0	0	0	0	1	0	0	0	0
8:00 AM	0	0	0	0	2	0	0	0	0
8:15 AM	0	0	0	0	1	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	1
2:00 PM	0	0	0	0	1	0	0	0	2
2:15 PM	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	1	0	0	0	1
2:45 PM	0	0	0	0	1	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	1	0	0	0	1
3:30 PM	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0

AM PEAK HOURS	Franklin Elementary School Drive - Southbound			Derby St - Westbound			Derby St - Eastbound		
7:45 AM	**U-Turn**	**Left**	**Right**	**U-Turn**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**
	0	0	0	0	4	0	0	0	1

PM PEAK HOURS	Franklin Elementary School Drive - Southbound			Derby St - Westbound			Derby St - Eastbound		
2:45 PM	**U-Turn**	**Left**	**Right**	**U-Turn**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**
	0	0	0	0	2	0	0	0	1

C

New England
TRAFFIC COUNTS

New England Traffic Counts
(413) 579-8366
emayboroda@netrafficcounts.com
www.netrafficcounts.com

CLIENT	Bryant Engineering	**STREET 1**	Derby St
CITY/TOWN	Newton, MA	**STREET 2**	Franklin Elementary School Drive
WEATHER	Sunny	**DATE**	06/15/2023
INTERSECTION #	1		

Pedestrians and Bicycles

	Franklin Elementary School Drive - Southbound			Derby St - Westbound			Derby St - Eastbound		
Start Time	**Peds**	**Left**	**Right**	**Peds**	**Thru**	**Right**	**Peds**	**Left**	**Thru**
7:00 AM	1	0	0	0	0	0	0	0	0
7:15 AM	3	0	0	1	0	0	0	0	0
7:30 AM	7	0	0	0	0	0	1	0	0
7:45 AM	5	0	0	0	0	0	2	0	0
8:00 AM	68	0	0	0	1	0	87	0	1
8:15 AM	47	0	0	3	0	0	41	0	0
8:30 AM	8	0	0	7	0	0	0	0	1
8:45 AM	18	0	0	5	0	0	4	0	2
2:00 PM	1	0	0	0	0	0	0	0	0
2:15 PM	3	0	1	0	0	0	2	0	0
2:30 PM	10	0	0	0	0	1	3	0	1
2:45 PM	94	0	0	5	0	0	109	0	0
3:00 PM	2	0	0	2	1	0	0	0	0
3:15 PM	5	0	0	4	0	0	4	0	0
3:30 PM	6	0	0	4	0	0	10	0	0
3:45 PM	17	0	0	0	0	0	18	0	0

AM PEAK HOURS	Franklin Elementary School Drive - Southbound			Derby St - Westbound			Derby St - Eastbound		
7:45 AM	**Peds**	**Left**	**Right**	**Peds**	**Thru**	**Right**	**Peds**	**Left**	**Thru**
	128	0	0	10	1	0	130	0	2

PM PEAK HOURS	Franklin Elementary School Drive - Southbound			Derby St - Westbound			Derby St - Eastbound		
2:45 PM	**Peds**	**Left**	**Right**	**Peds**	**Thru**	**Right**	**Peds**	**Left**	**Thru**
	107	0	0	15	1	0	123	0	0

New England
TRAFFIC COUNTS

New England Traffic Counts
(413) 579-8366
emayboroda@netrafficcounts.com
www.netrafficcounts.com

CLIENT	Bryant Engineers	**STREET 1**	Derby St
CITY/TOWN	Newton, MA	**STREET 2**	Cherry St
WEATHER	Sunny	**DATE**	06/15/2023
INTERSECTION #	2		

Passenger Cars & Heavy Vehicles Combined

	Cherry St - Northbound				Cherry St - Southbound				Derby St - Westbound				Derby St - Eastbound			
Start Time	**U-Turn**	**Left**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**	**Right**
7:00 AM	0	8	30	0	0	0	41	0	0	1	5	1	0	1	16	17
7:15 AM	0	3	23	0	0	2	28	3	0	2	9	2	1	4	16	14
7:30 AM	0	6	38	3	0	1	35	2	0	5	11	2	0	7	18	14
7:45 AM	0	5	43	3	0	2	36	3	0	4	15	3	0	5	24	17
8:00 AM	0	20	40	2	0	1	31	12	0	3	22	1	0	5	18	13
8:15 AM	0	12	33	3	0	3	34	11	0	2	27	0	0	4	24	16
8:30 AM	0	5	20	1	0	1	29	0	0	2	19	0	0	5	19	16
8:45 AM	0	6	30	1	0	1	29	5	0	1	9	0	0	3	9	12
2:00 PM	0	11	29	0	0	1	14	4	0	1	14	1	0	0	9	14
2:15 PM	0	11	25	2	0	0	28	5	0	0	12	0	0	3	14	11
2:30 PM	0	6	35	4	0	0	32	7	0	4	19	1	0	2	22	12
2:45 PM	0	11	24	3	0	1	35	8	0	8	20	1	0	2	17	8
3:00 PM	0	13	23	3	0	1	43	4	0	1	18	4	0	3	13	9
3:15 PM	0	8	39	5	0	1	42	10	0	0	20	0	0	9	16	20
3:30 PM	0	13	36	2	0	0	40	2	0	4	27	1	0	5	23	9
3:45 PM	0	6	41	0	0	0	36	7	0	3	20	4	0	5	20	14

AM PEAK HOURS	Cherry St - Northbound				Cherry St - Southbound				Derby St - Westbound				Derby St - Eastbound			
7:30 AM	**U-Turn**	**Left**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**	**Right**
	0	43	154	11	0	7	136	28	0	14	75	6	0	21	84	60
PHF	0.84				0.89				0.82				0.90			
HV%	0.0%	4.7%	1.3%	0.0%	0.0%	0.0%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

PM PEAK HOURS	Cherry St - Northbound				Cherry St - Southbound				Derby St - Westbound				Derby St - Eastbound			
3:00 PM	**U-Turn**	**Left**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**	**Right**
	0	40	139	10	0	2	161	23	0	8	85	9	0	22	72	52
PHF	0.91				0.88				0.80				0.81			
HV%	0.0%	2.5%	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%

New England
TRAFFIC COUNTS

New England Traffic Counts
(413) 579-8366
emayboroda@netrafficcounts.com
www.netrafficcounts.com

CLIENT	Bryant Engineers	**STREET 1**	Derby St
CITY/TOWN	Newton, MA	**STREET 2**	Cherry St
WEATHER	Sunny	**DATE**	06/15/2023
INTERSECTION #	2		

Heavy Vehicles

	Cherry St - Northbound				Cherry St - Southbound				Derby St - Westbound				Derby St - Eastbound			
Start Time	**U-Turn**	**Left**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**	**Right**
7:00 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM PEAK HOURS
7:30 AM

Cherry St - Northbound				Cherry St - Southbound				Derby St - Westbound				Derby St - Eastbound			
U-Turn	**Left**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**	**Right**
0	2	2	0	0	0	1	0	0	0	0	0	0	0	0	0

PM PEAK HOURS
3:00 PM

Cherry St - Northbound				Cherry St - Southbound				Derby St - Westbound				Derby St - Eastbound			
U-Turn	**Left**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**	**Right**	**U-Turn**	**Left**	**Thru**	**Right**
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

New England
TRAFFIC COUNTS

New England Traffic Counts
(413) 579-8366
emayboroda@netrafficcounts.com
www.netrafficcounts.com

CLIENT	Bryant Engineers	**STREET 1**	Derby St
CITY/TOWN	Newton, MA	**STREET 2**	Cherry St
WEATHER	Sunny	**DATE**	06/15/2023
INTERSECTION #	2		

Pedestrians and Bicycles

	Cherry St - Northbound				Cherry St - Southbound				Derby St - Westbound				Derby St - Eastbound			
Start Time	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
7:15 AM	0	0	0	0	4	0	0	0	0	0	0	0	1	0	0	0
7:30 AM	4	0	0	0	4	0	0	0	0	0	0	0	2	0	0	0
7:45 AM	0	0	0	0	5	0	0	0	0	0	0	0	1	0	0	0
8:00 AM	9	1	0	0	72	0	0	0	0	0	0	0	10	0	1	1
8:15 AM	2	0	0	0	39	0	0	0	0	0	0	0	6	0	0	0
8:30 AM	1	0	0	0	5	0	0	0	1	0	0	0	2	0	0	1
8:45 AM	0	0	0	0	5	0	0	0	0	0	0	0	1	0	3	0
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0
2:30 PM	5	1	0	0	9	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	25	0	0	0	70	0	0	0	0	0	0	0	8	0	0	0
3:00 PM	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	3	0	0	0	0	0	0	0	2	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
3:45 PM	3	0	1	0	8	0	0	0	0	0	0	0	8	0	0	0

AM PEAK HOURS
7:30 AM

Cherry St - Northbound				Cherry St - Southbound				Derby St - Westbound				Derby St - Eastbound			
Peds	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**
15	1	0	0	120	0	0	0	0	0	0	0	19	0	1	1

PM PEAK HOURS
3:00 PM

Cherry St - Northbound				Cherry St - Southbound				Derby St - Westbound				Derby St - Eastbound			
Peds	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**
4	0	1	0	13	0	0	0	0	0	0	0	13	0	0	0

New England
TRAFFIC COUNTS

New England Traffic Counts
(413) 579-8366
emayboroda@netrafficcounts.com
www.netrafficcounts.com

CLIENT	Bryant Engineering	**STREET 1**	Cherry St
CITY/TOWN	Newton, MA	**STREET 2**	Franklin School Driveway
WEATHER	Sunny	**DATE**	06/15/2023
INTERSECTION #	3		

Passenger Cars & Heavy Vehicles Combined

	Cherry St - Northbound			Cherry St - Westbound			Franklin School Driveway - Eastbound		
Start Time	**U-Turn**	**Left**	**Thru**	**U-Turn**	**Thru**	**Right**	**U-Turn**	**Left**	**Right**
7:00 AM	0	4	29	0	40	1	0	0	0
7:15 AM	0	6	24	0	32	3	0	1	3
7:30 AM	0	5	42	0	39	2	0	0	1
7:45 AM	0	9	44	0	41	12	0	0	1
8:00 AM	0	8	39	0	43	6	0	2	0
8:15 AM	0	4	34	0	44	1	0	1	1
8:30 AM	0	0	24	0	27	1	0	1	1
8:45 AM	0	0	33	0	32	1	0	0	2
2:00 PM	0	1	30	0	19	0	0	0	0
2:15 PM	0	2	27	0	33	2	0	0	1
2:30 PM	0	2	36	0	38	1	0	1	4
2:45 PM	0	1	27	0	40	0	0	3	5
3:00 PM	0	2	28	0	41	2	0	4	5
3:15 PM	0	3	45	0	52	1	0	0	3
3:30 PM	0	1	39	0	35	1	0	3	7
3:45 PM	0	9	43	0	32	9	0	2	7

AM PEAK HOURS	Cherry St - Northbound			Cherry St - Westbound			Franklin School Driveway - Eastbound		
7:30 AM	**U-Turn**	**Left**	**Thru**	**U-Turn**	**Thru**	**Right**	**U-Turn**	**Left**	**Right**
	0	26	159	0	167	21	0	3	3
PHF		0.87			0.89			0.75	
HV%	0.0%	0.0%	1.3%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%

PM PEAK HOURS	Cherry St - Northbound			Cherry St - Westbound			Franklin School Driveway - Eastbound		
3:00 PM	**U-Turn**	**Left**	**Thru**	**U-Turn**	**Thru**	**Right**	**U-Turn**	**Left**	**Right**
	0	15	155	0	160	13	0	9	22
PHF		0.82			0.82			0.78	
HV%	0.0%	0.0%	1.9%	0.0%	1.9%	0.0%	0.0%	0.0%	0.0%

New England
TRAFFIC COUNTS

New England Traffic Counts
(413) 579-8366
emayboroda@netrafficcounts.com
www.netrafficcounts.com

CLIENT	Bryant Engineering	**STREET 1**	Cherry St
CITY/TOWN	Newton, MA	**STREET 2**	Franklin School Driveway
WEATHER	Sunny	**DATE**	06/15/2023
INTERSECTION #	3		

Heavy Vehicles

	Cherry St - Northbound			Cherry St - Westbound			Franklin School Driveway - Eastbound		
Start Time	**U-Turn**	**Left**	**Thru**	**U-Turn**	**Thru**	**Right**	**U-Turn**	**Left**	**Right**
7:00 AM	0	0	1	0	1	0	0	0	0
7:15 AM	0	0	1	0	1	0	0	0	0
7:30 AM	0	0	1	0	0	0	0	0	0
7:45 AM	0	0	1	0	2	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	1	0	3	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	1	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	1	0	0	0	0
2:45 PM	0	0	0	0	2	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	1	0	1	0	0	0	0
3:30 PM	0	0	2	0	1	0	0	0	0
3:45 PM	0	0	0	0	1	0	0	0	0

AM PEAK HOURS	Cherry St - Northbound			Cherry St - Westbound			Franklin School Driveway - Eastbound		
7:30 AM	**U-Turn**	**Left**	**Thru**	**U-Turn**	**Thru**	**Right**	**U-Turn**	**Left**	**Right**
	0	0	2	0	2	0	0	0	0

PM PEAK HOURS	Cherry St - Northbound			Cherry St - Westbound			Franklin School Driveway - Eastbound		
3:00 PM	**U-Turn**	**Left**	**Thru**	**U-Turn**	**Thru**	**Right**	**U-Turn**	**Left**	**Right**
	0	0	3	0	3	0	0	0	0

C

New England
TRAFFIC COUNTS

New England Traffic Counts
(413) 579-8366
emayboroda@netrafficcounts.com
www.netrafficcounts.com

CLIENT	Bryant Engineering	**STREET 1**	Cherry St
CITY/TOWN	Newton, MA	**STREET 2**	Franklin School Driveway
WEATHER	Sunny	**DATE**	06/15/2023
INTERSECTION #	3		

Pedestrians and Bicycles

	Cherry St - Northbound			Cherry St - Westbound			Franklin School Driveway - Eastbound		
Start Time	**Peds**	**Left**	**Thru**	**Peds**	**Thru**	**Right**	**Peds**	**Left**	**Right**
7:00 AM	0	0	0	0	0	0	1	0	0
7:15 AM	0	0	0	0	0	0	2	0	0
7:30 AM	0	0	0	0	0	0	3	0	0
7:45 AM	0	0	0	1	0	1	1	0	0
8:00 AM	0	0	0	5	0	0	22	0	0
8:15 AM	0	0	0	3	0	0	16	0	0
8:30 AM	0	0	0	0	0	0	5	0	0
8:45 AM	0	0	0	0	0	0	4	0	0
2:00 PM	0	0	0	0	0	0	1	0	0
2:15 PM	0	0	0	2	1	0	3	0	0
2:30 PM	0	0	1	2	0	0	2	0	0
2:45 PM	2	0	0	2	0	0	9	0	1
3:00 PM	0	0	0	0	1	0	1	0	0
3:15 PM	0	0	0	0	0	0	1	0	0
3:30 PM	4	0	0	3	0	0	1	0	0
3:45 PM	0	1	0	2	0	0	2	0	0

AM PEAK HOURS	Cherry St - Northbound			Cherry St - Westbound			Franklin School Driveway - Eastbound		
7:30 AM	**Peds**	**Left**	**Thru**	**Peds**	**Thru**	**Right**	**Peds**	**Left**	**Right**
	0	0	0	9	0	1	42	0	0

PM PEAK HOURS	Cherry St - Northbound			Cherry St - Westbound			Franklin School Driveway - Eastbound		
3:00 PM	**Peds**	**Left**	**Thru**	**Peds**	**Thru**	**Right**	**Peds**	**Left**	**Right**
	4	1	0	5	1	0	5	0	0

APPENDIX B

Trip Generation

February 1, 2024
BAI No. 223057

Trip Generation Calculations

Franklin Elementary School
Derby Street, Newton, Massachusetts

Projected Elementary School Student Trips:

To estimate the proposed trip generation of the new school, the total number of on-site trips for the existing Franklin Elementary School were adjusted for the projected number of students. Currently, Franklin Elementary School has 363 students, and the proposed school will accommodate 414 students. Therefore, trip generation was conducted for the projected increase in the school population (51 students). Trips entering and exiting the existing school driveway are faculty and staff. The bus traffic currently is on Derby Street and is proposed to be accommodated in a separate bus loop on Derby Street. The drop-off and pick-up traffic are proposed to remain in the "blue zone" on the north side of Derby Street.

51additional students/363 existing students = 0.14

School A.M. Peak Hour

During the school A.M. peak hour, there are 52 trips entering and 8 trips exiting the Franklin Elementary School site. These trips include faculty and staff.

The increase in the number of trips entering and exiting the proposed new school is:

0.14 x 52 = 7.28, say 7 trips enterting
0.14 x 8 = 1.12, say 1 trip exiting

Total number of trips entering and exiting the proposed new school are:

52 + 7 = 59 trips entering
8 + 1 = 9 trips exiting

School P.M. Peak Hour

During the school P.M. peak hour, there are 28 trips entering and 33 trips exiting the Franklin Elementary School site. These trips include faculty and staff.

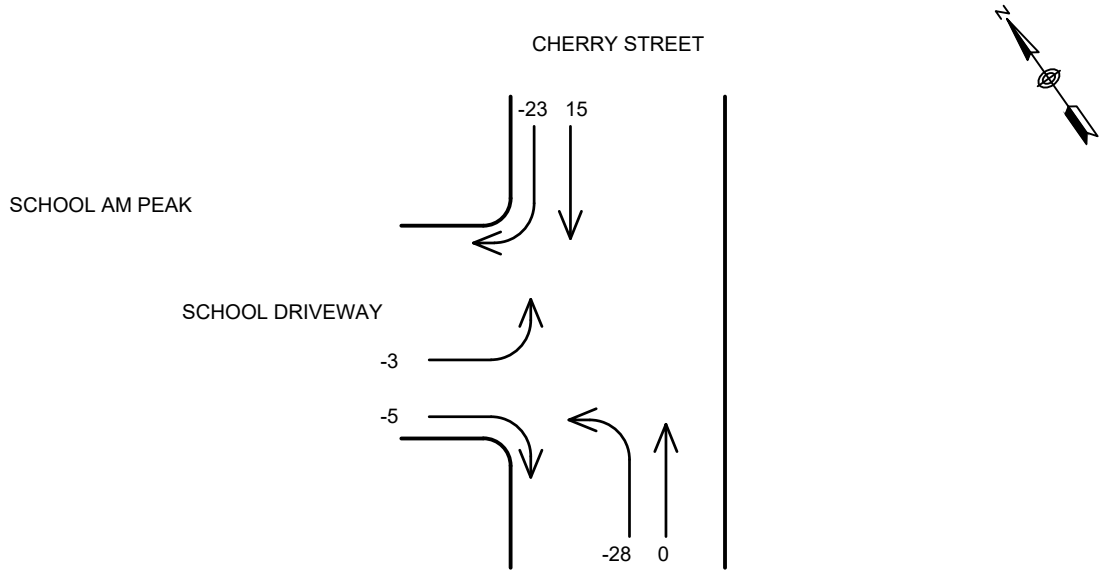
The increase in the number of trips entering and exiting the proposed new school is:

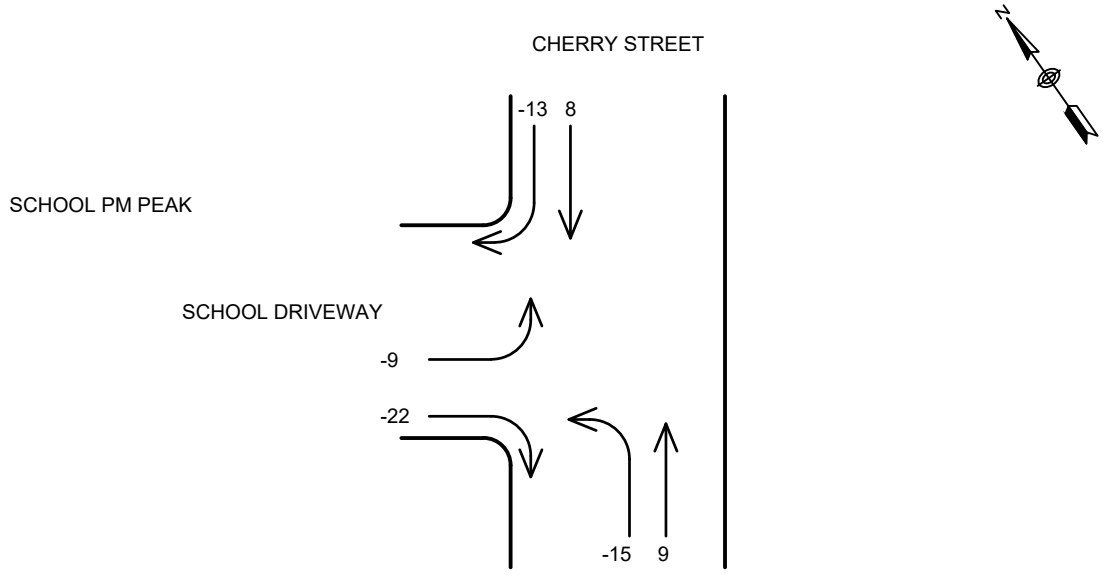
0.14 x 28 = 3.92, say 4 trips enterting
0.14 x 33 = 4.62, say 5 trips exiting

Total number of trips entering and exiting the proposed new school are:

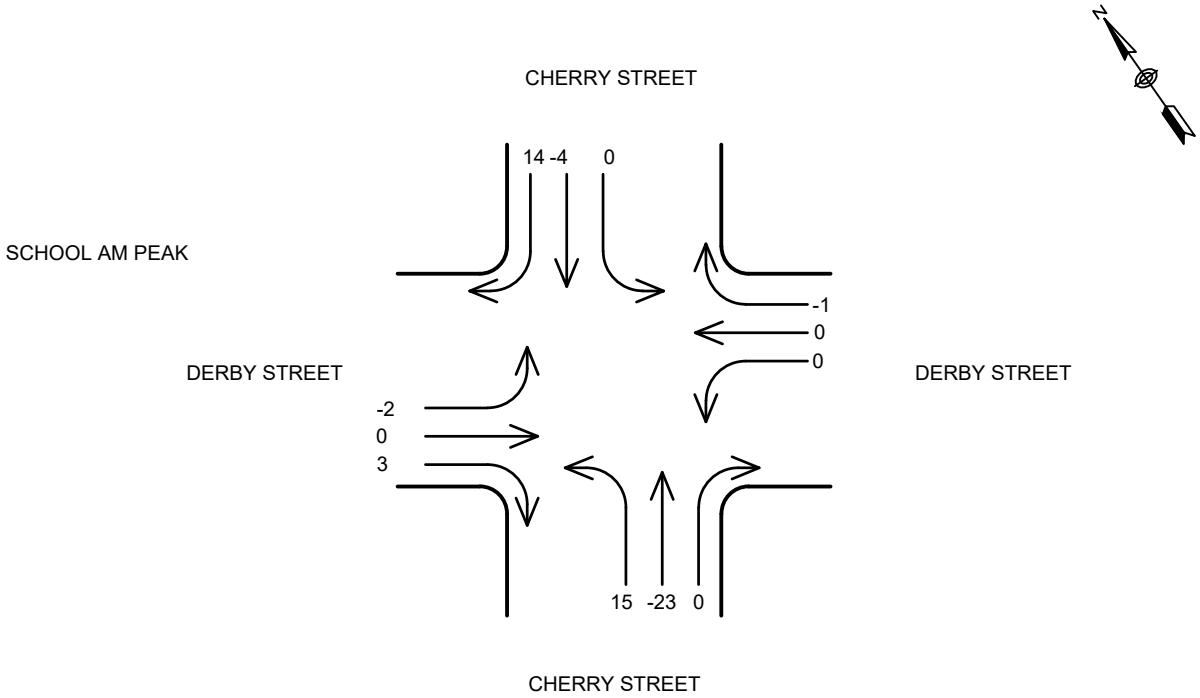
28 + 4 = 32 trips entering
33 + 5 = 38 trips exiting

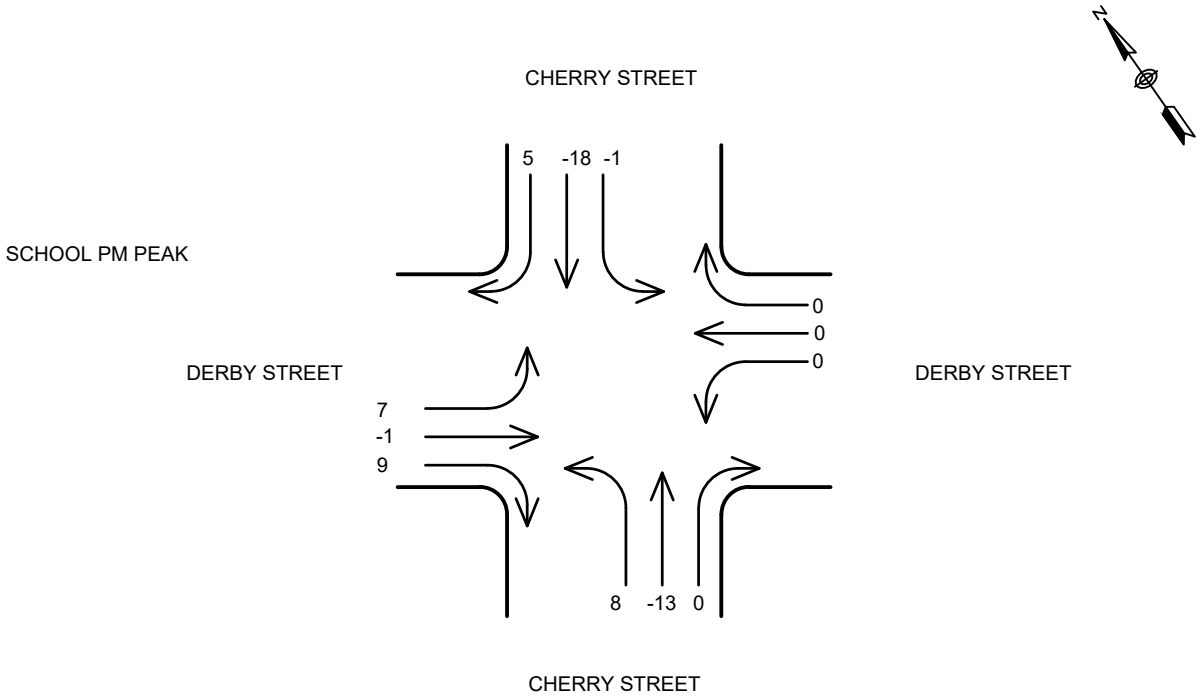
TRAFFIC VOLUMES
FRANKLIN ELEMENTARY SCHOOL
NEWTON, MA
TRIP GENERATION





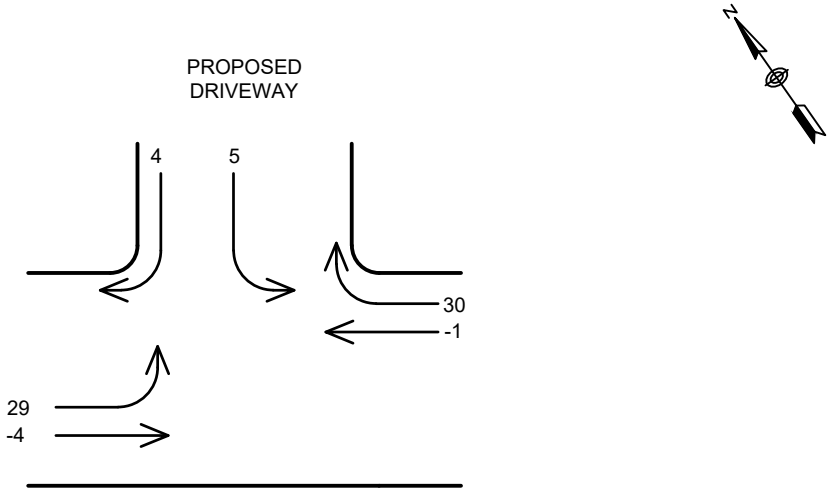
TRAFFIC VOLUMES
FRANKLIN ELEMENTARY SCHOOL
NEWTON, MA
TRIP GENERATION



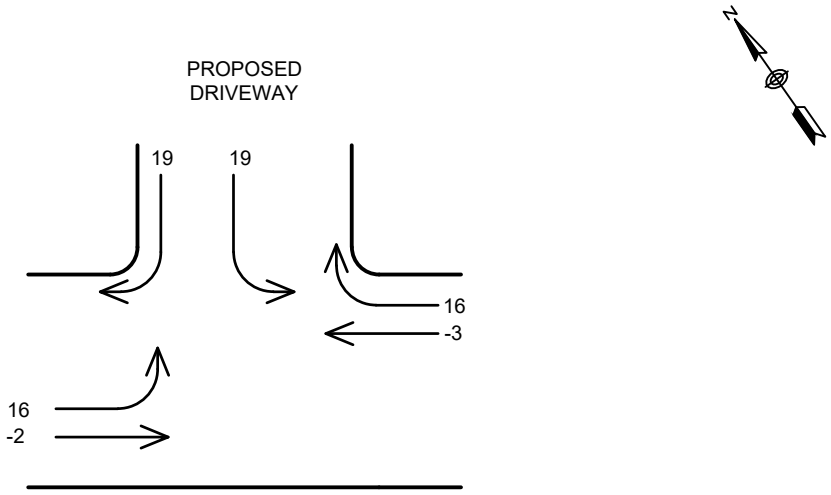


TRAFFIC VOLUMES
FRANKLIN ELEMENTARY SCHOOL
NEWTON, MA
TRIP GENERATION

SCHOOL AM PEAK



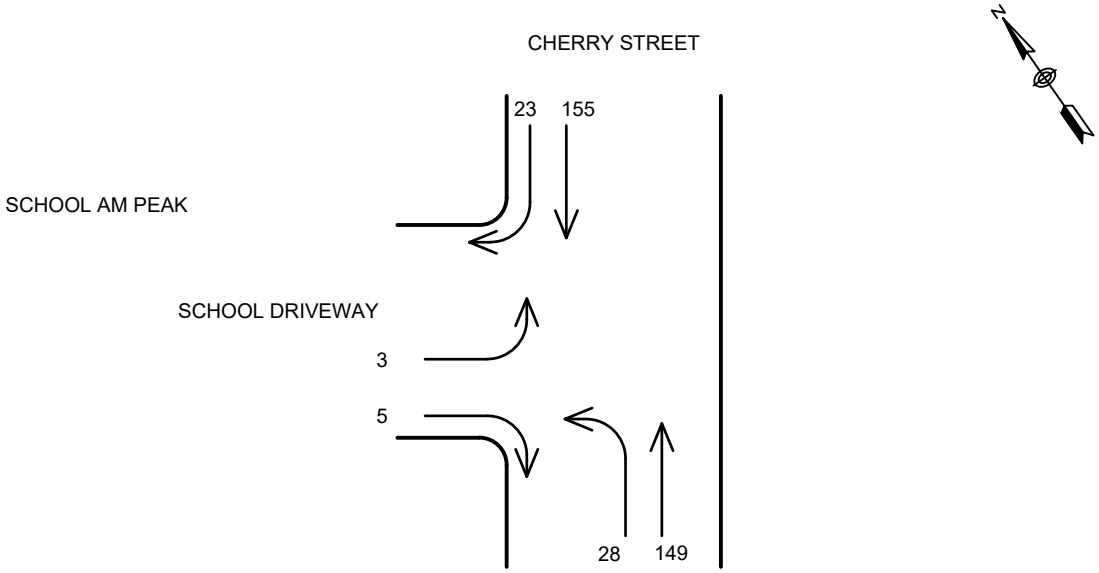
SCHOOL PM PEAK

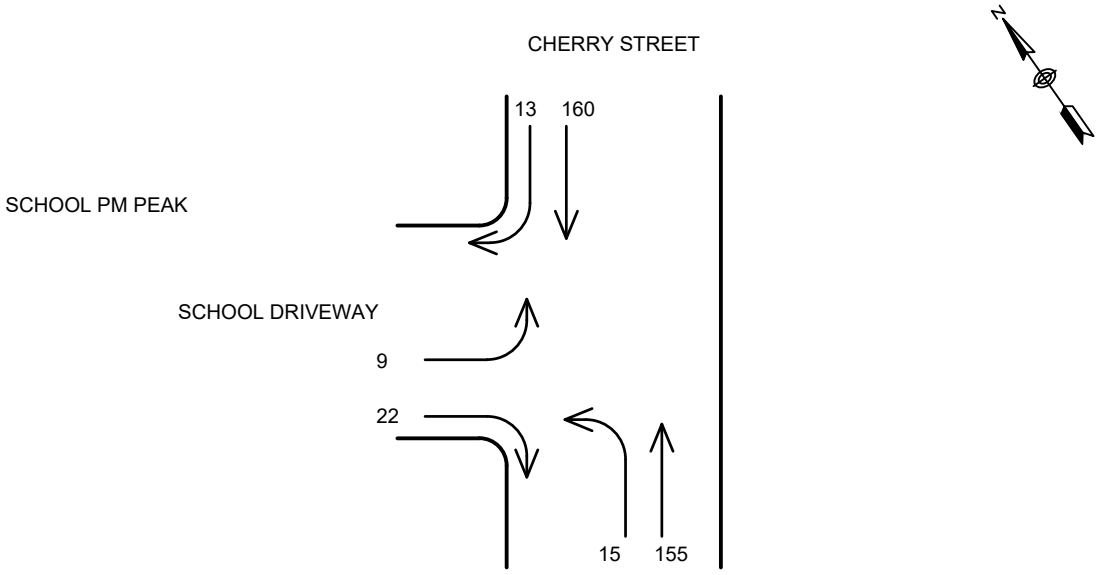


APPENDIX C

Intersection Capacity Analysis Computations

TRAFFIC VOLUMES
FRANKLIN ELEMENTARY SCHOOL
NEWTON, MA
EXISTING VOLUME





HCS7 Two-Way Stop-Control Report

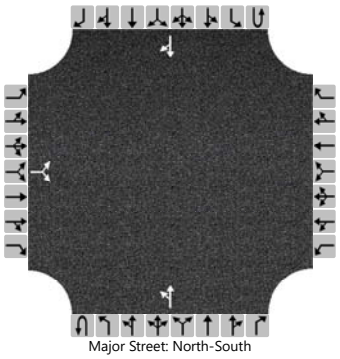
General Information

Analyst	RB
Agency/Co.	Bryant Associates, Inc.
Date Performed	1/26/2024
Analysis Year	2023
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	223057 Franklin ES - Existing Cherry Street DW

Site Information

Intersection	Cherry St/School DW
Jurisdiction	Newton
East/West Street	Existing School Driveway
North/South Street	Cherry Street
Peak Hour Factor	0.82
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		3		5						28	149				155	23
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

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

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			10							34						
Capacity, c (veh/h)			656							1297						
v/c Ratio			0.01							0.03						
95% Queue Length, Q_{95} (veh)			0.0							0.1						
Control Delay (s/veh)			10.6							7.8						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		10.6								1.4						
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

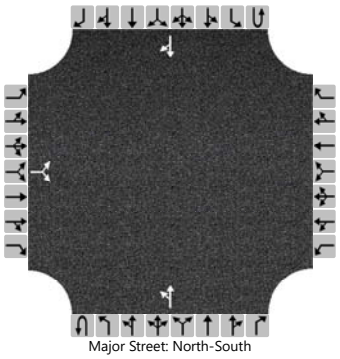
General Information

Analyst	RB
Agency/Co.	Bryant Associates, Inc.
Date Performed	1/26/2024
Analysis Year	2023
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	223057 Franklin ES - Existing Cherry Street DW

Site Information

Intersection	Cherry St/School DW
Jurisdiction	Newton
East/West Street	Existing School Driveway
North/South Street	Cherry Street
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		9		22						15	155				160	13
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

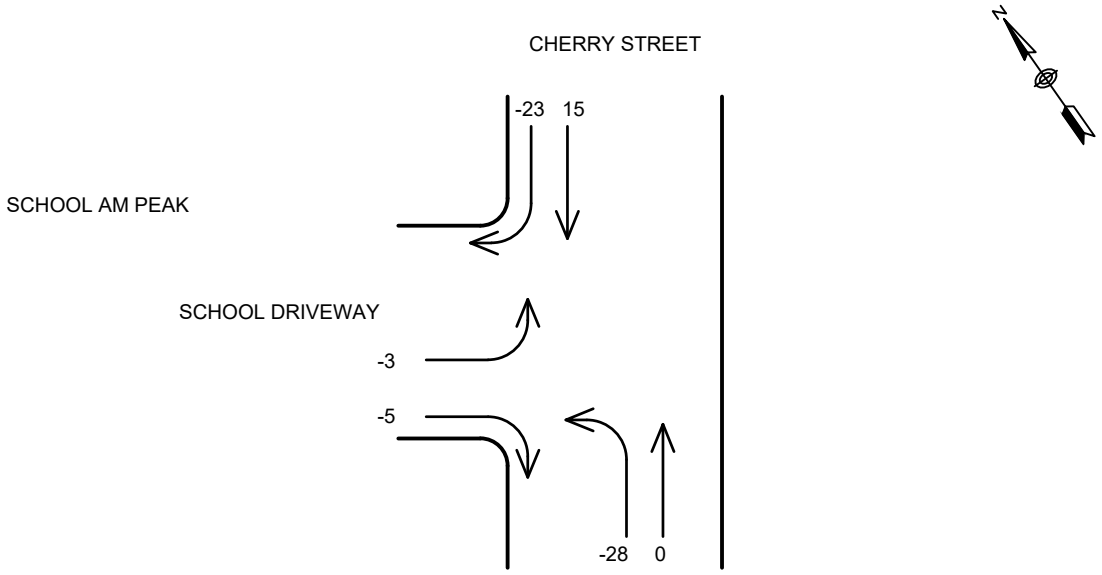
Critical and Follow-up Headways

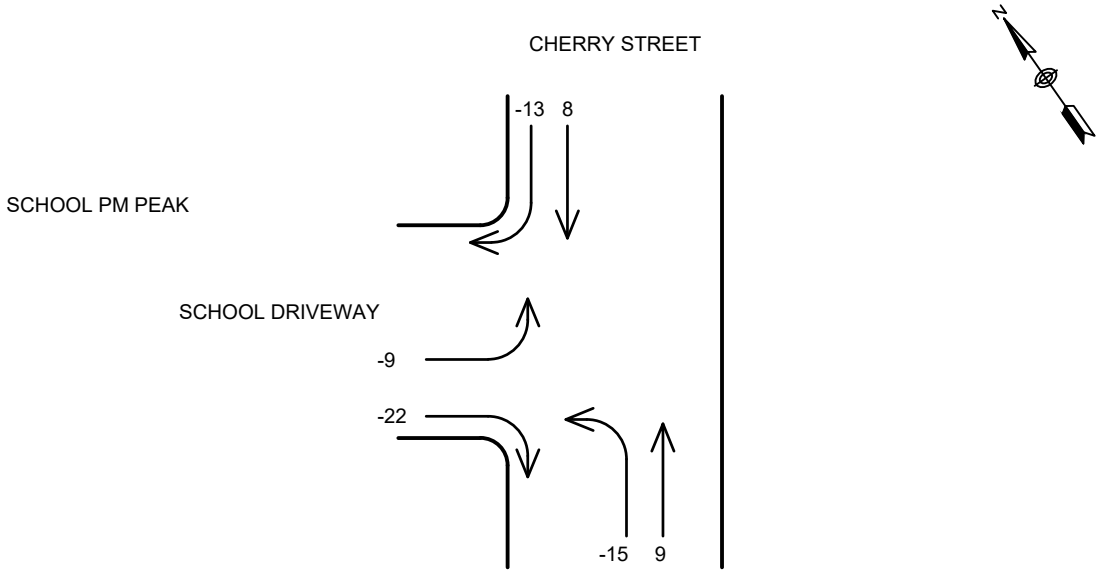
Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

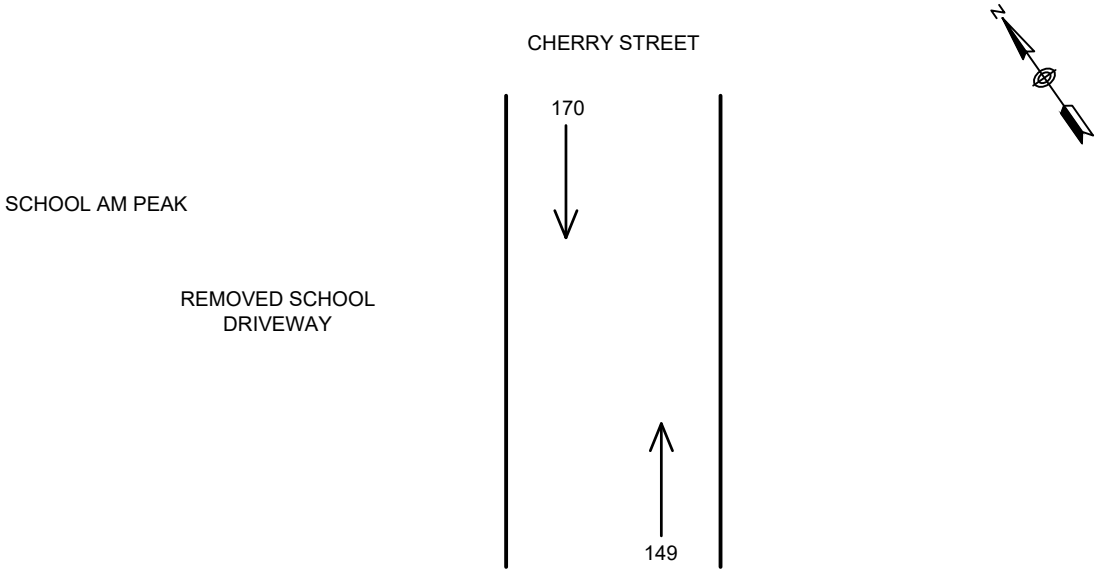
Flow Rate, v (veh/h)			34							17						
Capacity, c (veh/h)			753							1381						
v/c Ratio			0.05							0.01						
95% Queue Length, Q_{95} (veh)			0.1							0.0						
Control Delay (s/veh)			10.0							7.6						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		10.0								0.8						
Approach LOS		B														

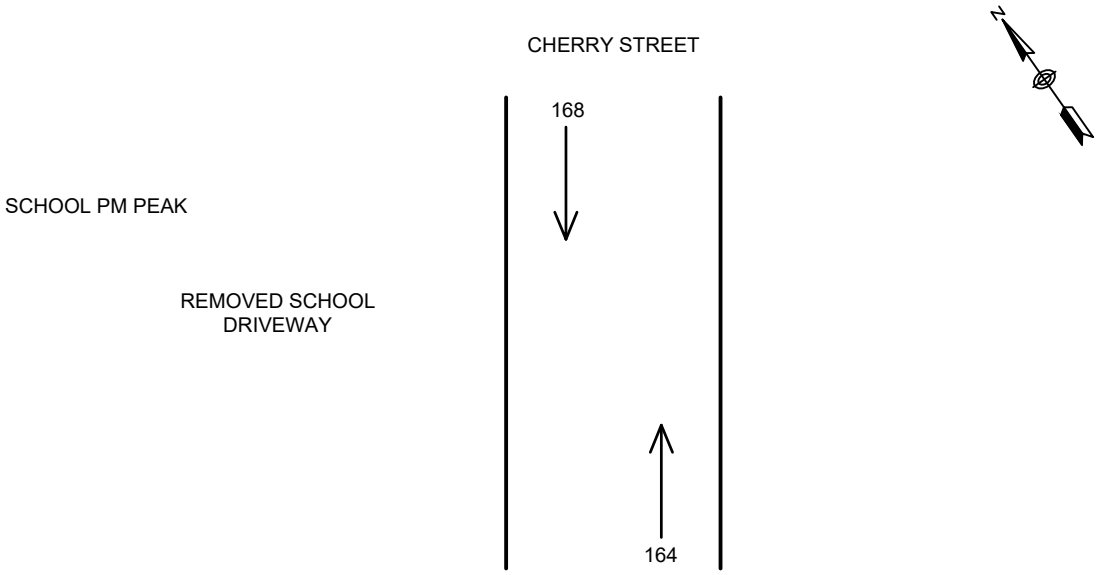
TRAFFIC VOLUMES
FRANKLIN ELEMENTARY SCHOOL
NEWTON, MA
TRIP GENERATION



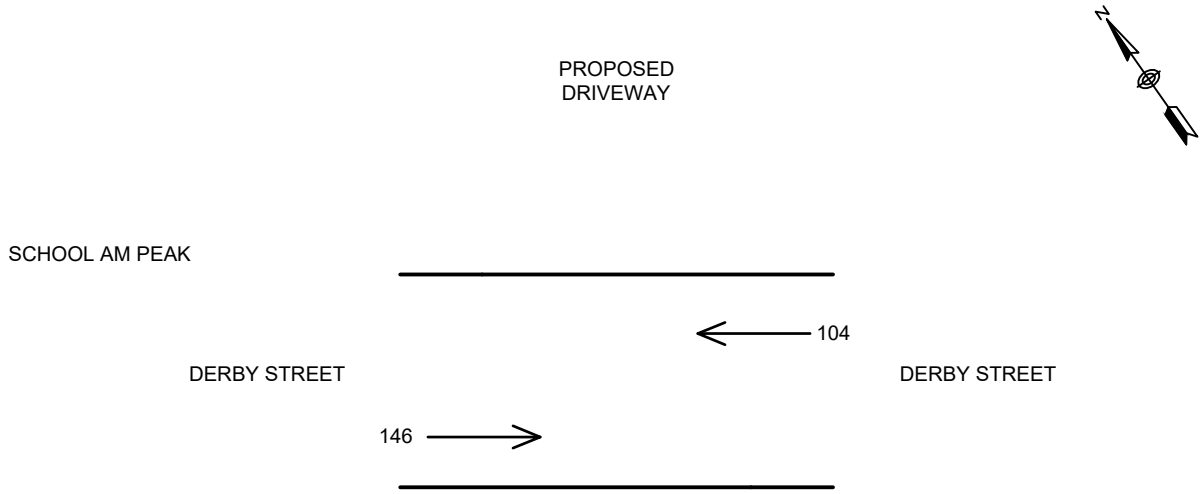


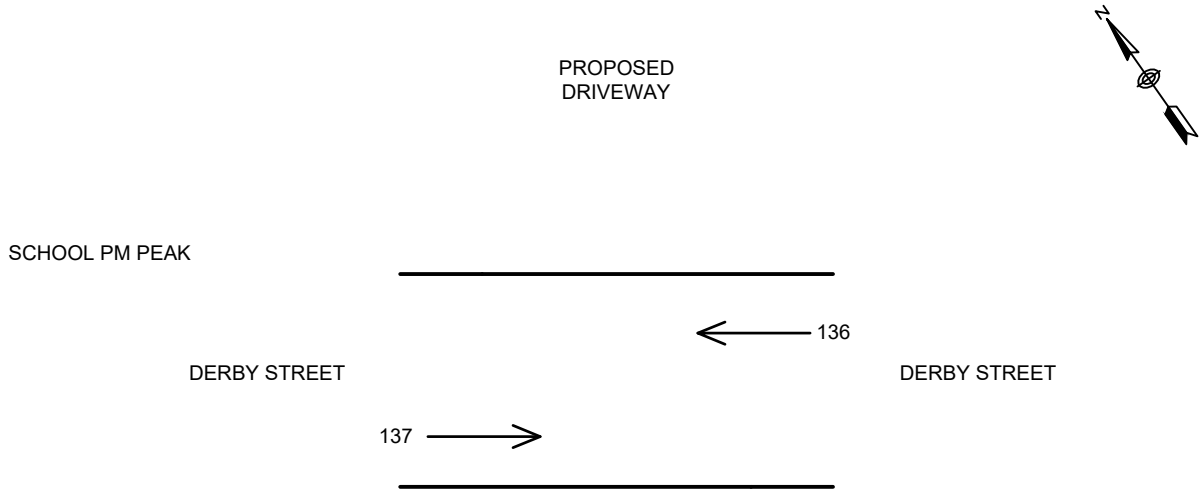
TRAFFIC VOLUMES
FRANKLIN ELEMENTARY SCHOOL
NEWTON, MA
BUILD VOLUME





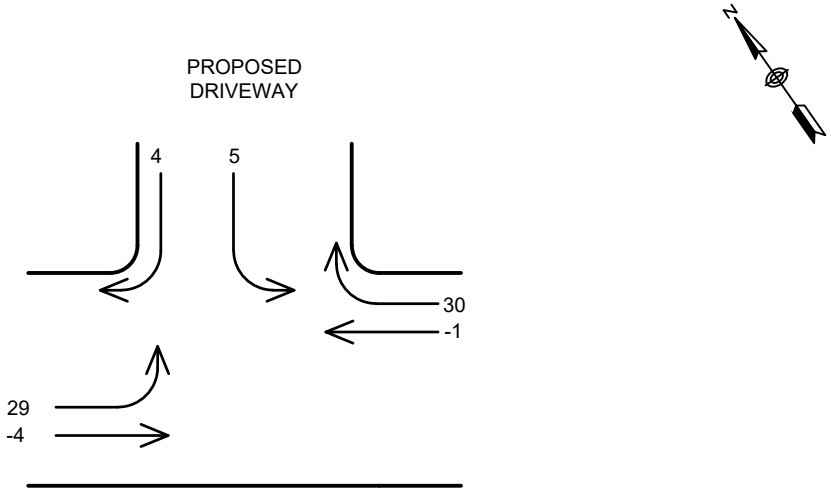
TRAFFIC VOLUMES
FRANKLIN ELEMENTARY SCHOOL
NEWTON, MA
EXISTING VOLUME



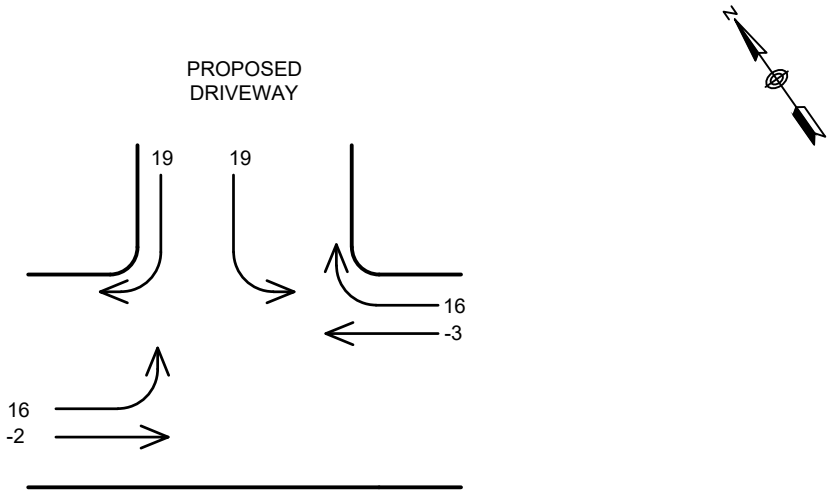


TRAFFIC VOLUMES
FRANKLIN ELEMENTARY SCHOOL
NEWTON, MA
TRIP GENERATION

SCHOOL AM PEAK

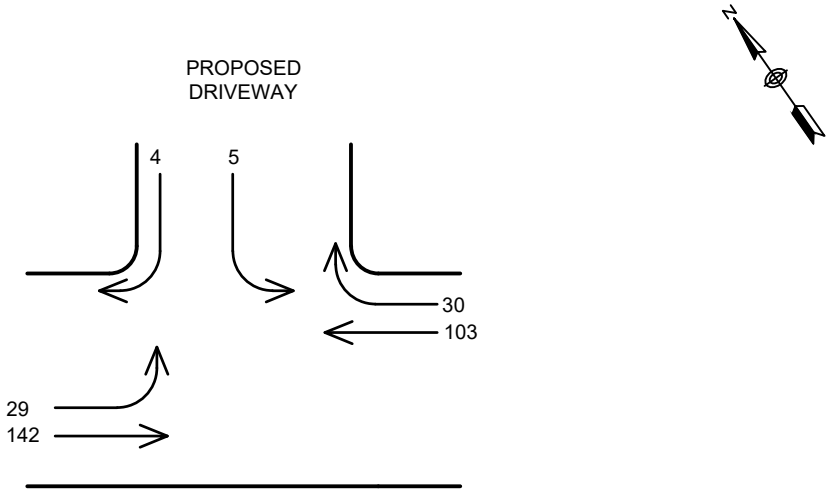


SCHOOL PM PEAK

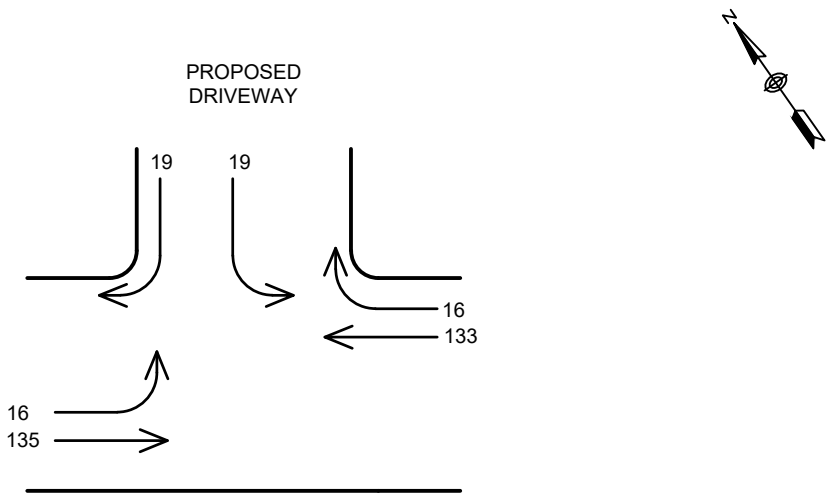


TRAFFIC VOLUMES
FRANKLIN ELEMENTARY SCHOOL
NEWTON, MA
BUILD VOLUME

SCHOOL AM PEAK



SCHOOL PM PEAK



HCS7 Two-Way Stop-Control Report

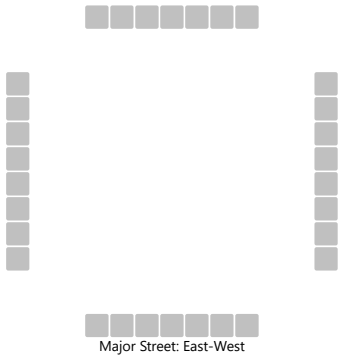
General Information

Analyst	ERL
Agency/Co.	Bryant Associates, Inc.
Date Performed	10/31/2023
Analysis Year	2023
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	223057 Franklin ES - Proposed Driveway

Site Information

Intersection	Derby St/Proposed DWY
Jurisdiction	Newton
East/West Street	Derby Street
North/South Street	Proposed Driveway
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		29	142				103	30						5		4
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

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

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		36													11	
Capacity, c (veh/h)		1223													537	
v/c Ratio		0.03													0.02	
95% Queue Length, Q_{95} (veh)		0.1													0.1	
Control Delay (s/veh)		8.0													11.9	
Level of Service (LOS)		A													B	
Approach Delay (s/veh)		1.6												11.9		
Approach LOS														B		

HCS7 Two-Way Stop-Control Report

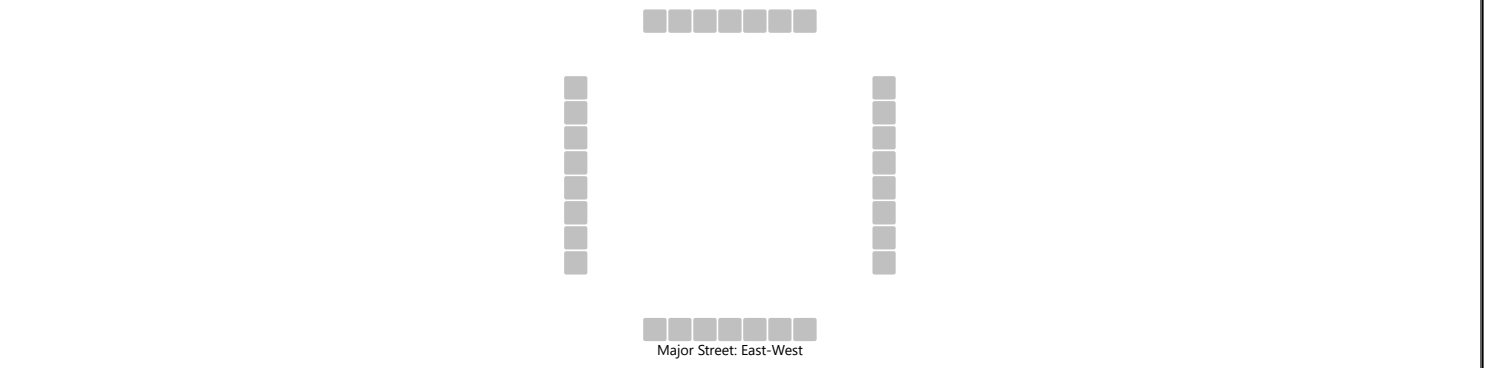
General Information

Analyst	ERL
Agency/Co.	Bryant Associates, Inc.
Date Performed	10/31/2023
Analysis Year	2023
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	223057 Franklin ES - Proposed Driveway

Site Information

Intersection	Derby St/Proposed DWY
Jurisdiction	Newton
East/West Street	Derby Street
North/South Street	Proposed Driveway
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		16	135				133	16						19		19
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage			Undivided													

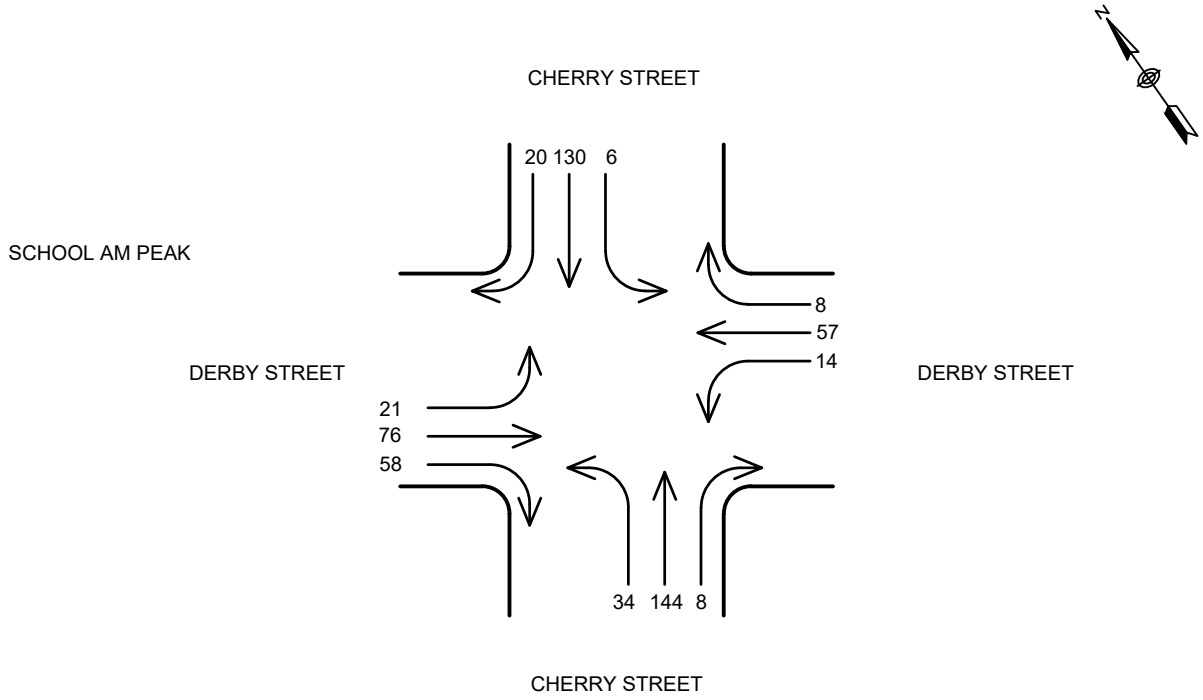
Critical and Follow-up Headways

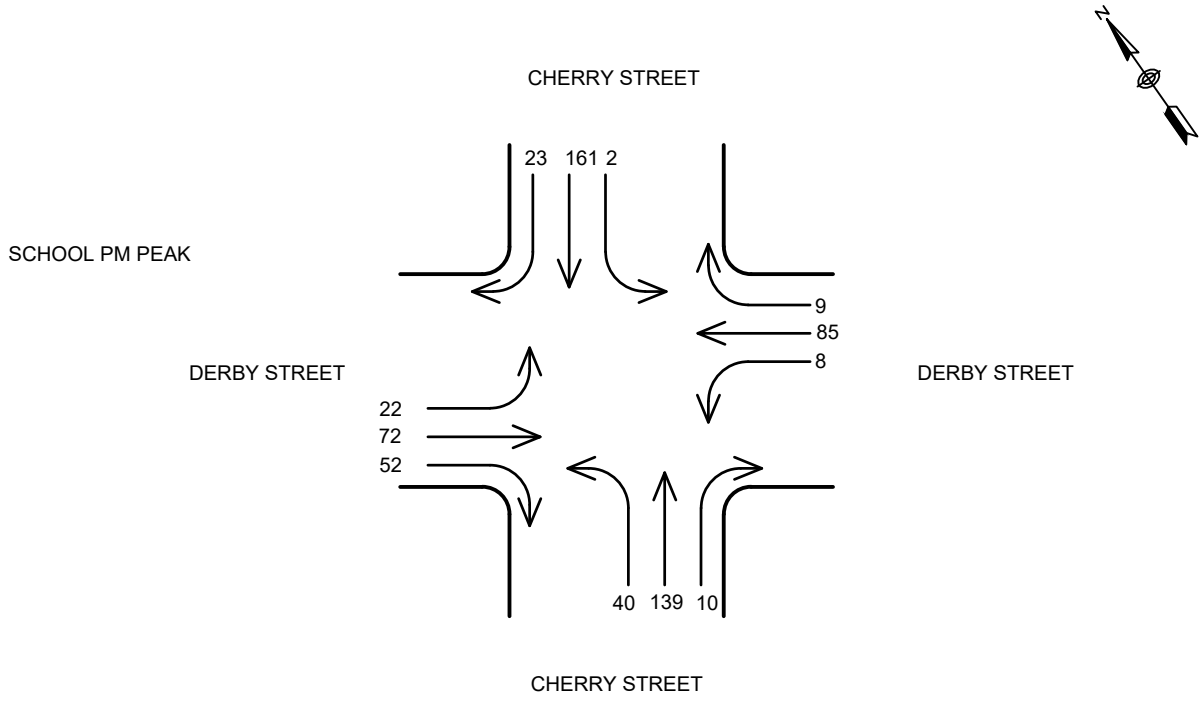
Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

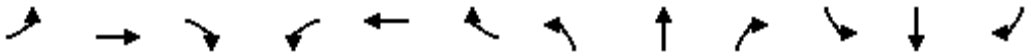
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		18													42	
Capacity, c (veh/h)		1350													673	
v/c Ratio		0.01													0.06	
95% Queue Length, Q_{95} (veh)		0.0													0.2	
Control Delay (s/veh)		7.7													10.7	
Level of Service (LOS)		A													B	
Approach Delay (s/veh)		0.9												10.7		
Approach LOS														B		

TRAFFIC VOLUMES
FRANKLIN ELEMENTARY SCHOOL
NEWTON, MA
EXISTING VOLUME







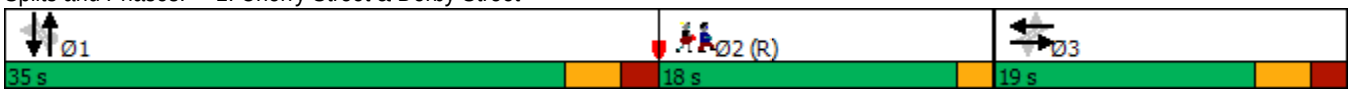
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	76	58	14	57	8	34	144	8	6	130	20
Future Volume (vph)	21	76	58	14	57	8	34	144	8	6	130	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	8	12	12	12	12	12	12	12	12	12	12	12
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		0.952			0.986			0.994			0.968	
Flt Protected		0.993			0.992			0.985			0.998	
Satd. Flow (prot)	0	1796	0	0	1858	0	0	1793	0	0	1822	0
Flt Permitted		0.939			0.937			0.852			0.987	
Satd. Flow (perm)	0	1698	0	0	1755	0	0	1551	0	0	1802	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34			7			4			27	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1544			1072			973			602	
Travel Time (s)		35.1			24.4			22.1			13.7	
Peak Hour Factor	0.75	0.79	0.85	0.70	0.65	0.67	0.43	0.84	0.67	0.75	0.90	0.42
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	6%	3%	0%	0%	1%	0%
Adj. Flow (vph)	28	96	68	20	88	12	79	171	12	8	144	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	192	0	0	120	0	0	262	0	0	200	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)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Minimum Split (s)	19.0	19.0		19.0	19.0		23.0	23.0		23.0	23.0	
Total Split (s)	19.0	19.0		19.0	19.0		35.0	35.0		35.0	35.0	
Total Split (%)	26.4%	26.4%		26.4%	26.4%		48.6%	48.6%		48.6%	48.6%	
Maximum Green (s)	14.0	14.0		14.0	14.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag							Lead	Lead		Lead	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		14.0			14.0			30.0			30.0	
Actuated g/C Ratio		0.19			0.19			0.42			0.42	
v/c Ratio		0.54			0.35			0.40			0.26	
Control Delay		27.7			26.9			16.9			12.9	

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	25%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Walk Time (s)	8.0
Flash Dont Walk (s)	8.0
Pedestrian Calls (#/hr)	20
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		27.7			26.9			16.9			12.9	
LOS		C			C			B			B	
Approach Delay		27.7			26.9			16.9			12.9	
Approach LOS		C			C			B			B	
Queue Length 50th (ft)		63			44			78			48	
Queue Length 95th (ft)		104			61			123			91	
Internal Link Dist (ft)		1464			992			893			522	
Turn Bay Length (ft)												
Base Capacity (vph)		357			346			648			766	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.54			0.35			0.40			0.26	

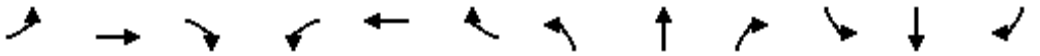
Intersection Summary			
Area Type:	Other		
Cycle Length: 72			
Actuated Cycle Length: 72			
Offset: 0 (0%), Referenced to phase 2:Ped and 6:, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 20.1		Intersection LOS: C	
Intersection Capacity Utilization 43.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Cherry Street & Derby Street



Lane Group	Ø2
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	72	52	8	85	9	40	139	10	2	161	23
Future Volume (vph)	22	72	52	8	85	9	40	139	10	2	161	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	8	12	12	12	12	12	12	12	12	12	12	12
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		0.948			0.985			0.989			0.975	
Flt Protected		0.991			0.994			0.989			0.999	
Satd. Flow (prot)	0	1785	0	0	1860	0	0	1846	0	0	1851	0
Flt Permitted		0.934			0.957			0.896			0.995	
Satd. Flow (perm)	0	1682	0	0	1791	0	0	1672	0	0	1843	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		39			8			8			20	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1544			1072			973			602	
Travel Time (s)		35.1			24.4			22.1			13.7	
Peak Hour Factor	0.61	0.78	0.65	0.50	0.78	0.56	0.77	0.85	0.50	0.50	0.94	0.58
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	36	92	80	16	109	16	52	164	20	4	171	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	208	0	0	141	0	0	236	0	0	215	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)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Minimum Split (s)	19.0	19.0		19.0	19.0		23.0	23.0		23.0	23.0	
Total Split (s)	19.0	19.0		19.0	19.0		35.0	35.0		35.0	35.0	
Total Split (%)	26.4%	26.4%		26.4%	26.4%		48.6%	48.6%		48.6%	48.6%	
Maximum Green (s)	14.0	14.0		14.0	14.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag							Lead	Lead		Lead	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		14.0			14.0			30.0			30.0	
Actuated g/C Ratio		0.19			0.19			0.42			0.42	
v/c Ratio		0.58			0.40			0.34			0.28	
Control Delay		28.6			27.8			15.4			13.7	

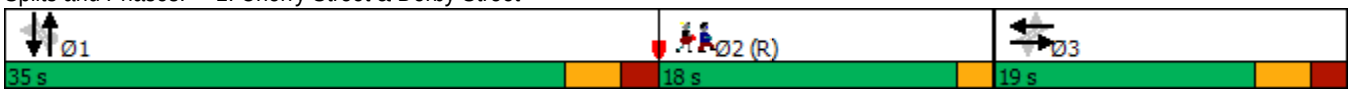
Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	25%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Walk Time (s)	8.0
Flash Dont Walk (s)	8.0
Pedestrian Calls (#/hr)	10
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		28.6			27.8			15.4			13.7	
LOS		C			C			B			B	
Approach Delay		28.6			27.8			15.4			13.7	
Approach LOS		C			C			B			B	
Queue Length 50th (ft)		68			52			66			55	
Queue Length 95th (ft)		109			86			109			100	
Internal Link Dist (ft)		1464			992			893			522	
Turn Bay Length (ft)												
Base Capacity (vph)		358			354			701			779	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.58			0.40			0.34			0.28	

Intersection Summary

Area Type: Other
Cycle Length: 72
Actuated Cycle Length: 72
Offset: 0 (0%), Referenced to phase 2:Ped and 6:, Start of Green
Natural Cycle: 60
Control Type: Pretimed
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 20.6 Intersection LOS: C
Intersection Capacity Utilization 55.9% ICU Level of Service B
Analysis Period (min) 15

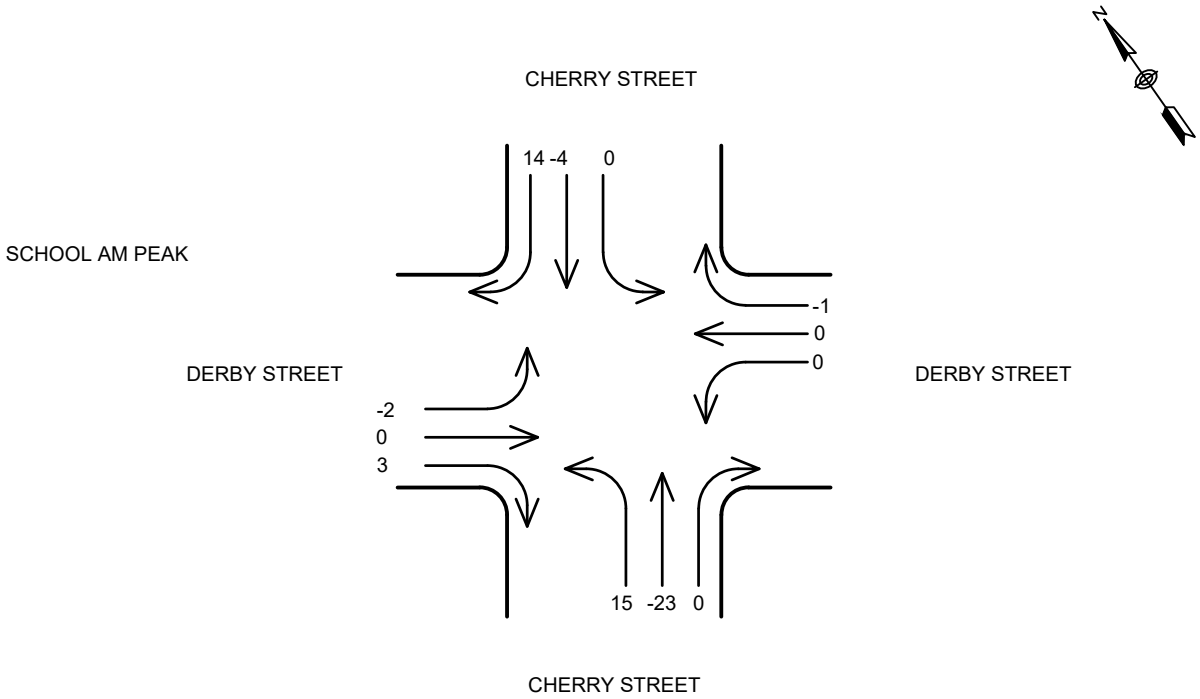
Splits and Phases: 1: Cherry Street & Derby Street

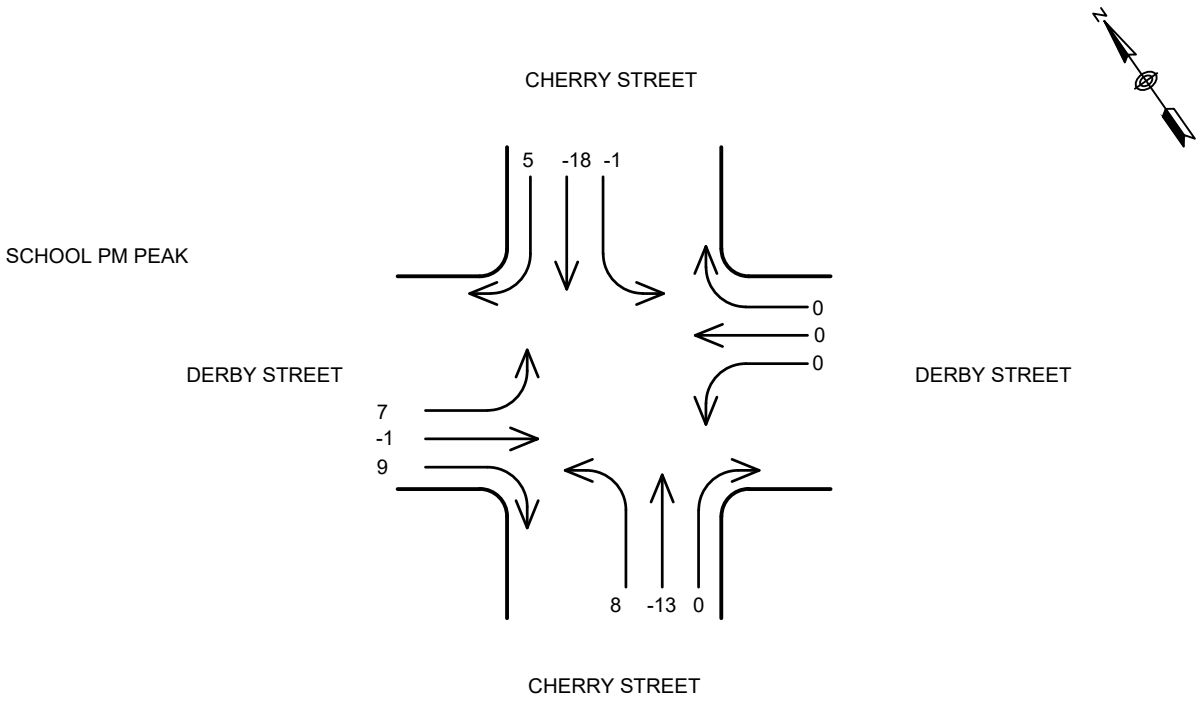


Lane Group	Ø2
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

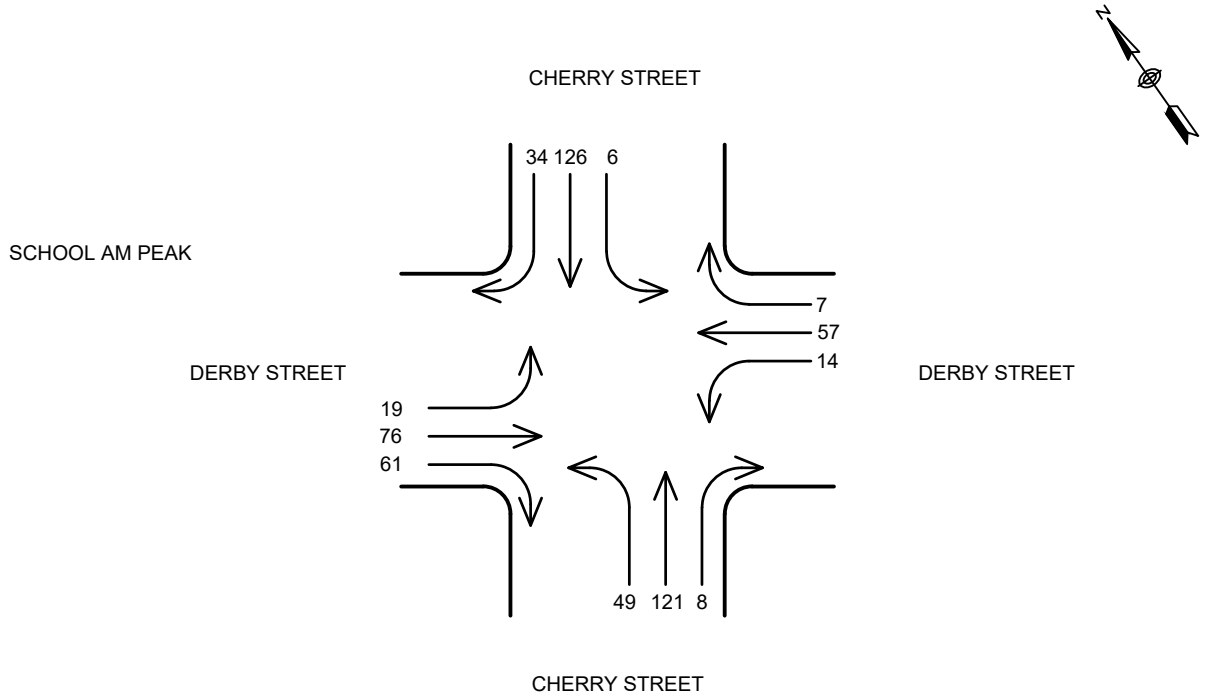
Intersection Summary

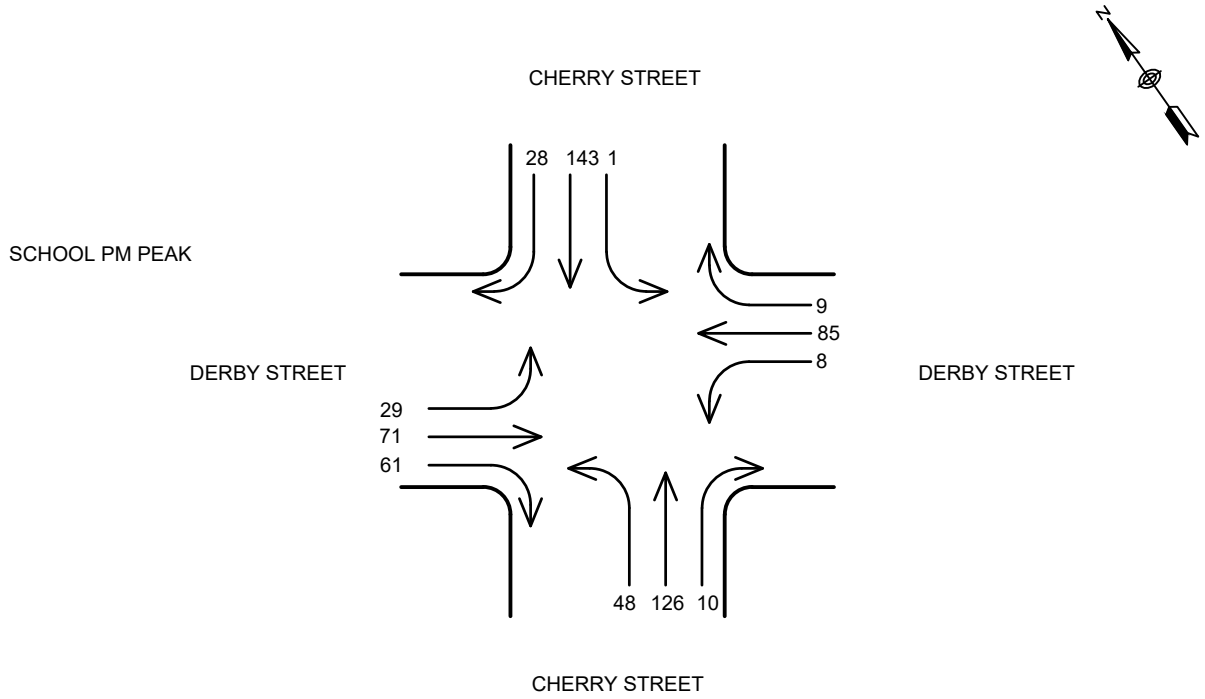
TRAFFIC VOLUMES
FRANKLIN ELEMENTARY SCHOOL
NEWTON, MA
TRIP GENERATION

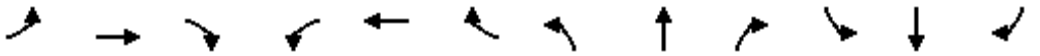




TRAFFIC VOLUMES
FRANKLIN ELEMENTARY SCHOOL
NEWTON, MA
BUILD VOLUME







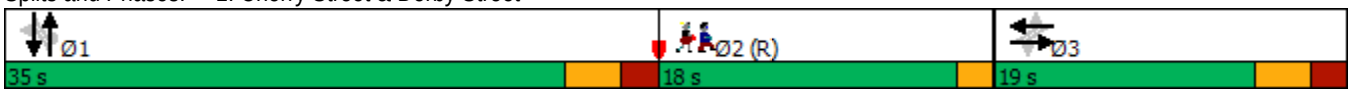
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	76	61	14	57	7	49	121	8	6	126	34
Future Volume (vph)	19	76	61	14	57	7	49	121	8	6	126	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	8	12	12	12	12	12	12	12	12	12	12	12
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		0.950			0.989			0.994			0.952	
Flt Protected		0.994			0.992			0.979			0.998	
Satd. Flow (prot)	0	1794	0	0	1864	0	0	1776	0	0	1794	0
Flt Permitted		0.947			0.936			0.793			0.989	
Satd. Flow (perm)	0	1709	0	0	1759	0	0	1438	0	0	1778	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			6			4			47	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1544			1072			973			602	
Travel Time (s)		35.1			24.4			22.1			13.7	
Peak Hour Factor	0.75	0.79	0.85	0.70	0.65	0.67	0.43	0.84	0.67	0.75	0.90	0.42
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	6%	3%	0%	0%	1%	0%
Adj. Flow (vph)	25	96	72	20	88	10	114	144	12	8	140	81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	193	0	0	118	0	0	270	0	0	229	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)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Minimum Split (s)	19.0	19.0		19.0	19.0		23.0	23.0		23.0	23.0	
Total Split (s)	19.0	19.0		19.0	19.0		35.0	35.0		35.0	35.0	
Total Split (%)	26.4%	26.4%		26.4%	26.4%		48.6%	48.6%		48.6%	48.6%	
Maximum Green (s)	14.0	14.0		14.0	14.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag							Lead	Lead		Lead	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		14.0			14.0			30.0			30.0	
Actuated g/C Ratio		0.19			0.19			0.42			0.42	
v/c Ratio		0.53			0.34			0.45			0.30	
Control Delay		27.1			26.9			17.8			12.2	

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	25%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Walk Time (s)	8.0
Flash Dont Walk (s)	8.0
Pedestrian Calls (#/hr)	20
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		27.1			26.9			17.8			12.2	
LOS		C			C			B			B	
Approach Delay		27.1			26.9			17.8			12.2	
Approach LOS		C			C			B			B	
Queue Length 50th (ft)		62			43			82			51	
Queue Length 95th (ft)		103			61			131			98	
Internal Link Dist (ft)		1464			992			893			522	
Turn Bay Length (ft)												
Base Capacity (vph)		362			346			601			768	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.53			0.34			0.45			0.30	

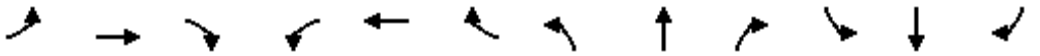
Intersection Summary			
Area Type:	Other		
Cycle Length: 72			
Actuated Cycle Length: 72			
Offset: 0 (0%), Referenced to phase 2:Ped and 6:, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.53			
Intersection Signal Delay: 19.8		Intersection LOS: B	
Intersection Capacity Utilization 50.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Cherry Street & Derby Street



Lane Group	Ø2
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	71	61	8	85	9	48	126	10	1	143	28
Future Volume (vph)	29	71	61	8	85	9	48	126	10	1	143	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	8	12	12	12	12	12	12	12	12	12	12	12
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		0.946			0.985			0.988			0.968	
Flt Protected		0.990			0.994			0.987				
Satd. Flow (prot)	0	1779	0	0	1860	0	0	1841	0	0	1839	0
Flt Permitted		0.909			0.948			0.874			0.998	
Satd. Flow (perm)	0	1634	0	0	1774	0	0	1630	0	0	1836	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42			8			8			27	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1544			1072			973			602	
Travel Time (s)		35.1			24.4			22.1			13.7	
Peak Hour Factor	0.61	0.78	0.65	0.50	0.78	0.56	0.77	0.85	0.50	0.50	0.94	0.58
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	48	91	94	16	109	16	62	148	20	2	152	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	233	0	0	141	0	0	230	0	0	202	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)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Minimum Split (s)	19.0	19.0		19.0	19.0		23.0	23.0		23.0	23.0	
Total Split (s)	19.0	19.0		19.0	19.0		35.0	35.0		35.0	35.0	
Total Split (%)	26.4%	26.4%		26.4%	26.4%		48.6%	48.6%		48.6%	48.6%	
Maximum Green (s)	14.0	14.0		14.0	14.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag							Lead	Lead		Lead	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		14.0			14.0			30.0			30.0	
Actuated g/C Ratio		0.19			0.19			0.42			0.42	
v/c Ratio		0.66			0.40			0.34			0.26	
Control Delay		32.5			27.9			15.5			12.9	

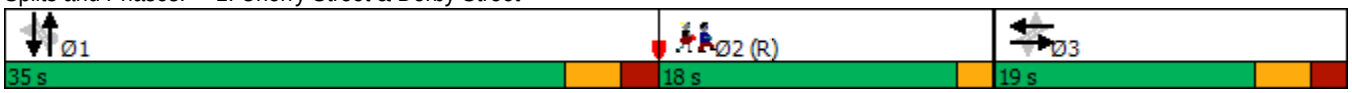
Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	2
Permitted Phases	
Minimum Split (s)	18.0
Total Split (s)	18.0
Total Split (%)	25%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Walk Time (s)	8.0
Flash Dont Walk (s)	8.0
Pedestrian Calls (#/hr)	10
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		32.5			27.9			15.5			12.9	
LOS		C			C			B			B	
Approach Delay		32.5			27.9			15.5			12.9	
Approach LOS		C			C			B			B	
Queue Length 50th (ft)		79			52			64			48	
Queue Length 95th (ft)		123			86			107			91	
Internal Link Dist (ft)		1464			992			893			522	
Turn Bay Length (ft)												
Base Capacity (vph)		351			351			683			780	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.66			0.40			0.34			0.26	

Intersection Summary

Area Type: Other
Cycle Length: 72
Actuated Cycle Length: 72
Offset: 0 (0%), Referenced to phase 2:Ped and 6:, Start of Green
Natural Cycle: 60
Control Type: Pretimed
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 21.9 Intersection LOS: C
Intersection Capacity Utilization 58.2% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: Cherry Street & Derby Street



Lane Group	Ø2
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

APPENDIX D

Crash Data Summary

CRASH SUMMARY

Project: Franklin Elementary School
Derby Street
Newton, MA

BAI Project No. 223057

Date Range: January 2019 through January 2024
Total Crashes: 14

Year	Property Damage Only	Injury	Fatal	Total
2019	3	0	0	3
2020	0	0	0	0
2021	6	1	0	7
2022	0	1	0	1
2023	1	1	0	2
2024	1	0	0	1

Time of Day	# Crashes
Midnight - 2:59 AM	0
3:00 AM - 5:59 AM	0
6:00 AM - 8:59 AM	1
9:00 AM - 11:59 AM	4
12:00 Noon - 2:59 PM	4
3:00 PM - 5:59 PM	3
6:00 PM - 8:59 PM	2
9:00 PM - 11:59 PM	0

Day of Week	# Crashes
Weekday	11
Weekend	3

Crash Type	# Crashes
Angle	7
Sideswipe	4
Head On	0
Rear End	1
Pedestrian	0
Bicycle	2
Overturn/Rollover	0
Object	0

Severity	# Crashes
Injury	3
Property Damage Only	11
Fatality	0

CRASH TABLE ABBREVIATIONS

Project: Franklin Elementary School
Derby Street
Newton, MA

BAI Project No. 223057

Person No.	
O	Operator
P	Passenger
U	Unknown

Crash Type	
A	Angle
BC	Bicycle
HO	Head-on
DEER	Deer
O	Other
OBJ	Object
PED	Pedestrian
RE	Rear-End
RO	Rollover/Overturn
SW	Side-swipe

CRASH DATA

Project: Franklin Elementary School
Derby Street
Newton, MA

BAI Project No. 223057

Year: 2019

Crash No.	Report No.	Vehicle No.	Date	Direction of Travel	Intersection/Crash Location	Person No.	No. of Injuries	Fatalities	Crash Type	Pavement Condition	Weather	Lighting	Military Time	Day
1	1900000073	1	1/19/2019	NORTH	INTERSECTION OF CHERRY STREET AND PLEASANT STREET	U	0	0	SW	ICE	SNOW	DUSK	1808	SATURDAY
		2		SOUTH		U	0	0						
		3		SOUTH		U	0	0						
2	1900000068	1	1/19/2019	SOUTH	INTERSECTION OF CHERRY STREET AND PLEASANT STREET	U	0	0	SW	ICE	SNOW	DARK-LIGHTED	1814	SATURDAY
		2		SOUTH		U	0	0						
3	1900000916	1	9/6/2019	WEST	DERBY STREET BETWEEN HOWARD STREET AND CHERRY STREET	U	0	0	BC	DRY	CLOUDY	DAYLIGHT	1703	FRIDAY
						TOTAL	0	0						

CRASH DATA

Project: Franklin Elementary School
Derby Street
Newton, MA

BAI Project No. 223057

Year: 2020

Crash No.	Report No.	Vehicle No.	Date	Direction of Travel	Intersection/Crash Location	Person No.	No. of Injuries	Fatalities	Crash Type	Pavement Condition	Weather	Lighting	Military Time	Day
						TOTAL	0	0						

CRASH DATA

Project: Franklin Elementary School
Derby Street
Newton, MA

BAI Project No. 223057

Year: 2021

Crash No.	Report No.	Vehicle No.	Date	Direction of Travel	Intersection/Crash Location	Person No.	No. of Injuries	Fatalities	Crash Type	Pavement Condition	Weather	Lighting	Military Time	Day
1	2100000378	1	5/24/2021	SOUTH	INTERSECTION OF DERBY STREET AND CHERRY STREET	U	0	0	A	DRY	CLEAR	DAYLIGHT	0913	MONDAY
		2		EAST		U	0	0						
2	2100000665	1	9/3/2021	PARKED	DERBY STREET BETWEEN HOWARD STREET AND CHERRY STREET	U	0	0	A	DRY	CLEAR	DAYLIGHT	1117	FRIDAY
		2				U	0	0						
3	2100000720	1	9/17/2021	PARKED	DERBY STREET BETWEEN HOWARD STREET AND CHERRY STREET	U	0	0	SW	DRY	CLEAR	DAYLIGHT	1644	FRIDAY
		2		WEST		U	0	0						
4	2100000738	1	9/21/2021	WEST	INTERSECTION OF DERBY STREET AND CHERRY STREET	U	1	0	BC	DRY	CLEAR	DAYLIGHT	1726	TUESDAY
5	2100000853	1	10/22/2021	PARKED	DERBY STREET BETWEEN HOWARD STREET AND CHERRY STREET	U	0	0	A	DRY	CLEAR	DAYLIGHT	1307	FRIDAY
		2		EAST		U	0	0						
6	2100000875	1	10/27/2021	NORTH	INTERSECTION OF DERBY STREET AND CHERRY STREET	U	0	0	RE	WET	RAIN	DAYLIGHT	0807	WEDNESDAY
		2		SOUTH		U	0	0						
7	2100001027	1	12/8/2021	PARKED	CHERRY STREET BETWEEN SCHOOL DRIVEWAY AND DERBY STREET	U	0	0	A	DRY	CLEAR	DAYLIGHT	1213	WEDNESDAY
		2		WEST		U	0	0						
						TOTAL	1	0						

CRASH DATA

Project: Franklin Elementary School
Derby Street
Newton, MA

BAI Project No. 223057

Year: 2022

Crash No.	Report No.	Vehicle No.	Date	Direction of Travel	Intersection/Crash Location	Person No.	No. of Injuries	Fatalities	Crash Type	Pavement Condition	Weather	Lighting	Military Time	Day
1	22000697	1	8/2/2022	SOUTH	INTERSECTION OF DERBY STREET AND CHERRY STREET	U	1	0	A	DRY	CLEAR	DAYLIGHT	1008	TUESDAY
		2		EAST		U	1	0						
						TOTAL	2	0						

CRASH DATA

Project: Franklin Elementary School
Derby Street
Newton, MA

BAI Project No. 223057

Year: 2023

Crash No.	Report No.	Vehicle No.	Date	Direction of Travel	Intersection/Crash Location	Person No.	No. of Injuries	Fatalities	Crash Type	Pavement Condition	Weather	Lighting	Military Time	Day
1	23000618	1	7/5/2023	SOUTH	INTERSECTION OF DERBY STREET AND CHERRY STREET	U	0	0	A	DRY	CLEAR	DAYLIGHT	1455	WEDNESDAY
		2		WEST		U	0	0						
2	23000755	1	8/12/2023	NORTH	INTERSECTION OF DERBY STREET AND CHERRY STREET	U	1	0	A	DRY	CLEAR	DAYLIGHT	0920	SATURDAY
		2		SOUTH		U	0	0						
						TOTAL	1	0						

CRASH DATA

Project: Franklin Elementary School
Derby Street
Newton, MA

BAI Project No. 223057

Year: 2024

Crash No.	Report No.	Vehicle No.	Date	Direction of Travel	Intersection/Crash Location	Person No.	No. of Injuries	Fatalities	Crash Type	Pavement Condition	Weather	Lighting	Military Time	Day
1	240000064	1	1/18/2024	PARKED	CHERRY STREET BETWEEN SCHOOL DRIVEWAY AND DERBY STREET	U	0	0	SW	ICE	CLEAR	DAYLIGHT	1339	THURSDAY
		2		SOUTH		U	0	0						
						TOTAL	0	0						

APPENDIX E

Speed Data

NE TRAFFIC COUNTS

City: Newton
Location 1: Derby St
Location 2: Between Pershing Rd and Howard St
Tech: EM
Latitude: 42.358095
Longitude: -71.229330

Direction: East

6/15/2023 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	1
1:00	0	0	0	1	2	0	1	0	0	0	0	0	0	4
2:00	0	0	2	0	0	0	0	0	0	0	0	0	0	2
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00	0	0	1	3	2	0	0	0	0	0	0	0	0	6
5:00	0	0	1	6	8	8	2	0	0	0	0	0	0	25
6:00	1	0	5	31	26	6	0	0	0	0	0	0	0	69
7:00	7	15	39	63	26	3	0	0	0	0	0	0	0	153
8:00	43	32	32	26	3	0	0	0	0	0	0	0	0	136
9:00	1	4	21	32	29	9	1	0	0	0	0	0	0	97
10:00	2	1	16	38	14	5	1	0	0	0	0	0	0	77
11:00	1	3	15	39	23	5	0	0	0	0	0	0	0	86
12:00 PM	0	3	18	46	36	5	1	0	0	0	0	0	0	109
1:00	0	2	14	38	35	7	1	0	0	0	0	0	0	97
2:00	12	21	21	30	20	7	0	0	0	0	0	0	0	111
3:00	20	28	41	35	17	2	0	0	0	0	0	0	0	143
4:00	20	19	33	37	9	3	1	0	0	0	0	0	0	122
5:00	5	12	38	77	30	3	1	0	0	0	0	0	0	166
6:00	1	7	30	65	23	2	2	0	0	0	0	0	0	130
7:00	6	1	18	34	29	5	1	0	0	0	0	0	0	94
8:00	1	1	13	38	18	5	1	0	0	0	0	0	0	77
9:00	0	2	7	23	12	1	0	0	0	0	0	0	0	45
10:00	0	0	4	13	11	7	2	0	0	0	0	0	0	37
11:00	0	0	1	11	6	2	1	0	0	0	0	0	0	21
Total	120	151	370	686	380	85	16	0	0	0	0	0	0	1808

New Line	Percentile	15th	50th	85th	95th
	Speed	20	27	32	35

Mean Speed (Average)	26.0
10 MPH Pace Speed	25-34
Number in Pace	1066
Percent in Pace	59.0%
Number > 45 MPH	0
Percent > 45 MPH	0.0%

NE TRAFFIC COUNTS

City: Newton
Location 1: Derby St
Location 2: Between Pershing Rd and Howard St
Tech: EM
Latitude: 42.358095
Longitude: -71.229330

Direction: East

6/16/2023 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	0	1	6	7	0	0	0	0	0	0	0	0	14
1:00	0	0	1	2	0	2	1	0	0	0	0	0	0	6
2:00	0	0	1	1	0	1	0	0	0	0	0	0	0	3
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00	1	0	0	1	1	1	0	0	0	0	0	0	0	4
5:00	0	0	1	9	7	1	1	0	0	0	0	0	0	19
6:00	0	1	10	22	13	6	0	0	0	0	0	0	0	52
7:00	3	5	26	58	33	3	1	0	0	0	0	0	0	129
8:00	27	31	42	32	4	0	1	0	0	0	0	0	0	137
9:00	3	4	33	55	18	1	0	0	0	0	0	0	0	114
10:00	3	7	19	39	25	5	0	0	0	0	0	0	0	98
11:00	0	2	14	57	23	5	0	0	0	0	0	0	0	101
12:00 PM	0	4	25	52	39	11	1	0	0	0	0	0	0	132
1:00	3	0	26	50	33	6	2	1	0	0	0	0	0	121
2:00	13	12	26	45	18	3	0	0	0	0	0	0	0	117
3:00	22	13	27	35	7	1	0	0	0	0	0	0	0	105
4:00	10	10	24	64	40	4	1	0	0	0	0	0	0	153
5:00	7	12	44	68	33	3	0	0	0	0	0	0	0	167
6:00	4	12	43	72	31	5	1	0	0	0	0	0	0	168
7:00	3	10	26	38	8	0	0	0	0	0	0	0	0	85
8:00	0	2	13	31	13	3	1	0	0	0	0	0	0	63
9:00	0	1	9	22	12	0	1	0	0	0	0	0	0	45
10:00	0	1	4	18	9	4	1	0	0	0	0	0	0	37
11:00	0	0	9	3	7	2	0	0	0	0	0	0	0	21
Total	99	127	424	780	381	67	12	1	0	0	0	0	0	1891

New Line	Percentile	15th	50th	85th	95th
	Speed	21	27	32	35
	Mean Speed (Average)	26.2			
	10 MPH Pace Speed	21-30			
	Number in Pace	1196			
	Percent in Pace	63.2%			
	Number > 45 MPH	1			
	Percent > 45 MPH	0.1%			
Grand Total	Percentile	15th	50th	85th	95th
	Speed	21	27	32	35
	Mean Speed (Average)	26.1			
	10 MPH Pace Speed	21-30			
	Number in Pace	2254			
	Percent in Pace	60.9%			
	Number > 45 MPH	1			
	Percent > 45 MPH	0.0%			

NE TRAFFIC COUNTS

City: Newton
Location 1: Derby St
Location 2: Between Pershing Rd and Howard St
Tech: EM
Latitude: 42.358095
Longitude: -71.229330

Direction: West

6/15/2023 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	0	0	0	1	0	1	0	0	0	0	0	0	2
1:00	0	0	1	3	0	2	1	0	0	0	0	0	0	7
2:00	0	0	0	1	0	1	0	0	0	0	0	0	0	2
3:00	0	0	0	2	0	0	1	0	0	0	0	0	0	3
4:00	0	0	0	0	2	0	0	0	0	0	0	0	0	2
5:00	0	0	2	1	3	2	1	0	0	0	0	0	0	9
6:00	1	1	2	11	5	1	0	0	0	0	0	0	0	21
7:00	12	9	24	18	3	2	0	0	0	0	0	0	0	68
8:00	59	33	26	15	5	0	0	0	0	0	0	0	0	138
9:00	1	1	13	33	24	3	0	0	0	0	0	0	0	75
10:00	1	1	12	22	14	4	0	0	0	0	0	0	0	54
11:00	0	2	11	33	20	2	1	0	0	0	0	0	0	69
12:00 PM	4	3	12	23	28	6	1	0	0	0	0	0	0	77
1:00	7	7	23	37	21	5	1	0	0	0	0	0	0	101
2:00	25	24	36	31	6	1	1	0	0	0	0	0	0	124
3:00	16	21	52	33	10	3	0	0	0	0	0	0	0	135
4:00	20	29	42	40	20	0	0	0	0	0	0	0	0	151
5:00	3	11	38	70	33	6	0	0	0	0	0	0	0	161
6:00	5	6	33	48	42	12	0	0	0	0	0	0	0	146
7:00	3	2	21	43	22	6	2	1	0	0	0	0	0	100
8:00	2	3	17	36	24	3	0	0	0	0	0	0	0	85
9:00	1	0	14	24	18	3	0	0	0	0	0	0	0	60
10:00	0	1	3	18	12	3	0	0	0	0	0	0	0	37
11:00	0	2	4	7	10	4	0	0	0	0	0	0	0	27
Total	160	156	386	549	323	69	10	1	0	0	0	0	0	1654

New Line	Percentile	15th	50th	85th	95th
	Speed	18	26	32	35

Mean Speed (Average)	25.0
10 MPH Pace Speed	20-29
Number in Pace	927
Percent in Pace	56.0%
Number > 45 MPH	1
Percent > 45 MPH	0.1%

NE TRAFFIC COUNTS

City: Newton
Location 1: Derby St
Location 2: Between Pershing Rd and Howard St
Tech: EM
Latitude: 42.358095
Longitude: -71.229330

Direction: West

6/16/2023 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	0	3	4	5	2	1	0	0	0	0	0	0	15
1:00	0	0	3	3	4	0	1	0	0	0	0	0	0	11
2:00	0	0	0	1	2	2	1	0	0	0	0	0	0	6
3:00	0	0	0	0	0	2	0	0	0	0	0	0	0	2
4:00	0	0	0	0	1	2	0	0	0	0	0	0	0	3
5:00	0	0	3	0	3	5	0	0	0	0	0	0	0	11
6:00	0	1	2	8	7	5	0	0	0	0	0	0	0	23
7:00	5	6	10	21	11	2	0	0	0	0	0	0	0	55
8:00	51	28	21	15	1	0	0	0	0	0	0	0	0	116
9:00	6	13	27	27	18	3	0	0	0	0	0	0	0	94
10:00	0	3	15	29	25	4	1	0	0	0	0	0	0	77
11:00	0	8	21	32	28	4	0	0	0	0	0	0	0	93
12:00 PM	3	3	19	34	29	8	1	2	0	0	0	0	0	99
1:00	5	7	22	43	37	7	1	0	0	0	0	0	0	122
2:00	29	30	30	24	10	3	0	0	0	0	0	0	0	126
3:00	29	20	52	61	14	2	0	0	0	0	0	0	0	178
4:00	2	4	34	57	46	7	1	1	0	0	0	0	0	152
5:00	8	12	29	67	29	4	3	0	0	0	0	0	0	152
6:00	7	6	21	60	40	7	1	0	0	0	0	0	0	142
7:00	9	19	35	22	14	1	0	0	0	0	0	0	0	100
8:00	1	1	15	44	20	4	0	0	1	1	0	0	0	87
9:00	1	0	13	18	6	1	0	0	0	0	0	0	0	39
10:00	1	1	9	17	13	2	1	0	0	0	0	0	0	44
11:00	1	2	4	14	11	3	0	0	0	0	0	0	0	35
Total	158	164	388	601	374	80	12	3	1	1	0	0	0	1782

New Line				
	Percentile	15th	50th	85th	95th
	Speed	19	27	32	35
	Mean Speed (Average)	25.4			
	10 MPH Pace Speed	21-30			
	Number in Pace	986			
	Percent in Pace	55.3%			
	Number > 45 MPH	5			
	Percent > 45 MPH	0.3%			

Grand Total				
	Percentile	15th	50th	85th	95th
	Speed	18	26	32	35
	Mean Speed (Average)	25.2			
	10 MPH Pace Speed	21-30			
	Number in Pace	1910			
	Percent in Pace	55.6%			
	Number > 45 MPH	6			
	Percent > 45 MPH	0.2%			

NE TRAFFIC COUNTS

City: Newton
Location 1: Derby St
Location 2: Between Pershing Rd and Howard St
Tech: EM
Latitude: 42.358095
Longitude: -71.229330

Direction: Combined

6/15/2023 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	0	0	0	2	0	1	0	0	0	0	0	0	3
1:00	0	0	1	4	2	2	2	0	0	0	0	0	0	11
2:00	0	0	2	1	0	1	0	0	0	0	0	0	0	4
3:00	0	0	0	2	0	0	1	0	0	0	0	0	0	3
4:00	0	0	1	3	4	0	0	0	0	0	0	0	0	8
5:00	0	0	3	7	11	10	3	0	0	0	0	0	0	34
6:00	2	1	7	42	31	7	0	0	0	0	0	0	0	90
7:00	19	24	63	81	29	5	0	0	0	0	0	0	0	221
8:00	102	65	58	41	8	0	0	0	0	0	0	0	0	274
9:00	2	5	34	65	53	12	1	0	0	0	0	0	0	172
10:00	3	2	28	60	28	9	1	0	0	0	0	0	0	131
11:00	1	5	26	72	43	7	1	0	0	0	0	0	0	155
12:00 PM	4	6	30	69	64	11	2	0	0	0	0	0	0	186
1:00	7	9	37	75	56	12	2	0	0	0	0	0	0	198
2:00	37	45	57	61	26	8	1	0	0	0	0	0	0	235
3:00	36	49	93	68	27	5	0	0	0	0	0	0	0	278
4:00	40	48	75	77	29	3	1	0	0	0	0	0	0	273
5:00	8	23	76	147	63	9	1	0	0	0	0	0	0	327
6:00	6	13	63	113	65	14	2	0	0	0	0	0	0	276
7:00	9	3	39	77	51	11	3	1	0	0	0	0	0	194
8:00	3	4	30	74	42	8	1	0	0	0	0	0	0	162
9:00	1	2	21	47	30	4	0	0	0	0	0	0	0	105
10:00	0	1	7	31	23	10	2	0	0	0	0	0	0	74
11:00	0	2	5	18	16	6	1	0	0	0	0	0	0	48
Total	280	307	756	1235	703	154	26	1	0	0	0	0	0	3462
New Line			Percentile	15th	50th	85th	95th							
			Speed	19	27	32	35							
		Mean Speed (Average)		25.5										
		10 MPH Pace Speed		21-30										
		Number in Pace		1981										
		Percent in Pace		57.2%										
		Number > 45 MPH		1										
		Percent > 45 MPH		0.0%										

NE TRAFFIC COUNTS

City: Newton
Location 1: Derby St
Location 2: Between Pershing Rd and Howard St
Tech: EM
Latitude: 42.358095
Longitude: -71.229330

Direction: Combined

6/16/2023 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	0	4	10	12	2	1	0	0	0	0	0	0	29
1:00	0	0	4	5	4	2	2	0	0	0	0	0	0	17
2:00	0	0	1	2	2	3	1	0	0	0	0	0	0	9
3:00	0	0	0	0	0	2	0	0	0	0	0	0	0	2
4:00	1	0	0	1	2	3	0	0	0	0	0	0	0	7
5:00	0	0	4	9	10	6	1	0	0	0	0	0	0	30
6:00	0	2	12	30	20	11	0	0	0	0	0	0	0	75
7:00	8	11	36	79	44	5	1	0	0	0	0	0	0	184
8:00	78	59	63	47	5	0	1	0	0	0	0	0	0	253
9:00	9	17	60	82	36	4	0	0	0	0	0	0	0	208
10:00	3	10	34	68	50	9	1	0	0	0	0	0	0	175
11:00	0	10	35	89	51	9	0	0	0	0	0	0	0	194
12:00 PM	3	7	44	86	68	19	2	2	0	0	0	0	0	231
1:00	8	7	48	93	70	13	3	1	0	0	0	0	0	243
2:00	42	42	56	69	28	6	0	0	0	0	0	0	0	243
3:00	51	33	79	96	21	3	0	0	0	0	0	0	0	283
4:00	12	14	58	121	86	11	2	1	0	0	0	0	0	305
5:00	15	24	73	135	62	7	3	0	0	0	0	0	0	319
6:00	11	18	64	132	71	12	2	0	0	0	0	0	0	310
7:00	12	29	61	60	22	1	0	0	0	0	0	0	0	185
8:00	1	3	28	75	33	7	1	0	1	1	0	0	0	150
9:00	1	1	22	40	18	1	1	0	0	0	0	0	0	84
10:00	1	2	13	35	22	6	2	0	0	0	0	0	0	81
11:00	1	2	13	17	18	5	0	0	0	0	0	0	0	56
Total	257	291	812	1381	755	147	24	4	1	1	0	0	0	3673

New Line				
	Percentile	15th	50th	85th	95th
	Speed	20	27	32	35
	Mean Speed (Average)	25.8			
	10 MPH Pace Speed	21-30			
	Number in Pace	2183			
	Percent in Pace	59.4%			
	Number > 45 MPH	6			
	Percent > 45 MPH	0.2%			

Grand Total				
	Percentile	15th	50th	85th	95th
	Speed	20	27	32	35
	Mean Speed (Average)	25.7			
	10 MPH Pace Speed	21-30			
	Number in Pace	4164			
	Percent in Pace	58.4%			
	Number > 45 MPH	7			
	Percent > 45 MPH	0.1%			

NE TRAFFIC COUNTS

City: Newton
Location 1: Cherry St
Location 1: S/O Pleasant St
Tech: EM
Latitude: 42.358374
Longitude: -71.227045

Direction: North

6/15/2023 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	3	0	1	1	1	0	0	0	0	0	0	0	0	6
1:00	1	0	3	4	1	0	0	0	0	0	0	0	0	9
2:00	1	0	1	0	2	0	0	0	0	0	0	0	0	4
3:00	0	0	0	1	2	0	0	0	0	0	0	0	0	3
4:00	2	0	2	2	0	0	0	0	0	0	0	0	0	6
5:00	1	2	7	5	11	3	1	0	0	0	0	0	0	30
6:00	3	4	23	32	20	9	0	0	0	0	0	0	0	91
7:00	12	35	48	36	8	1	1	0	0	0	0	0	0	141
8:00	10	33	30	39	20	1	0	0	0	0	0	0	0	133
9:00	5	22	24	45	16	1	0	0	0	0	0	0	0	113
10:00	8	9	16	30	12	2	0	0	0	0	0	0	0	77
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	12	8	14	32	23	6	1	0	0	0	0	0	0	96
8:00	3	13	22	34	28	5	0	0	0	0	0	0	0	105
9:00	2	12	11	31	10	6	0	0	0	0	0	0	0	72
10:00	0	6	14	8	8	3	0	0	0	0	0	0	0	39
11:00	0	2	2	9	11	2	0	0	0	0	0	0	0	26
Total	63	146	218	309	173	39	3	0	0	0	0	0	0	951

NE TRAFFIC COUNTS

City: Newton
Location 1: Cherry St
Location 1: S/O Pleasant St
Tech: EM
Latitude: 42.358374
Longitude: -71.227045

Direction: North

6/16/2023 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	1	3	4	2	2	0	0	0	0	0	0	0	12
1:00	3	1	1	1	1	0	0	0	0	0	0	0	0	7
2:00	0	0	1	1	0	1	0	0	0	0	0	0	0	3
3:00	0	0	1	0	4	0	0	0	0	0	0	0	0	5
4:00	1	0	0	0	0	1	0	0	0	0	0	0	0	2
5:00	1	2	2	5	9	7	2	0	0	0	0	0	0	28
6:00	0	6	9	14	23	12	3	0	0	0	0	0	0	67
7:00	1	15	22	37	23	8	0	1	0	0	0	0	0	107
8:00	6	38	35	40	25	5	0	0	0	0	0	0	0	149
9:00	6	15	27	49	26	6	1	0	0	0	0	0	0	130
10:00	1	11	22	27	23	5	0	0	0	0	0	0	0	89
11:00	0	17	34	52	40	10	0	0	0	0	0	0	0	153
12:00 PM	4	16	35	60	30	4	0	0	0	0	0	0	0	149
1:00	7	14	35	36	35	12	1	0	0	0	0	0	0	140
2:00	5	21	36	55	38	6	1	1	1	0	0	0	0	164
3:00	17	29	35	51	26	4	1	0	0	0	0	0	0	163
4:00	9	23	40	51	25	6	1	0	0	0	0	0	0	155
5:00	11	26	33	55	35	11	1	0	0	0	0	0	0	172
6:00	3	26	29	47	34	5	3	0	0	0	0	0	0	147
7:00	4	14	12	37	27	8	2	0	0	0	0	0	0	104
8:00	0	8	12	32	20	4	0	0	0	0	0	0	0	76
9:00	0	4	13	19	16	2	0	1	0	0	0	0	0	55
10:00	2	4	11	9	20	1	0	0	0	0	0	0	0	47
11:00	0	1	4	9	8	5	2	0	0	0	0	0	0	29
Total	81	292	452	691	490	125	18	3	1	0	0	0	0	2153
Grand Total	144	438	670	1000	663	164	21	3	1	0	0	0	0	3104

Stats	Percentile	15th	50th	85th	95th
	Speed	19	27	32	35

Mean Speed (Average)	25.9
10 MPH Pace Speed	21-30
Number in Pace	1669
Percent in Pace	53.8%
Number > 45 MPH	4
Percent > 45 MPH	0.1%

NE TRAFFIC COUNTS

City: Newton
Location 1: Cherry St
Location 1: S/O Pleasant St
Tech: EM
Latitude: 42.358374
Longitude: -71.227045

Direction: South

6/15/2023 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	2	1	1	1	1	0	0	0	0	0	0	0	0	6
1:00	0	0	0	7	2	0	0	0	0	0	0	0	0	9
2:00	0	1	0	1	1	0	0	0	0	0	0	0	0	3
3:00	0	0	0	0	1	1	1	0	0	0	0	0	0	3
4:00	0	0	0	5	2	1	0	0	0	0	0	0	0	8
5:00	1	2	3	6	16	7	3	0	0	0	0	0	0	38
6:00	0	2	8	24	32	7	2	0	0	0	0	0	0	75
7:00	5	30	33	55	34	8	1	0	0	0	0	0	0	166
8:00	17	36	40	32	26	4	0	0	0	0	0	0	0	155
9:00	2	10	15	41	31	8	1	0	0	0	0	0	0	108
10:00	6	14	13	19	17	3	1	0	0	0	0	0	0	73
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	4	8	14	41	9	0	0	0	0	0	0	0	0	76
8:00	6	15	13	30	6	0	0	0	0	0	0	0	0	70
9:00	0	8	10	27	6	0	1	0	0	0	0	0	0	52
10:00	1	5	8	17	6	2	0	0	0	0	0	0	0	39
11:00	1	1	3	8	3	1	0	0	0	0	0	0	0	17
Total	45	133	161	314	193	42	10	0	0	0	0	0	0	898

NE TRAFFIC COUNTS

City: Newton
Location 1: Cherry St
Location 1: S/O Pleasant St
Tech: EM
Latitude: 42.358374
Longitude: -71.227045

Direction: South

6/16/2023 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	0	2	1	2	1	0	0	0	0	0	0	0	6
1:00	0	0	2	2	2	1	0	0	0	0	0	0	0	7
2:00	0	0	0	1	1	0	0	0	0	0	0	0	0	2
3:00	0	0	0	2	1	0	0	0	0	0	0	0	0	3
4:00	0	0	1	2	0	3	1	0	0	0	0	0	0	7
5:00	1	1	4	10	17	5	0	0	0	0	0	0	0	38
6:00	1	3	7	20	34	7	1	0	0	0	0	0	0	73
7:00	6	28	34	62	24	2	0	0	0	0	0	0	0	156
8:00	22	27	48	44	10	1	0	0	0	0	0	0	0	152
9:00	6	16	37	43	11	2	0	0	0	0	0	0	0	115
10:00	5	11	28	47	15	2	0	0	0	0	0	0	0	108
11:00	5	21	34	42	16	0	0	0	0	0	0	0	0	118
12:00 PM	4	21	32	56	14	1	0	0	0	0	0	0	0	128
1:00	4	19	36	50	11	2	0	0	0	0	0	0	0	122
2:00	9	29	54	64	13	1	0	0	0	0	0	0	0	170
3:00	7	28	47	37	8	1	0	0	0	0	0	0	0	128
4:00	6	25	41	50	20	2	0	0	0	0	0	0	0	144
5:00	11	22	35	62	23	2	1	0	0	0	0	0	0	156
6:00	4	24	30	52	16	1	0	0	0	0	0	0	0	127
7:00	1	16	24	26	19	6	0	0	0	0	0	0	0	92
8:00	2	11	8	16	6	0	0	0	0	0	0	0	0	43
9:00	2	6	15	22	8	1	0	0	0	0	0	0	0	54
10:00	1	8	12	10	8	0	0	0	0	0	0	0	0	39
11:00	2	2	5	11	3	0	0	0	0	0	0	0	0	23
Total	99	318	536	732	282	41	3	0	0	0	0	0	0	2011
Grand Total	144	451	697	1046	475	83	13	0	0	0	0	0	0	2909

Stats	Percentile	15th	50th	85th	95th
	Speed	19	26	31	34

Mean Speed (Average)	25.0
10 MPH Pace Speed	20-29
Number in Pace	1731
Percent in Pace	59.5%
Number > 45 MPH	0
Percent > 45 MPH	0.0%

NE TRAFFIC COUNTS

City: Newton
Location 1: Cherry St
Location 1: S/O Pleasant St
Tech: EM
Latitude: 42.358374
Longitude: -71.227045

Direction: Combined

6/15/2023 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	5	1	2	2	2	0	0	0	0	0	0	0	0	12
1:00	1	0	3	11	3	0	0	0	0	0	0	0	0	18
2:00	1	1	1	1	3	0	0	0	0	0	0	0	0	7
3:00	0	0	0	1	3	1	1	0	0	0	0	0	0	6
4:00	2	0	2	7	2	1	0	0	0	0	0	0	0	14
5:00	2	4	10	11	27	10	4	0	0	0	0	0	0	68
6:00	3	6	31	56	52	16	2	0	0	0	0	0	0	166
7:00	17	65	81	91	42	9	2	0	0	0	0	0	0	307
8:00	27	69	70	71	46	5	0	0	0	0	0	0	0	288
9:00	7	32	39	86	47	9	1	0	0	0	0	0	0	221
10:00	14	23	29	49	29	5	1	0	0	0	0	0	0	150
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	16	16	28	73	32	6	1	0	0	0	0	0	0	172
8:00	9	28	35	64	34	5	0	0	0	0	0	0	0	175
9:00	2	20	21	58	16	6	1	0	0	0	0	0	0	124
10:00	1	11	22	25	14	5	0	0	0	0	0	0	0	78
11:00	1	3	5	17	14	3	0	0	0	0	0	0	0	43
Total	108	279	379	623	366	81	13	0	0	0	0	0	0	1849

NE TRAFFIC COUNTS

City: Newton
Location 1: Cherry St
Location 1: S/O Pleasant St
Tech: EM
Latitude: 42.358374
Longitude: -71.227045

Direction: Combined

6/16/2023 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	1	5	5	4	3	0	0	0	0	0	0	0	18
1:00	3	1	3	3	3	1	0	0	0	0	0	0	0	14
2:00	0	0	1	2	1	1	0	0	0	0	0	0	0	5
3:00	0	0	1	2	5	0	0	0	0	0	0	0	0	8
4:00	1	0	1	2	0	4	1	0	0	0	0	0	0	9
5:00	2	3	6	15	26	12	2	0	0	0	0	0	0	66
6:00	1	9	16	34	57	19	4	0	0	0	0	0	0	140
7:00	7	43	56	99	47	10	0	1	0	0	0	0	0	263
8:00	28	65	83	84	35	6	0	0	0	0	0	0	0	301
9:00	12	31	64	92	37	8	1	0	0	0	0	0	0	245
10:00	6	22	50	74	38	7	0	0	0	0	0	0	0	197
11:00	5	38	68	94	56	10	0	0	0	0	0	0	0	271
12:00 PM	8	37	67	116	44	5	0	0	0	0	0	0	0	277
1:00	11	33	71	86	46	14	1	0	0	0	0	0	0	262
2:00	14	50	90	119	51	7	1	1	1	0	0	0	0	334
3:00	24	57	82	88	34	5	1	0	0	0	0	0	0	291
4:00	15	48	81	101	45	8	1	0	0	0	0	0	0	299
5:00	22	48	68	117	58	13	2	0	0	0	0	0	0	328
6:00	7	50	59	99	50	6	3	0	0	0	0	0	0	274
7:00	5	30	36	63	46	14	2	0	0	0	0	0	0	196
8:00	2	19	20	48	26	4	0	0	0	0	0	0	0	119
9:00	2	10	28	41	24	3	0	1	0	0	0	0	0	109
10:00	3	12	23	19	28	1	0	0	0	0	0	0	0	86
11:00	2	3	9	20	11	5	2	0	0	0	0	0	0	52
Total	180	610	988	1423	772	166	21	3	1	0	0	0	0	4164
Grand Total	288	889	1367	2046	1138	247	34	3	1	0	0	0	0	6013

Stats				
	Percentile	15th	50th	85th	95th
	Speed	19	26	32	35

Mean Speed (Average)	25.4
10 MPH Pace Speed	20-29
Number in Pace	3390
Percent in Pace	56.4%
Number > 45 MPH	4
Percent > 45 MPH	0.1%

APPENDIX F

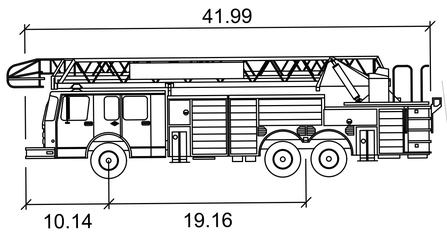
Supplemental Plans and Information

Site Option A2

LEMON BROOKE HM FH

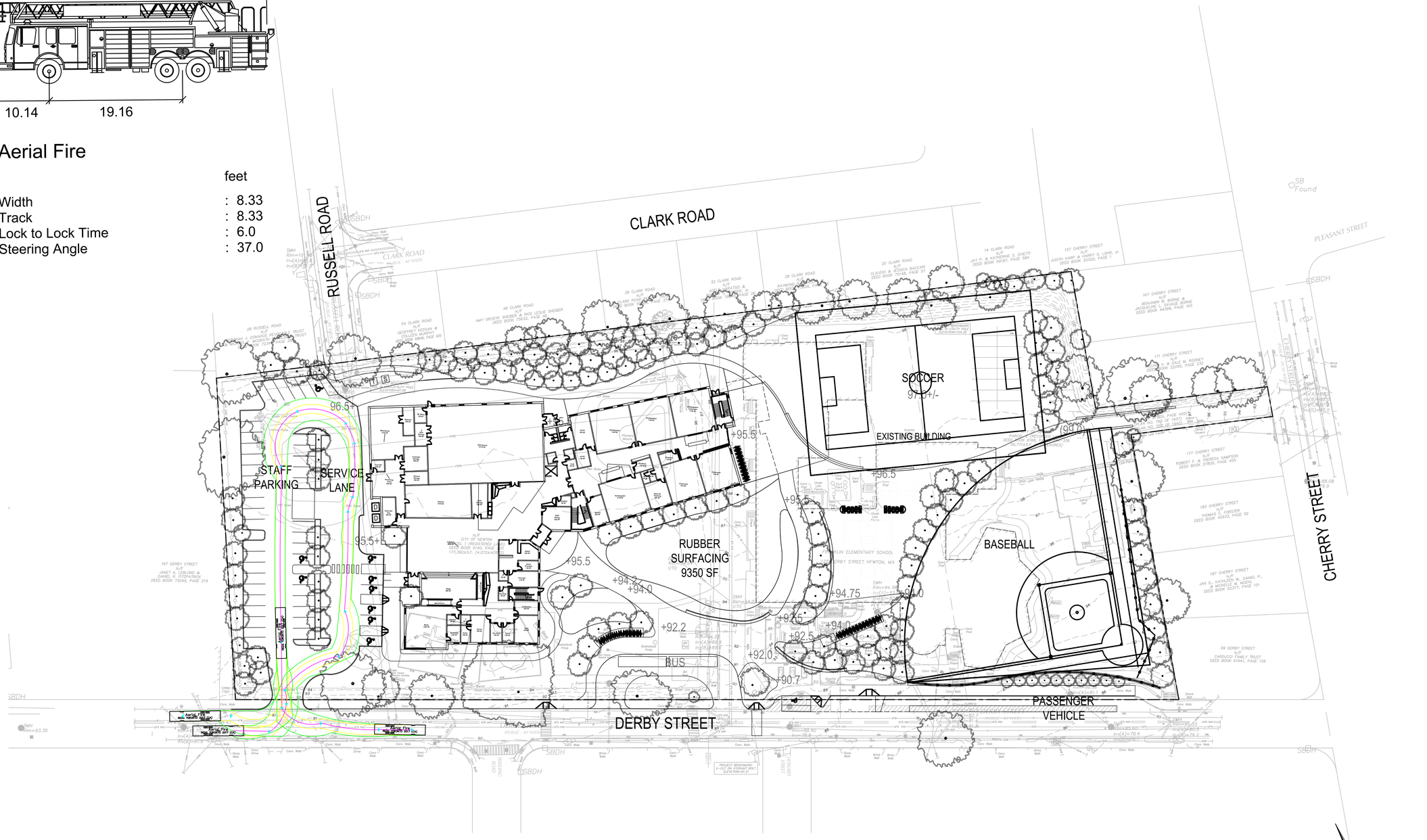
1/3/2024 2:02:37 PM

LEGEND:



Aerial Fire

	feet
Width	: 8.33
Track	: 8.33
Lock to Lock Time	: 6.0
Steering Angle	: 37.0



samiotes

Samiotes Consultants Inc.
Civil Engineers + Land Surveyors

20 A Street
Framingham, MA 01701

T 508.877.6688
F 508.877.8349

www.samiotes.com

NOTES:

FRANKLIN ELEMENTARY SCHOOL
125 DERBY STREET
WEST NEWTON, MA

SEAL

REVISION

FIRE TRUCK MOVEMENT EXHIBIT

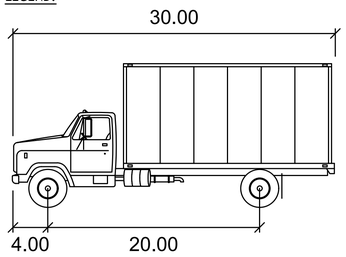
JOB # 52064.00	EX-FT
DATE: ??.??.????	
SCALE: 1"=40'	
DRAWN BY: KAH	
APPROVED BY: ???	

FILE: 52064.00 - FRANKLIN ELEMENTARY SCHOOL SD.DWG

P:\PROJECTS\2022\52064.00 FRANKLIN ELEM SCHOOL - WEST NEWTON\DWG\52064.00 - FRANKLIN ELEMENTARY SCHOOL SD.DWG

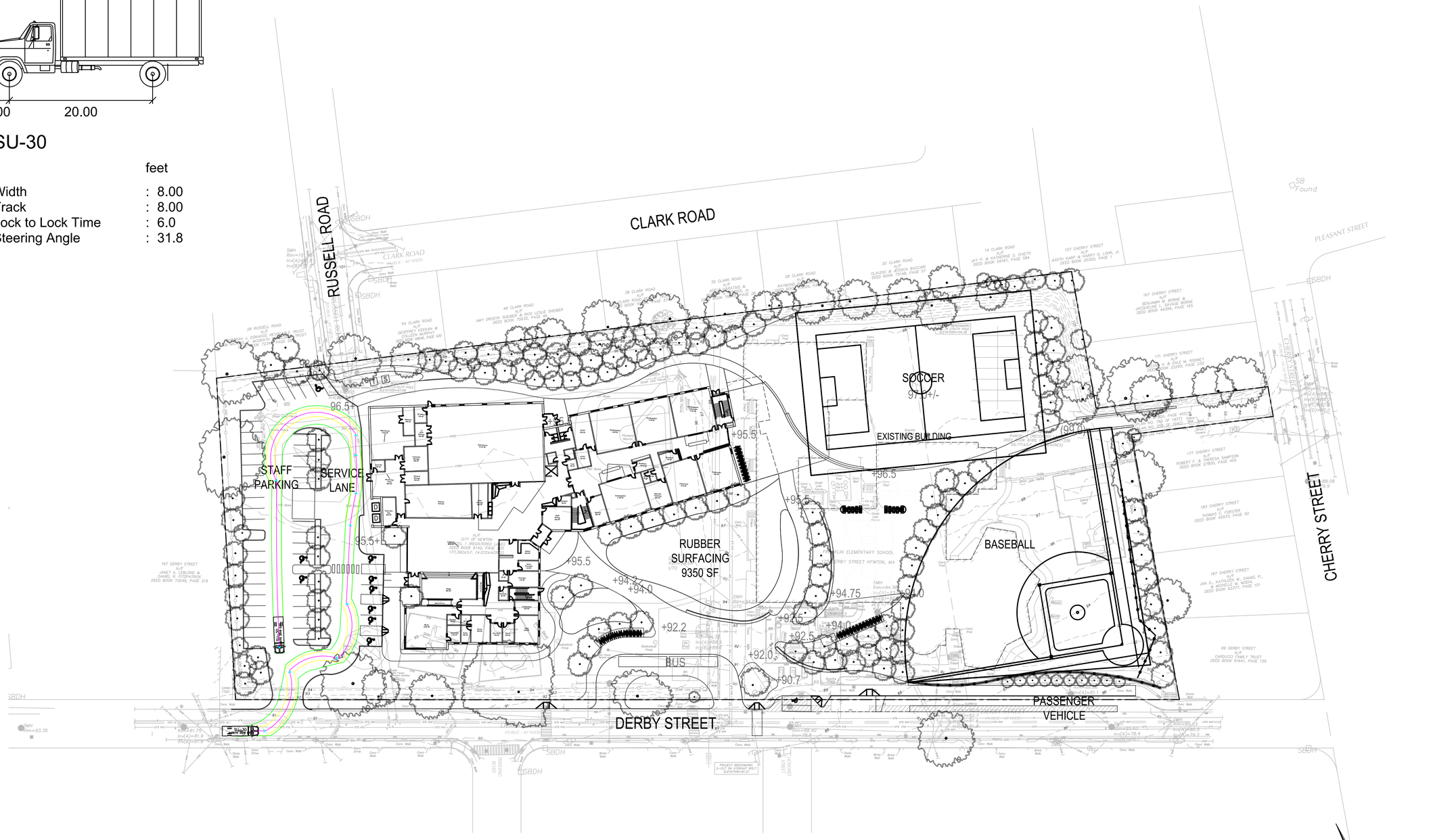
1/3/2024 3:03:02 PM

LEGEND:



SU-30

	feet
Width	: 8.00
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 31.8



samiotes

Samiotes Consultants Inc.
Civil Engineers + Land Surveyors

20 A Street
Framingham, MA 01701

T 508.877.6688
F 508.877.8349

www.samiotes.com

NOTES:

FRANKLIN ELEMENTARY SCHOOL
125 DERBY STREET
WEST NEWTON, MA

SEAL

REVISION

DELIVERY TRUCK MOVEMENT EXHIBIT

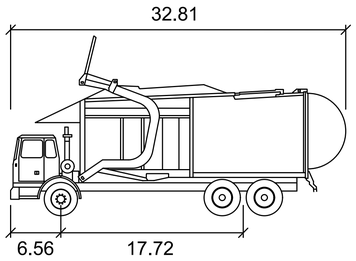
JOB # 52064.00	EX-DT
DATE: ??.??.????	
SCALE: 1"=40'	
DRAWN BY: KAH	
APPROVED BY: ???	

FILE: 52064.00 - FRANKLIN ELEMENTARY SCHOOL SD.DWG

P:\PROJECTS\2022\52064.00 FRANKLIN ELEM SCHOOL - WEST NEWTON\DWG\52064.00 - FRANKLIN ELEMENTARY SCHOOL SD.DWG

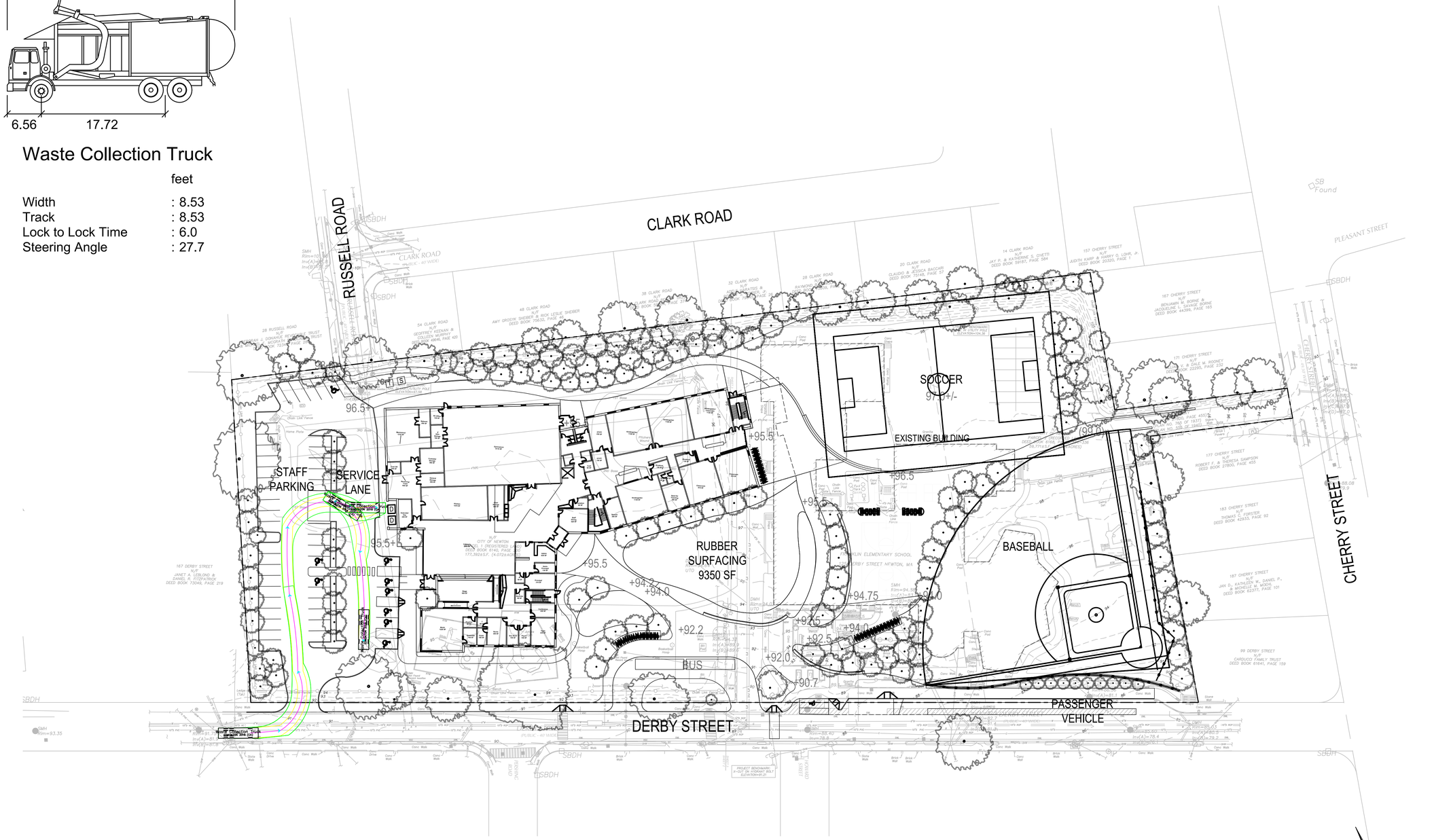
1/3/2024 3:03:08 PM

LEGEND:



Waste Collection Truck

	feet
Width	: 8.53
Track	: 8.53
Lock to Lock Time	: 6.0
Steering Angle	: 27.7



samiotes

Samiotes Consultants Inc.
Civil Engineers + Land Surveyors

20 A Street
Framingham, MA 01701

T 508.877.6688
F 508.877.8349

www.samiotes.com

NOTES:

FRANKLIN ELEMENTARY SCHOOL
125 DERBY STREET
WEST NEWTON, MA

SEAL

REVISION

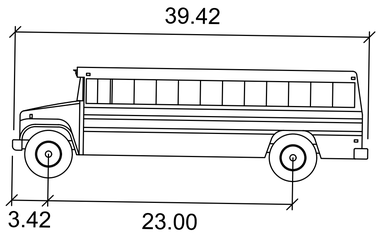
GARBAGE TRUCK MOVEMENT EXHIBIT

JOB # 52064.00	EX-GT
DATE: ??.??.????	
SCALE: 1"=40'	
DRAWN BY: KAH	
APPROVED BY: ???	

FILE: 52064.00 - FRANKLIN ELEMENTARY SCHOOL SD.DWG

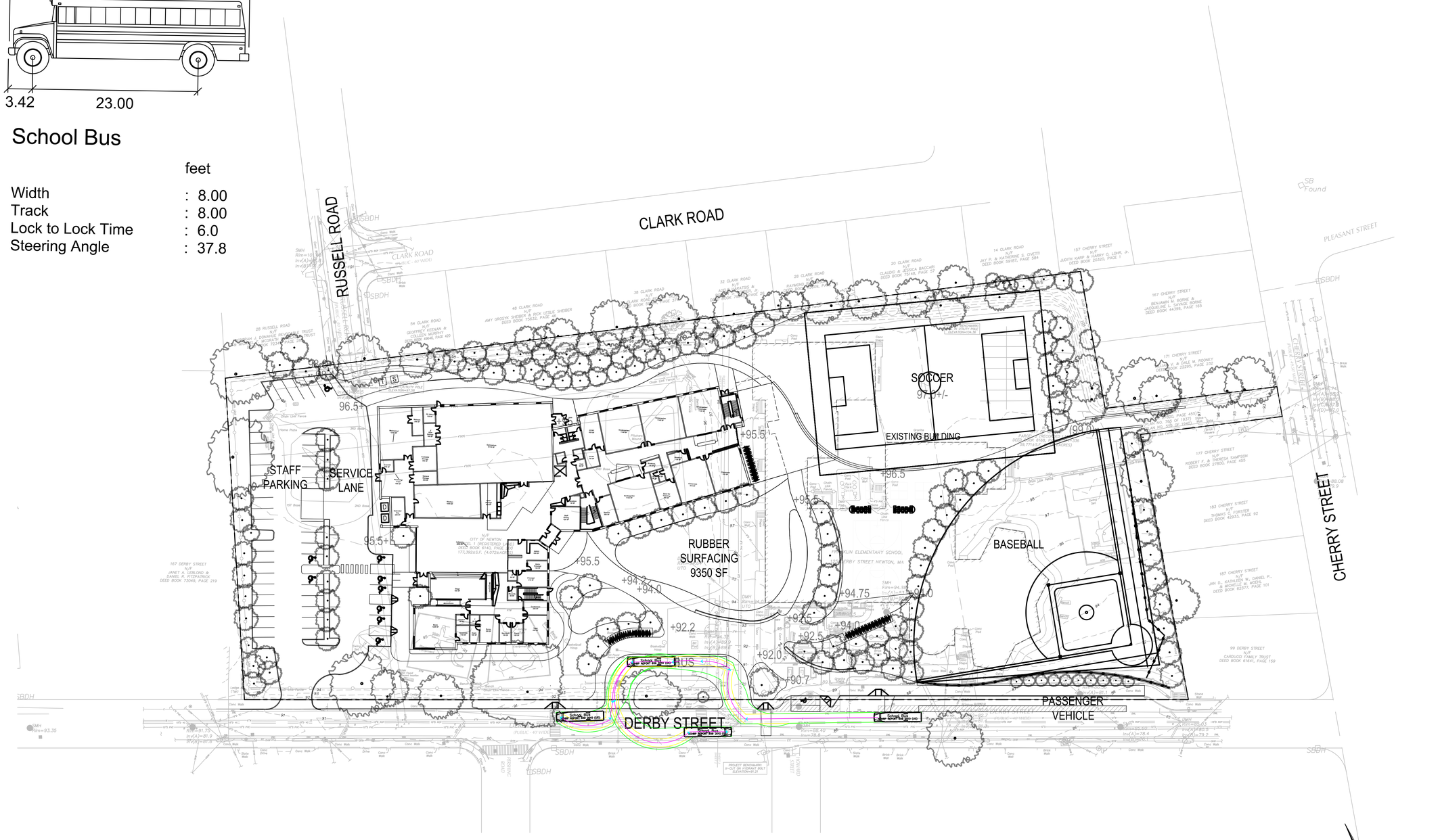
P:\PROJECTS\2022\52064.00 FRANKLIN ELEM SCHOOL - WEST NEWTON\DWG\52064.00 - FRANKLIN ELEMENTARY SCHOOL SD.DWG

LEGEND:



School Bus

	feet
Width	: 8.00
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 37.8



samiotes

Samiotes Consultants Inc.
Civil Engineers + Land Surveyors

20 A Street
Framingham, MA 01701

T 508.877.6688
F 508.877.8349

www.samiotes.com

NOTES:

FRANKLIN ELEMENTARY SCHOOL
125 DERBY STREET
WEST NEWTON, MA

SEAL

REVISION

BUS MOVEMENT EXHIBIT

JOB # 52064.00	EX-BUS
DATE: ??.??.????	
SCALE: 1"=40'	
DRAWN BY: KAH	
APPROVED BY: ???	

FILE: 52064.00 - FRANKLIN ELEMENTARY SCHOOL SD.DWG

P:\PROJECTS\2022\52064.00 FRANKLIN ELEM SCHOOL - WEST NEWTON\DWG\52064.00 - FRANKLIN ELEMENTARY SCHOOL SD.DWG

2. *Controller Data*

TCT	DM-400	N/A/N/A
Manufacturer	Model No.	Serial No./Ocean State No.

TYPE	CONDITION	CONTROLLER PHASE CHANNEL CAPABILITY
☐ Electromechanical ☒ Non-NEMA ☐ NEMA-Modular ☐ NEMA-Keyboard	☐ Good ☐ Fair ☒ Poor	☐ 2 Phase ☒ 4 Phase ☐ 8 Phase ☐ 16 Phase (TS2/1)

CONTROLLER TYPE	SETTING TYPE
☒ Pretimed ☐ Semi-Actuated ☐ Actuated	☒ Pin ☐ Thumbwheel ☐ Dial ☐ Keyboard

BACKPANEL SIZE	LOAD SWITCHES INSTALLED/TYPE	FLASH TRANSFER RELAYS INSTALLED
8P	2-PDC 200 1-CROUSE HINDS SLS 8	1-AEMCO 1-MAGNACRAFT

CONTROLLER SOFTWARE LEVEL	CONFLICT MONITOR (OR MMU) MODEL/SIZE
N/A	CROUSE HINDS M61A

FLASHER	INTERCONNECT CABLE (If Yes, List Size)	COORDINATED (If Yes, complete section 9)	SPARE CONDUITS
CROUSE HINDS CHF12	N/A	N/A	NO

DETECTOR/AMPLIFIERS	QUANTITY/TYPE
CANOGA 402/2T (1)	

3. Cabinet Data

OUTSIDE DIMENSIONS CABINET SIZE	TYPE OF SUPPORT	CONDITION
☐ M Size	☒ Side of Pole	☐ Good
☐ P Size	☐ Pedestal	☐ Fair
☒ Other ____4_____	☐ Ground	☒ Poor

DOOR	VENT	FAN / THERMOSTAT	MANUAL CONTROL	TEST BUTTONS (If Yes, List Type)
☒ Single ☐ Double ☐ Police ☐ Other	YES - SCREEN NEEDS REPLACING	YES/NO	NONE	NONE

POLICE DOOR SWITCHES	DOCUMENTATION IN CABINET
N/A	MAINTENANCE SHEET

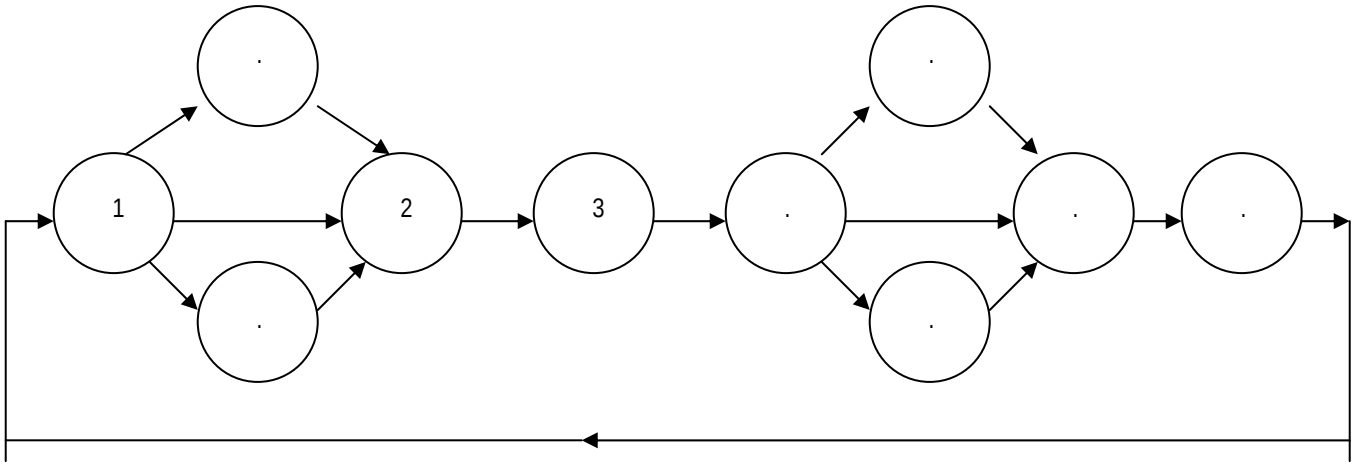
4. Signal Head Data

HEAD NO.	NO. OF LENSES SIZE OF LENSES	TYPE OF MOUNTING	VISOR TYPE					COLOR	CONDITION
	• 8"/12" • Incand/L.E.D. /Fiber • # of Sections • Arrows	• Span • Bracket • Mast Arm • Mast Arm Shaft • Post	• Tunnel (T) • Cut (C) • Full (F) • Crate (Cr) • Damaged (D) • Missing (M)					• Yellow • Green • Black • Gray	• Good • Fair • Poor
			R	Y	G	WALK	DONT WALK		
A	12", 3-SECT BALLS	POST	C	C	C			GREEN	FAIR
B	12", 3-SECT BALLS	POST	C	C	C			GREEN	FAIR
C	12", 3-SECT BALLS	POST	T	T	T			GREEN	FAIR
D	12", 3-SECT BALLS	POST	T	T	T			GREEN	FAIR
E	12", 3-SECT BALLS	POST	T	T	T			GREEN	FAIR
F	12", 3-SECT BALLS	POST	C	C	C			GREEN	FAIR
G	12", 3-SECT BALLS	POST	T	T	M			GREEN	FAIR
H	12", 3-SECT BALLS	POST	C	C	C			GREEN	FAIR
P1	1-SECT HAND/MAN (SOLID)	POST				Cr		GREEN	FAIR
P2-P3	1-SECT HAND/MAN (SOLID)	POST				C		GREEN	FAIR
P4	1-SECT HAND/MAN (SOLID)	POST				D		GREEN	FAIR
P5-P7	1-SECT HAND/MAN (SOLID)	POST				C		GREEN	FAIR
P8	1-SECT HAND/MAN (SOLID)	POST				Cr		GREEN	FAIR

5. Cabinet Accessories

DEVICE	MANUFACTURER	MODEL	SER. NO.	FUNCTION
	TORK	8007L		TIME SWITCH
	CROUSE HINDS	UFC-100		POWER

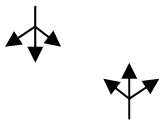
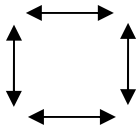
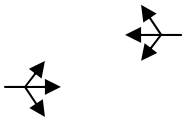
6. Traffic Signal Phasing Diagram



7. Signal Timing Sheet

∅1 CHERRY ST NB/SB	∅2 EXCLUSIVE PED	∅3 DERBY ST EB/WB
∅4	∅5	∅6
∅7	∅8	OLA
OLB	OLC	OLD

PHASE	∅1	∅2	∅3	∅4	∅5	∅6	∅7	∅8
Minimum Green (initial)	18		8 14					
Extension (passage) Vehicle Interval	4	-	4					
Yellow	3		3					
Red Clear	2		2					
Maximum Green I	30		14					
Maximum Green II	-		-					
Pedestrian Walk		8						
Pedestrian Clear		10						
Seconds Per Act								
Time to Reduce								
Before Reduction								
Minimum Gap								
Pedestrian Gap								
Walk (flash/steady)								
Recall	-	-	-					
Memory	-	-	-					
Delay								
Ped. Extend Thru Clear		NO						

∅1	∅2	∅3	∅4
			

∅5	∅6	∅7	∅8

8. *Time of Day Plans*

Daylight Savings / Equate Days				
DST Begin:	Month	_____	Week	_____
DST End:	Month	_____	Week	_____

Equate Days	
_____ =	_____
_____ =	_____

DAY	TIME HH:MM	Coord Pattern	MAX 2 Phases	OMITS Phases	Aux Events

9. Coordination Data for Eagle Controllers

SET-UP	CODE	0	1	2	3
Operation		FREE	AUTO	MANUAL	---
Mode (Normal)		PERM	YIELD	PM YLD	PM OMIT
Maximum		M INH	MAX 1	MAX 2	---
Correction		DWELL	MX DW	SH WAY	SW+
Offset		BEGIN	END	---	---
Force		PLAN	CYCLE	---	---

CYCLE LENGTH	1	2	3	4
Split 1				
Split 2				
Split 3				
Split 4				

CYCLE/ OFFSET	1	2	3	4	5	6
1						
2						
3						
4						

Cycle/Split Modes: 0=Actuated; 1=Coord Phase; 2=Min Rec; 3=Max Rec; 4=Ped Rec; 5=Max+Ped Rec
6=Phase Omitted; 7=Dual Coord Phase

Cycle _/Split_	1	2	3	4	5	6	7	8	9
Time									
Mode									

Cycle __/Split_	1	2	3	4	5	6	7	8	9
Time									
Mode									

Cycle __/Split_	1	2	3	4	5	6	7	8	9
Time									
Mode									

Cycle _ /Split_	1	2	3	4	5	6	7	8	9
Time									
Mode									

Cycle __/Split__	1	2	3	4	5	6	7	8	9
Time									
Mode									

Cycle __/Split__	1	2	3	4	5	6	7	8	9
Time									
Mode									

10. MUTCD Compliance Check-List

Two (2) Signal Faces Per Approach	☒ Yes	☐ No	☐ N/A
Proper Use of Turn Indications	☐ Yes	☐ No	☒ N/A
Proper Size of Vehicle Signal Displays	☒ Yes	☐ No	☐ N/A
Proper Size of Pedestrian Signal	☒ Yes	☐ No	☐ N/A
Displays	☒ Yes	☐ No	☐ N/A
Proper Vertical Clearance (vehicle) (VISUAL INSPECTION ONLY)			
-- Span Wire/Mast Arm: 15' Min./19' Max.	☐ Yes	☐ No	☒ N/A
-- Post or Pedestal: 8' Min./15' Max.	☒ Yes	☐ No	☐ N/A
-- Non-Pedestrian Island 4½' Min.	☐ Yes	☐ No	☒ N/A
Proper Vertical Clearance (pedestrian) (VISUAL INSPECTION ONLY)			
-- 7' Min./10' Max. On Sidewalks	☒ Yes	☐ No	☐ N/A
Proper Horizontal Placement (VISUAL INSPECTION ONLY)			
-- 8' Min. Separation (signals)	☒ Yes	☐ No	☐ N/A
-- Posts/Poles 2' Min. Off Curb	☒ Yes	☐ No	☐ N/A
Proper Use of Pedestrian Signals	☒ Yes	☐ No	☐ N/A
Proper Timing/Clearance			
-- Vehicle Phase(s)	☒ Yes	☐ No	☐ N/A
-- Pedestrian Phase(s)	☐ Yes	☒ No	☐ N/A
Adequate Visibility (VISUAL INSPECTION ONLY)	☒ Yes	☐ No	☐ N/A
Longitudinal Head Placement			
-- At Least One Signal > 40' From Stopline	☒ Yes	☐ No	☐ N/A
-- Both Signals < 150' From Stopline	☒ Yes	☐ No	☐ N/A
MUTCD Compliance	☐ Yes	☒ No	☐ N/A

REMARKS:
Pedestrian phase is not adequate to cross the intersection. Based on current MUTCD this should be 14 seconds.

11. Notes

Pavement Condition: The center of the intersection and River St SB were recently repaved.
-Cherry St NB has trenches through the street and the shoulders are in rough condition.
-Derby St EB has a few cracks but is in decent condition overall.
-Derby St WB has a trench in the middle of the street and cracking.

Striping Condition: All crosswalks and stop lines were recently re-striped.
-Cherry St NB DYCL is in decent condition.
-Waverly Ave NB and SB DYCL in decent condition.
-Derby St EB does not have a DYCL.
-Derby St WB does not have a DYCL.

Loop Issues: Loops are not working. Terminal wires are in the cabinet, but not connected.

Other:
-All wheelchair ramps are missing the detectable warning panels.
-Signal head "G" is missing a visor.
-Signal head P4 has a damaged visor and is twisted away from its crosswalk.
-Intersection is post mounted. No overhead signal displays.

CHERRY STREET PROPOSED CROSSWALK
SIGHT DISTANCE TRIANGLES

H:\223057\dwg\223057 SSD Cherry Crosswalk.dwg February 08, 2024 – 2:39pm rblandin

Countermeasure Selection Tool

Name of location: Crosswalk at Derby Street
Your Performance Objective: Improve Safety at Uncontrolled Crossings
Site Description Answers:
Roadway Configuration: 2 lanes (1 lane in each direction)
Average Annual Daily Traffic (AADT): < 9,000
Posted Speed Limit: 35 mph

Based upon your input, the following countermeasures were found:

Should Always Be Considered
Marked Crosswalks
Lighting and Illumination
Parking Restrictions (at Crossing Locations)

Should Be Considered
Curb Extensions
Crossing Islands
Rectangular Rapid-Flashing Beacon (RRFB)
Pedestrian Hybrid Beacon (PHB)

PEDSAFE

Pedestrian Safety Guide and Countermeasure Selection System

Countermeasure Selection Tool

Name of location: Crosswalk at Cherry Street
Your Performance Objective: Improve Safety at Uncontrolled Crossings
Site Description Answers:
Roadway Configuration: 2 lanes (1 lane in each direction)
Average Annual Daily Traffic (AADT): < 9,000
Posted Speed Limit: 35 mph

Based upon your input, the following countermeasures were found:

Should Always Be Considered
Marked Crosswalks
Lighting and Illumination
Parking Restrictions (at Crossing Locations)

Should Be Considered
Curb Extensions
Crossing Islands
Rectangular Rapid-Flashing Beacon (RRFB)
Pedestrian Hybrid Beacon (PHB)

PEDSAFE

Pedestrian Safety Guide and Countermeasure Selection System

Marked Crosswalks

Marked crosswalks indicate optimal or preferred locations for pedestrians to cross and help designate right-of-way for motorists to yield to pedestrians. Pedestrians are sensitive to out-of-the-way travel, and reasonable accommodation should be made to make crossings both convenient and safe at locations with adequate visibility. Various crosswalk marking patterns are given in the Manual on Uniform Traffic Control Devices (MUTCD),[8] including transverse lines, ladder, and continental markings. However, high-visibility crosswalks are preferred over parallel line crosswalks.

Marked crosswalks are desirable at some high pedestrian volume locations to guide pedestrians along a preferred walking path. Crosswalks are often installed at signalized intersections and other selected locations with appropriate levels of pedestrian and vehicle traffic. Crosswalks should be installed in conjunction with other enhancements that physically reinforce crosswalks and reduce vehicle speeds. Recommended guidelines and priorities for crosswalk installation at uncontrolled locations are given in in the Resources section. These guidelines are based on a major study of 1,000 marked crosswalks and 1,000 unmarked crossings in 30 U.S. cities.[9]

A marked crosswalk alone is typically not enough for multilane roadway crossings where annual average daily traffic is in excess of 10,000 vehicles. More substantial crossing improvements are also needed to prevent an increase in pedestrian crash potential. More substantial treatments include the refuge island, PHB, and RRFB.

Purpose

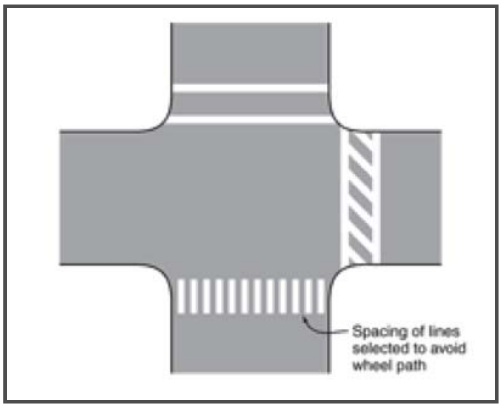
Any location that is an intersection of two roadways has a natural crossing location. Marked crosswalks warn motorists to expect pedestrian crossings and indicate preferred crossing locations for pedestrians. However, motorists may fail to yield to pedestrians if the crossing is unmarked. All crossings should be accompanied with visibility enhancements to improve safety and reduce crashes.

Considerations

- Crosswalk locations should be convenient for pedestrian access.
- Marked crosswalks are important for pedestrians with vision loss.
- Crosswalk markings must be placed to include the ramp so that a wheelchair does not have to leave the crosswalk to access the ramp.
- One option for enhancing a marked crossing is to install a raised crosswalk.

View Other At Crossing Locations Treatments

A marked crosswalk with a warning sign and pedestrian refuge island. *pedbikeimages.org - Carl Sundstrom*



Examples of crosswalk markings.
2009 Manual on Uniform Traffic Control Devices.

The enhancements shown in this rendering of a midblock crosswalk include high-visibility markings, curb extensions, in-street pedestrian crossing signs, lighting, and warning signs.
Federal Highway Administration.

Estimated Cost

Infrastructure	Description	Median	Average	Min. Low	Max. High	Cost Unit	# of Sources (Observations)
Crosswalk	High Visibility Crosswalk	$3,070	$2,540	$600	$5,710	Each	4(4)
Crosswalk	Striped Crosswalk	$340	$770	$110	$2,090	Each	8(8)
Crosswalk	Striped Crosswalk	$5.87	$8.51	$1.03	$26	Linear Foot	12(48)
Crosswalk	Striped Crosswalk	$6.32	$7.38	$1.06	$31	Square Foot	5(15)

The cost of high visibility crosswalk marking can range from $600-$5700 each with an average of $2540. Information about different types of marking patters can be found in the IT TENC Technical Committee 109-01 publication Pavement Marking Patterns Used at Uncontrolled Pedestrian Crossings.[10]

Safety Effects

A summary of studies that have looked at the safety effects of marked crosswalks and crosswalk enhancements can be found here.

Case Studies

Shoreline, Washington
Eureka, CA
Washington, District of Columbia
Las Vegas, Nevada
Ithaca, New York
Fort Pierce, FL
Cambridge, MA
Seattle, Washington
Portland, OR
Tucson, AZ
Arlington County, VA
Salt Lake City, UT
Tucson, AZ
Queens, New York
Brooklyn, New York
Eureka, California
Cambridge, MA
Tampa, Florida
Washington, District of Columbia
Albemarle, Virginia
Detroit, Michigan
St. Petersburg, Florida
San Francisco, California
Phoenix, Arizona

PEDSAFE

Pedestrian Safety Guide and Countermeasure Selection System

Lighting and Illumination

View Other At Crossing Locations Treatments

Appropriate quality and placement of lighting can enhance an environment and increase comfort and safety. Pedestrians may assume that their ability to see oncoming headlights means motorists can see them at night; however, without sufficient lighting, motorists may not be able to see pedestrians in time to stop.

A single luminaire placed directly over the crosswalk does not adequately illuminate the pedestrian for the approaching motorist. It is best to place streetlights along both sides of arterial streets and provide a consistent level of lighting along a roadway. This includes lighting pedestrian crosswalks and approaches to the crosswalks. A study conducted by the Virginia Tech Transportation Institute found that 20 lx (a unit of illuminance) was necessary for motorists to detect a pedestrian in the crosswalk. To achieve 20 lx, the luminaire should be placed 10 feet from the crosswalk, in between the approaching vehicles and the crosswalk. At intersections, the luminaires should also be placed before the crosswalk on the approach into the intersection. This differs from traditional placement of luminaires over the actual intersection.[13]

Roadway lighting. *Source: pedbikeimages.org - Annie Lux*

Appropriate quality and placement of lighting can enhance an environment as well as increase comfort and safety.
Source: Living Streets Page 7-18

In commercial areas or in downtown areas, specialty pedestrian-level lighting may be placed over the sidewalks to improve pedestrian comfort, security, and safety. Well-lit pedestrian areas make people walking through the area feel safer. Streetlights and building lights can enhance the ambiance of the area and the visibility of pedestrians in commercial areas with nighttime pedestrian activity. Nighttime pedestrian crossing areas may be supplemented with brighter or additional lighting.

Purpose

Roadway lighting has often focused on the needs of the motorist and not necessarily the safety of the pedestrian. However, it is important to consider lighting that illuminates pedestrian crosswalks and reduces glare to motorists. Pedestrian fatalities occur disproportionately during dark conditions. Adequate roadway lighting enhances the safety of all roadway users, while pedestrian-scale lighting improves nighttime security and enhances commercial districts.

Considerations

• Install lighting on both sides of wide streets and streets in commercial districts.
• Use uniform lighting levels.
• Place lights in advance of midblock and intersection crosswalks on

both approaches to illuminate the front of the pedestrian and avoid creating a silhouette.

Pedestrian-scale lighting in Marion, Iowa.
pedbikeimages.org - Brandon Whyte

Estimated Cost

Infrastructure	Description	Median	Average	Min. Low	Max. High	Cost Unit	# of Sources (Observations)
Lighting	In-pavement Lighting	$18,250	$17,620	$6,480	$40,000	Total	4(4)
Lighting	Streetlight	$3,602	$4,882	$310	$13,895	Each	12(17)

Lighting varies based on the fixture type, manufacturer differences, roadway widths, project-specific factors, and utility service agreement. Usually, in-pavement lights are installed as a system, which is the reason the total cost is included here, as opposed to an individual light cost. Also, though not included above, average approximate underpass lighting costs can range from $350 to $3,400 each, and crosswalk lighting can range from approximately $10,750 to $42,000 per crosswalk.

Safety Effects

A summary of studies that have looked at the safety effects of lighting and illumination can be found here.

Case Studies

Clemson, SC
Grand Junction, CO
Eureka, CA
Ithaca, New York
Fort Plain, NY
Tempe, AZ
University Place, WA
Phoenix, Arizona
Shoreline, Washington
Bellevue, WA
Montgomery County, Maryland
Santa Monica, CA

Asheville, NC
Eureka, California
Englewood, Ohio
San Francisco, California
Cambridge, Massachusetts

PEDSAFE

Pedestrian Safety Guide and Countermeasure Selection System

Parking Restrictions (at Crossing Locations)

View Other At Crossing Locations Treatments

Parking restrictions help improve pedestrian and motorist sightlines through an intersection and can include the removal of parking space markings and/or installation of new “parking prohibition” pavement markings, curb paint, or signage. Removing a parking space on the approach into an intersection may help pedestrians to safely cross the street by providing them with a clearer view of oncoming vehicles. Removing a parking space also frees up roadway space for other uses.

Generally, vehicles should not be parked within at least 20 feet of an intersection and parking restrictions should consider adequate sightlines for motorists and pedestrians to be able to see and react to each other. The minimum setback is 20 feet in advance of the crosswalk where speeds are 25 mph or less, and 30 feet where speeds are between 26 and 35 mph.

However, it may also be important to provide physical roadway measures to prevent motorists from parking on the sidewalk or in areas intended for pedestrians to walk. Curb extensions improve sightlines and shorten the distance pedestrians need to cross a roadway.

Parking restrictions at intersections may provide help pedestrians to safely cross the street by providing them with a clearer view of oncoming vehicles. *Source: Peter Lagerwey.*

This rendering shows how the design of on-street parking can improve visibility at a midblock crosswalk.
Federal Highway Administration.

Purpose

Sightlines of pedestrians and motorists are limited when vehicles are parked too close to pedestrian crossings, which increases risk for pedestrians who intend to cross the road.

Considerations

• Communicate with community stakeholders about parking space removal.
• Consistently enforce parking restrictions with signage, paint, and pavement markings.
• If curb extensions are out of the budget, vertical delineators can work to prevent motorists from parking vehicles too close to a crosswalk.

Estimated Cost

The cost of this countermeasure varies based on the required signs and pavement markings. Removing the striping of a parking space and/or adding paint is relatively inexpensive. However, the cost can increase substantially ($2,000 to $20,000) if curb extensions are added. Additionally, delineators cost approximately $50 to $100, and parking restriction signs cost approximately $200.

Case Studies

Hoboken, New Jersey
New York City, New York

PEDSAFE

Pedestrian Safety Guide and Countermeasure Selection System

Rectangular Rapid-Flashing Beacon (RRFB)

View Other Signals and Signs Treatments

RRFBs are pedestrian-actuated conspicuity enhancements used in combination with a pedestrian, school, or trail crossing warning sign to improve safety at uncontrolled, marked crosswalks. The device includes two rectangular-shaped yellow indications, each with an LED-array-based light source, that flash with high frequency when activated. The RRFB design differs from the standard flashing beacon by utilizing:

- A different shape
- A much faster rapid-pulsing flash rate.
- A brighter light intensity.

A Rectangular Rapid-Flashing Beacon (RRFB) in Princeton, New Jersey. *Federal Highway Administration.*

The RRFB is a treatment option at many types of established pedestrian crossings. RRFBs are particularly effective at multilane crossings with speed limits less than 40 mph. Consider the Pedestrian Hybrid Beacon (PHB) instead for roadways with higher speeds.

RRFBs are placed on both sides of a crosswalk below the pedestrian crossing sign and above the arrow indication pointing at the crossing. The flashing pattern can be activated with pushbuttons or automated (e.g., video or infrared) pedestrian detection, and should be unlit when not activated.

A Rectangular Rapid-Flashing Beacon (RRFB). *Source: Carol Kachadoorian (2012)*

The Federal Highway Administration has issued interim approval for the use of the RRFB (IA-21). State and local agencies must request and receive permission to use this interim approval before they can use the RRFB.

Purpose

The RRFB is a device used in combination with pedestrian warning signs to provide a high-visibility strobe-like warning to drivers when pedestrians use a crosswalk.

Considerations

• RRFBs should not be used without the presence of a pedestrian crossing sign.
• A RRFB should be installed in the median rather than the far-side of the roadway if there is a pedestrian refuge or other type of median.
• Advance yield or stop pavement markings and signs may be used to supplement RRFBs.
• The crosswalk approach should not be controlled by a YIELD sign, STOP sign, traffic-control signal, or located at a roundabout.
• Solar-power panels can be used to eliminate the need for a power source.
• RRFB should be reserved for locations with significant pedestrian safety issues, as over-use of RRFB treatments

may diminish their effectiveness.
• Other treatments may be more appropriate in locations with sight distance constraints.
• A high-intensity unit (SAE-1) should be used instead of a less intense unit.

Estimated Cost

Infrastructure	Description	Median	Average	Min. Low	Max. High	Cost Unit	# of Sources (Observations)
Flashing Beacon	RRFB	$14,160	$22,250	$4,520	$52,310	Each	3(4)

The cost to furnish and install a flashing beacon can vary widely depending on site conditions and the type of device that is used (from $4,500 to $52,000 each). The RRFB can be constructed using solar power to simplify installation. The installation may include an indication visible to pedestrians confirming that the device is activated and/or an audible message instructing pedestrians to wait until cars have stopped before crossing. The pushbutton and other components of the crosswalk must meet all other MUTCD accessibility requirements.

Safety Effects

The installation of RRFBs can reduce pedestrian crashes by 47%, see NCHRP Research Report 841: Development of Crash Modification Factors for uncontrolled Pedestrian Crossing Treatments.

Case Studies

San Francisco, California
St. Petersburg, Florida
Elmwood Park, New Jersey
Miami-Dade County, Florida